;OUTHERN REGIONAL COMMITTEE

ALL INDIA COUNCIL FOR TECHNICAL EDUCATION

DATE : Saturday, the 25th October, 1975.

TIME : 10.30 a.m.

PLACE : Conference Hall No. 2,
Shastri Bhavan,
35, Haddows Road, Madras-6.

ORTY SECOND MEETING

AGENDA

OVERNMENT OF INDIA
'INISTRY OF EDUCATION AND SOCIAL WELFARE
OUTHERN REGIONAL OFFICE
SHASTRI BHAVAN ", MADRAS-6
85650/84998

ALL INDIA COUNCIL FOR TECHNICAL EDUCATION

FORTY-SECOND MEETING OF THE

SOUTHERN REGIONAL COMMITTEE

on 25th October, 1975 at 10.30 A.M.,

at Conference Hall No: 2, "Shastri Bhavan",
35, Haddows Road, MADRAS-600006.

1. AGENDA

Item No.	ITEM	Page No.	Concerned Appendix
1.	To confirm the Minutes of the meeting of the Southern Regional Committee held on 1st April 1975.	1	1
2.	To receive a report on the action taken on the recommendations of the last meeting of the Regional Committee.	2 - 9	-
3.	To receive a report of the Expert Committee set up to examine the proposal of the State Government of Karnataka for the starting of a Diploma course in Automobile Technology at Government Polytechnic, Bellary.	10 - 12	3
4.	To receive a report of the Expert Committee set up to examine the proposal of the State Government of Kerala for introduction of a Post-Diploma course in Refrigeration and Air-conditioning at the Government Polytechnic, Kalamassery.	13 - 15	4
5.	To receive a report of the Expert Committee set up by the Southern Regional Committee to consider the proposal of the State Government of Karnataka		

Item No.

29). To receive a report of the Expert Committee set up to examine the proposal of the State Government of Tamilnadu for introduction of Industrial Engineering course at the Undergraduate level at College of Engineering, Guindy, Madras.

30). To receive a report of the Expert Committee set up to examine the proposal of the State Government of Tamilnadu for introduction of Under-graduate course in Industrial Electronics at College of Engineering, Guindy, Madras.

31). To receive a report of the Expert Committee appointed to examine the proposal of the State Government of Tamilnadu for introduction of Power Electronics course at Under-graduate level at College of Engineering, Guindy, Madras.

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32. To receive a report of the Expert Committee set up to examine the proposal of the State Government of Tamilnadu for introduction of Fisheries Technology and Navigation as electives in Mechanical Engineering at College of Engineering, Guindy, Madras.

33). To receive a report of the Expert Committee appointed to examine the proposal of the State Government of Tamilnadu for introduction of Computer Science as an elective at the Under-graduate level at the College of Engineering, Guindy, Madras.

34). To receive a report of the Expert Committee set up to examine the proposal of the State Government of Tamilnadu for introduction of Naval Architecture and Marine Engineering as electives under Mechanical Engineering at College of Engineering, Guindy, Madras.

35). Any other Item with the permission ofthe Chair.

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ITEM NO.1: TO CONFIRM THE MINUTES OF THE MEETING OF THE SOUTHERN REGIONAL COMMITTEE HELD ON 1ST APRIL, 1975.

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The minutes of the meeting of the Southern Regional Committee held at Madras on 1st April, 1975 were circulated to the members. As no comments have been received from any member of the Committee, the minutes may be deemed to have been confirmed by circulation. The minutes may be seen at Appendix-1.

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ITEM NO.2: TO RECEIVE A REPORT ON THE ACTION TAKEN ON THE RECOMMENDATIONS OF THE LAST MEETING OF THE REGIONAL COMMITTEE.

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Recommendations/Decisions	Action taken
41.2: POST DIPLOMA COURSE IN TELEVISION ENGINEERING Having regard to the topics expected to be covered in a Post-Diploma course, the employbility of the candiates completing such a course, the Regional Committee resolved that the minimum duration of Post-Diploma course in Television Engineering (Servicing and Maintenance) should be one academic year of nine months. The Regional Committee decided that these recommendations should be forwarded to the different states for their consideration and appropriate action.	The recommendations of the Regional Committee have been brought to the notice of the different States/ Union Territory in the Southern Region in order to enable them to take necessary action in the matter.
STAFF STRUCTURE OF ENGINEERING COLLEGES & POLYTECHNICS 41.3: While endorsing the recommendations of the Standing Committee regarding staff structure in Engineering Colleges and Polytechnics, the Committee observed that the designation of the post of Professor of Placement and Training in the Polytechnics should be appropriately worded since the staff structure in the Polytechnics did not provide any cadre of Professors. The Committee therefore decided that the Post should be designated as Officer-in-charge of Placement and Training and the status of this post should be that of the Head of the Department.	The recommendations of the Regional Committee have been forwarded to the All India Council for Technical Education for further necessary action in the matter.

41.4: IMPLEMENTATION OF U.G.C. SCALES OF PAY.

The Regional Committee resolved that the All India Council for Technical Education should be requested to expedite its decision on the implementation of the revised U.G.C. scales for the Engineering Colleges and Polytechnics.

The recommendations of the Regional Committee have been communicated to All India Council for Technical Education which has been requested to expedite its decision in the matter.

41.5: INTRODUCTION OF MODEL DIPLOMA COURSE.

The Regional Committee recommended that scheme for introduction of Model Diploma course in specialised technician fields with Soviet assistance for training of middle level technicians in emergent areas of Technological development should be provided under the centrally sponsored Sector.

The recommendations of the Regional Committee have been forwarded to the All India Council for Technical Education for its consideration

NOMINATIONS ON BEHALF OF AICTE TO TECH. INSTT. IN THE R

41.6: The Regional Committee resolved to recommend to the All India Council for Technical Education, to allow it to continue to make nominations on behalf of All India Council for Technical Education, on the Governing Bodies of different Technical Institutions in the Southern Region including Central Institutions like Technical Teachers' Training Institute, Madras.

The Regional Committee's recommendations have been forwarded to the All India Council for Technical Education for consideration..

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41.7. EVALUATION OF THE MADRAS INSTITUTE OF TECHNOLOGY, MADRAS.

The Regional Committee approved the Report submitted by the Evaluation Committee on the Madras Institute of Technology, Madras for forwarding the same to the All India Council for Technical Education and Ministry of Education for further necessary action.

Having regard to the importante of the evaluation work, the Regional Committee also expressed the desire that the Evaluation Committee should try to expedite the evaluation work in respect of different institutions in the various States, even by stretching a little more than what may be feasible and the concerned State Governments should provide all possible facilities to the Evaluation Committees to complete this important task. The Regional Committee also agreed in principle that the evaluation of the Polytechnics which had hitherto left out should be brought within the purview of the Evaluation Committee.

The Report of the Evaluation Committee on the evaluation of the Madras Institute of Technology, Madras along with the recommendations of the Regional Committee has already been forwarded to the Ministry of Education for further necessary action.

The necessary action regarding evaluation of other technical institutions in the different States has also been initiated. The Evaluation Committee is likely to evaluate the institution in the State of Kerala sometimes in the month of November,'75.

41.8: REVIEW OF FUNCTIONS OF REGIONAL COMMITTEE.

The Regional Committee felt that in order to meet the challenges posed by the latest situations in the field of technical education, its role had assumed greater importance It had therefore become necessary that a serious thought should be given to spell out the important functions to which the Regional Committee should pay greater attention. Accordingly the Regional Committee appointed a Committee to examine the entire position in detail the major areas of importance and to report its findings to the Regional Committee.

The Committee appointed for the purpose, met on 15th September, 1975 at Madras to consider its assignment. The recommendations of the Committee have been placed before the Regional Committee for consideration under Item No.16.

41.9: POST-DIPLOMA COURSE IN AUTOMOBILE ENGINEERING.

The Regional Committee approved the revival of the post-diploma course in Automobile Engineering by the Nachimuthu Polytechnic, Pollachi with effect from the year 1970-71.

The recommendations of the Regional Committee have been forwarded to the All India Council for Technical Education for its approval.

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41.10: DEPUTATION OF TEACHERS FOR SHORT-TERM COURSES AT THE TECHNICAL TEACHERS TRAINING INSTITUTE.

In order to improve the situation and remove the factors responsible for delay in deputing teachers, the Regional Committee recommended that for short-term courses the State Government should authorise the Principals of the respective technical institutions to sponsor the teachers directly so that unnecessary delay be avoided and the teachers concerned are able to make use of the courses thus organised. The representatives of the State Governments agreed to take necessary action accordingly.

The recommendations have been forwarded to the State Governments.

41.12: POST-DIPLOMA COURSE.

The Regional Committee considered the report of its Expert Committee and approved the proposal of the State Government of Kerala for the introduction of post-diploma course in Industrial Electronics at Central Polytechnic, Trivandrum with the estimates of cost as recommended by the Expert Committee.

The recommendations of the Southern Regional Committee have been forwarded to the All India Council for Technical Education for approval.

41.13: SANDWICH DEGREE COURSE IN TEXTILE TECHNOLOGY.

The Regional Committee considered the report of its Expert Committee and approved the proposal of the State Government of Tamilnadu for introduction of Sandwich degree course in Textile Technology at Thiagarajar College of Engineering, Madurai with the estimates of cost as recommended by the Expert Committee.

The Recommendations of the Southern Regional Committee have been sent to the All India Council for Technical Education for its approval.

41.14: POST-DIPLOMA COURSE IN REFRIGERATION AND AIR-CONDITIONING AT GOVERNMENT POLYTECHNIC, KARWAR.

The Regional Committee referred the report of the Expert Committee to the State Government of Karnataka for review and decided that the report may be considered only after the comments of the State Government have been received.

The report of the Expert Committee has been sent to the Director of Tech. Education, Karnataka, Bangalore with the request ~~xxx~~ to send the comments of the State Govt. of Karnataka on the report. Reply in the matter is awaited.

41.15: REVISED COURSE IN ARCHITECTURE.

The Regional Committee decided that an Expert Committee may be appointed to select suitable Architectural Institutions in the Southern Region in consultation with the State Governments concerned where the revised architectural course on sandwich basis could be organised. The Regional Committee authorised its Chairman to constitute this Committee

The matter is being examined and the Expert Committee for the purpose will be constituted in due course.

41.16: DIPLOMA COURSE IN CINEMATOGRAPHY.

The Regional Committee considered the report of its Expert Committee and approved the introduction of diploma course in Cinematography in Central Polytechnic, Trivandrum with the estimates of cost as recommended by the Expert Committee.

The recommendations of the Regional Committee have been forwarded to the All India Council for Technical Education for its approval.

41.17: SHORT-TERM TRAINING OF TEACHERS IN INDUSTRY.

The Regional Committee noted that the utilisation of facilities made available under the Scheme has not been very satisfactory in the year 1974-75. The Committee expressed hope that in the year 1975-76 the provision made under the scheme should be fully utilised in order to train the maximum number of teachers of engineering colleges and polytechnics in Industry. The representative of the State Governments agreed to take necessary steps to make the most of the facilities extended under the Scheme.

In order to facilitate the task of the State Directorates of Technical Education to depute the maximum number of teachers for Industrial training, the Regional Office has intimated the seats available for the respective States and requested them to go ahead with the placement of teachers without waiting for any further approval in this behalf which was no longer necessary

41.19: HIGH VOLTAGE LABORATORY.

The Regional Committee recommended that the additional area of nearly 441 sq.ft. and additional height of 14' constructed by the National Institute of Engineering, Mysore for its High Voltage Laboratory over and above the ceiling may be approved and the revised cost of construction as assessed by the Expert Technical Committee should be accepted for the purpose of release of additional

The recommendations of the Southern Regional Committee have been sent to the Government of India for further necessary action in the matter.

41.20: CONFERENCE OF PRINCIPALS OF TECHNICAL INSTITUTIONS.

The Regional Committee accepted the recommendations of the Programme & Screening Committee and approved with slight modifications the overall programme of the proposed Conference. The Regional Committee expressed its satisfaction that the systematic approach adopted shall render great help in best utilisation of the available time and making the Conference a good success.

The Conference has been finally fixed on the 21st, 22nd and 23rd November,75 at Coimbatore. The full report about further developments in this behalf is placed before the Regional Committee under Item No.20.

41.22: PART-TIME DEGREE COURSES.

The Regional Committee considered the report of its Expert Committee and approved the introduction of part-time degree courses in Civil, Mechanical and Electrical Engineering with an intake of 30 students for each course at the Engineering Colleges, Trivandrum with the estimates of cost as approved by the Expert Committee.

The recommendations of Southern Regional Committee have been forwarded to All India Council for Technical Education for approval.

41.23: SCHEME OF TRAINING OF POLYTECHNIC TEACHERS AT TECHNICAL TEACHERS TRAINING INSTITUTE, MADRAS.

The Regional Committee decided that the Technical Teachers' Training Institute, Madras should bring out a brochure giving all the courses organised and the facilities it can offer for training and retraining so that the State Governments and the State Directorate of Technical Education may be able to take all possible steps to accelerate the progress in the implementation of the scheme for the training of polytechnic teachers.

The Principal, Technical Teachers' Training Institute, Adyar has been requested to intimate the action taken in this behalf. The reply received from the Principal will be placed on the table.

ITEM NO.3: TO RECEIVE A REPORT OF THE EXPERT COMMITTEE SET UP TO EXAMINE THE PROPOSAL OF THE STATE GOVERNMENT OF KARNATAKA FOR THE STARTING OF A DIPLOMA COURSE IN AUTOMOBILE TECHNOLOGY AT GOVERNMENT POLYTECHNIC, BELLARY.

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The State Government of Karnataka had forwarded a proposal for starting of a full time three year diploma course in Automobile Technology at Government Polytechnic, Bellary. The Southern Regional Committee, at its meeting held on the 24th April,1970 considered the proposal and recommended the introduction of the Diploma Course. The All India Council for Technical Education endorsed the recommendations of the Regional Committee and approved the above course subject to the condition that the demand for technicians in the speciality should be reassessed and when only the employment potential justified, the course should be started, and before starting the course, the State Government should inform the Regional Committee of the studies carried out about the employment opportunities, arrangements made for sandwich training and other related aspects.

The State Government started the course at Government Polytechnic, Bellary in 1970-71 but did not inform the Regional Committee about the demand of technicians in the field. In order to assess the need and estimate the requirements for the introduction of the course at the Polytechnic, an Expert Committee, consisting of the following members was constituted with the approval of the Chairman, Southern Regional Committee:-

1. Shri H.S. Parameshwaran,
   Principal,
   Ramakrishna Mission Tech. Instt.,
   Madras-600004.
2. Shri S.K. Handa, Member-Secretary and
   Asst. Educational Adviser (T),
   Ministry of Education & S.W.,
   Southern Regional Office,
   Madras-600006.

The Expert Committee visited the Government Polytechnic, Bellary on the 12th September, 1975. The Committee held a meeting with the Principal and Staff of the institution to discuss the various aspects of the proposal. The State Government was represented by Shri C.A. Manje Gowda, Assistant Director (Planning), Directorate of Technical Education, Karnataka.

As a result of discussions and detailed examination of the proposal, the Committee recommended the introduction of the three year diploma course in Automobile Technology at the Government Polytechnic, Bellary with an intake of 30 students, within the sanctioned intake of 120 students.

Keeping in view the facilities already available at the Polytechnic and taking into account the requirements for the course as per the standards laid down by the All India Council for Technical Education, the Committee recommended the following additional facilities:-

NON-RECURRING:

Buildings	...	Rs. 3,52,200/-
Equipment*	...	Rs. 4,00,000/-
Library	...	Rs. 20,000/-
Library Furniture	...	Rs. 5,000/-
Total	...	Rs. 7,77,200/-

RECURRING:

Staff Salaries (As per State Government Scale of Pay)		Rs. 45,000/-
Oil, Petrol and consumables		Rs. 10,000/-
Total	...	Rs. 55,000/-

* The list of equipment is given in Annexure-I of the Report. The Committee, however, recommended that the Polytechnic may be given the freedom to substitute any item of equipment, according to the actual requirement of the syllabus, which may prove to be more useful at the time of purchase. The ceiling for the equipment, however, should not be exceeded.

The Report of the Expert Committee is placed at Appendix - 3. The details of the facilities recommended by the Committee are given in the Report.

The matter is placed before the Southern Regional Committee for its consideration.

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ITEM NO.4: TO RECEIVE A REPORT OF THE EXPERT COMMITTEE SET UP TO EXAMINE THE PROPOSAL OF THE STATE GOVERNMENT OF KERALA FOR INTRODUCTION OF A POST-DIPLOMA COURSE IN REFRIGERATION AND AIR-CONDITIONING AT THE GOVERNMENT POLYTECHNIC, KALAMASSERY.

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The State Government of Kerala had submitted a proposal for the introduction of a post-diploma course in Refrigeration and Air-Conditioning at two selected Polytechnics in Kerala. The Southern Regional Committee, at its 40th meeting held on the 2nd May, 1974, approved in principle, the introduction of a post-diploma course in Refrigeration and Air-Conditioning in one of the Polytechnics in Kerala.

Subsequently the Director of Technical Education, Kerala intimated that they intend to start the post-diploma course at Government Polytechnic, Kalamassery. In order to determine the Polytechnic most suitable to start the course and also to assess the estimates of cost, an Expert Committee consisting of the following members was set up in consultation with the Chairman of the Southern Regional Committee:-

1. Shri S. Srinivasan,
   Principal & Special Officer,
   C.M. Kothari Technological Instt.,
   Avadi, Madras.600054.

2. Shri S.K. Handa, Member-Secretary and
   Asst. Educational Adviser (Tech.),
   Ministry of Education & S.W.,
   Southern Regional Office,
   Madras-600006.

The two members of the Committee visited the Government Polytechnic, Kalamassery. Shri S.K. Handa on 24th December, 1974 and Shri S. Srinivasan on 31st July, 1975. The Committee had discussions

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with the Director of Technical Education, Kerala and Principal and other members of staff of the Polytechnic. The Committee visited the institute its various laboratories and workshops with a view to ascertain the facilities available with the Polytechnic and to assess the additional facilities that would be required to run the course effectively. The Committee also visited a few factories and had detailed discussions with them regarding the possibilities of practical training of students and employment potential in the Industry for the students of the post-diploma course.

As a result of discussions and detailed examination of the proposal, the Committee recommended the introduction of a post-diploma course in Refrigeration and Air-Conditioning at Government Polytechnic, Kalamassery. The Committee further recommended that the duration of course should be one year and three months, with diploma in Mechanical/Electrical Engineering as the minimum admission qualification.

Out of the period of one year and three months prescribed for the course, nine months should be spent in the Polytechnic comprising of two semesters of 450 working hours each and six months in practical training in an established Air-Conditioning and Refrigeration Industry. The practical training in Industry should be well organised and related most effectively with the theoretical instruction in the Polytechnic. The Committee also recommended that the majority of the candidates, as far as possible, should be sponsored by the Industry, so that they could be immediately employed and absorbed after their successful completion of the course.

The Committee recommended that the admission to the post-diploma course should be 10 students to start with and further increase in the intake may be effected only when it is fully justified by greater demand from Industry.

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Having regard to the facilities already available at the Polytechnic and the additional requirements for the proper conduct of the course, the Committee recommended the following facilities for the post-diploma course,

NON-RECURRING:

Buildings	...	Nil
Equipment @	...	Rs. 1,55,000/-
Total	...	Rs. 1,55,000/-

RECURRING: (PER ANNUM)

Staff Salaries (as per State Scales of Pay)	Rs. 45,000/-
Books & Periodicals	Rs. 5,000/-
Maintenance & Contingencies	Rs. 6,000/-
Honorarium to Staff from Industry for Lectures.	Rs. 4,000/-
Scholarships for Sandwich Practical Training.	Rs. 9,000/-
Total...	Rs.69,000/-

@ The list of equipment is given in Annexure-I of the Report. The Committee however recommended that the Polytechnic may be given the freedom to subtitute any item of equipment, according to the actual requirements of the syllabus which may prove to be more useful at the time of purchase. The ceiling for the equipment however, should not be exceeded.

The Report of the Expert Committee is placed at Appendix-4. The details of the facilities recommended by the Committee are given in the Report.

The matter is placed before the Southern Regional Committee for its consideration.

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ITEM NO.5: TO RECEIVE A REPORT OF THE EXPERT COMMITTEE SET UP BY THE SOUTHERN REGIONAL COMMITTEE TO CONSIDER THE PROPOSAL OF THE STATE GOVERNMENT OF KARNATAKA FOR THE INTRODUCTION OF A DIPLOMA COURSE IN AUTOMOBILE TECHNOLOGY AT SMT. L.V. POLYTECHNIC, HASSAN.

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The State Government of Karnataka submitted a proposal for the introduction of a diploma course in Automobile Technology with an intake of 30 students at Smt. L.V. Polytechnic, Hassan. The Southern Regional Committee at its 35th meeting held on the 12th October,70 recommended the proposal. The All India Council for Technical Education considered the recommendation of the Regional Committee and approved the introduction of diploma course in Automobile Technology at Smt. L.V. Polytechnic, Hassan, subject to the condition that the demand for technicians in the speciality should be reassessed and only when the employment potential justified, the course should be started, and that before starting the course the State Government should inform the Regional Committee of the studies carried out about the employment potential, arrangement for sandwich training and other related aspects.

The State Government did not inform the Regional Committee about the studies carried out in the matter. However, in order to examine the need and assess the additional requirements for the introduction of the course in Automobile Technology at Smt. L.V. Polytechnic, Hassan, an Expert Committee of the following members was set up by the Southern Regional Committee:-

1. Prof. B.R. Narayana Iyengar,
   175, First Main Road,
   Seshadripuram, Bangalore.
2. Shri S.K. Handa, Member-Secretary &
   Asst. Educational Adviser (T),
   Ministry of Education & S.W.,
   Southern Regional Office,
   Madras-6.

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The Expert Committee visited the institute on 14th August, 1975. The Committee examined all the aspects of the proposal and had detailed discussions with the Principal and the members of the Staff for the purpose.

During the course of discussions, the Committee was informed by the representative of the State Government that there was a considerable increase in vehicular traffic as well as in tourist traffic in the area. The State Government representative however, did not produce any statistics in support of the vehicular traffic and tourist traffic at Hassan as also for the need of additional trained personnel in the field of Automobile Technology.

The Committee further noted that at present there was not much industrial activity in and around Hassan which could provide for a meaningful practical training programme for the students of the diploma course in Automobile Technology. The Committee also observed that the diploma course in Automobile Technology was already being offered at three institutions in the State with an annual intake of 140 students. In this connection, the representative of the State Government pointed out that there was a great rush to the diploma course at the existing three centres and the number of applications received for admission to the course were roughly three to four times the sanctioned intake. The representative of the State Government also pointed out to the satisfactory position regarding employment of the diploma holders in the subject. It was mentioned that there were only 140 diploma holders in Automobile Technology registered in the Employment Exchanges and it was not known whether these candidates were really unemployed or a number of them were seeking better avenues of employment. The State Government accordingly felt the need for an additional centre at Hassan, to start the course.

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However, since no concrete data was made available the State Government was requested to furnish the necessary statistics about the increase in vehicular and tourist traffic and also definite information to establish the need and justify the additional demand for a diploma course in Automobile Technology at Smt. L.V. Polytechnic, Hassan to enable the Southern Regional Committee to decide this point. The State Government has subsequently furnished the information which may be seen at Appendix-5.

The Committee also assessed the additional requirements of the institute for conducting the diploma course in Automobile Technology. Having regard to the facilities already available with the Institution by way of Buildings, equipment, and staff the Committee recommended the following facilities for the introduction of the diploma course in Automobile Technology with an annual intake of 30 students within the overall sanctioned intake of 120 at Smt. L.V. Polytechnic, Hassan.

NON-RECURRING:

Buildings		Nil
Equipment		Rs.4,00,000/-
Library		Rs. 20,000/-
Library Furniture		Rs. 5,000/-
	Total ...	Rs.4,25,000/-

RECURRING (PER ANNUM)

Staff Salaries as per State Scales of pay.	Rs. 45,000/-
Provision for spare parts, oil, petrol & other consumables	Rs. 10,000/-
Total ...	Rs. 55,000/-

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The details of the additional facilities recommended by the Expert Committee are given in the Report which is placed at Appendix-5. The list of the items of equipment recommended for the course are given in Annexure-I of the above Report. The Committee recommended that the institution may be given the freedom to substitute any item of equipment according to the actual requirements of the syllabus, which may prove to be more useful at the time of purchase subject to the condition that overall ceiling is not exceeded.

The matter is placed before the Regional Committee for its consideration.

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ITEM NO.6: TO RECEIVE A REPORT OF THE EXPERT COMMITTEE APPOINTED TO EXAMINE THE PROPOSAL OF THE STATE GOVERNMENT OF KERALA FOR STARTING OF A DIPLOMA COURSE IN FISHERIES TECHNOLOGY AT KERALA GOVERNMENT POLYTECHNIC, CALICUT.

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A proposal was received from the State Government of Kerala for starting Diploma course in Fisheries Technology at Kerala Government Polytechnic, Calicut. The proposal was considered by the Southern Regional Committee at its 36th meeting held on 23rd April, 1971. The Regional Committee approved the starting of diploma course in Fisheries Technology at the Kerala Government Polytechnic, Calicut. The Central Government also approved, in principle, the introduction of a diploma course in Fisheries Technology at the Kerala Government Polytechnic, Calicut under the programme of diversification of diploma courses in the State.

In order to reassess the need for the course and also to assess the estimates of cost for the introduction of diploma course, an expert Committee consisting of the following was set up with the approval of Chairman, Southern Regional Committee:-

1. Shri A. Srinivasan,
   Deputy Director of Fisheries (Research),
   Department of Fisheries,
   Office of the Asst. Director of
   Fisheries (Hydrology),
   87, Poonamallee High Road,
   Madras-600010.

2. Shri S.K. Handa, Member-Secretary &
   Asst. Educational Adviser (T),
   Ministry of Education & Social Welfare,
   Southern Regional Office,
   Madras-600006.

The Committee visited the Kerala Government Polytechnic on Saturday, the 6th September, 1975. The

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Committee had a meeting with Shri V. Kurien Thomas Joint Director of Technical Education, Kerala, Trivandrum, the Principal of the Polytechnic and other staff members in the Polytechnic. The Committee also went round the main buildings, laboratories and workshops of the Institute to have an idea about the facilities already available with the Polytechnic and additional facilities that would be necessary to run the course effectively.

Having regard to the various considerations, the Committee felt that the diploma course in Fisheries Technology would meet the felt needs of Industry and may be started at Kerala Government Polytechnic, Calicut. The Committee also notes that the State Government was very keen to start the diploma course to meet its man-power requirements at this level. The Committee recommended that the intake to the course should be 15 to start with out of which 7 candidates should be sponsored by Industry. The increase in intake should be effected only when it is justified by greater demand. The intake of 15 should be within the overall sanctioned intake of 270.

The Committee further recommends that the course should be organised on a sandwich basis and should be of 3½ years duration which will include 12 months practical training in Industry. The Committee has also stipulated that the minimum qualification for admission to this diploma course in Fisheries Technology should be 2 years Pre-degree course so that the students could devote more time to specialisation in technical subjects and that they have adequate knowledge of basic sciences when they enter the Diploma Course.

Taking into account the facilities already available with the Kerala Government Polytechnic, Calicut, the Committee has recommended the following additional facilities for conducting the course in accordance with approved standards.

NON-RECURRING:

Buildings		Nil
Equipment *	...	Rs.60,000/-
Library	...	Rs.10,000/-
Total	---	Rs. 70,000/-

* The list of equipment is given in Annexure-III of the Report. The Committee, however, recommended that the Polytechnic may be given the freedom to substitute any item of equipment, according to the actual requirement of the syllabus, which may prove to be more useful at the time of purchase. The ceiling for the equipment, however, should not be exceeded.

RECURRING (PER ANNUM)

Staff Salaries (as per State Scale of pay)	...	Rs. 64,000/-
Scholarship for Sandwich Practical training @ Rs.150/- per student per month.		Rs. 27,000/-
Honorarium to Guest speakers etc.		Rs. 5,000/-
Total	..	Rs. 96,000/-

The details of the facilities are given in the report of the Committee which may be seen at Appendix-6.

The matter is placed before the Regional Committee for consideration.

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ITEM NO. 7 : TO RECEIVE A REPORT OF THE EXPERT COMMITTEE SET UP TO EXAMINE THE PROPOSAL FROM THE GOVERNMENT OF TAMILNADU REGARDING RECOGNITION OF POST-DIPLOMAS IN PRODUCTION ENGINEERING AND INDUSTRIAL ENGINEERING AWARDED BY THE STATE BOARD OF TECHNICAL EDUCATION, TAMILNADU.

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A proposal was received by the Ministry of Education & Social Welfare from the State Government of Tamilnadu for the recognition of Post-diploma in Production Engineering and Post-diploma in Industrial Engineering awarded by the State Board of Technical Education. Both these courses are being offered at P.S.G. Polytechnic, Coimbatore from the academic year 1962-63.

The courses were introduced without the prior approval of the Southern Regional Committee and the All India Council for Technical Education. Before considering the question of recognition of these diplomas, the Government of India, therefore, forwarded the proposal to the Southern Regional Committee to consider the same and make recommendations. The Southern Regional Committee appointed an Expert Committee consisting of the following to examine the matter in detail:-

1. Prof. R.G. Narayanamurthy,
   Professor and Head of the Dept. of
   Mechanical Engineering,
   Indian Institute of Technology,
   Madras.

2. Shri S.K. Handa, Member-Secretary &
   Asst. Educational Adviser (T),
   Ministry of Education & S.W.,
   Southern Regional Office,
   Madras-6.

The Expert Committee visited the P.S.G. Polytechnic, Coimbatore on the 18th August, 1975. The Committee examined the standards and contents of the courses offered and had detailed discussions with the

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Principal and members of the staff about the need and utility of these courses with reference to the actual requirements of the industry. The Committee also went round the institution to see if adequate facilities were available by way of buildings, equipment and staff to run the courses in accordance with the approved standards.

The Committee was satisfied with the minimum admission requirements, the duration and the standards and contents of the courses prescribed for the Post-diplomas in Production Engineering and Industrial Engineering. In view of the specialised training given through these courses with reference to the requirements of the Industry, the Committee was satisfied that the courses were organised in accordance with the felt needs of the Industry. The Committee, however, observed that the facilities at present available for conducting these courses were not adequate. In the light of the facilities already available, the Committee recommended that the following additional facilities are necessary for the proper conduct of the courses.

NON-RECURRING:

Buildings (3,000 sq.ft. at Rs.35/- per sq.ft.)		Rs. 1,05,000/-
Equipment		Rs. 3,00,000/-
Library		Rs. 10,000/-
Furniture		Rs. 10,000/-
Total	..	Rs. 4,25,000/-

RECURRING: (PER ANNUM)

Staff Salary (Lecturers 2)		Rs. 20,000/-
Maintenance (at Rs.350/- per annum for 20 students)		Rs. 7,000/-
Total	..	Rs. 27,000/-

Having regard to the duration, the minimum admission requirements, the standards and contents of the courses as also the demand for the personnel trained through such specialised Post-diplomas, the Committee recommended that Post-Diplomas in Production Engineering and Industrial Engineering awarded by the State Board of Technical Education, Tamilnadu, may be recognised for purposes of employment to the subordinate posts such as Workstudy Assistants, Maintenance and Safety Engineers, Process Assistants, Inspection Assistants, Tool Design Assistants, Planning Assistants, Quality Control Assistants etc., for which Post-diploma in Production Engineering or Industrial Engineering is prescribed as a qualification. However, before the diplomas are recognised, the Committee recommended that it was necessary that additional facilities required to ensure the proper standards should be made available.

The details of the additional facilities recommended and other observations are given in the Report which may be seen at Appendix-7 .

The matter is placed before the Regional Committee.

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ITEM NO.8: TO RECEIVE A REPORT OF THE EXPERT COMMITTEE SET UP TO EXAMINE THE PROPOSAL OF THE STATE GOVERNMENT OF TAMILNADU FOR THE INTRODUCTION OF THE SANDWICH COURSE IN TEXTILE TECHNOLOGY AT THE NACHIMUTHU POLYTECHNIC, POLLACHI.

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The State Government of Tamilnadu submitted a proposal to the Southern Regional Committee for the introduction of the Sandwich course in Textile Technology at the Nachimuthu Polytechnic, Pollachi. The Southern Regional Committee at its 38th meeting held on 9th December, 1972 resolved to refer the proposal to the Standing Committee. Accordingly, an Expert Committee consisting of the following members was set up to examine the proposal in detail and make recommendations:-

1. Shri A. Mani,
   Principal,
   P.A.C. Ramaswamy Raja Polytechnic,
   Rajapalayam,
   Tamilnadu.
2. Shri S.K. Handa, Member-Secretary &
   Asst. Educational Adviser (T),
   Ministry of Education & S.W.,
   Southern Regional Office,
   Madras-600006.

The Committee paid a visit to the Nachimuthu Polytechnic, Pollachi on 18th August, 1975. The Committee had detailed discussions with the Principal to collect information on the various points to examine the proposal in all its aspects. The Committee also went round the laboratories and workshops and examined all the facilities available with the Polytechnic by way of building, equipment, staff, library etc.

The Committee noted that the Nachimuthu Polytechnic had started only an institutional course though the proposal received was for starting a Sandwich type diploma course in Textile Technology. The Committee felt that there is not enough evidence of

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employment opportunities for the candidates undergoing textile diploma course. The Committee, therefore, did not find any justification for a purely institutional course without any relationship to the actual needs of Industry.

The Committee realised that there were a large number of textile mills in the district which could sponsor candidates for the course and also offer training facilities for the students. The Committee, therefore, was prepared to support the course if organised on a sandwich pattern in close collaboration with industry. The Committee noted that the proposal received from the State Government was also for a sandwich course. The Polytechnic also had a plan and were making arrangements to organise the course on a sandwich basis. The Committee accordingly recommended that the introduction of Diploma course in Nachimuthu Polytechnic, Pollachi be approved but only on sandwich pattern.

The annual intake to the sandwich diploma course in Textile Technology be restricted to 20 which should be within the overall sanctioned capacity of the Polytechnic. The Committee further recommended that at least 50% of the intake i.e. 10 students should be sponsored by Textile Industry so that they are immediately employed after they successfully complete the diploma course.

Having regard to the facilities already available with the Polytechnic and the additional requirements which would be essential to run the course properly, the Committee recommended the following facilities for the Diploma course in Textile Technology.

NON-RECURRING:

Buildings (14,850 sq.ft.)	..	Rs.3,83,000/-
Equipment	..	Rs.6,90,400/-
Furniture	..	Rs. 20,000/-
Library	..	Rs. 20,000/-
Total	..Rs..	11,13,400/-

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RECURRING: (PER ANNUM)

Staff Salaries	Rs. 1,35,000/-
Maintenance	Rs. 21,000/-
Library, Journal etc.	Rs. 2,000/-
Scholarship for Sandwich training	Rs. 3,000/-
Total ...	Rs. 1,61,000/-

The Report of the Committee is placed at Appendix-8. The details of the facilities recommended by the Committee are given in the Report.

The matter is placed before the Southern Regional Committee for its consideration.

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ITEM NO.9: TO RECEIVE A REPORT OF THE EXPERT COMMITTEE SET UP TO EXAMINE THE PROPOSAL OF THE STATE GOVERNMENT OF TAMILNADU FOR STARTING DIPLOMA COURSES IN MECHANICAL AND ELECTRICAL ENGINEERING AT THE RAMAKRISHNA MISSION VIDYALAYA POLYTECHNIC, COIMBATORE.

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The State Government of Tamil Nadu submitted a proposal for starting of diploma courses in Mechanical and Electrical Engineering at the Ramakrishna Mission Vidyalaya Polytechnic, Coimbatore. The proposal was considered by the Southern Regional Committee at its meeting held on 9th December, 1972. The Regional Committee decided to refer the proposal to the Standing Committee to examine the matter in detail and make recommendations.

In pursuance of the recommendations of the Regional Committee, one man Expert Committee with Prof. G.R. Damodaran, Chairman, Southern Regional Committee of the All India Council for Technical Education was set up to visit the Institute to examine the various aspects of the proposal. Prof. G.R. Damodaran paid a visit to the Ramakrishna Mission Vidyalaya Polytechnic on 11th June,75. On the basis of the visit, discussions with the Principal and other members of the teaching staff of the Polytechnic and detailed study of the proposal, the one man Expert Committee observed that there was a demand for trained technicians in Mechanical Engineering to serve in the field of Agriculture Engineering in rural areas and therefore recommended that the diploma course in Mechanical Engineering be introduced at the Institute with effect from the Academic year 1975-76. The Committee recommended that the ultimate intake capacity should be 25. For diploma course in Electrical Engineering, the Committee recommended that this may be instituted only after the need for the same is firmly established.

The Committee examined the facilities already available with the Institute in order to estimate the additional requirements for running the diploma course in

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Mechanical Engineering in accordance with the approved standards. The Committee observed that the Polytechnic established in rural area surroundings with simple structure to house the laboratories and class rooms has the necessary facilities to institute a diploma course in Mechanical Engineering on semester basis.

The Committee, however, recommended that some marginal additional facilities shall have to be provided to the Institute to make up the deficiency for running the diploma course in Mechanical Engineering in accordance with approved standards. The summary of the additional facilities recommended by the Committee is given as below:-

NON-RECURRING:

Buildings (1,500 sq.ft.@ Rs.35/- (per sq.ft.)	..	Rs. 52,500/-
Equipment	..	Rs. 1,00,000/-
Library	..	Rs. 20,000/-
Total	..	Rs. 1,72,500/-

RECURRING: (PER ANNUM)

Staff Salaries (As per State Scales)		Rs. 66,000/-
Maintenance (@ Rs.350/- per student)		Rs. 26,250/-
Total	..	Rs. 92,250/-

The details of the facilities recommended and other observations made by the Committee are given in the Report which may be seen at Appendix-9.

The matter is placed before the Regional Committee for consideration.

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ITEM NO.10: TO RECEIVE A REPORT OF THE EXPERT COMMITTEE TO EXAMINE THE PROPOSAL OF THE STATE GOVERNMENT OF KARNATAKA FOR INTRODUCTION OF DEGREE COURSE IN TELE-COMMUNICATION ENGINEERING AT THE B.V.B. COLLEGE OF ENGINEERING AND TECHNOLOGY, HUBLI.

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A proposal was received from the State Government of Karnataka for introduction of a degree course in Tele-Communication Engineering at the B.V.B. College of Engineering and Technology, Hubli. In order to assess the estimates of cost for the introduction of a degree course, an Expert Committee consisting of the following was constituted with the approval of the Chairman of the Southern Regional Committee:-

1. Prof. K.S. Hegde,
   Executive Secretary,
   Indian Society for Technical Education,
   Indian Instt. of Tech. Campus,
   Madras-600036.

2. Shri S.K. Handa, Member-Secretary &
   Asst. Educational Adviser (T),
   Ministry of Education & S.W.,
   Southern Regional Office,
   Madras-600006.

The Committee paid a visit to the B.V.B. College of Engineering and Technology, Hubli on the 11th September, 1975. The Committee had a meeting with the Principal of the College and other staff members to have the necessary information on all the relevant points to examine the proposal in detail. The Committee also went round the different laboratories, workshops and the main buildings of the College, to see the facilities already available with the College and the additional facilities that would be necessary to run the degree course in Tele-Communication Engineering effectively.

Having regard to the latest developments and various other considerations, the Committee recommended that the B.V.B. College of Engineering, Hubli may be approved

to start the degree course in Tele-Communication Engineering. The Committee recommended that the intake to the course should be 20 to be adjusted within the overall sanctioned intake capacity of the College.

Keeping in view the instructional facilities already available with the institution, the standard of instructional facilities approved by the Southern Regional Committee for a degree course in Electronics and Communication Engineering and the additional requirements for the course as furnished by the College, the Committee recommended the following instructional facilities for running the course in accordance with approved standards.

NON-RECURRING

Buildings (6,000 sq.ft. of R.C.C. type @ Rs.35/- per sq.ft.	Rs. 2.10 lakhs
Equipment	Rs. 5.00 lakhs
Furniture	Rs. 0.50 lakhs
Library	Rs. 1.00 lakhs
Total ..	Rs. 8.60 lakhs

RECURRING (PER ANNUM)

Staff salaries (as per State Scale of Pay)	Rs. 90,000/-
Books & Magazines	Rs. 5,000/-
Total ..	Rs. 95,000/-

The details of the facilities recommended and all other aspects are given in the Report of the Committee which may be seen at Appendix-10.

The matter is placed before the Regional Committee for consideration.

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ITEM NO.11: TO RECEIVE A REPORT OF THE EXPERT COMMITTEE OF THE SOUTHERN REGIONAL COMMITTEE ON THE PROPOSAL OF THE STATE GOVERNMENT OF TAMIL-NADU FOR INCREASED CENTRAL ASSISTANCE FOR THE PURCHASE OF EQUIPMENT AT THE GOVERNMENT POLYTECHNIC FOR WOMEN, MADURAI.

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The Government Polytechnic for Women, Madurai was started during the year 1963-64 by the State Government of Tamilnadu. The proposal for establishment of the Government Polytechnic for Women, Madurai was submitted for approval of the Southern Regional Committee. The proposal was considered by the Southern Regional Committee at its 33rd meeting held on the 30th April, 1969. On the recommendations of the Southern Regional Committee, the All India Council for Technical Education approved the establishment of the Government Polytechnic for Women, Madurai for conducting diploma courses in (a) Civil Engineering Draughtsmanship (b) Commercial Practice and (c) Library Science, with sanctioned intake of 30 in each course with the following estimates of cost:-

NON-RECURRING:

Buildings	...	Rs. 6,69,440/-
Equipment	...	Rs. 6,69,865/-
Hostel for 150 students	...	Rs. 6,29,700/-
Total	...	Rs.19,69,005/-

RECURRING: (PER ANNUM)

Staff Salaries	...	Rs. 1,90,060/-
Maintenance	...	Rs. 29,700/-
Library & Other amenities	...	Rs. 15,000/-
Total	...	Rs. 2,34,760/-

The State Government of Tamilnadu subsequently approached the Government of India, Ministry of Education for increased central assistance by way of

minimum outlay of Rs.14.78 lakhs for equipment as against amount of Rs.6.69 lakhs approved by the All India Council for Technical Education. The State Government confirmed that necessary plan provision for the increased central assistance had been made in their State Plan. The Ministry of Education accordingly requested the Southern Regional Office that the proposal may be examined by the Southern Regional Committee.

In order to examine the request of the State Government for increased Central assistance for equipment an Expert Committee consisting of the following members was constituted, in consultation with the Chairman, Southern Regional Committee:-

1. Shri M. Narayanan,
   Principal,
   Women's Polytechnic,
   Trivandrum.

2. Prof. G.P. Asthana,
   Director,
   Thiagarajar School of Management,
   Madurai.

3. Shri M. Kothandaraman,
   Principal,
   C.N.T. Institute,
   Madras.

4. Shri S.K. Handa, Member-Secretary &
   Asst. Educational Adviser (T),
   Ministry of Education & S.W.,
   Southern Regional Office,
   Madras.6.

The above mentioned Expert Committee visit the Government Polytechnic for Women, Madurai on the 6th September, 1975. The Expert Committee observed that the institution was running the following two courses:-

i) Civil Engineering (General)

ii) Commercial Practice (Sandwich)

The Committee noted that Diploma course in Civil Engineering (General) was offered against the Civil Engineering (Draughtsmanship) course approved for the Polytechnic. Out of the other two approved courses viz. Diploma in Commercial Practice and Library Science, the latter has not yet been started by the Polytechnic.

The Committee visited the various laborato of the Polytechnic to ascertain the facilities already provided by way of equipment and the facilities proposed be provided according to the requirements of the Polytec The lists of equipments, laboratory-wise, submitted by institute for the purpose were examined by the Committe Having regard to the equipment already purchased for the different laboratories for the approved courses, the add- tional requirements as furnished by the institution, the standards laid down by the Southern Regional Committee for these courses and the actual requirements now assessed, Expert Committee recommended that an amount of Rs.8.00 l may be approved as against Rs.6.69 lakhs sanctioned earl for the three courses, viz. Civil Engineering (Draughtsm ship), Commercial Practice and Library Science. In estimating the requirements, the Committee took into conside ration the Civil Engineering (Draftsmanship) course whic has been approved and not Diploma in Civil Engineering (General) which has yet to be approved. The details of the recommendations are given in the Report of the Expert Committee given at Appendix-11.

The matter is placed before the Regional Committee for consideration.

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ITEM No.12: TO RECEIVE A REPORT OF THE EXPERT COMMITTEE OF THE SOUTHERN REGIONAL COMMITTEE SET UP TO EXAMINE THE PROPOSAL OF THE STATE GOVERNMENT OF KARNATAKA FOR INTRODUCTION OF DIPLOMA COURSE IN TELE-COMMUNICATION ENGINEERING AT GOVERNMENT POLYTECHNIC FOR WOMEN, BANGALORE.

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A proposal was received from the State Government of Karnataka for the introduction of a diploma course in Radio Engineering later on redesignated as Tele-Communication Engineering at Government Polytechnic for Women, Bangalore. The proposal was considered by the Southern Regional Committee at its meeting held in April, 1969. The Regional Committee approved in principle the introduction of the course. The Government of India also approved in principle the recommendations of the Regional Committee for starting the course.

The general policy of the All India Council for Technical Education, however, is that the demand for technicians in specialised areas should be reassessed and the courses should be started only when justified by the employment potential. Accordingly in order to examine the proposal in all its aspects and also to assess the estimates of cost, an Expert Committee consisting of the following members was appointed with the approval of the Chairman, Southern Regional Committee:-

1. Prof. K.S. Hegde,
   Programme Director,
   I.S.T.E.,
   Indian Institute of Technology Campus,
   Madras-600036.

2. Shri S.K. Handa, Member-Secretary &
   Asst. Educational Adviser (T),
   Ministry of Education & S.W.,
   Southern Regional Office,
   Madras-600006.

The Committee visited the institution and had detailed discussions with the Principal and members of the staff of the Polytechnic as also with the Director of Technical Education, Karnataka State. The Committee also

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went round the institution and laboratories to see the physical facilities already available by way of buildings equipment, staff and additional facilities that would be required to run the course in accordance with the approve standards.

Having regard to the various considerations, the Committee came to the conclusion that there was a nee for diploma course in Tele-Communication Engineering and recommended that the course may be introduced with the sanctioned intake of 30 students at the Government Polytechnic for Women, Bangalore. The Committee, however, stipulated that the intake for the course should be readjusted within the overall intake capacity of the Polytechnic.

Keeping in view the facilities already availab with the Polytechnic, the additional requirements for the course as furnished by the Institute, and the standards laid down by the All India Council for Technical Educati for the diploma course in Electronics, the Committee reco the following instructional facilities for the course:-

NON-RECURRING:

Buildings: R.C.C. type 7,700 sq.ft. @ Rs.35/- per sq.ft. ..	₹	Rs.2,69,500/-
Workshop Buildings: 990 sq.ft. @ Rs.25/- per sq.ft.	₹	Rs. 24,750/-
Equipment	₹	Rs.3,75,000/-
Furniture	₹	Rs. 50,000/-
Library including Library Furniture	₹	Rs. 50,000/-
Total		Rs.7,69,250/-

NOTE: The Committee noted that in view of rapid increase in prices, implementation of the development schem should be completed as early as possible in order to avoid further increase in the cost as has already happened with reference to earlier estimates as were approved by the State Government.

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RECURRING (PER ANNUM)

Staff Salaries	...	Rs. 35,500/-
Maintenance	...	Rs. Nil
	Total ..	Rs. 35,500/-

The details of the facilities recommended ar[illegible] other recommendations/observations made by the Committe[illegible] are given in the Report of the Committee which may be s[illegible] at Appendix-12.

The matter is placed before the Regional Committee for consideration.

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ITEM NO.13: TO RECEIVE A REPORT OF THE EXPERT COMMITTEE SET UP BY THE SOUTHERN REGIONAL COMMITTEE TO EXAMINE THE REQUEST OF THE STATE GOVERNMENT OF TAMILNADU FOR INCREASED CENTRAL ASSISTANCE TOWARDS ESTABLISHMENT OF GOVERNMENT POLYTECHNIC FOR WOMEN, COIMBATORE.

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The Government Polytechnic for Women, Coimbatore was established during the year 1964-65 by the State Government of Tamilnadu. The proposal for the establishment of the Polytechnic was submitted by the State Government for the approval of the Southern Regional Committee. The proposal was considered by the Southern Regional Committee at its meeting held on 30th April, 1969. On the recommendations of the Regional Committee, the All India Council for Technical Education approved the establishment of the Polytechnic for conducting diploma courses in Civil Engineering (Draughtsmanship), Commercial Practice and Electronics with an intake of 30 in each of the courses with the following estimates of cost:-

NON-RECURRING:

Buildings	Rs. 7.81 lakhs
Equipment	Rs.10.70 lakhs
Hostel for 150 students	Rs. 6.30 lakhs
Total ...	Rs.24.81 lakhs

The State Government of Tamilnadu, however, sanctioned the following estimates of cost for the establishment of the Polytechnic:-

NON-RECURRING:

Buildings	Rs.10.40 lakhs
Equipment	Rs.14.78 lakhs
Hostel	Rs. 5.00 lakhs
	Rs.30.18 lakhs

The State Government accordingly requested the Government of India for the approval of above facilities and for increased Central assistance on that basis.

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In support of their request, the State Government stated that in addition to above, they also propose to conduct Diploma courses in Civil Engineering (Structure) and Mechanical Engineering (Drawing & Design). Further they have increased the intake from 30 to 60 for the diploma course in Commercial Practice. Also in due course they have to diversify the courses and the additional facilities thus made available would be utilised for the new diversified courses that may be offered by the Polytechnic.

In order to examine the request of the State Government of Tamilnadu for increased Central assistance, an Expert Committee consisting of the following members was constituted in consultation with the Chairman of the Southern Regional Committee:-

1. Dr. P.S. Sarma,
   Prof. of Electronics & Commn. Engg.,
   P.S.G. College of Technology,
   Peelamedu P.O., Coimbatore.

2. Shri R.G. Gopalakrishnan,
   Prof. of Civil Engineering,
   Coimbatore Institute of Technology,
   Coimbatore.

3. Shri S. Shanmugasundaram,
   Prof. of Commerce,
   P.S.G. Arts College,
   Coimbatore.

   &

4. Shri S.K. Handa, Member-Secretary &
   Asst. Educational Adviser (T),
   Ministry of Education & S.W.,
   Southern Regional Office,
   Madras-6.

The above mentioned Expert Committee visited the Government Polytechnic for Women, Coimbatore on 18th August,75 The Committee had discussions with the Principal and members of the staff of the Institution. The Committee also went round the institution and various laboratories to ascertain the facilities already provided and additional requirements with reference to the approved standards.

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On the basis of the detailed scrutiny, the Committee came to the conclusion that the amount of Rs. 4.27 lakhs sanctioned for Civil Engineering - Draughtsmanship, course was adequate and no extra amount need be sanctioned for this course. Similarly, the Committee recommended that the amount of Rs.4.187 lakhs sanctioned for the Electronics laboratory was also quite adequate. The Committee, however, recommended that an additional amount of Rs.36,500/- already approved by the Regional Committee for an increased intake from 30 to 60 may be sanctioned after necessary confirmation about the availability of the plan provision has been received from the State Government. Besides this, the Committee also recommended an amount of Rs.11,000/- for one Electric Typewriter and one Electric Printing Calculator. The Committee thus recommended a total amount of Rs.11.17 lakhs for equipment for the three approved courses as against the total of Rs.10.70 lakhs approved earlier by the Regional Committee. In estimating the requirements, the Committee took into account the Civil Engineering (Draughtsmanship) course which has been approved by the Regional Committee and not the diploma course in Civil Engineering (Structure) which has not been approved. The Committee further noted that the Diploma course in Mechanical Engineering (Drawing and Design) had also not been approved. The question of examining the scheme of introduction of these courses and assessing their requirements can be examined only after proposals in this behalf along with the necessary details and justification for offering these courses at the Women's Polytechnic, are received from the State Government.

As regards the buildings, the Committee felt that the area already sanctioned for the approved courses was quite adequate. The Committee, therefore, did not recommend any additional space for the three approved courses. However, for increased intake from 30 to 60 for Diploma course in Commercial Practice, the Committee recommended an additional area of 2,540 sq.ft. at a cost of Rs.50,400/- and

desired that the same may be sanctioned after necessary confirmation about the availability of plan provision for the same has been received from the State Government. The Committee accordingly recommended that an amount of Rs.7.85 lakhs for buildings may be increased to Rs.8.314 lakhs on account of increase in intake in Diploma course in Commercial Practice. In case the Polytechnic wanted increase in the cost of Buildings on account of rise in prices and cost of construction, the Committee felt that it was a different issue and the matter should be taken up separately by the State Government with the Government of India with all the details for examination by appropriate Expert Technical Committee.

Summary of the recommendations now made by the Committee and the estimates sanctioned previously for the two approved courses viz. Civil Engineering (Draughtsmanship) Commercial Practice and Electronics are given below:-

	Sanctioned earlier	New recommended
Buildings	Rs 7.81 lakhs	8.314 lakhs
Equipment	Rs 10.70 "	11.170 "

The details about the observations and recommendations made by the Committee are given in the Report which may be seen at **Appendix-13**.

The matter is placed before the Committee for consideration.

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ITEM NO.14: TO RECEIVE A REPORT OF THE EXPERT COMMITTEE APPOINTED TO EXAMINE THE PROPOSAL OF THE STATE GOVERNMENT OF KARNATAKA TO BRING S.J. COLLEGE OF ENGINEERING, MYSORE TO THE STANDARDS LAID DOWN BY THE ALL INDIA COUNCIL FOR TECHNICAL EDUCATION.

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A proposal was received from the State Government of Karnataka for the development of Sri Jayachamarajendra College of Engineering, Mysore to bring it up to the standards laid down by the All India Council for Technical Education. In order to consider the above proposal of the State Government of Karnataka and to assess the estimates of cost for the development of the College in accordance with the standards of the All India Council for Technical Education, an Expert Committee consisting of the following members was constituted:-

1. Dr. R. Subbayyan,
   Principal,
   P.S.G. College of Technology,
   Peelamedu P.O.,
   Coimbatore.

2. Prof. B.R. Narayana Iyengar,
   175, First Main Road,
   Seshadripuram,
   Bangalore.

3. Prof. K.S. Hegde,
   Programme Director,
   I.S.T.E.,
   Indian Instt. of Technology Campus,
   Madras-36.

4. Shri S.K. Handa, Member-Secretary &
   Asst. Educational Adviser (T),
   Ministry of Education & S.W.,
   Southern Regional Office,
   Madras-6.

The Committee visited the college on 2nd September, 1975. The Committee had detailed discussi with the Management, Principal and Secretary of the Institution. The Committee also went round the institution and various laboratories to see the facilities

already created in the institution. The Committee felt that the college was in good shape for being developed as an institution in accordance with the approved standards of the All India Council for Technical Education. Having regard to the facilities already created by the College before admission to State-grant-in-aid code, the additional requirements as furnished by the Colleg and the standards prescribed by the All India Council for Technical Education, the Committee recommended the following facilities for the development of the College for degree courses in Electrical and Mechanical Engineering.

NON-RECURRING:

Buildings 17,000 Sq.ft. @ Rs.30/- per Sq.ft. (Class rooms, Drawing Halls, Science Laboratory, Physics Laboratory, Chemistry laboratory & Administrative Buildings.	Rs. 5,10,000/
Equipment	
Mechanical	Rs. 6,60,000/
Electrical (including Electronics)	Rs. 1,06,000/
Physics	Rs. 60,000/
Chemistry	Rs. 60,000/
Furniture	Rs. 50,000/
Library including Library furniture	Rs. 1,00,000/
Hostel for 150 students (including Wardens Quarters, Servants' Quarters and Furniture)	Rs. 9,56,000/
Students' Amenities	Rs. 1,14,000
Total..	Rs.26,16,000/-

RECURRING (PER ANNUM)

Staff Salaries for full complement for Mechanical, Electrical Engineering (as per All India Council for Technical Education Scales of pay)	Rs. 5,00,000/
Maintenance Expenditure	Rs. 2,20,000/
Library	Rs. 30,000
Total ..	Rs. 7,50,000/

The Committee did not consider the development of the College for Degree course in Civil Engineering because the State Government in its proposal had stated that the second stage of development concerning Civil Engineering Course should not be undertaken now as there were enough facilities already available in other institutions in the State. The State Government had requested for the consideration of the development of the College only for electrical and mechanical engineering degree courses involving an expenditure of Rs.5.45 lakhs for which the necessary confirmation about the availability of the plan provision was given by the State Government. The Committee in this context observed that in order to bring the College up to the standards laid down by the All India Council for Tehhnical Education, even for degree courses in Electrical and Mechanical Engineering an outlay of Rs.26.16 lakhs as given above would be necessary. The Committee accordingly recommended that the State Government should provide the entire amount for the development of the College in order to ensure maintenance of proper standards.

The report of the Expert Committee giving complete details of facilities recommended and other observations made may be seen at Appendix-14. In suggesting the detailed list of additional equipment recommended for the development of the College, the Committee has also recommended that the College should be given freedom to substitute any item which may prove to be more useful at the time of purchase of equipment to suit the need of the changing pattern of the syllabi.

The matter is placed before the Committee for consideration.

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ITEM NO.13: TO RECEIVE A REPORT OF THE EXPERT COMMITTEE SET UP BY THE SOUTHERN REGIONAL COMMITTEE TO EXAMINE THE REQUEST OF THE STATE GOVERNMENT OF TAMILNADU FOR INCREASED CENTRAL ASSISTANCE TOWARDS ESTABLISHMENT OF GOVERNMENT POLYTECHNIC FOR WOMEN, COIMBATORE.

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The Government Polytechnic for Women, Coimbatore was established during the year 1964-65 by the State Government of Tamilnadu. The proposal for the establishment of the Polytechnic was submitted by the State Government for the approval of the Southern Regional Committee. The proposal was considered by the Southern Regional Committee at its meeting held on 30th April, 1969. On the recommendations of the Regional Committee, the All India Council for Technical Education approved the establishment of the Polytechnic for conducting diploma courses in Civil Engineering (Draughtsmanship), Commercial Practice and Electronics with an intake of 30 in each of the courses with the following estimates of cost:-

NON-RECURRING:

Buildings	Rs. 7.81 lakhs
Equipment	Rs.10.70 lakhs
Hostel for 150 students	Rs. 6.30 lakhs
Total ...	Rs.24.81 lakhs

The State Government of Tamilnadu, however, sanctioned the following estimates of cost for the establishment of the Polytechnic:-

NON-RECURRING:

Buildings	Rs.10.40 lakhs
Equipment	Rs.14.78 lakhs
Hostel	Rs. 5.00 lakhs
	Rs.30.18 lakhs

The State Government accordingly requested the Government of India for the approval of above facilities and for increased Central assistance on that basis.

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In support of their request, the State Government stated that in addition to above, they also propose to conduct Diploma courses in Civil Engineering (Structure) and Mechanical Engineering (Drawing & Design). Further they have increased the intake from 30 to 60 for the diploma course in Commercial Practice. Also in due course they have to diversify the courses and the additional facilities thus made available would be utilised for the new diversified courses that may be offered by the Polytechnic.

In order to examine the request of the State Government of Tamilnadu for increased Central assistance, an Expert Committee consisting of the following members was constituted in consultation with the Chairman of the Southern Regional Committee:-

1. Dr. P.S. Sarma,
   Prof. of Electronics & Commn. Engg.,
   P.S.G. College of Technology,
   Peelamedu P.O., Coimbatore.

2. Shri R.G. Gopalakrishnan,
   Prof. of Civil Engineering,
   Coimbatore Institute of Technology,
   Coimbatore.

3. Shri S. Shanmugasundaram,
   Prof. of Commerce,
   P.S.G. Arts College,
   Coimbatore.

   &

4. Shri S.K. Handa, Member-Secretary &
   Asst. Educational Adviser (T),
   Ministry of Education & S.W.,
   Southern Regional Office,
   Madras-6.

The above mentioned Expert Committee visited the Government Polytechnic for Women, Coimbatore on 18th August,75 The Committee had discussions with the Principal and members of the staff of the Institution. The Committee also went round the institution and various laboratories to ascertain the facilities already provided and additional requirements with reference to the approved standards.

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On the basis of the detailed scrutiny, the Committee came to the conclusion that the amount of Rs. 4.27 lakhs sanctioned for Civil Engineering - Draughtsmanship, course was adequate and no extra amount need be sanctioned for this course. Similarly, the Committee recommended that the amount of Rs.4.187 lakhs sanctioned for the Electronics laboratory was also quite adequate. The Committee, however, recommended that an additional amount of Rs.36,500/- already approved by the Regional Committee for an increased intake from 30 to 60 may be sanctioned after necessary confirmation about the availability of the plan provision has been received from the State Government. Besides this, the Committee also recommended an amount of Rs.11,000/- for one Electric Typewriter and one Electric Printing Calculator. The Committee thus recommended a total amount of Rs.11.17 lakhs for equipment for the three approved courses as against the total of Rs.10.70 lakhs approved earlier by the Regional Committee. In estimating the requirements, the Committee took into account the Civil Engineering (Draughtsmanship) course which has been approved by the Regional Committee and not the diploma course in Civil Engineering (Structure) which has not been approved. The Committee further noted that the Diploma course in Mechanical Engineering (Drawing and Design) had also not been approved. The question of examining the scheme of introduction of these courses and assessing their requirements can be examined only after proposals in this behalf along with the necessary details and justification for offering these courses at the Women's Polytechnic, are received from the State Government.

As regards the buildings, the Committee felt that the area already sanctioned for the approved courses was quite adequate. The Committee, therefore, did not recommend any additional space for the three approved courses. However, for increased intake from 30 to 60 for Diploma course in Commercial Practice, the Committee recommended an additional area of 2,540 sq.ft. at a cost of Rs.50,400/- and

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desired that the same may be sanctioned after necessary confirmation about the availability of plan provision for the same has been received from the State Government. The Committee accordingly recommended that an amount of Rs.7.85 lakhs for buildings may be increased to Rs.3.314 lakhs on account of increase in intake in Diploma course in Commercial Practice. In case the Polytechnic wanted increase in the cost of Buildings on account of rise in prices and cost of construction, the Committee felt that it was a different issue and the matter should be taken up separately by the State Government with the Government of India with all the details for examination by appropriate Expert Technical Committee.

Summary of the recommendations now made by the Committee and the estimates sanctioned previously for the two approved courses viz. Civil Engineering (Draughtsmanship) Commercial Practice and Electronics are given below:-

	Sanctioned earlier	New recommended
Buildings	Rs 7.81 lakhs	8.314 lakhs
Equipment	Rs 10.70 "	11.170 "

The details about the observations and recommendations made by the Committee are given in the Report which may be seen at **Appendix-13**.

The matter is placed before the Committee for consideration.

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ITEM NO.14: TO RECEIVE A REPORT OF THE EXPERT COMMITTEE APPOINTED TO EXAMINE THE PROPOSAL OF THE STATE GOVERNMENT OF KARNATAKA TO BRING S.J. COLLEGE OF ENGINEERING, MYSORE TO THE STANDARDS LAID DOWN BY THE ALL INDIA COUNCIL FOR TECHNICAL EDUCATION.

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A proposal was received from the State Government of Karnataka for the development of Sri Jayachamarajendra College of Engineering, Mysore to bring it up to the standards laid down by the All India Council for Technical Education. In order to consider the above proposal of the State Government of Karnataka and to assess the estimates of cost for the development of the College in accordance with the standards of the All India Council for Technical Education, an Expert Committee consisting of the following members was constituted:-

1. Dr. R. Subbayyan,
   Principal,
   P.S.G. College of Technology,
   Peelamedu P.O.,
   Coimbatore.

2. Prof. B.R. Narayana Iyengar,
   175, First Main Road,
   Seshadripuram,
   Bangalore.

3. Prof. K.S. Hegde,
   Programme Director,
   I.S.T.E.,
   Indian Instt. of Technology Campus,
   Madras-36.

4. Shri S.K. Handa, Member-Secretary &
   Asst. Educational Adviser (T),
   Ministry of Education & S.W.,
   Southern Regional Office,
   Madras-6.

The Committee visited the college on 2nd September, 1975. The Committee had detailed discussi with the Management, Principal and Secretary of the Institution. The Committee also went round the institution and various laboratories to see the facilities

already created in the institution. The Committee felt that the college was in good shape for being developed as an institution in accordance with the approved standards of the All India Council for Technical Education. Having regard to the facilities already created by the College before admission to State-grant-in-aid code, the additional requirements as furnished by the Colleg and the standards prescribed by the All India Council for Technical Education, the Committee recommended the following facilities for the development of the Colleg for degree courses in Electrical and Mechanical Engineering.

NON-RECURRING:

Buildings 17,000 Sq.ft. @ Rs.30/- per Sq.ft. (Class rooms, Drawing Halls, Science Laboratory, Physics Laboratory, Chemistry laboratory & Administrative Buildings.	Rs. 5,10,000/
Equipment	
Mechanical	Rs. 6,60,000/
Electrical (including Electronics)	Rs. 1,06,000/
Physics	Rs. 60,000/
Chemistry	Rs. 60,000/
Furniture	Rs. 50,000/
Library including Library furniture	Rs. 1,00,000/
Hostel for 150 students (including Wardens Quarters, Servants' Quarters and Furniture)	Rs. 9,56,000/
Students' Amenities	Rs. 1,14,000
Total..	Rs.26,16,000/

RECURRING (PER ANNUM)

Staff Salaries for full complement for Mechanical, Electrical Engineering (as per All India Council for Technical Education Scales of pay)	Rs. 5,00,000/
Maintenance Expenditure	Rs. 2,20,000/
Library	Rs. 30,000/
Total ..	Rs. 7,50,000/

The Committee did not consider the development of the College for Degree course in Civil Engineering because the State Government in its proposal had stated that the second stage of development concerning Civil Engineering Course should not be undertaken now as there were enough facilities already available in other institutions in the State. The State Government had requested for the consideration of the development of the College only for electrical and mechanical engineering degree courses involving an expenditure of Rs.5.45 lakhs for which the necessary confirmation about the availability of the plan provision was given by the State Government. The Committee in this context observed that in order to bring the College up to the standards laid down by the All India Council for Technical Education, even for degree courses in Electrical and Mechanical Engineering an outlay of Rs.26.16 lakhs as given above would be necessary. The Committee accordingly recommended that the State Government should provide the entire amount for the development of the College in order to ensure maintenance of proper standards.

The report of the Expert Committee giving complete details of facilities recommended and other observations made may be seen at Appendix-14. In suggesting the detailed list of additional equipment recommended for the development of the College, the Committee has also recommended that the College should be given freedom to substitute any item which may prove to be more useful at the time of purchase of equipment to suit the need of the changing pattern of the syllabi.

The matter is placed before the Committee for consideration.

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ITEM NO.15: TO RECEIVE A REPORT OF THE EXPERT COMMITTEE OF THE SOUTHERN REGIONAL COMMITTEE SET UP TO ASSESS ESTIMATES OF COST FOR THE DEVELOPMENT OF BASAVESHWAR COLLEGE OF ENGINEERING, BAGALKOT AS PER THE STANDARDS LAID DOWN BY THE ALL INDIA COUNCIL FOR TECHNICAL EDUCATION.

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A proposal was received by the Ministry of Education, Government of India from the State Government of Karnataka to admit Basaveshwar College of Engineering, Bagalkot under the State grant-in-aid code and to bring it up to the standards laid down by the All India Council for Technical Education. The Central Government agreed in principle to the proposal of the State Government of Karnataka and requested the Southern Regional Committee to assess the estimates of cost for the development of the College.

The Regional Committee considered the matter at its 34th meeting held on 24th April, 1970 and decided to appoint an Expert Committee consisting of the following members to examine the proposal in detail and make recommendations:-

1. Prof. B.H. Karakaraddi,
   Principal,
   Regional Engineering College,
   Surathkal,
   Karnataka State.

2. Shri S. Ramaswamy,
   Managing Director,
   Chemicals & Plastics India Ltd.,
   Madras.

3. Prof. P.S. Mani Sundaram,
   Principal,
   Regional Engineering College,
   Tiruchirapalli.

4. Dr. T. Thimmaiah,
   Managing Director,
   Mysore Minerals Ltd.,
   Bangalore

5. Shri S.K. Handa, Member-Secretary &
   Asst. Educational Adviser (T),
   Ministry of Education & S.W.,
   Southern Regional Office, Madras-6.

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The Committee paid a visit to the College on the 11th September, 1975. The Committee had detailed discussion with the Management, Principal and members o f the staff to examine the proposal in all its aspects. The Committee also went round the part of the new buildings of the College which has been already constructed and also the Polytechnic whose facilities are at present utilised for conducting the courses. The Committee felt that the College was in a good shape for being developed as an Institution in accordance with the approved standards of the All India Council for Technical Education. Having regard to the facilities already created by the College before admission to the State grant-in-aid-code, the additional requirements as furnished by the College and the standards laid down by All India Council for Technical Education, the Committee recommended the following estimates of cost for providing necessary facilities for the development of the [illegible].

NON-RECURRING:

Buildings	..	Rs.27.40 lakhs
Equipment	..	Rs.32.00 lakhs
Furniture	..	Rs. 1.40 lakhs
Library	..	Rs. 1.50 lakhs
Students Amenities	..	Rs. 1.29 lakhs
Hostels	..	Rs.12.41 lakhs
Total	..	Rs.76.00 lakhs

RECURRING (PER ANNUM)

Staff Salaries (as per All India Council for Technical Education Scale of Pay)	..	Rs. 6.90 lakhs
Maintenance expenditure including consumables	..	Rs. 3.30 lakhs
Library	..	Rs. 0.50 lakhs
Total	..	Rs.10.70 lakhs

The Committee noted that the estimates of Rs.34.25 lakhs made previously by the State Expert Committee were not adequate and an outlay of Rs.76.00 lakhs shall have to be made for the development of the College in accordance with the approved standards. The details of the facilities recommended by the Committee and other observations made are given in the Report which may be seen at Appendix-15. In suggesting the detailed list of additional equipment recommended for the development of the College, the Committee also recommended that the College should be given freedom to substitute any item which may prove to be most useful at the time of purchase of equipment to suit the need of the changing pattern of the syllabi.

The matter is placed before the Regional Committee for consideration.

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ITEM No. 16: TO RECEIVE A REPORT OF THE EXPERT COMMITTEE APPOINTED BY THE SOUTHERN REGIONAL COMMITTEE TO REVIEW THE FUNCTIONS OF THE REGIONAL COMMITTEE IN THE LIGHT OF THE CHALLENGES POSED BY THE LATEST DEVELOPMENTS.

The question of revision of the functions of the Regional Committee, in the light of the challenges posed by the latest developments, was considered by the Southern Regional Committee at its meeting held on 1.4.1975. The Regional Committee observed that there are a number of important functions which shall have to be performed by the Regional Committee without duplicating in any way the work of other organisations/institutions set up in the different States. The Committee felt that in order to meet the challenges posed by the latest situations in the field of technical education, the role of the Regional Committee had assumed great importance. The members expressed the view that it had become necessary that a serious thought should be given to spell out the important functions to which the Regional Committee should pay greater attention. Accordingly, the Regional Committee decided to set up the following Committee to examine the entire position in detail, the major areas of importance and make recommendations to the Regional Committee:

1. Prof.T.R.Doss,
   Vice-Chancellor,
   Jawaharlal Nehru Technological University,
   HYDERABAD.

2. Dr. K.A.V.Pandalai,
   Director,
   Indian Institute of Technology,
   MADRAS.

3. Sri M.V.Rajagopal,
   Director of Technical Education Incharge,
   Government of Andhra Pradesh,
   HYDERABAD.

4. Dr.S.Vasudev,
   Director of Technical Education,
   Government of Kerala,
   TRIVANDRUM.

5. Sri K.S.Ballal,
Director of Technical Education,
Government of Karnataka,
BANGALORE.

6. Dr.V.C.Kulandaiswamy,
Director of Technical Education,
Government of Tamilnadu,
GUINDY, MADRAS.

7. Prof.K.M.Bahauddin,
Principal,
Regional Engineering College,
CALICUT.

and 8. Sri S.K.Handa,
Member-Secretary &
Asst.Educational Adviser (Tech),
Ministry of Education & S.W.,
MADRAS.

A meeting of the Committee was held on the 15th September 1975 at Madras. After discussing the matter at great length, the Committee recommended the following revised functions for the Regional Committee:

1. To survey the facilities for technical education in all States and to make recommendations to the Co-ordinating Committee/All India Council for Technical Education on the consolidation and development of existing institutions and establishment of new institutions. wherever necessary;

2. To watch closely the progress of development of the different technical institutions in the region and advise the State Governments and the institutions concerned for the introduction of appropriate measures, wherever required;

3. To promote liaison between technical institutions and Industry and other technical establishments;

4. To survey from time to time, the position regarding close collaboration between technical institutions and industry and suggest concrete measures to accelerate the progress and to

ensure optimum utilisation of the facilities in the technical institutions for training right type of technical personnel to me the requirements of the Industry and R.D. organisations;

5. To ensure effective coordination and feed-back of the productive activities of the technical institutions, the State Boards of Technical Education and Industrial Liaison Boards with a view to promote the interests of the Technical Education in different aspects.

6. To review critically and objectively as well as monitoring the academic aspects of training, the levels of performance of the laboratories and the faculties and the standards of instruction and examination at the first degree as well as at the diploma level.

7. To correlate the results of its evaluation with the local and State evaluations and suggest supplementary measures to achieve better results.

8. To review the implementation of different measures for improvement of quality and standards of technical education and make suggestions for improvements, modifications and new suggestions, wherever necessary.

9. To promote coordination between technical institutions, industry and all other agencies -- Central, State and local in the related areas, to ensure optimum contribution under the total effort for economic growth of the country.

The report of the Committee is given at Appendix No.16.

The matter is placed before the Regional Committee for consideration.

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ITEM NO.17: TO RECEIVE A NOTE ON THE PROGRAMMES OFFERED BY THE TECHNICAL TEACHERS TRAINING INSTITUTE, MADRAS ON THE TRAINING OF POLYTECHNIC TEACHERS AND PROGRESS MADE IN TRAINING OF TEACHERS.

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The Technical Teachers Training Institute, Madras was established by the Government of India, in the year 1966, for training of Polytechnic teachers. The programme of training extends over 18 months for diploma holders. The training course provides for institutional training in instruction techniques, as also for practical training in industry. The training programme therefore processes the teachers through an inbuilt system of teaching techniques and industrial orientation. The candidates completing successfully the course are awarded the Diploma by the Technical Teachers Training Institute, Madras. From 1974-75 a B.Tech.(Edn) degree course of the University of Madras of the duration of 9 months (one academic year) has also been introduced for the holders of B.E./B.Tech. degrees.

The Institute also conducts short-term programmes for Polytechnic teachers under the Quality Improvement Programme of the Government of India. The Institute is also conducting Crash Training Programme in Television Maintenance & Servicing for diploma hold in Applied Electronics or Communication Engineering. The details of the Teachers trained under these progra from 1966-67 to 1975-76 are given in the note received from Technical Teachers Training Institute, Madras which may be seen at Appendix-17. The details of the short-term courses conducted by the Technical Teachers Training Institute, Madras under the Quality Improvement Programme from 15-1-71 to 15-9-1975 are also contained in the note at Annexure-I referred to above.

The Plan of Action recommended by Prof. Damodaran's Special Committee on reorganisation of Polytechnic Education and approved by the All India Council for Technical Education inter-alia stipulated that an all out effort should be made to provide appropriate training to all polytechnic teachers within the next five years. The Southern Regional Committee at its last meeting reviewed the progress in this behalf and observed that it had became necessary that the State Directorates of Technical Education should draw up a meaningful and effective programme of training of all the Polytechnic Teachers in their respective states by utilising the facilities available at the Technical Teachers Training Institute, Madras. The Regional Committee further recommended that the Technical Teachers Training Institute should bring out a Brochure giving all the coursesorganised and facilities it can offer for training and retraining of teachers so that the State Directorate of Technical Education may be able to take all possible steps to accelerate the progress in the implementation of the Scheme for the training of Polytechnic teachers.

Information about the action taken by Technical Teachers Training Institute, Madras to bring out the brochure and by the State Directorates of Technical Education about the programme drawn by them is at present awaited. The same will be made available at the time of the meeting by those concerned. However in this connection, it may be stated that information about the Polytechnics teachers already trained and yet to be trained in so far as Tamilnadu and Karnataka is concerned has been made available which is given as below:-

DIRECTOR OF TECHNICAL EDUCATION, TAMILNADU.

So far a total 99 teachers have undergone training at the Technical Teachers Training Institute,

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Madras since 1966. The number of teachers deputed for the above training at the above Institute is fixed by the Principal, Technical Teachers Training Institute, Madras and as such it has not been possible to depute more staff for training. On an average 10 to 12 teachers could be deputed each year. At this rate it would take a number of more years to have all the teachers approximately 690 in number, trained at the institute.

DIRECTOR OF TECHNICAL EDUCATION, KARNATAKA.

There are 18 Government Polytechnics, 3 Polytechnics for Women, 5 aided Polytechnics and one evening Polytechnic offering engineering courses in the State.

The information regarding the number of teachers working in these polytechnics, the numbers trained so far and the balance number to be trained is furnished below:-

	Total No.	No. trained	No. to be trained.
I. ENGINEERING.			
a) Graduate	120	33	94
b) Diploma holders	253	84	169
II. PHYSICS	21	4	17
III. MATHEMATICS	22	9	13
	416	130	293

The number of teachers to be deputed every year from this state has been limited to the seats earmarked by the Technical Teachers Training Institute, Madras for this State. As such it may not be possible to get all the teachers thained by the end of the fifth five year plan as contemplated in the report unless the intake capacity is increased in the Technical Teachers Training Institute, Madras or an extention centre is started in the State.

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It will be seen from above that a stage has been reached when greater attention shall have to be devoted to formulate concrete plans for the development of faculty of the Polytechnics in the different States spelling out in detail the resources and efforts to be put in by all concerned. In this context the facilities available at Technical Teachers Training Institute, Madras, the manner in which we can have optimum utilisation of the same and the way to ensure best co-ordination between all concerned as also greater impact of energy and efforts put in from different ends may have to be examined in depth.

The matter is placed before the Regional Committee for its consideration.

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ITEM NO.18: TO CONSIDER THE QUESTION OF GRANTING PER.. MISSION TO FAILED CANDIDATES TO APPEAR FOR THE EXAMINATION UPTO A MAXIMUM OF FIVE TIM. FOR THREE YEAR DIPLOMA COURSES IN ENGINEE. RING.

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The question as to the number of attempts that might be permitted for an individual candidate to pass the first year examination either in the degree or in the diploma course was considered at the 27th meeting of the Co-ordinating Committee of the All India Council for Technical Education held on 18th October,58. The coordinating Committee recommended that unsuitable candidates should be eliminated at the end of the first year of degree and diploma courses with a view to ensuring effective utilisation of available facilities and providing timely advice for such candidates to choose alternative courses. The Coordinating Committee requ. the Universities, State Boards and Institutions to formulate suitable rules for the purpose. The Committee also recommended that no student should be allowed to continue to study in the first year class of his cours beyond two years nor should be allowed to appear at mo than three examinations for the completion of the fir. year.

In pursuance of the above recommendations of the Co-ordinating Committee of the All India Council for Technical Education, the State Government of Andhra Pradesh issued orders that the number of changes given to the candidates for the first year diploma examinations should be restricted to three which shall also include the first attempt as a regular candidate in the concerned Polytechnic/Institution. These chances must be availed in a period of 2 years, failing which the candidates w would not be allowed to appear for the examination any more.

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The State Government of Andhra Pradesh received representations that the candidates failing 3 times in the first year diploma examinations in engineering shall lose their future. It is desirable that such candidates be permitted for the examination at least upto five times to help them to pursue their studies in the Polytechnics. The State Government accordingly directed the Director of Technical Education, Andhra Pradesh, Hyderabad to have the views of the Government of India on the above point. The Director of Technical Education, Andhra Pradesh, Hyderabad approached the Southern Regional Office to reconsider the matter and communicate the views of Government of India whether the candidates failing in the first year diploma examination in engineering could be given five chances within a period of slightly over two years. A copy of letter No. EI-3/I53113/74 dated 23rd June, 1975 10th July, 1975 received from the Director of Technical Education In-charge, Andhra Pradesh, Hyderabad is placed at Appendix-18.

The matter was referred to the Ministry of Education and Social Welfare, New Delhi. The Ministry has desired that the matter may be consired by the Regional Committee.

The matter is accordingly placed before the Regional Committee for consideration.

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ITEM NO.19: TO CONSIDER THE QUESTION OF REIMPOSITION OF UPPER AGE LIMIT FOR ADMISSION INTO DIPLOMA COURSE IN ENGINEERING.

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The question of prescribing age limits for admission to technical institutions has been considered by the All India Council for Technical Education from time to time. At one time when the duration of the technical courses at the degree level was generally 4 years, the Council had recommended the maximum and minimum age limits, as 17 and 21 for the degree courses and 15 and 21 for the diploma courses respectively.

With the reorganisation of secondary education to 11 years pattern and consequent introduction of 5 years integrated courses in Engineering and Technology, the All India Council for Technical Education at its meeting held in April, 1960 recommended that during the transitional period, the minimum age of entry into the first degree course may be fixed at 16 and it should be raised to 17 when the reorganisation of the secondary education is completed.

In the light of the views expressed by the Education Commission that the age of admission of the child to Class I should ordinarily be not less than 6 and that there should be no age limit prescribed for any subsequent steps, the All India Council for Technical Education at its meeting held on the 23rd September, 1969, reviewed its earlier decision and recommended that no rigid age limits should be prescribed for, admission to degree and diploma courses in technical institutions. These recommendations of the Council were approved by the Government of India and communicated to all the authorities concerned for necessary action from the academic session 1970-71.

The Director of Technical Education, Andhra Pradesh has now intimated that the removal of both the lower and upper age limits have created certain problems in Polytechnics in their State. Due to disparity in age groups, there is a lot of indiscipline amongst the students, as some of the over aged students are in the habit of taking lead in defying the authorities, violating the rules and regulations of the institute and indulging in various acts of indiscipline such as boycotting of the classes and monthly tests, distrubing the examination work etc. Generally the over-aged students do not show any interest in studies and force the younger students to follow them in their acts of indiscipline.

The matter was considered by the Andhra Pradesh State Board of Technical Education. The Board decided that the question relating to reimposition of the upper age limit may be taken up denovo with the Government of India. The Director of Technical Education has therefore proposed that the reimposition of the upper age limit of 21 years in respect of admissions at the Diploma courses in the Polytechnics of the State with effect from 1975-76, and has requested concurrence of the Government of India for the same. As regards the over aged students, who were desirous of acquiring the diploma qualification, the Director of Technical Education has suggested that they may do so by appearing for the diploma examination, privately or by seeking admission to part time diploma courses.

A copy of the communication received from the Director of Technical Education, Andhra Pradesh is placed at Appendix-19. The matter was referred to the Ministry which has desired that the question may be placed before the Southern Regional Committee for consideration.

The matter is accordingly placed before the Regional Committee.

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ITEM NO.20: TO RECEIVE A NOTE ON CONFERENCE OF PRINCIPALS OF ENGINEERING COLLEGES AND POLYTECHNICS IN THE SOUTHERN REGION PROPOSED TO BE HELD ON NOVEMBER 21ST, 22ND and 23RD 1975 AT COIMBATORE.

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The Regional Committee at its last meeting held on April, 1975 approved the recommendations of the Standing Committee to hold a Conference of all the Principals of Polytechnics and Engineering Colleges in the Southern Region to consider the challenges posed by the latest situations in the field of Technical Education and to formulate specific measures for further development and improvement in the different crucial areas. A copy of the note placed before the Regional Committee may be seen at Appendix-20.

The Regional Committee noted that the Conference shall be organised by the P.S.G. College of Technology, Coimbatore in collaboration with all the Directors of Technical Education in the Southern Region and the Southern Regional Office of the Ministry of Education. The Regional Committee agreed with the observations of the Standing Committee that the Principals Conference will prove to be very useful in formulating new measures and schemes for the improvement and development of Technical Education. In this connection, the Regional Committee noted that the Screening Committee set up in pursuance of the recommendations of the Standing Committee has already done the necessary spade work to ensure that the Conference provides an effective opportunity to review the schemes already implemented in the different important areas of technical education and to formulate an effective strategy for further improvement and development. With slight modifications, the Regional Committee approved the under mentioned topics which were considered necessary for inclusion in the over-all programme of the Conference.

It will be seen from above that a stage has been reached when greater attention shall have to be devoted to formulate concrete plans for the development of faculty of the Polytechnics in the different States spelling out in detail the resources and efforts to be put in by all concerned. In this context the facilities available at Technical Teachers Training Institute, Madras, the manner in which we can have optimum utilisation of the same and the way to ensure best co-ordination between all concerned as also greater impact of energy and efforts put in from different ends may have to be examined in depth.

The matter is placed before the Regional Committee for its consideration.

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ITEM NO.18: TO CONSIDER THE QUESTION OF GRANTING PER.. MISSION TO FAILED CANDIDATES TO APPEAR FOR THE EXAMINATION UPTO A MAXIMUM OF FIVE TIM.. FOR THREE YEAR DIPLOMA COURSES IN ENGINEE RING.

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The question as to the number of attempts that might be permitted for an individual candidate to pass the first year examination either in the degree or in the diploma course was considered at the 27th meeting of the Co-ordinating Committee of the All India Council for Technical Education held on 18th October,58. The coordinating Committee recommended that unsuitable candidates should be eliminated at the end of the first year of degree and diploma courses with a view to ensuring effective utilisation of available facilities and providing timely advice for such candidates to choose alternative courses. The Coordinating Committee requ.. the Universities, State Boards and Institutions to formulate suitable rules for the purpose. The Committee also recommended that no student should be allowed to continue to study in the first year class of his cours beyond two years nor should be allowed to appear at mo than three examinations for the completion of the fir.. year.

In pursuance of the above recommendations of the Co-ordinating Committee of the All India Council for Technical Education, the State Government of Andhra Pradesh issued orders that the number of changes given to the candidates for the first year diploma examinations should be restricted to three which shall also include the first attempt as a regular candidate in the concerned Polytechnic/Institution. These chances must be availed in a period of 2 years, failing which the candidates w would not be allowed to appear for the examination any more.

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The State Government of Andhra Pradesh received representations that the candidates failing 3 times in the first year diploma examinations in engineering shall lose their future. It is desirable that such candidates be permitted for the examination at least upto five times to help them to pursue their studies in the Polytechnics. The State Government accordingly directed the Director of Technical Education, Andhra Pradesh, Hyderabad to have the views of the Government of India on the above point. The Director of Technical Education, Andhra Pradesh, Hyderabad approached the Southern Regional Office to reconsider the matter and communicate the views of Government of India whether the candidates failing in the first year diploma examination in engineering could be given five chances within a period of slightly over two years. A copy of letter No. EI-3/I53113/74 dated 23rd June, 1975 10th July, 1975 received from the Director of Technical Education In-charge, Andhra Pradesh, Hyderabad is placed at Appendix-18.

The matter was referred to the Ministry of Education and Social Welfare, New Delhi. The Ministry has desired that the matter may be consired by the Regional Committee.

The matter is accordingly placed before the Regional Committee for consideration.

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ITEM NO.19: TO CONSIDER THE QUESTION OF REIMPOSITION OF UPPER AGE LIMIT FOR ADMISSION INTO DIPLOMA COURSE IN ENGINEERING.

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The question of prescribing age limits for admission to technical institutions has been considered by the All India Council for Technical Education from time to time. At one time when the duration of the technical courses at the degree level was generally 4 years, the Council had recommended the maximum and minimum age limits, as 17 and 21 for the degree courses and 15 and 21 for the diploma courses respectively.

With the reorganisation of secondary education to 11 years pattern and consequent introduction of 5 years integrated courses in Engineering and Technology, the All India Council for Technical Education at its meeting held in April, 1960 recommended that during the transitional period, the minimum age of entry into the first degree course may be fixed at 16 and it should be raised to 17 when the reorganisation of the secondary education is completed.

In the light of the views expressed by the Education Commission that the age of admission of the child to Class I should ordinarily be not less than 6 and that there should be no age limit prescribed for any subsequent steps, the All India Council for Technical Education at its meeting held on the 23rd September, 1969, reviewed its earlier decision and recommended that no rigid age limits should be prescribed for, admission to degree and diploma courses in technical institutions. These recommendations of the Council were approved by the Government of India and communicated to all the authorities concerned for necessary action from the academic session 1970-71.

The Director of Technical Education, Andhra Pradesh has now intimated that the removal of both the lower and upper age limits have created certain problems in Polytechnics in their State. Due to disparity in age groups, there is a lot of indiscipline amongst the students, as some of the over aged students are in the habit of taking lead in defying the authorities, violating the rules and regulations of the institute and indulging in various acts of indiscipline such as boycotting of the classes and monthly tests, distrubing the examination work etc. Generally the over-aged students do not show any interest in studies and force the younger students to follow them in their acts of indiscipline.

The matter was considered by the Andhra Pradesh State Board of Technical Education. The Board decided that the question relating to reimposition of the upper age limit may be taken up denovo with the Government of India. The Director of Technical Education has therefore proposed that the reimposition of the upper age limit of 21 years in respect of admissions at the Diploma courses in the Polytechnics of the State with effect from 1975-76, and has requested concurrence of the Government of India for the same. As regards the over aged students, who were desirous of acquiring the diploma qualification, the Director of Technical Education has suggested that they may do so by appearing for the diploma examination, privately or by seeking admission to part time diploma courses.

A copy of the communication received from the Director of Technical Education, Andhra Pradesh is placed at Appendix-19. The matter was referred to the Ministry which has desired that the question may be placed before the Southern Regional Committee for consideration.

The matter is accordingly placed before the Regional Committee.

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ITEM NO.20: TO RECEIVE A NOTE ON CONFERENCE OF PRINCIPALS OF ENGINEERING COLLEGES AND POLYTECHNICS IN THE SOUTHERN REGION PROPOSED TO BE HELD ON NOVEMBER 21ST, 22ND and 23RD 1975 AT COIMBATORE.

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The Regional Committee at its last meeting held on April, 1975 approved the recommendations of the Standing Committee to hold a Conference of all the Principals of Polytechnics and Engineering Colleges in the Southern Region to consider the challenges posed by the latest situations in the field of Technical Education and to formulate specific measures for further development and improvement in the different crucial areas. A copy of the note placed before the Regional Committee may be seen at Appendix-20.

The Regional Committee noted that the Conference shall be organised by the P.S.G. College of Technology, Coimbatore in collaboration with all the Directors of Technical Education in the Southern Region and the Southern Regional Office of the Ministry of Education. The Regional Committee agreed with the observations of the Standing Committee that the Principals Conference will prove to be very useful in formulating new measures and schemes for the improvement and development of Technical Education. In this connection, the Regional Committee noted that the Screening Committee set up in pursuance of the recommendations of the Standing Committee has already done the necessary spade work to ensure that the Conference provides an effective opportunity to review the schemes already implemented in the different important areas of technical education and to formulate an effective strategy for further improvement and development. With slight modifications, the Regional Committee approved the under mentioned topics which were considered necessary for inclusion in the over-all programme of the Conference.

MANAGEMENT:

1. Review of the existing system of Management in the technical institutions at all levels.
2. Organisation, functioning and development of private institutions.
3. Organisation, functioning and development of Government institutions.
4. Autonomy of institutions and role of Government.
5. Hostel Management.

FACULTY:

1. Review of existing schemes for faculty development.
2. New schemes for faculty development in all respects.
3. Special measures to create conditions for motivated and dedicated work.
4. Academic Leadership.

INTERACTION WITH INDUSTRY:

1. Review of the existing situation
2. Special measures to accelerate the interaction.
3. Diversification with reference to actual needs of Industry.
4. Sandwich courses and other short-term and long-term industrially oriented courses.

CURRICULA:

1. Review of the existing schemes for Curriculum development.
2. Special measures to create conditions in technical institutions to keep curricula alive and alert to changing situations.

FUTURE GROWTH/DEVELOPMENT:

1. Growth and advancement in new directions without much additional inputs.
2. Earn while you learn Schemes.
3. Entrepreneurship and Creativity
4. Utilisation of spare capacity in laboratories and workshop for production and vocationalisation of High Schools.

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The Regional Committee noted that the Screening Committee had undertaken to get suitable papers written on the various topics which shall be circulated to all the Principals as also selected invitees from Industry. The Principals in turn will have consultations with their faculty members and in the light of their own thinking and experience send their written comments on the specific issues well in advance. The Screening Committee in the light of these comments, shall plan the entire programme of discussions so that the representatives having definite ideas to contribute get adequate time to supplement their written comments already sent.

In this connection, it may be stated that the Members of the Screening Committee have since written some papers on the various sections concerning (a) Management, (b) Faculty, (c) Interaction with Industry (d) Curricula and (e) Future Growth/Development approved for the Conference. These papers are placed at Appendixes (20) I, II, III, IV & V. It is now proposed to circulate these papers to all the Principals.These papers would serve as food for thought for the Principals and help them to discuss the relevant ideas with their faculty members. However in order to formulate the necessary strategy for further improvement and development, another paper is being prepared in pursuance of the discussions held by the Screening Committee at its meetings on 1st and 8th September,1975, which shall an overall review of the schemes already being implemented, the impact that the schemes have made and the feasibility of the ideas expressed in these papers to formulate new schemes to meet the challenge of present situations. This paper will also be sent to all the Principals to enable them to give their comments in a concrete manner. The paper will be laid on the table for the information of the Regional Committee.

The Conference has been finally fixed on the 21st to 23rd November, 1975 at Coimbatore. For the present an intimation has been sent to all the Principals about the proposed Conference. The Directors of Technical Education have also been requested to approve the participation of the Principals in the proposed Conference. The above mentioned papers as well as the paper on strategy referred to above will be circulated after the same has been seen by the Regional Committee.

The matter is placed before the Regional Committee for consideration. The members may like to give their valuable advice to make further improvement or amendment in the approach adopted for organising the Conference.

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ITEM NO.21: TO CONSIDER THE PROPOSAL OF THE ANDHRA PRADESH GOVERNMENT FOR THE ESTABLISHMENT OF A WOMENS POLYTECHNIC AT TIRUPATI UNDER THE MANAGEMENT OF TIRUMALA TIRUPATI DEVASTHANAMS.

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The Director of Technical Education, Andhra Pradesh, Hyderabad has forwarded a proposal for the establishment of Women's Polytechnic at Tirupati under the Management of Tirumala Tirupati Devasthanams for the approval of Southern Regional Committee. A copy of the letter from Director of Technical Education explaining the details of the schemes is given as Appendix-21.

As will be observed therefrom Tirumala Tirupati Devasthanam in their resolution No.1740 dated 11th July,75, have resolved to establish a Women's Polytechnic in 1975-76 being international womens year and informed the Director of Technical Education, Andhra Pradesh, Hyderabad that they propose to start the said Polytechnic under the private management of Tirumala Tirupati Devasthanams, Tirupati to offer the diploma in Commercial Practice (2) Architecture and Interior Decoration and (3) Food Technology and Catering with the existing facilities already available in the Home Science Department of the Sri Padmavati College for Women, Tirupati.

The Devasthanam requested the Director of Technical Education, Andhra Pradesh to obtain urgently the concurrence of the State Government of Andhra Pradesh and Southern Regional Office, Madras in order to enable them to start the Polytechnic from the academic year 1975-76. The Director of Technical Education, Andhra Pradesh has endorsed the proposal of establishment of a Women's Polytechnic at Tirupati for the consideration of the Southern Regional Committee. In the proposal, the Director of Technical Education, Andhra Pradesh has mentioned that at present there is no Women's Polytechnic in the Sri Venkateswara University area.

ITEM NO.22: TO CONSIDER THE QUESTION OF ESTABLISHMENT OF COMPUTER CENTRE AT P.S.G. COLLEGE OF TECHNOLOGY, COIMBATORE.

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A proposal has been received from the P.S.G. College of Technology, Coimbatore for establishment of a Computer Centre. It has been pointed out that the State Board of Technical Education and Training, Tamilnadu has agreed, in principle, for setting up of a Computer Centre at Coimbatore to meet the needs of the technical institutions and Research centres in and around Coimbatore. The gross capital expenditure on the Computer Centre would amount to Rs.25.01 lakhs. The details are given in the proposal submitted by the P.S.G. College of Technology, which may be seen at Appendix-22.

In this connection it may be stated that the Board of Post-graduate Studies and Research had appointed four Visiting Committees, one for each region, to evaluate the working of Post-graduate courses and to make recommendations for their consolidation and proper development. The recommendations of the Visiting Committees were examined by the Committee consisting of Chairmen of the Visiting Committees and the Chairman of the Post-Graduate Board in order to have a uniform approach to the whole question of development of Post-graduate courses, including the major fields of specialisation, norms for financial assistance, creation of research facilities and other related matters.

The main recommendations formulated by this Committee and accepted by the Board INTER-ALIA include that expensive items like Computer should be provided

on a regional basis. The All India Council for Technical Education at its 21st meeting held on 8th April, 1972 also endorsed the above recommendations. In this connection it may be stated that a Computer Centre has already been established at Indian Institute of Technology, Madras.

The matter is, however, placed before the Regional Committee for consideration.

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ITEM NO.23: TO RECEIVE A NOTE ON THE QUESTION OF MANAGEMENT OF PRIVATE TECHNICAL INSTITUTIONS.

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The All India Council for Technical Education at its meeting held in April 1972 had recommended that a Special Committee may be appointed to take an overall view of the present state of private engineering colleges, polytechnics and other technical institutions in the country, their financial resources, organisational and administrative set up, the relationship with State Governments and other educational authorites, funding etc., and to lay down broad policy guide-lines for their proper running and further development. In pursuance of these recommendations, a High Power Committee has been appointed to consider the matter in detail and make recommendations.

The Committee held its first meeting on 9th September, 1974 and considered the various aspects of the organisational and administrative set up of the private institutions. In order to formulate meaningful guidelines for running the private institutions on sound lines and to ensure their fuller development, the Committee wanted to have complete information about the present functions of the Governing Councils of the institutions and the various problems of the institutions in different aspects. Accordingly, the Ministry of Education Government of India asked the Regional Office to ascertain the present position by discussions or otherwise from the private technical institutions on the relevant aspects and forward the same to them along with our views in the matter for further consideration by the High Power Committee.

In pursuance of the above, steps were taken to obtain necessary information on the different aspects from the various technical institutions at the degree and diploma level. Replies have been received from a number institutions, a summary of which is placed at Appendix-

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been reached when the institutions should consolidate their position and make further advances in improving standards and quality of technical education. The proper Management of the Technical Institutions and consequently the optimum utilisation of the facilities is, therefore, most essential in order to make the best of the money spent on the establishment of these institutions. The Regional Committee may like to consider this important question of management of private technical institutions and like to offer its views on the issue.

The matter is placed before the Regional Committee.

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ITEM NO.24: TO RECEIVE A REPORT ABOUT THE NOMINATIONS MADE BY THE CHAIRMAN ON BEHALF OF THE REGIONAL COMMITTEE.

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The Regional Committee is aware that two representatives of the All India Council for Technical Education are normally to be nominated by the Southern Regional Committee on the Governing Councils of the Non-Government Institutions. Since the last meeting of the Southern Regional Committee, the Chairman has approved the nominations of the following members as representatives of the All India Council for Technical Education on the Governing Councils/Board of Governors of the under mentioned Institutions:-

Name of Institutions	Name of representatives
1. Regional Engineering College, Tiruchirapalli.	Prof. T.R. Doss, Vice-Chancellor, Jawaharlal Nehru Technological University, Camp.College of Fine Arts & Architecture, Saifabad, Hyderabad.
2. Karnataka Regional Engineering College, Surathkal.	1. Dr. T. Thimmaiah, Chairman & Managing Director, Mysore Minerals Ltd., 67/2,Lavelle Road, Bangalore-560001. 2. Dr.K.A.V.Pandalai, Director, Indian Instt. of Technology, Indian Instt. of Technology (P.O.), Madras-600036.

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3. Acharya Pathasala
Polytechnic,
Bangalore-560019.

1. Sri Arumugam,
Chairman,
District Small Scale
Industries Institute,
Central & Drives,
Coimbatore.

2. Col. G.K. Rao,
General Manager,
Bharat Electronics Ltd.,
Bangalore.

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ITEM No.25: TO RECEIVE A REPORT ON THE IMPLEMENTATION OF PRACTICAL TRAINING STIPEND SCHEME IN THE REGION.

The Ministry of Education, Social Welfare and Culture set up in the year 1969 the Board of Apprenticeship Training, (Southern Region) Madras with a view to intensify the programme of training of engineering graduates and diploma-holders.

A copy of the note regarding the implementation of Government of India Programme of Apprenticeship Training during the year 1974-75 and the implementation of the Apprentices (Amendment) Act 1973 as it pertains to the training of graduates and diploma holders during the year 1975-76 received from the Board of Apprenticeship Training, Southern Region, Madras is placed at Appendix No.25.

It would be observed therefrom that against the provision of Rs.32.80 Lakhs made for payment of stipends to the trainees during the year 1974-75, an expenditure of Rs.31.18 Lakhs was incurred for payment to the Engineering graduates and Diploma holders who joined the scheme during 1974-75 as well as to the candidates selected under the scheme year 1973-74, who continued their one year training during 1974-75. It will also be observed therefrom that the year 1975-76, the training of Engineering graduates and Diploma holders has been regulated under the Apprentices (Amendment) Act 1973. In view of this change, the Ministry of Education, Government of India informed the Board while releasing the funds for the year 1975-76 that the placement of candidates during the year 1975-76 should be as per the provisions of the Apprentices (Amendment) Act 1973.

As per the provisions of the above mentioned Act, every employer is required to train a prescribed number of graduates and Technician apprentices in relation to the managerial/supervisory personnel employed and the training facilities avail-

in the organisation. The period of training for the apprentices has been prescribed as one year. The graduates in engineering and technology will be paid for Post-institutional training a stipend of Rs.250/- p.m. and diploma-holders for Post-institutional training a sum of Rs.150/- p.m. The Act also provides for training for students undergoing Sandwich Courses in degree and diploma institutions. The Sandwich course student from a degree institution will be paid a sum of Rs.150/- p.m. and from a diploma institutions a sum of Rs.100/- per month, for the period of one year of training during the course of their studies in the institution. The stipends will be paid by the organisation concerned and 50% of the stipend paid to the apprentices would be reimbursed the Government of India through the Board.

In order to ensure that the trainees get gainful and effective training, the Board has already initiated following steps:

1. A guideline was prepared for formulating training programmes and circulated to the Industries.

2. The apprentices were required to submit periodic training reports.

3. The training establishments were requested to furnish periodic assessment reports.

4. Establishments were visited by the officers of the Board to supervise the training programmes.

As per the Apprentices (Amendment) Act now in vogue, the training programme of the trainees in the Industrial organisations has to be regulated as per the programme approved by the Government of India. Having once fixed the number of training places in the various Industrial organisations, the Board will have now more facilities available to see that the trainees undergo a purposeful training programme in the Industry concerned so that the candidates after training become easily employable in any Industrial organisation.

ITEM NO.26: TO RECEIVE A REPORT OF THE EXPERT COMMITTEE SET UP TO EXAMINE THE PROPOSAL OF THE STATE GOVERNMENT OF TAMILNADU FOR INTRODUCTION OF A COURSE IN DAIRY ENGINEERING IN CENTRAL POLYTECHNIC, MADRAS.

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ITEM NO.27: TO RECEIVE A REPORT OF THE EXPERT COMMITTEE SET UP TO EXAMINE THE PROPOSAL OF THE STATE GOVERNMENT OF TAMILNADU FOR INTRODUCTION OF POST-DIPLOMA COURSE IN TELEVISION ENGINEERING AT CENTRAL POLYTECHNIC, MADRAS.

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ITEM NO.28: TO RECEIVE A REPORT OF THE EXPERT COMMITTEE SET UP TO EXAMINE THE PROPOSAL OF THE STATE GOVERNMENT OF TAMILNADU FOR RESTRUCTURING THE EXISTING FISHERIES TECHNOLOGY AND NAVIGATION DIPLOMA COURSE AT CENTRAL POLYTECHNIC, MADRAS.

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The Expert Committees set up for the purpose are to visit the Central Polytechnic, Madras on 20th October, 1975. The reports of the Expert Committees will be placed on the table.

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ITEM NO:29: TO RECEIVE A REPORT OF THE EXPERT COMMITTEE SET UP TO EXAMINE THE PROPOSAL OF THE STATE GOVERNMENT OF TAMILNADU FOR INTRODUCTION OF INDUSTRIAL ENGINEERING COURSE AT THE UNDER-GRADUATE LEVEL AT COLLEGE OF ENGINEERING, GUINDY.

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ITEM NO.30: TO RECEIVE A REPORT OF THE EXPERT COMMITTEE SET UP TO EXAMINE THE PROPOSAL OF THE STATE GOVERNMENT OF TAMILNADU FOR INTRODUCTION OF UNDER-GRADUATE COURSE IN INDUSTRIAL ELECTRONICS AT COLLEGE OF ENGINEERING, GUINDY.

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ITEM NO.31: TO RECEIVE A REPORT OF THE EXPERT COMMITTEE APPOINTED TO EXAMINE THE PROPOSAL OF THE STATE GOVERNMENT OF TAMILNADU FOR INTRODUCTION OF POWER ELECTRONICS COURSE AT UNDER-GRADUATE LEVEL AT COLLEGE OF ENGINEERING, GUINDY.

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ITEM NO.32: TO RECEIVE A REPORT OF THE EXPERT COMMITTEE SET UP TO EXAMINE THE PROPOSAL OF THE STATE GOVERNMENT OF TAMILNADU FOR INTRODUCTION OF FISHERIES TECHNOLOGY AND NAVIGATION AS ELECTIVES IN MECHANICAL ENGINEERING AT COLLEGE OF ENGINEERING, GUINDY.

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ITEM NO.33: TO RECEIVE A REPORT OF THE EXPERT COMMITTEE APPOINTED TO EXAMINE THE PROPOSAL OF THE STATE GOVERNMENT OF TAMILNADU FOR INTRODUCTION OF COMPUTER SCIENCE AS AN ELECTIVE AT THE UNDER-GRADUATE LEVEL AT THE COLLEGE OF ENGINEERING, GUINDY.

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ITEM NO.34: TO RECEIVE A REPORT OF THE EXPERT COMMITTEE SET UP TO EXAMINE THE PROPOSAL OF THE STATE GOVERNMENT OF TAMILNADU FOR INTRODUCTION OF NAVAL ARCHITECTURE AND MARINE ENGINEERING AS ELECTIVES UNDER MECHANICAL ENGINEERING AT COLLEGE OF ENGINEERING, GUINDY.

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The Expert Committee s constituted for the purpose are to visit the Engineering College, Guindy on 13th October, 1975.

The reports of the Expert Committees will be placed on the table.

APPENDIXES

MINUTES OF THE FORTYFIRST MEETING OF THE SOUTHERN REGIONAL COMMITTEE OF THE ALL INDIA COUNCIL FOR TECHNICAL EDUCATION HELD AT MADRAS IN THE CONFERENCE HALL, SHASTRI BHAVAN AT 10.30 A.M. ON THE 1ST APRIL, 1975.

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The FORTYFIRST meeting of the Southern Regional Committee of the All India Council for Technical Education was held in the Conference Hall, at Shastri Bhavan, Madras on the 1st April, 1975 at 10.30 A.M. under the Chairmanship of Prof. G.R.Damodaran.

The following were present:-

MINISTRESOF GOVERNMENT OF INDIA.

1. Ministry of Education and Social Welfare.	Dr. K.A.V. Pandalai, Director, Indian Institute of Technology, MADRAS.
2. Ministry of Labour and Employment.	Sri E.G. Menon, Asst. Director of Apprenticeship Training, Southern Region, Guindy, MADRAS.
3. Ministry of Railways	Sri R.Tyagarajan, Addl. Chief Mechanical Engineer (W), Southern Railway, MADRAS.

STATE GOVERNMENTS IN THE REGION

4. Government of Kerala	Dr. S.Vasudev, Director of Technical Education, Government of Kerala, TRIVANDRUM.
5. Government of Karnataka	Sri K.S. Ballal, Director of Technical Education, Government of Karnataka, BANGALORE
6. Government of Tamilnadu	Sri C.G.Rangabashyam, IAS, Special Secretary to Government of Tamilnadu, Education Department, Fort St. George, MADRAS.

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STATE BOARDS OF TECHNICAL EDUCATION

7. State Board of Technical Education & Training, Tamilnadu.	Dr. V.C.Kulandaiswamy, Director of Technical Education, Government of Tamilnadu, MADRAS.25.

OTHER INTERESTS:

8. Labour	Sri S.M. Narayanan, Asst. Secretary, Indian National Trade Union Congress, Tamilnadu Branch, 11, Philips Street, MADRAS.1.

TECHNICAL INSTITUTIONS & UNIVERSITIES HAVING TECHNOLOGICAL DEPARTMENTS.

9. Technical Institutions and Universities having technological departments.		1. Prof. G.R.Damodaran, Dean, Post-graduate studies, P.S.G. College of Technology, COIMBATORE.
10.	-do-	2. Dr. B.K.Ramaiah, Principal, Visveswaraya College of Engineering, BANGALORE.
11.	-do-	3. Prof. A.P.Jambulingam, Principal, Technical Teachers' Training Institute, Madras.
12.	-do-	4. Sri S.N. Parappa, Principal, S.J. Polytechnic, Bangalore.
13.	-do-	5. Prof. K.M.Bahauddin, Principal, Regional Engineering College, CALICUT.
14. Chairman, Board of Apprenticeship Training (Southern Region) (Ex-officio)		Sri V.M.Raghavan, Director, Board of Apprenticeship Training, (Southern Region) MADRAS. (Nominee of the Chairman)

OTHER PROFESSIONAL BODIES:

15. Institution of Engineers (India).	Prof. B.R.Narayana Iyengar, F.I.E., 175, 1st Main Road, Seshadripuram, BANGALORE-20.
16. Indian Society for Technical Education.	Prof. K.S. Hegde, Executive Secretary, Indian Society for Technical Education, C/o. Indian Institute of Technology, I.I.T. (P.O.), MADRAS-36.
17. Co-opted Member	Mrs. K.R.L. Reddi, Principal, Kamala Nehru Polytechnic for Women, Exhibition Grounds, HYDERABAD.
18. All India Council for Technical Education Member resident in Madras.	Sri M. Ganapati, Institution of Engineers(India), MADRAS.
19. All India Council for Technical Education Member resident in Madras.	Sri R. Viraraghavan, Training Officer, Binny Limited (B&C Mills), Carnataka House, Stephenson Road, MADRAS-12.
20. Member-Secretary	Sri S.K. Handa, Regional Officer, Southern Regional Office, Ministry of Education & S.W., MADRAS.

The following members could not attend:

1. Government of Andhra Pradesh.	Sri M.V.Rajagopal, I.A.S., Secretary to the Govt. of Andhra Pradesh, Education Department, HYDERABAD-22.
2. Government of Pondicherry.	Sri Prodipto Ghosh, I.A.S., Director of Education/ Secretary to the Government of Pondicherry, Education Department, Pondicherry.

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3. State Board of Technical Education & Training, Andhra Pradesh.	Sri P.H.N.B. Sarma, Jt. Director of Technical Education, Government of Andhra Pradesh, Hyderabad.
4. State Board of Technical Education, Kerala State.	Sri P.K.Umashankar, I.A.S., Special Secretary (Higher Education), Government of Kerala, Trivandrum.
5. State Advisory Board of Technical Education, Karnataka State.	Sri B.S.Srikantiah, Commissioner of Education & Secretary to the Government of Karnataka, Department of Education & Youth Services, Vidhana Soudha, Bangalore.1.
6. Industry	Lt. Gen.C.Sundara Rao (Retd.), Managing Director, Bharat Heavy Plates and Vessels Limited, Visakhapatnam.
7. Commerce	Sri S.Narayanaswamy, M.L.C., M/s. Chitra & Co., MADRAS.
8. Technical Institutions and Universities having Technological Departments	Sri Md. Abdul Kayyum Khan, Principal, Jawaharlal Nehru Polytechnic, Hyderabad.
9. All India Council for Technical Education.	Sri K.T. Chandy, Chairman, Kerala State Industrial Development Corporation, Trivandrum.
10. State Industrial Liaison Board, Tamilnadu.	Sri N.Mahalingam, Chairman, Sakthi Pipes Ltd., Sakthi Sugar Limited, 49, St. Mary's Road, Madras-18.
11. Co-opted Member	Dr. S.M. Patil, Chairman & Managing Director, Hindusthan Machine Tools Ltd., Bangalore-3.

Nominations for the following constituencies had not yet been received:-

1. State Industrial Liaison Board, Karnataka State.
2. State Industrial Liaison Board, Andhra Pradesh.
3. State Industrial Liaison Board, Pondicherry.

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Prof. T.R. Doss, Vice-Chancellor, Jawaharlal Nehru Technological University, Hyderabad and Prof. C.P. Kuriakose, Pro-Vice-Chancellor of Cochin University attended the meeting as special invitees. Sri A.P. Srivastava, Education Officer (Tech) and Mrs. D. Janaki, Asst. Information Officer, Press Information Bureau, Madras were also present.

The Chairman welcomed the members to the Fortyfirst meeting of the Southern Regional Committee. The Chairman pointed out that the former Member-Secretary, Sri M.S.Srinivasan had been transferred to Delhi on his promotion to the next higher rank and referred to the good work done by him during the period of his association with the Southern Regional Committee. At the request of the Chairman, the Regional Committee decided to place on record its appreciation for the services rendered by Sri M.S. Srinivasan as Member-Secretary of the Regional Committee. The Chairman then welcomed Sri S.K. Handa, the new Member-Secretary who has taken over in place of Sri M.S. Srinivasan. The Chairman pointed out that Sri S.K. Handa had been till recently in West Germany as Head of the Education Department in the Indian Embassy, Bonn where he was nearly for a period of 4 years. On his transfer back to India, Sri Handa has straightaway been posted to Madras to take charge of the Southern Regional Office. The Chairman expressed the hope that the Regional Committee shall have the full benefit of the valuable experience acquired by Sri Handa in West Germany during the period of his four years tenure in that country. With these few remarks, the Chairman requested the Committee to take up the items on the Agenda for consideration.

ITEM NO.1: TO CONFIRM THE MINUTES OF THE MEETING OF THE SOUTHERN REGIONAL COMMITTEE HELD ON 2ND MAY, 1974.

The Regional Committee noted that the Minutes of its Fortieth meeting held on 2nd May, 1974

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were duly circulated to all the members. In the absence of any comments, the Committee resolved that the Minutes may be confirmed.

ITEM NO.2: TO RECEIVE A REPORT ON THE ACTION TAKEN ON THE RECOMMENDATIONS OF THE LAST MEETING OF THE REGIONAL COMMITTEE.

The Regional Committee noted the action taken and progress made on the resolutions passed at its last meeting held on the 2nd May, 1974. In connection with the introduction of post-diploma course in Television Engineering (Servicing and Maintenance), the Regional Committee observed that one of the States was thinking of introducing a Post-diploma course of six months duration in the subject. The Regional Committee felt that six months period was inadequate to conduct effectively a post-diploma course. Having regard to the topics expected to be covered in a Post-diploma course, the employbility of the candidates completing such a course, the Regional Committee resolved that the minimum duration of Post-diploma course in Television Engineering (Servicing and Maintenance) should be one academic year of nine months. The Regional Committee decided that these recommendations should be forwarded to the different States for their consideration and appropriate action.

ITEM NO.3: TO RECEIVE A REPORT OF THE SECOND MEETING OF THE STANDING COMMITTEE OF THE SOUTHERN REGIONAL COMMITTEE HELD ON 16TH DECEMBER,1974.

The Regional Committee noted the recommendations made on the various items by the Standing Committee at its meeting held on 16th December, 1974 and also the action taken on various recommendations. While endorsing the recommendations of the Standing Committee regarding staff structure in Engineering Colleges and Polytechnics, the Committee observed that the designation of the post of Professor of Placement and Training

in the Polytechnics should be appropriately worded since the staff structure in the polytechnics did not provide any cadre of Professors. The Committee therefore decided that the post should be designated as Officer incharge of Placement and Training and the status of this post should be that of the Head of the Department.

ITEM NO.4: TO REPORT THE IMPORTANT DECISIONS TAKEN/ RECOMMENDATIONS MADE BY THE ALL INDIA COUNCIL FOR TECHNICAL EDUCATION AT ITS 22ND MEETING HELD ON 17TH MAY, 1974.

The Regional Committee noted the important decisions taken and recommendations made by the All India Council for Technical Education at its 22nd Meeting held on 17th May, 1974. The Committee observed that the Council had recommended that the revised University Grants Commission scales should be made applicable to the teachers in Engineering Colleges and Polytechnics. The Council, however, felt that before implementing the revised pay scales of teachers in Engineering Colleges and Polytechnics, the details of qualifications, experience and other requirements prescribed for the various categories of teaching posts in technical institutions should be examined, vis-a-vis those recommended by the University Grants Commission for teachers in Universities and colleges for whom the revised pay scales are applicable. The Council authorised its Chairman to obtain the views of the State Governments and to appoint a Committee to examine all these questions and take a decision on the implementation of the revised scales in engineering colleges and polytechnics. While noting the above recommendations the representatives of some of the States and the technical institutions pointed out that in the absence of decision on the revised scales by the All India Council for Technical Education, they were facing a lot of difficulties. The members pointed out that it was essential that the All India Council for Technical

Education should give its own version of the revised scales for the engineering colleges and polytechnics without delay. The Committee accordingly resoved that the All India Council for Technical Education should be requested to expedite its decision in this behalf.

ITEM NO.5: TO NOTE THE PROGRESS MADE ON THE INTRODUCTION OF MODEL DIPLOMA COURSES FOR TRAINING OF TECHNICIANS IN CERTAIN EMERGING TECHNOLOGICAL AREAS AT SELECTED INSTITUTIONS WITH THE CO-OPERATION OF THE GOVERNMENT OF U.S.S.R.

The Regional Committee noted that the scheme for introduction of model diploma courses in specialised technician fields with Soviet assistance for training of middle level technician in emerging areas of technological development was at present included in the State Sector under reorganisation and diversification of polytechnic courses. The representatives of some of the State Governments pointed out that this special scheme was considered by them very important in making new advances in specialised areas but it would be a great strain if they had to include it in the State Sector. Besides, the inclusion of this scheme would require considerable readjustment of the proposals contemplated by the State Governments for implementation during the Fifth Five Year Plan. Having regard to the difficulty of the States and the importance of this scheme for promoting specialised courses in emerging areas of technology, the Regional Committee recommended that for some time important schemes of this type should be provided under the Centrally sponsored Sector.

ITEM NO.6: TO RECEIVE A REPORT ABOUT THE NOMINATIONS MADE BY THE CHAIRMAN ON BEHALF OF THE REGIONAL COMMITTEE.

The Regional Committee noted the nominations made by the Chairman on its behalf on the Governing Bodies of the different institutions. In this context, the Committee observed that the Ministry of Education has decided that hereafter the representative of the

All India Council for Technical Education on the Board of Governors of the Technical Teachers' Training Institute, Madras who was so far being nominated by the Regional Committee on behalf of the All India Council for Technical Education, shall be nominated by the Council itself. The Regional Committee discussed in great detail the effect of this change in the procedure and felt that the proposed change would not be helpful in the interest of promotion of technical education in the region. The Regional Committee observed that the Southern Regional Committee was in close touch with the developments in the different areas of importance in the field of technical education and should therefore be in a better position to nominate the representatives on the Board of Governors of the various technical institutions including those set up by the Central Government. The Regional Committee, accordingly, resolved to recommend to the All India Council for Technical Education to allow it to continue to deal with the nominations of the representatives of the All India Council for Technical Education on the Governing Bodies of the different technical institutions.

ITEM NO.7: TO RECEIVE A REPORT OF THE EVALUATION COMMITTEE ON THE EVALUATION OF THE MADRAS INSTITUTE OF TECHNOLOGY, MADRAS.

The Regional Committee expressed high appreciation for the report submitted by the Evaluation Committee on the Madras Institute of Technology, Madras. The Committee remarked that it was an excellent piece of work which the Evaluation Committee has done particularly in the context of improving the standards and quality of technical institutions by spelling out valuable guide lines. The representatives of some of the State Governments remarked that they were in great need for such evaluation reports to enable them to know as to where they stand so that they may be able to make

good the deficiencies in the polytechnics and engineering colleges in their States and formulate specific measures for their further development and growth which was of paramount importance at present. The representatives of some of the State Governments further pointed out that even though the State Boards of Technical Education had been set up, they would like to have the evaluation of their polytechnics by outside agencies. The members of the Committee, accordingly, expressed the view that it would be really beneficial if the work of the Evaluation Committees of the Southern Regional Committee covered the polytechnics also particularly wherever the concerned State Governments were keen to have evaluation from the outside agencies. The Regional Committee accordingly agreed in principle, that the evaluation of the polytechnics which had been hitherto left out should also be brought within the purview of the Evaluation Committees.

Having regard to the importance of the evaluation work, the Regional Committee also expressed the desire that the Evaluation Committee should try to expedite the evaluation work in respect of different institutions in the various States, as far as possible, even by stretching a little more than what may be feasible, and the concerned State Governments should provide all possible facilities to the Evaluation Committees to complete this important task.

ITEM NO.8: TO REVIEW THE FUNCTIONS OF THE REGIONAL COMMITTEE WITH A VIEW TO SUGGEST SUITABLE MODIFICATIONS IN THE LIGHT OF CHALLENGES POSED BY THE LATEST DEVELOPMENT.

The Regional Committee noted that the All India Council for Technical Education at its last meeting held on17th May, 1974 had authorised its Chairman to examine the existing functions of the Regional Committees and revise them wherever necessary

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in accordance with the major responsibilities entrusted to them. The Committee observed that in the light of the latest developments, there were a number of important functions which shall have to be performed by the Regional Committees, without duplicating in any way, the work of other institutions/organisations set up in the different States. The Committee felt that in order to meet the challenges posed by latest situations in the field of technical education, the role of the Regional Committee had assumed great importance. The members expressed the view that it had become necessary that a serious thought should be given to spell out the important functions to which the Regional Committee should pay greater attention. Accordingly, the Regional Committee decided to set up the following Committee to examine the entire position in detail, the major areas of importance and report to the Regional Committee.

1. Prof. T.R. Doss,
   Vice-Chancellor,
   Jawaharlal Nehru Technological University,
   HYDERABAD.
2. Dr. K.A.V. Pandalai,
   Director,
   Indian Institute of Technology,
   MADRAS-36.
3. Sri M.V. Rajagopal,
   Director of Technical Education I/c,
   Government of Andhra Pradesh,
   HYDERABAD.
4. Dr. S.Vasudev,
   Director of Technical Education,
   Government of Kerala,
   TRIVANDRUM.
5. Sri K.S. Ballal,
   Director of Technical Education,
   Government of Karnataka,
   BANGALORE.
6. Dr. V.C.Kulandaiswamy,
   Director of Technical Education,
   Government of Tamilnadu,
   MADRAS.

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7. Prof. K.M. Behauddin,
Principal,
Regional Engineering College,
Calicut.

and 8. Sri S.K. Handa,
Member-Secretary,
Southern Regional Committee of the
All India Council for Technical Education,
and
Asst Educational Adviser (Tech.),
Ministry of Education & S.W.,
Southern Regional Office,
MADRAS. .. CONVENER.

ITEM NO.9: TO CONSIDER THE REQUEST FOR REVIVAL OF POST-DIPLOMA COURSE IN AUTOMOBILE ENGINEERING FROM 1970-71 IN NACHIMUTHU POLYTECHNIC, POLLACHI.

The Regional Committee noted that the Post-diploma course in Automobile Engineering which was discontinued from 1965-66 was revived by the Institute from the year 1970-71 with an intake of 15 to 20 students with the approval of the Director of Technical Education, Tamilnadu. The Regional Committee also noted the reasons advanced by the Institute and endorsed by the State Government that the employment opportunities for post-diploma students had become bright after the formation of Transport Corporations. Having regard to these considerations, the Regional Committee approved the revival of the Post-Diploma course in Automobile Engineering by Nachimuthu Polytechnic, Pollachi with effect from the year 1970-71.

ITEM NO.10: TO RECEIVE A NOTE FROM THE TECHNICAL TEACHERS' TRAINING INSTITUTE REGARDING THE PROBLEM OF DEPUTING TEACHERS TO SHORT COURSES UNDER QUALITY IMPROVEMENT PROGRAMME.

The Regional Committee noted the problem of Technical Institutions in deputing teachers to short courses under Quality Improvement Programme organised by the Technical Teachers' Training Institute, Madras.

The Committee appreciated that the facilities afforded by the Technical Teachers' Training Institute, Madras and different courses organised by the Institute under the Quality Improvement Programme, should be utilised to the maximum possible extent. In order to improve the situation and remove the factors responsible for delay in deputing teachers, the Regional Committee recommended that for short-term courses the State Governments should authorise the Principals of the respective technical institutions to sponsor the teachers directly so that unnecessary delay be avoided and the teachers concerned are able to make use of the courses thus organised. The representatives of the State Governments agreed to take necessary action accordingly.

ITEM NO.11: TO CONSIDER A NOTE ON THE IMPLEMENTATION OF THE RECOMMENDATIONS OF THE ALL INDIA COUNCIL FOR TECHNICAL EDUCATION REGARDING MAINTENANCE EXPENDITURE IN POLYTECHNICS AND ENGINEERING COLLEGES.

The Regional Committee noted the revised norms approved for calculating recurring expenditure in engineering colleges and polytechnics. The Committee also noted that these revised norms have already been intimated to the State Governments and expressed the hope that the same will be duly adopted by all the States.

ITEM NO.12: TO RECEIVE A REPORT OF THE EXPERT COMMITTEE APPOINTED TO EXAMINE THE PROPOSAL OF THE STATE GOVERNMENT OF KERALA FOR INTRODUCTION OF POST-DIPLOMA COURSE IN INDUSTRIAL ELECTRONICS AT THE CENTRAL POLYTECHNIC, TRIVANDRUM.

The Regional Committee considered the report of its Expert Committee and approved the proposal of the State Government of Kerala for the introduction of post-diploma course in Industrial Electronics at Central Polytechnic, Trivandrum with the following estimates of cost:

NON-RECURRING:

Equipment	...	Rs. 1.50 Lakhs
Books and Furniture	...	Rs. 0.50 Lakhs

RECURRING:

Staff

Lecturer .. 1		
Part-time Lecturer .. 2		
Instructor .. 1	Rs.0.43 Lakhs	p.a.
Skilled Assistant .. 1		
Attender .. 1		
L.D.C. .. 1		
Books and periodicals	Rs.0.05	"
Maintenance and Contingencies	0.05	"
Honorary & Supervisory Staff in Industry during training.	Rs.0.02	"
	Rs.0.55 Lakhs	

The Regional Committee accepted the recommendations of its Expert Committee that besides the holders of diploma in Electronics, the diploma holders in Electrical Engineering will also be eligible for admission to this course. The Regional Committee also agreed that the intake to the post-diploma course be restricted to 10 which should be within the approved strength of the polytechnic and further increase in intake will be effected only when it is fully justified by greater demand from Industry. The Regional Committee also endorsed the recommendations of the Expert Committee that the State Government and the institution concerned should ensure active co-operation of the Electronics Industry before actually introducing the course. Further, the majority of the candidates, as far as possible, should be sponsored by the Industry so that they could be readily and immediately employed after successful completion of the course.

ITEM NO.13: TO RECEIVE A REPORT OF THE EXPERT COMMITTEE TO EXAMINE THE PROPOSAL OF THE STATE GOVERNMENT OF TAMILNADU TO START A SANDWICH TYPE OF DEGREE COURSE IN TEXTILE TECHNOLOGY AT THIAGARAJAR COLLEGE OF ENGINEERING, MADURAI.

The Regional Committee considered the report of its Expert Committee and approved the proposal of the

State Government of Tamilnadu for introduction of Sandwich degree course in Textile Technology at Thiagarajar College of Engineering, Madurai with the following estimates of cost:-

NON-RECURRING.

Buildings 8,534 sq.ft. at Rs.30/- p.sq.ft.		Rs. 2,56,000/-
Equipment		Rs. 3,10,000/-
Total ..		Rs. 5,66,000/-

RECURRING (Per Annum)

Salary of staff	Rs. 1,61,515/-
Consumables	Rs. 20,000/-
Total ..	Rs. 1,81,515/-

or say Rs. 1.82 Lakhs

The Regional Committee endorsed the recommendations of the Expert Committee that the intake to the course should be 15 per semester which should be in addition to approved strength for the institution. The Regional Committee also accepted the recommendations of its Expert Committee that the course should be started only after the necessary co-operation of Industry has been ensured by the Institute. The Regional Committee stipulated that the Industry should provide continuous supervision and also sponsor 10 candidates every semester.

ITEM NO.14: TO RECEIVE A REPORT OF THE EXPERT COMMITTEE SET UP TO EXAMINE THE PROPOSAL OF THE STATE GOVERNMENT OF KARNATAKA FOR INTRODUCTION OF POST-DIPLOMA COURSE IN REFRIGERATION AND AIR CONDITIONING AT GOVERNMENT POLYTECHNIC, KARWAR.

The Regional Committee referred the report of the Expert Committee to the State Government of Karnataka for review and decided that the report may be considered only after the comments of the State Government have been received.

ITEM No.15: TO CONSIDER THE QUESTION OF INTRODUCTION OF REVISED CURRICULUM AND SYLLABUS FOR SIX YEAR FULL TIME DIPLOMA COURSE IN ARCHITECTURE ON SANDWICH PATTERN IN SELECTED INSTITUTIONS.

The Regional Committee decided that an Expert Committee may be appointed to select suitable Architectural institutions in the Southern Region in consultation with the State Governments concerned where the revised architectural course on Sandwich basis could be organised. The Regional Committee authorised its Chairman to constitute this Committee.

ITEM No.16: TO RECEIVE A REPORT OF THE EXPERT COMMITTEE APPOINTED TO WORK OUT THE FINANCIAL ESTIMATES FOR THE INTRODUCTION OF DIPLOMA COURSE IN CINEMATOGRAPHY IN CENTRAL POLYTECHNIC, TRIVANDRUM.

The Regional Committee considered the report of its Expert Committee and approved the introduction of diploma course in Cinematography in Central Polytechnic, Trivandrum with the following estimates of cost:-

NON-RECURRING.

Buildings (5,420 sq.ft.)		Rs. 2.45 Lakhs
Equipment		Rs.15.72 Lakhs
	Total ..	Rs.18.17 Lakhs

RECURRING

Staff		Rs. 1.13 Lakhs p.a.
Consumables		Rs. 0.50 Lakhs p.a.
	Total ..	Rs. 1.63 Lakhs p.a.

The Regional Committee endorsed the recommendations of the Expert Committee that the proposed diploma course should be confined to 16 mm. cinematography, for which adequate facilities are at present not available anywhere in the country. The Regional Committee

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agreed with the recommendations of the Expert Committee that the intake to the course should be restricted to 10 only to start with, and the increase in intake should be effected only when it is fully justified by greater demand from Industry and other film organisations. The above intake shall be in addition to the approved strength of the polytechnic.

The Committee also endorsed the recommendations of the Expert Committee that the course shall be of two years duration with P.U.C., or Pre-degree examination or equivalent as the minimum qualifications for admission.

ITEM No.17: TO RECEIVE A NOTE ON THE PROGRAMME OF SHORT TERM TRAINING IN INDUSTRY FOR TEACHERS OF ENGINEERING COLLEGES AND POLYTECHNICS UNDER THE QUALITY IMPROVEMENT PROGRAMME IN THE SOUTHERN REGION.

The Regional Committee noted that the utilisation of facilities made available under the scheme has not been very satisfactory in the year 1974-75. The Committee expressed the hope that in the current year the provision made under the scheme will be fully utilised in order to train the maximum possible number of teachers of engineering colleges and polytechnics in Industry. The representatives of State Governments agreed to take necessary steps to make the most of the facilities extended under the scheme.

ITEM No.18: TO RECEIVE A NOTE ON THE IMPLEMENTATION OF PRACTICAL TRAINING STIPEND SCHEME IN THE REGION.

The Regional Committee noted the progress in the implementation of the scheme and the number of graduates and diploma-holders posted for training during the year 1973-74 and the year 1974-75. The Committee also noted the steps taken by the Board of Apprenticeship Training for ensuring gainful and effective experience to the candidates placed in the Industrial Establishment for training under the scheme.

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ITEM NO.19: TO CONSIDER THE QUESTION OF INCREASE IN THE AREA AND HEIGHT OF THE HIGH VOLTAGE LABORATORY OF THE NATIONAL INSTITUTE OF ENGINEERING, MYSORE.

The Regional Committee observed that an area of 1,441 sq.ft. with 34' height constructed by the National Institute of Engineering, Mysore for the High Voltage Laboratory as against the ceiling of 1,000 sq.ft. with 20' height was justified. The Regional Committee, therefore, recommended that the additional area of nearly 441 sq.ft. and additional height of 14' constructed by the Institute for its High Voltage Laboratory over and above the ceiling may be approved and the revised cost of construction as assessed by the Expert Technical Committee should be accepted for the purpose of release of additional grant to the Institute.

ITEM NO.20: TO RECEIVE A NOTE ON CONFERENCE OF PRINCIPALS OF ENGINEERING COLLEGES AND POLYTECHNICS IN THE SOUTHERN REGION PROPOSED TO BE HELD TOWARDS THE END OF MAY, 1975.

The Regional Committee was glad to note the recommendations of its Standing Committee regarding the Conference of Principals of Polytechnics and Engineering Colleges in the Southern States proposed to be held at Coimbatore towards the beginning of June 1975. The Regional Committee noted that the Conference shall be organised by the P.S.G. College of Technology, Coimbatore in collaboration with all the Directors of Technical Education in the Southern States and the Southern Regional Office of the Ministry of Education.

The Regional Committee agreed with the observations of its Standing Committee that the proposed Conference will be very useful to consider the challenges posed by the latest situations in the field of technical education and to formulate specific measures for further improvement and development in the different crucial areas.

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The Regional Committee noted that the Programme and Screening Committee set up in pursuance of the recommendations of the Standing Committee has already done the necessary spade work to ensure that the Conference provides an opportunity to review the schemes already implemented in the different important areas of technical education and to formulate a useful strategy in the field of technical education for further improvement and development in the Southern Region. The Regional Committee approved with slight modifications the recommendations of the Programme and Screening Committee and resolved that the undermentioned topics should be included in the overall programme of the proposed Conference.

MANAGEMENT:

1. Review of the existing system of Management in the technical institutions at all levels.
2. Organisation, functioning and development of Private institutions.
3. Organisation, functioning and development of Government institutions.
4. Autonomy of institutions and role of Government.
5. Hostel Management.

FACULTY:

1. Review of existing schemes for faculty development.
2. New schemes for faculty development in all respects.
3. Special measures to create conditions for motivated and dedicated work.
4. Academic Leadership.

INTERACTION WITH INDUSTRY

1. Review of the existing situation
2. Special measures to accelerate the interaction.
3. Diversification with reference to actual needs of Industry.
4. Sandwich courses and other short-term and long term industrially oriented courses.

CURRICULA:

1. Review of the existing schemes for Curriculum development.
2. Special measures to create conditions in technical institutions to keep curricula alive and alert to changing situations.

FUTURE GROWTH/DEVELOPMENT:

1. Growth and advancement in new directions without much additional inputs.
2. Earn while you learn Schemes.
3. Entrepreneurship and Creativity.
4. Utilisation of spare capacity in laboratories and workshop for production and vocationalisation of High schools.

The Regional Committee noted with satisfaction that the Programme and Screening Committee will arrange to get suitable papers written on all these topics which shall be circulated to all Principals of Polytechnics and Engineering Colleges as also selected invitees from Industry. The Principals in turn will have consultations with their faculty members and in the light of their own thinking and experience send written comments on the specific issues well in advance. The Programme and Screening Committee in the light of these comments shall plan the entire programme of discussions in an effective manner so that the representatives having definite ideas to contribute get adequate time to present their views to further supplement their written comments already sent. The Regional Committee expressed the satisfaction that the systematic approach thus adopted shall render great help in ensuring the best utilisation of the available time and making the Conference a good success.

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ITEM NO.21: TO CONSIDER THE LETTER NO.F.26-7/74-T.5 DATED THE 29TH JULY,1974 FROM THE MINISTRY OF EDUCATION AND SOCIAL WELFARE, GOVERNMENT OF INDIA REGARDING THE NEW EQUIPMENT LIST FOR POLYTECHNICS SUGGESTED BY THE CURRICULUM DEVELOPMENT CELL AT TECHNICAL TEACHERS' TRAINING INSTITUTE, BHOPAL.

The Regional Committee noted the guide lines suggested by the Technical Teachers' Training Institute, Bhopal for the revised list of equipment for the Polytechnic courses keeping in view the changes in curriculum, teaching practices and techniques.

The Regional Committee also noted that the Ministry of Education has already requested all the States and Union Territories to counsel the polytechnics both Government and non-Government in their control, to equip their laboratories and workshops in accordance with these guide lines.

ITEM NO.22: TO RECEIVE A REPORT OF THE EXPERT COMMITTEE SET UP TO EXAMINE THE PROPOSAL OF THE ENGINEERING COLLEGE, TRIVANDRUM FOR STARTING PART-TIME COURSES IN CIVIL, MECHANICAL AND ELECTRICAL ENGINEERING FOR DIPLOMA HOLDERS EMPLOYED IN INDUSTRY OR OTHER TECHNICAL ORGANISATIONS.

The Regional Committee considered the report of its Expert Committee and approved the introduction of part-time degree courses in Civil, Mechanical and Electrical Engineering with an intake of 30 students for each course at the Engineering College, Trivandrum with the following estimates of cost:-

NON-RECURRING:

Extra lighting in laboratories, library and dinning hall	Rs. 25,000/-
Purchase of new books	Rs. 25,000/-
Furniture	Rs. 20,000/-
	Rs. 70,000/-

RECURRING (PER ANNUM):

1. Pay/Honorarium of teaching staff at Rs.20/- per hour	Rs.1,80,000/-
2. Pay and Honorarium to office and supporting staff	Rs. 45,000/-
3. Maintenance expenditure on stores and consumable material, water, electricity, gas etc.	Rs. 50,000/-
4. Office expenses and contingencies	Rs. 10,000/-
5. Library Books	Rs. 5,000/-
	Rs.2,90,000/-

ITEM NO.23: TO RECEIVE A NOTE ON THE PROGRAMME OFFERED BY THE TECHNICAL TEACHERS' TRAINING INSTITUTE, MADRAS ON THE TRAINING OF POLYTECHNIC TEACHERS, AND TO CONSIDER THE QUESTION OF MAKING THE BEST USE OF THE FACILITIES OFFERED.

The Regional Committee noted the facilities provided by the Technical Teachers' Training Institute, Madras and the various courses organised by it. The Committee observed that it was very essential that the facilities created at the institute at such a great cost should be utilised to the maximum possible extent. In this context, the Regional Committee decided that the Technical Teachers' Training Institute should bring out a Brochure giving all the courses organised and the facilities it can offer for training and retraining so that the State Governments and the State Directorates of Technical Education may be able to take all possible steps to accelerate the progress in the implementation of the scheme for the training of polytechnic teachers.

ITEM NO.24: ANY OTHER ITEM:

The Regional Committee noted the various proposals received from the Government of Tamilnadu

for introduction of new courses and also the proposals received from the Government of Kerala which were placed on the table and decided to refer these proposals to its Standing Committee for examinging them in detail and making recommendations.

The Meeting terminated with a Vote of thanks to the Chair.

Sd/.....,
(S.K. HANDA.)
MEMBER-SECRETARY.

Sd/.....,
(G.R.DAMODARAN)
CHAIRMAN.

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APPENDIX-3

REPORT OF THE EXPERT COMMITTEE OF THE SOUTHERN REGIONAL COMMITTEE FOR THE INTRODUCTION OF DIPLOMA COURSE IN AUTOMOBILE TECHNOLOGY AT GOVERNMENT POLYTECHNIC, BELLARY.

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The State Government of Karnataka submitted a proposal for starting a full time diploma course in Automobile Technology at Government Polytechnic, Bellary under diversification of courses. The Southern Regional Committee at its meeting held on 24th April, 1970 considered the above proposal of the Government and recommended the introduction of the course. The All India Council for Technical Education considered the above recommendation and approved the same subject to the condition that the demand for technicians in the speciality should be reassessed and when only the employment potential justified, the course should be started and that before starting the course, the State Government should inform the Regional Committee of the studies carried out about the employment potential, arrangements made for sandwich training and other related aspects.

The State Government did not inform the Regional Committee about the reassessment of demand of technicians in the field, but started the course at the Government Polytechnic, Bellary from the year 1970-71. In order to assess the need and estimate the requirements for introduction of the course at the Polytechnic, an Expert Committee consisting of the following members was appointed with the approval of the Chairman, Southern Regional Committee:-

1. Shri H.S. Parameswaran,
   Principal,
   Ramakrishna Mission Tech. Instt.,
   Mylapore, Madras-600004.

2. Shri S.K. Handa, Member-Secretary and
   Asst. Educational Adviser (T),
   Ministry of Education & S.W.,
   Southern Regional Office,
   Madras-600006.

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The Committee visited the Institution on 11th and 12th September, 1975. Shri C.A. Manje Gowda, Asst. Director, Planning, Directorate of Technical Education was present on behalf of the State Government. The Committee had detailed discussions with the Principal and other staff members in the Polytechnic to discuss the various aspects of the proposal including the need of the course. The Committee also went round the institution to ascertain the facilities already available with the institution by way of Laboratories, Workshops, staff and library etc. and the additional facilities that would be necessary to run the diploma course effectively.

The Committee noted that the Government Polytechnic, Bellary was established in the year 1949. The Polytechnic is at present conducting the following courses of instruction at the Institution.

Courses	Sanctioned Intake	Present Intake
DIPLOMA		
Civil	60	30
Mechanical	30	30
Electrical	30	30
Automobile	--	30
Metallurgy	30	30
Senior Certificate course - Automobile Mechanic.	--	15

The intake in Civil Engineering was decreased from 60 to 30 and the three year diploma course in Automobile Technology was introduced with an intake of 30 students within the sanctioned intake of 120 from the year 1970-71.

The Committee was informed that a large vehicular traffic was passing through Bellary in order to meet the need and demand of transportation of local products of Bellary and the six northern districts of

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Karnataka including Dharwar, Belgaum, Bijapur, Gulbarga, Bidar and Raichur. The following figures of registrations of vehicles in the district of Bellary were furnished to the Committee which gives an idea of the vehicular traffic in the area:-

No. of Buses	..	272
No. of Goods vehicles	..	818
No. of Jeeps	..	383
No. of Motor Cycles & Scooters	..	1560
No. of Tractors	..	454
No. of Trailers	..	398

The Expert Committee was further intimated that the Karnataka State Transport Corporation had a service Centre for its fleet at Bellary. There were a number of Automobile Maintenance establishments in Bellary and many small garages were handling all kind of Automobile repairs. The State Government representative mentioned that in order to meet the need for repairs and maintenance of such a large vehicular traffic, there was a need and demand for a course in Automobile Technology at the Government Polytechnic, Bellary and the course was accordingly started in 1970-71. It was pointed out that the demand for admission to the Automobile Course was heavy and the course was very popular with the students, because the students of Diploma course in Automobile Technology were able to get gainful employment after their studies. Out of 300 applications received for all the courses together for the current session, more than 150 had applied for admission to Diploma course in Automobile Technology. The Committee was also informed that three batches of students who had come out after the introduction of the course in 1970-71 were already fully employed.

The Committee also observed that the Polytechnic had a strong background for Automobile course. Even before the introduction of Diploma course in Automobile Technology, the Polytechnic had been successfully running Automobile Mechanic course to meet the needs of the District of Bellary and other six districts mentioned above. The Committee was therefore of the opinion that there was a need for a course in Automobile Technology at Government Polytechnic, Bellary. In fact the course had already been introduced with effect from 1970-71 and was being run successfully. The Committee accordingly recommended that Diploma course in Automobile Technology with a sanctioned intake of 30 within the over all sanctioned capacity of 120 may be approved.

The Committee, however, observed that in order to make the programme of training in Automobile Technology more meaningful, there should be effective colloboration with Industry, so that the products of the Institute may have better training, and their continuous contact with the Industry should develop in them a sense of appreciation of live situations in Industry. In this connection, the Committee further recommended that in order to promote this collaboration, preference in the matter of admission should be given to those who are sponsored by the Automobile Industry. Efforts should also be made to ensure that as far as possible, a considerable number of candidates for admission to the course are sponsored by Industry.

The Committee examined the facilities already available with the Institute with a view to assess the additional requirements for the diploma course in Automobile Technology. The Committee noted that facilities for Civil, Mechanical and Electrical Engineering courses by way of equipment and staff had been generally provided according ~~xxxkkx~~ to the

standards approved by the All India Council for Technical Education. The facilities by way of buildingswere, however, not adequate.

Keeping in view these considerations and taking into account the requirements for introduction of the three year diploma course in Automobile Technology as per the standards laid down by the All India Council for Technical Education, the Committee recommended the following facilities by way of buildings, equipment and staff for introduction of the diploma course with an intake of 30 students within the sanctioned intake of 120 at the Government Polytechnic, Bellary:-

NON-RECURRING:

BUILDINGS:

1. Class rooms (2 rooms each 750 sq.ft.)	..	1,500 sq.ft.
2. Drawing Hall(2000 sq.ft.)	..	2,000 "
3. Additions to Library & Reading room	..	500 "
4. Staff Common Room	..	200 "
5. Students Common Room	..	300 "
6. Room for Head of Section & Lecturer	..	500 "
7. Office Room (Addition)	..	300 "
		5,300 "
Add 42% for walls, passage etc.	..	2,226 "
Total	..	7,526 "

Cost at the rate of Rs.30/- per sq.ft. (7526 x 30) Rs.2,25,680/-

II. WORKSHOPS.

1. Auto Machine Shop	..	2,000 sq.ft.
2. Auto Service Station	..	2,400 "
		4,400 "
Add 15% for walls and passages	..	660 "
Total	..	5,060 "

Cost at the rate of Rs.25/- per sq.ft. (5060 x 25) Rs.1,26,500/-

Total for Buildings ..Rs. 3,52,180/- or say Rs.3,52,200/-

	B/f.	3,52,200/-
Equipment@	Rs.	4,00,000/-
Library	Rs.	20,000/-
Library Furniture	Rs.	5,000/-
Total ..	Rs.	7,77,200/-

@ The list of equipment is given in Annexure-I. The Committee, however, recommended that the Polytechnic may be given the freedom to substitute any item of equipment, according to the actual requirement of the syllabus, which may prove to be more useful at the time of purchase. The ceiling for the equipment, however, should not be exceeded.

RECURRING:

Staff:

1.	Head of Section	.. 1
2.	Lecturer	.. 2
3.	Asst. Lecturer	.. 1
4.	Draughtsman	.. 1
5.	Foreman	.. 1
6.	Instructor	.. 1
7.	Asst. Instructor	.. 1
8.	Auto driver-cum-Mechanics	.. 2
9.	Helpers	.. 1
10.	Store Keeper	.. 1
11.	Typists-cum-Clerk	.. 1
12.	Peon	.. 1

Staff Salaries .. Rs.45,000/- p.a.
(As per State Scale of Pay)

As the provision for admission is within the sanctioned intake, no provision has been made for general maintenance. However, in view of the fact that driving formed a part of the course, the Committee recommended maintenance expenditure of Rs.10,000/- per annum for the maintenance of spare parts, oil and petrol and other requirements for instructional purposes.

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A summary of the recommendations made by the Expert Committee is given below:-

NON-RECURRING:

Buildings	Rs.	3,52,200/-
Equipment	Rs.	4,00,000/-
Library	Rs.	20,000/-
Library Furniture	Rs.	5,000/-
Total ...	Rs.	7,77,200/-

RECURRING:

Staff Salaries (as per State Government Scales of Pay)	Rs.	45,000/-
*Provision for spare parts, oil, petrol and other consumables etc.	Rs.	10,000/-
Total	Rs.	55,000/-

* This provision will be in addition to the normal maintenance expenditure admissible to the institution.

The Committee would like to place on record its thanks and appreciation for the assistance rendered and help extended by the Directorate of Technical Education, the Principal and staff members of the Polytechnic in making suitable arrangements for its visit.

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ANNEXURE - I.(3)

LIST OF EQUIPMENT REQUIRED FOR THE THREE YEAR DIPLOMA COURSE IN AUTOMOBILE TECHNOLOGY.

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I. ENGINE AND ACCESSORIES TESTING LAB:

S.No. 1.	Particulars of Equipment 2.	No. 3.
1.	Engine Analyser	1
2.	Engine, Four cylinder similar to jeep with dynamometer	1
3.	Diesel fuel pump calibrating and testing machine with accessories	1 set
4.	Air Compressor 3 H.P. 10-9 C.Ft.	1
5.	Carburettors, Stromberg, Carter Zenith of different types, Calauded Hobson, Ball and Ball, Marvel, Tillotson, Amal etc.	1 set
6.	Tuning Light set	1
7.	Electrical Test Bench Universal	1
8.	Carburettor Test Bench	1
9.	Vacuum gauge and compression guage for diesel and petrol enginer.	1 set
10.	Injector Testing Equipment	1
11.	Techometer	1
12.	4 Cylinder Diesel Enginer	1
13.	Lump sum provision for misc. tools and measuring instruments etc.	
14.	Temperature gauges of different types	1 set
15.	Engine units complete for conducting experiments (with stand)	
	a) Standard	1
	b) Ambassador	1
	c) Fiat	1
	d) Perking P.4	1
	e) Tata Mercedez	1
16.	Fuel pump and injection testing and calibrating machine.	
17.	Exhaust gas engine analyser	
18.	Universal electric fault finding equipment	
19.	Coil condenser distribution testing unit	
20.	Tubeflaming tool box (three)	

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21.	Sand blast, pressure spark plug tester 'Champion'	
22.	Universal piston ring Tester	
23.	Cylinder dial gauges	3
24.	Cylinder ridge reamers	6
25.	Connecting rod aligning machine with bend and twist removing rolls	
26.	Stud removers	
27.	Starter gebartirm armature, testing grower	
28.	'Neon' Timing light	

D. MECHANICAL WORKSHOP - DISMANTLING, OVERHAULING & ASSEMBLING.

1.	Bearing and Steering Wheel Puller complete range	1 set
2.	Piston Pin Remover	1
3.	Pressure Bleeder	1
4.	Greasing guns Adapters, Nipples etc. with garage tools	1 set
5.	Micrometer set - each size 0-6" outside and inside - one each	
6.	Set of Wheel spanners	6
7.	Torque Wrenches - 2 sets (upto 200 ft. lbs. and upto 100 lbs. respectively)	2 sets
8.	Adjustable Remover suitable for Automobile	1 set
9.	One set Type Lever and accessories	
10.	For providing a ramp or a pit	
11.	Hand Operated Portable crane	1
12.	Wheel alignment gauge turn table type	
13.	Universal hydraulic brakes bleeding unit	
14.	Engine overhauling beds to suit Standard makes of Indian made.	3
15.	Horizontal surface grinding machine with magnetic check for surfacing cylinder heads inlet and exhaust manifolds and clutch pressure plates.	
16.	'Snapon' or similar major machine tool kit	2 units
17.	i) Hydraulic Jack HI-LIFT type ii) Trolley Jack	1 1
18.	Wheel alignment gauge	1

....3.

19.	Valve spring Tester	1
20.	Cylinder dial gauge	1
21.	Growler	1
22.	Batteries 6 and 12 volts	4
23.	Motor cycle in good running condition Motor cars in good running condition Jeep car in good running condition Motor Lorry (Diesel Engine) in good running condition.	1 2 1 1
24.	Lump sum provision for misc. tools and measuring instruments, etc.	

III. MACHINE SHOP - RECONDITIONING SHOP:

1.	Arbor press-hand-operated	1
2.	DieselNozzle grinding and lapping equpt.	1 set
3.	Lathe (Sliding, surfaceing and screw cutting) 7" centre x 6', 10½" lathe admitting between centres 3-0" Motor driven 400 volts A.C. 3 phase, 50 cycles with chucks.	1
4.	Bench grinder drive by A.C. Motor single phase 230 Volts, A.C. 1/5 H.P.	1
5.	Connecting rod alinger	1
	Connecting Twisting tool	1
6.	General purpose tyre inflating gauge with air chuck	1
7.	Wheel cylinder Hones	1 set
8.	Spark plug clearner and tester (Testing under pressure)	1 set
9.	Cylinder Honing set	1
10.	Rubber cups for valve lapping one, tap and tie set complete (6 mm. to 24 mm. 1/16 to 1" BSF.)	
11.	Cylinder Ridge Remover	
12.	Crank shaft Grinder with Attachment	1
13.	Cylinder Boring Bar	
14.	Valve grinder	1
15.	Valve Seat Cutter	1
16.	Ecentric Valve Seat Grinder	
17.	Adjustable Reamer	1 set
18.	Battery charger	1
19.	Vulcanising outfit	1
20.	Drill, pillar type capacity 3/4" motorised	1

21. Spray gun set with accessories 1

22. Lump sum provision for misc. tools and measuring instruments etc.

23. Cylinder sleeve removal and refitting machine 'Hydraulic type)

24. Universal Magnetising equipment

25. Taps and die set mm. size range from 1/8 to 1"

IV. DEMONSTRATIVE MODELS.

1. Fluid Fly Wheel working model Automobile Transmission. 1 set

2. Gross sectional engine complete with gear box and clutch, dynamo, self starter, fuel and water pump radiator, driven with suitable A.C. Motor 1

3. Lump sum provision for misc. tools and measuring instruments etc.

4. Carburettors types 'sola' Zenith Fort and 3 in each S.V.

5. Sectionised engine chassis models

Total....Rs.4.00 lakhs.

N.B. The institution would be free to substitute any item according to their felt need, which may prove more useful at the time of the purphase.

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APPENDIX - 4.

REPORT OF THE EXPERT COMMITTEE OF THE SOUTHERN REGIONAL COMMITTEE ON THE INTRODUCTION OF A POST-DIPLOMA COURSE IN REFRIGERATION AND AIR-CONDITIONING AT THE GOVERNMENT POLYTECHNIC, KALAMASSERY.

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The State Government of Kerala submitted a proposal for introduction of a Post-Diploma course in Refrigeration and Air-Conditioning in two selected Polytechnics in Kerala. The proposal of the State Government of Kerala was placed before the Southern Regional Committee at its 40th meeting held on 2nd May, 1974. The Regional Committee approved in principle the introduction of a post-diploma course in Refrigeration and Air-Conditioning in one of the Polytechnics in Kerala. The State Government subsequently informed that they intend to start the Post-Diploma course at Government Polytechnic, Kalamassery. The Polytechnic was established in the year 1951. The courses offered at the Polytechnic are as follows:-

Diploma courses offered	Sanctioned intake	Duration
FULL TIME.		
Civil	60	3 years
Mechanical	90	
Automobile	30	
Electrical	60	
Chemical	30	
	270	
PART-TIME.		
Civil	20	4 years
Mechanical	20	
Electrical	20	
	60	

In order to determine the suitability of the Polytechnic to start the course and also to assess the estimates of cost, an Expert Committee consisting of

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the following members was set up with the approval of the Chairman of the Southern Regional Committee:-

1. Shri S. Srinivasan,
   Principal & Special Officer,
   C.M. Kothari Technological Instt.,
   Avadi, Madras-600054.

2. Shri S.K. Handa, Member-Secretary and
   Asst. Educational Adviser (T),
   Ministry of Education & S.W.,
   Southern Regional Office,
   Madras-600006.

Shri S.K. Handa, Asst. Educational Adviser(T) made a visit to the Institution on the 24th December,'74. Principal S. Srinivasan visited the Polytechnic on 31st July, 1975. The Committee had discussions with the Director of Technical Education, Principal and other staff members of the Polytechnic. The Committee also went round the institution, its various laboratories and workshops in order to have an idea about facilities already available with the Polytechnic and additional facilities that would be necessary to run the course effectively. The Expert Member Principal Srinivasan also made a visit to a few factories and had detailed discussions with the officers of the Companies about the possibilities for practical training of the students and the openings for those completing successfully the post-diploma course.

The Committee noted that the State Government of Kerala propose to start the job-oriented course, which includes theory, laboratory work and industrial training. The duration of the course will be one year and three months with a diploma in Mechanical or Electrical Engineering of the Government of Kerala or any other examination accepted by the Government of Kerala as equivalent thereto as the admission qualification.

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The Committee noted that in view of the need to diversify the diploma courses and orient them functionally to industrial needs, the All India Council for Technical Education has recommended that our Polytechnics, should be free to institute diversified courses of different branches of engineering and technology both at the diploma and post-diploma course stages according to the felt needs of the Industry for technicians in the respective areas. In this connection, the Committee discussed in detail with the Principal regarding the openings for the candidates. There are a large number of Refrigeration and Air-Conditioning units, Cold Storage and Ice Industry Units in and around Kalamassery, which can offer Practical Training to the students. The Committee pointed out that it would be necessary to ensure active co-operation of the Industries before actually introducing the course. The Director of Technical Education informed that there are a number of Industrial organisations which are prepared to collaborate and offer practical training to the students of the Post-Diploma course. Having regard to the proximity of Industry and the willingness of a large number of organisations to offer all possible facilities, the Committee recommended that it would be most fruitful to organise the Post-Diploma course on sandwich pattern at Government Polytechnic, Kalamassery.

The Committee further noted that a large number of firms in and around Cochin deal specially with Food Processing, Cold Storage and Ice making units. There are, of course, also a few firms dealing with Air-Conditioning and Refrigeration. Therefore the Committee felt that if students were to be locally employable, their theoretical instruction and also practical training should have emphasis on the following specialised areas:-

1. Refrigerated Food and Beverage Process
2. Frozen Food Process.

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3. Refrigerated Warehouse Practice
4. Ice manufacture
5. Refrigerated & Frozen Food Distribution.

Having regard to the objective of the course, the Committee recommended that out of one year and three months prescribed as the duration of the course, nine months should be spent in the Polytechnic comprising of two semesters of 450 working hours each and six months in an established Air-Conditioning and Refrigeration Industry. The practical training should be given in two stages of 3 months each at the end of the Ist and Second semester respectively. The practical training in Industry should be well organised and related most effectively with the theoritical instructions in the Polytechnic. The Committee also recommended that the majority of the candidates, as far as possible, should be sponsored by the Industry so that they could be immediately employed and absorbed after their successful completion of the course.

The Committee further recommended that the admission to the Post-Diploma course should be 10 to start with and further increase in intake may be effected only when it is fully justified by greater demand from Industry.

INDUSTRIAL INPLANT TRAINING:

In order to develop Industrial Training for students of the sandwich Post-Diploma course in Air-Conditioning and Refrigeration, it is necessary that a Technical Advisory Committee representing the leading Industries connected with Air-Conditioning and Refrigeration be set up by the Polytechnic. All the training programmes may be arranged with the help of Training Committee whose advice shall be most beneficial. A senior lecturer or lecturer from the Polytechnic should

also be entrusted with the job of Training Officer to visit the various Industries both before the actual start of the Industrial Training and also during the period of Industrial Training. The Training Officer can also be alloted the work of developing Liaison with various Industries and also following up on the job training of the students. It is necessary that every student should be inspected once a week.

The Committee noted that the All India Council for Technical Education has not prepared any model list of physical facilities for the Post-Diploma course in Refrigeration and Air-Conditioning. The Committee accordingly examined the requirements for the course having regard to the facilities already available with the institute and the additional requirements as furnished by the Polytechnic. The additional requirements thus furnished were scrutinised by the Committee in consultation with the Director of Technical Education and the Principal of the Polytechnic. The Committee felt that the facilities already available with the Polytechnic by way of buildings will be adequate for the conduct of the Post-Diploma course in Refrigeration and Air-Conditioning, and no additional building was necessary for the purpose. The other facilities which were considered necessary for organising the course by the Committee are given below:-

Since it is a specialised course, the Polytechnic will need equipment required for the proper conduct of the course at an estimated cost of Rs.1.55 lakhs. The list of equipment necessary for the conduct of the course is given in Annexure-I. The Committee however recommended that the Polytechnic may be given the freedom to substitute any item of equipment, according to the actual requirements of the syllabus which may prove to be more useful at the time of purchase. The ceiling for the equipment however, should not be exceeded.

The Polytechnic will also need the following additional staff:-

Senior Lecturer	..	1 (Rs.560-1100)
Lecturer	..	1 -do-
Associate Lecturer/Demonstrator		1 (Rs. 330-575)
Refrigeration Mechanic	..	1 (Rs. 285-550)

The Polytechnic will also require financial assistance for Books, Maintenance and honorarium to staff. The summary of the recommendations for the additional facilities are given below:-

NON-RECURRING:

Buildings	... Nil
Equipment (as per Annexure-I)	...Rs.1.55 lakhs
Total ..	...Rs.1.55 lakhs

RECURRING (PER ANNUM)

Staff Salaries (as per State Scale of Pay) ..	...Rs.45,000/-
Books and Periodicals	...Rs. 5,000/-
Maintenance & Contingencies	...Rs. 6,000/-
Honorarium to staff from Industry for Lectures.	..Rs. 4,000/-
Scholarships for Sandwich Practical Training.	..Rs. 9,000/-
Total ...	..Rs.69,000/-

The Committee wishes to place on record its thanks to Director of Technical Education, Kerala, Principal, Government Polytechnic, Kalamassery and the members of its staff for rendering all possible assistance and for making suitable arrangements for the visit of the Committee.

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ANNEXURE-I

LIST OF EQUIPMENTS FOR POST-DIPLOMA COURSE IN "REFRIGERATION AND AIR-CONDITIONING".

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Sl. No.	Particulars	Qty.	Amount
1.	Cold storage plant, 1 ton capacity with freezer and cold rooms experimental type	1	30,000/-
2.	Experimental ice plant 65 Kg. per day capacity with necessary accessories	1	20,000/-
3.	Experimental Air-Conditioning plant 1ton capacity with all accessories	1	20,000/-
4.	Vapour absorption Refrigerator	1	8,000/-
5.	Steamjet Refrigerations system(Light type	1	20,000/-
6.	Domestic Refrigerator or Fridge	1	4,000/-
7.	Hermetically sealed compressor unit for air conditioning room.	1	4,000/-
8.	Vacuum pump (high vacuum type)	1	5,000/-
9.	Table mounted Refrigerator model unit-open type compressor.	1	3,000/-
10.	Thermostatic expansion valve with solenoid valve control table model.	1	4,000/-
11.	Refrigerator model - without heat exchanger	1	3,000/-
12.	Refrigerator model without heat exchanger with pressure regulator valve.	1	3,000/-
13.	Hermetically sealed compressor unit for walk in cooler.	1	4,000/-
14.	Second hand working condition water coolers for dismantling and assembling	2	2,000/-
15.	Refrigerant cylinders, tools, spare expansion valves, driers, compressors instruments like hydrometer, air flow meters, aneroid meters, etc.		25,000/-
	Total ...		1,55,000/-

N.B. The institution would be free to substitute any item according to their felt need, which may prove more useful at the time of purchase.

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APPENDIX - 5.

REPORT OF THE EXPERT COMMITTEE OF THE SOUTHERN REGIONAL COMMITTEE ON THE INTRODUCTION OF A DIPLOMA COURSE IN AUTOMOBILE TECHNOLOGY AT SMT. L.V. POLYTECHNIC, HASSAN.

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Under the scheme of diversification of courses, the State Government of Karnataka inter-alia forwarded the proposal for starting a diploma course in Automobile Technology at Smt. L.V. Polytechnic, Hassan with an intake of 30 students. The above proposal was considered by the Southern Regional Committee at its 35th meeting held on 12th October, 1970. The Regional Committee recommended the proposal. The All India Council for Technical Education considered the above recommendation and approved the proposal of the State Government for starting a diploma course in Automobile Technology at Smt. L.V. Polytechnic, Hassan subject to the condition that the demand for technicians in the speciality should be reassessed and only when the employment potential justified, the course should be started and that before starting the course the State Government should inform the Regional Committee of the studies carried out about the employment potential, arrangements for Sandwich Training and other related aspects.

The State Government did not intimate the Regional Committee about the reassessment of demand for technicians and the employment potential in the speciality with reference to their proposal for starting a diploma course in Automobile Technology at Smt. L.V. Polytechnic, Hassan. In order to examine the need and assess the additional requirements for introduction of the course in Automobile Technology at Smt. L.V. Polytechnic, Hassan, an Expert Committee consisting of the following members was set up by the Regional Committee:-

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1. Prof. B.R. Narayana Iyengar,
   175, First Main Road,
   Seshadripuram,
   Bangalore-560020.

2. Shri S.K. Handa, Member-Secretary &
   Asst. Educational Adviser (T),
   Ministry of Education & S.W.,
   Southern Regional Office,
   Madras-600006.

The Expert Committee visited the institution on 14th August, 1975. The Asst. Educational Adviser (T) was represented by Shri A.P. Srivastava, Education Officer (T). Shri C.A. Manje Gowda, Asst. Director of Planning, Directorate of Technical Education, Karnataka was also present on behalf of the State Government. The Committee examined all aspects of the proposal and had also detailed discussions with the Principal and Members of the Staff.

Smt. L.V. Polytechnic, Hassan was originally started as an Occupational institute in the year 1949, with a diploma course in Civil Engineering with an intake of 30 students. Subsequently, the admission to the Civil Engineering course was increased to 60 and courses in Mechanical and Electrical Engineering were added. The Institute is at present conducting three year diploma courses in Civil, Mechanical and Electrical Engineering with an intake of 120 students with 40 in each branch.

In their scheme for starting of Diploma course in Automobile Technology at Polytechnic, Hassan, the State Government mentioned that there had been considerable developments in Automobile industry during the recent years, especially in the Districts of Hassan, Chikamagallur and Shimoga and there was considerable scope for employment for the technically qualified persons in Automobile Engineering. Keeping in view

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the regional requirements, the State Government had formulated the proposal for starting diploma course at Hassan. On the basis of its visit and discussions, with all concerned, the Committee made the following observations:-

DEMAND & NEED FOR TECHNICIAN IN AUTOMOBILE TECHNOLOGY:

The Expert Committee examined the local need and demand for personnel in Automobile Technology. The State Government representative mentioned that Hassan served as a point of export for coffee and local products for the districts of Hassan, Chickamagallur, Shimoga and Coorg, and as such in recent years there was a considerable increase in vehicular traffic in the area. The State Government representative also mentioned about the increase in tourist traffic for visit to Sfavanbelgola & Hatibed temples near Hassan. However, the State Government representative did not produce any statistics in support of their contention for increased vehicular and tourist traffic at Hassan and for the need of additional trained personnel in the field Automobile Engineering.

INDUSTRIAL ACTIVITY:

The Expert Committee also noted that there were not much industrial activity at present at Hassan. There is only one Agricultural Implements Factory of the State Government, a service station of the Tata's Massey & Fergusson Tractors and one depot of the Karnataka Road Transport Corporation at Hassan. Except for 40 garages in and around Hassan for the repairs and maintenance of vehicles, there are no automobile or ancillary industries in and around Hassan which could provide for a meaningful practical training programme for the Students of the Diploma course in Automobile Technology.

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The Expert Committee further observed that a diploma course in Automobile Technology of three years duration was already offered at the under mentioned institutions with a total intake of 140 students to meet the needs of the State.

S.J. Polytechnic, Bangalore .. 30
C.P.C. Polytechnic, Mysore .. 40
Karnataka Poly., Mangalore .. 40
and Govt. Polytechnic, Bellary .. 30

In this connection the State Government representative mentioned that there was a great rush for admissions to the diploma course in Automobile Technology and the number of applications received for admission to the course were roughly 3 to 4 times the sanctioned intake. As regards the employability of those who had passed out in the course, it was mentioned that only about 140 Diploma holders in Automobile Technology were registered in the Employment Exchanges and it was also not known whether those candidates were really unemployed or a number of them were seeking better avenues of employment. The State Government accordingly felt the need for an additional Centre at Hassan to start the Course. However, since no concrete data was made available, the State Government of Karnataka was requested to furnish the necessary statistics about the increase in vehicular and tourist traffic and also definite information to establish the need and justify the additional demand for a diploma course in Automobile Technology at Smt. L.V. Polytechnic, Hassan to enable the Southern Regional Committee to decide this point.

With a view to assess the additional requirements for introduction of a diploma course in Automobile Technology at Smt. L.V. Polytechnic, Hassan, the Committee went round the institution to ascertain the facilities

already available by way of buildings, equipments and staff at the institute. The Committee observed that the institute had a built up plinth area of 66,773 sq.ft. as against the normal requirement of a polytechnic of 54,200 sq.ft. conducting diploma course in Civil, Mechanical and Electrical Engineering with an annual intake of 120 students. It was noted that the class rooms, laboratories and workshops were quite spacious and an area of nearly 5,000 sq.ft. of shop floor in the workshop buildings was vacant. It was also observed that all the laboratories and workshops were fully equipped as per the All India Council for Technical Education standard for running a diploma course in Civil, Mechanical and Electrical Engineering with an annual intake of 120 students.

Keeping in view the above position and taking into account the requirements of introduction of the three years diploma course in Automobile Technology, as per the standard laid down by the All India Council for Technical Education, the Committee recommended the following facilities by way of buildings, equipment and staff for introduction of the diploma course with an intake of 30 students within the sanctioned intake of 120 students at the Smt. L.V. Polytechnic, Hassan.

NON-RECURRING:

Building	.. Nil
Equipment *	..Rs.4,00,000/-
Library	..Rs. 20,000/-
Library Furniture	..Rs. 5,000/-
Total ...	..Rs.4,25,000/-

* The List of Equipments is given in Annexure-I of the Report. The Committee however recommended that the Polytechnic may be given the freedom to substitute any item of equipment, according to the actual requirements of the syllabus which may prove to be more useful at the time of purchase. The ceiling for the equipment, however, should not be exceeded.

RECURRING:

STAFF:

1.	Head of Section	.. 1
2.	Lecturer	.. 1
3.	Asst. Lecturer	.. 1
4.	Draughtsman	.. 1
5.	Foreman	.. 1
6.	Instructor	.. 1
7.	Asst. Instructor	.. 1
8.	Auto driver cum-mechanics	.. 2
9.	Helpers	.. 4
10.	Store Keeper	.. 1
11.	Typists-cum-clerk	.. 1
12.	Peon	.. 1

As the provision for admission is within the sanctioned intake, no provision has been made for general maintenance. However in view of the fact that driving formed a part of the course, the Committee recommended maintenance expenditure of Rs.10,000/- per annum for the maintenance of spare parts, oil and petrol and other requirements for instructional purposes.

A summary of the recommendations made by the Expert Committee is given below:-

NON-RECURRING:

1. Buildings	..	Nil
2. Equipment	..	Rs. 4,00,000/-
3. Library	..	Rs. 20,000/-
4. Library Furniture	..	Rs. 5,000/-
Total ..	..	Rs. 4,25,000/-

RECURRING (PER ANNUM)

Staff Salaries (as per State Government scale of Pay)	..	Rs. 45,000/-
*Provision for spare parts, Oil, petrol and other consumable etc.	..	Rs. 10,000/-
Total ..	..	Rs. 55,000/-

* This provision will be in addition to the normal maintenance expenditure admissible to the institution.

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The Committee wishes to place on record its thanks and appreciation to Directorate of Technical Education, the Principal and Staff members of Smt. L.V. Polytechnic, Hassan for rendering all possible assistance and making suitable arrangements for its visit.

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LIST OF EQUIPMENT REQUIRED FOR THE THREE YEAR DIPLOMA COURSE IN AUTOMOBILE TECHNOLOGY.

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I. ENGINE AND ACCESSORIES TESTING LAB:

S.No. 1.	Particulars of Equipment 2.	No. 3.
1.	Engine Analyser	1
2.	Engine, Four Cylinder similar to jeep with dynamometer	1
3.	Diesel fuel pump calibrating and testing machine with accessories	1 set
4.	Air Compressor 3 H.P. 10-9 C.Ft.	1
5.	Carburettors, Stromberg, Carter Zenith of different types, Calaudéd Hobson, Ball and Ball, Marvel, Tillotson, Amal etc.	1 set
6.	Tuning Light set	1
7.	Electrical Test Bench Universal	1
8.	Carburettor Test Bench	1
9.	Vacuum gauge and compression guage for diesel and petrol enginer.	1 set
10.	Injector Testing Equipment	1
11.	Techometer	1
12.	4 Cylinder Diesel Enginer	1
13.	Lump sum provision for misc. tools and measuring instruments etc.	
14.	Temperature gauges of different types	1 set
15.	Engine units complete for conducting experiments (with stand)	
	a) Standard	1
	b) Ambassador	1
	c) Fiat	1
	d) Perking P.4	1
	e) Tata Mercedez	1
16.	Fuel pump and injection testing and calibrating machine.	
17.	Exhaust gas engine analyser	
18.	Universal electric fault finding equipment	
19.	Coil condenser distribution testing unit	
20.	Tubeflaming tool box (three)	

...2.

21. Sand blast, pressure spark plug tester 'Champion' 1
22. Universal piston ring Tester
23. Cylinder dial gauges 3
24. Cylinder ridge reamers 6
25. Connecting rod aligning machine with bend and twist removing rolls
26. Stud removers
27. Starter gebartirm armature, testing grower
28. 'Neon' Timing light

D. MECHANICAL WORKSHOP - DISMANTLING, OVERHAULING & ASSEMBLING.

1. Bearing and Steering Wheel Puller complete range 1 set
2. Piston Pin Remover 1
3. Pressure Bleeder 1
4. Greasing guns Adapters, Nipples etc. with garage tools 1 set
5. Micrometer set - each size 0-6" outside and inside - one each
6. Set of Wheel spanners 6
7. Torque Wrenches - 2 sets (upto 200 ft. lbs. and upto 100 lbs. respectively) 2 sets
8. Adjustable Remover suitable for Automobile 1 set
9. One set Type Lever and accessories
10. For providing a ramp or a pit
11. Hand Operated Portable crane 1
12. Wheel alignment gauge turn table type
13. Universal hydraulic brakes bleeding unit
14. Engine overhauling beds to suit Standard makes of Indian made. 3
15. Horizontal surface grinding machine with magnetic check for surfacing cylinder heads inlet and exhaust manifolds and clutch pressure plates.
16. 'Snapon' or similar major machine tool kit 2 units
17. i) Hydraulic Jack HI-LIFT type 1
    ii) Trolley Jack 1
18. Wheel alignment gauge 1

....3.

19.	Valve spring Tester	1
20.	Cylinder dial gauge	1
21.	Growler	1
22.	Batteries 6 and 12 volts	4
23.	Motor cycle in good running condition Motor cars in good running condition Jeep car in good running condition Motor Lorry (Diesel Engine) in good running condition	1 2 1 1
24.	Lump sum provision for misc. tools and measuring instruments, etc.	

III. MACHINE SHOP - RECONDITIONING SHOP.

1.	Arbor press-hand-operated	1
2.	Diesel Nozzle grinding and lapping eqpt.	1 set
3.	Lathe (Sliding, surfaceing and screw cutting) 7" centre x 6', $10\frac{1}{2}$" lathe admitting between centres 3-0" Motor driven 400 volts A.C. 3 phase, 50 cycles with chucks.	1
4.	Bench grinder drive by A.C. Motor single phase 230 Volts, A.C. 1/5 H.P.	1
5.	Connecting rod alinger	1
	Connecting Twisting tool	1
6.	General purpose tyre inflating gauge with air chuck	1
7.	Wheel cylinder Hones	1 set
8.	Spark plug clearner and tester (Testing under pressure)	1 set
9.	Cylinder Honing set	1
10.	Rubber cups for valve lapping one, tap and tie set complete (6 mm. to 24 mm. 1/16 to 1" BSF)	
11.	Cylinder Ridge Remover	
12.	Grank shaft Grinder with Attachment	1
13.	Cylinder Boring Bar	
14.	Valve Seinder	1
15.	Valve Seat Cutter	1
16.	Ecentric Valve Seat Grinder	
17.	Adjustable Reamer	1 set
18.	Battery charger	1
19.	Vulcanising outfit	1
20.	Drill, pillar type capacity 3/4" motorised.	1

21. Spray gun set with accessories 1

22. Lump sum provision for misc. tools and measuring instruments etc.

23. Cylinder sleeve removal and refitting machine 'Hydraulic type)

24. Universal Magnetising equipment

25. Taps and die set mm. size range from 1/8 to 1"

IV. DEMONSTRATIVE MODELS.

1. Fluid Fly Wheel working model Automobile Transmission. 1 set

2. Gross sectional engine complete with gear box and clutch, dynamo, self starter, fuel and water pump radiator, driven with suitable A.C. Motor 1

3. Lump sum provision for misc. tools and measuring instruments etc.

4. Carburettors types 'sola' Zenith Fort and 3 in each S.V.

5. Sectionised engine chassis models

Total....Rs.4.00 lakhs.

N.B. The institution would be free to substitute any item according to their felt need, which may prove more useful at the time of the purphase.

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APPENDIX-6.

REPORT OF THE EXPERT COMMITTEE OF THE SOUTHERN REGIONAL COMMITTEE OF THE ALL INDIA COUNCIL FOR TECHNICAL EDUCATION ON THE INTRODUCTION OF DIPLOMA COURSE IN FISHERIES TECHNOLOGY AT THE KERALA GOVERNMENT POLYTECHNIC, CALICUT.

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The State Government of Kerala submitted a proposal for starting a diploma course in Fisheries Technology at Kerala Government Polytechnic, Calicut. The Institution situated in excellent surroundings in the northern end of the town was established in the year 1946. The Polytechnic is at present offering training in the following Diploma courses:-

Diploma courses offered	Sanctioned intake	Duration
FULL TIME		
Civil	90	3 years
Mechanical	75	
Electrical	75	
Chemical	30	
	270	
PART TIME.		
Civil	20	4 years
Mechanical	20	
Electrical	20	
	60	

The proposal received from the State Government of Kerala was considered at the 36th meeting of the Southern Regional Committee held on 23rd April,71. The Regional Committee inter-alia, approved the starting of a diploma course in Fisheries Technology at Kerala Government Polytechnic, Calicut. The Central Government has also approved in principle, the introduction of a diploma course in Fisheries Technology at the Kerala Government Polytechnic, Calicut, as part of Programme of diversification of diploma courses in the State. In order to examine the various aspects

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of the proposal in detail and assess the estimates of cost, an Expert Committee consisting of the following members was appointed with the approval of the Chairman:-

1. Shri A. Srinivasan,
   Deputy Director of Fisheries (Research),
   Department of Fisheries,
   Office of the Asst. Director of
   Fisheries (Hydrology),
   87, Poonamalle High Road,
   Madras-600010.

2. Shri S.K. Handa, Member-Secretary and
   Asst. Educational Adviser (T),
   Ministry of Education & S.W.,
   Southern Regional Office,
   Madras-600006.

Shri S.K. Handa was represented by an Officer from the Southern Regional Office who accompanied the Committee to render all assistance to the Expert and to furnish the necessary information and clarification, wherever required, for examining the proposall

The Committee visited the Kerala Government Polytechnic, Calicut on Saturday, the 6th September,75. The Committee had a meeting with the Joint Director of Technical Education, the Principal of the Polytechnic and other staff members in the Polytechnic. The Committee also went round the main buildings, laboratories and workshops of the Institution to have an idea about the facilities already available with the Polytechnic and additional facilities that would be required to run the course effectively. On the basis of its visit and the detailed discussion held with the authorities concerned, the Committee made the following observations and recommendations:-

NEED FOR THE COURSE:

The Committee requested the Joint Director of Technical Education to furnish the necessary information and details to justify the need for starting

a Diploma course in Fisheries Technology at the Polytechnic. This was all the more imperative since diploma courses in Fisheries Technology and Food Technology offered in the past in the same polytechnic were abolished. The Committee was informed that there were a large number of freezing plants which would absorb a considerable number of diploma holders in Fisheries Technology. The Committee however, felt that Fisheries Technology was a narrow specialisation and offered training for particular jobs which will deny the students a wider range of employment opportunities and it was therefore necessary to plan for the introductionof new courses after taking into account the facilities already available. The Committee noted that following courses at the diploma/certificate level were already available in the Southern Region in this field:-

1. Diploma course of 3 years duration in Fisheries Technology and Navigation - Central Polytechnic, Madras.
2. Training course in Fish Processing in Central Food Technological Institute, Mysore.
3. Training course in Fish Processing in Central Institute of Fisheries Technology, Ernakulam.
4. Central Institute of Fisheries - Operatives - offering eight different courses for manning fishing vessels.

Besides, the States like Tamilnadu have their own staff training Institutes. The Committee noted that at present the Central Polytechnic, Madras is the only Institution conducting 3 year diploma course in Fisheries Technology in the Southern Region but there was no information that adequate employment opportunities were available for the diploma holders in Fisheries Technology and Navigation either in Government Service or in the Industry.

In the circumstances above, the Committee was of the view that a great deal of care was needed in deciding about the starting of a diploma course in Fisheries Technology. The Committee was not very clear in its mind about the plan formulations in Fisheries during the next plan periods, the growth and development envisaged and the man power requirements. Opinions from Fisheries Departments and Kerala Fisheries corporation were not made available to the Committee.

The Committee, however, noted the following facts, as regards employment opportunities. India has a coastline of 5000 Km., Kerala State 590 Km. and Tamilnadu 1000 Km. Kerala has the high density of population and a flourishing fish industry, mineral factories, coir industry and fish processing units along the coastline. The area of in shore fishable waters in Kerala is 25,000 sq.Km., while Tamilnadu has 35,000 sq.Km. and India has 2,50,000 sq.Km. (40 fathom line). Kerala State has 21,000 fishing craft of which over 2,000 were machanised (year 1972). Current fish landings of Kerala amount to 4 lakhs tonnes, of which prawns forms about 5%. During 1973 about 48,000 tons of fish were exported (including frog legs) and 85% of freezing units of India are located in Kerala State. So also 31 cut of 42 canning units of India, are located in Kerala. When all the fishing harbours and other infra structure are ready, the total mechanized boats will reach an ultimate 10,000 numbers, and the fish catch will quadruple then. Even the existing processing units in Kerala could absorb quite a number of technologists. At present there is a freezing capacity of over 7,000. There are over 70 plants in the cold chain in Kerala. Each plant could have (1) a plant Manager (2) a technologist (processing) and (3) one or two assistant technologists. Of these the latter two categories could be of diploma holders in Fisheries Technology.

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If the processing industry (including the Kerala Fisheries Corporation) could take the diploma holders in Fisheries Technology, a course in the Kerala Government Polytechnic will be justified. There is scope for employment in the above field. Since all the processing units deal in export of processed fish, prawns and frog legs, earning foreign exchange (it was Rs.80 crores in 1973), high degree of quality control is necessary. For this purpose, qualified persons shall be required by Industry at the level of technicians who could be trained through a diploma course in Fisheries Technology. The Committee, therefore, felt that the diploma course in Fisheries Technology would meet the felt needs of Industry and may be started at Kerala Government Polytechnic, Calicut. The Committee noted that the State Government was also very keen to start the diploma course to meet its manpower requirements at this level.

INDUSTRIAL PRACTICAL TRAINING:

The Committee noted that there are a number of Fish Processing Units, cold storages, Ice making Factories in Kerala State. A list of such industries in Kerala State is given in Annexure-I. Besides, State and Central Government Fisheries Organisations having valuable equipments, specimens, aquarium and research, facilities such as Marine Fisheries Research Sub-Station of the Central Fisheries Research Institute and Fisheries Technological Station are now functioning in the locality. Training in processing could be had in the freezing plants of the Kerala Fisheries Corporation in Calicut, Cannanore, Cochin etc. and in the private processors plants in cochin area. Inland Fisheries training could be had in Malampuzha and Navigation and Seamanship with the port authorities or with CIFO

COURSE CONTENT:

At the outset, the Committee observed that the State Government of Kerala has not yet framed any syllabus for the technician course in Fisheries Technology. The Committee suggests that this course could be conducted on a semester - pattern with five semesters of institutional coaching and two semesters of practical training. Having regard to proximity of Fishing Industry and facilities available for practical training, the Committee recommended that the course should be organised on sandwich basis with the fourth and seventh semesters devoted to practical training. To cater to the peculiar needs of Kerala State, the diploma course should lay special emphasis on (1) Fish processing (2) Coastal aqua - culture, in addition to the usual syllabus in inland Fisheries, marine fisheries (including Oceanography) and technology (including elementry navigation and seamanship). In fish processing emphasis must be on freezing, canning, fish oil and fishmeal manufacture etc. Bacteriology must be also taught. Expert assistance could be had from the Scientists of Central Marine Fisheries, Central Fisheries Technological Institute, Central Institute of Fisheries Operatives, Integrated Fisheries Project etc. through special guest lectures and practical training. Practical tours should be organised to important fishing centres like Malpe, Mangalore situated in Karnataka State, Ernakulam, Cochin, Neendakara, Narakal, Malampuzha in Kerala State, Tuticorin, Mandapam, Thanjavoor, Mettur and Bhavanisagar in Tamilnadu.

MINIMUM ADMISSION, QUALIFICATION AND DURATION:

The minimum qualification for admission to diploma course in Fisheries Technology should be 2 years pre-degree course so that the students could devote more time to specialisation in technical subjects

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and that they have adequate knowledge of basic sciences when they enter the Diploma course. The candidates passing pre-degree with Biology, Chemistry, Physics are the ones suitable for this course. The duration of the course should be 3½ years which will include 12 months practical training in industry.

INTAKE:

In the absence of definite information about greater demand, the Committee recommended that the intake to the diploma course in Fisheries Technology should be 15 to start with and out of these 7 candidates should be sponsored by the industry. Further increase in intake should be effected only when it is fully justified by greater demand. The intake of 15 should be within the overall sanctioned intake capacity of 270.

FACILITIES:

The Committee noted that the All India Council for Technical Education has not prepared any model list of physical facilities for diploma course in Fisheries Technology. The Committee accordingly examined the requirements for the course having regard to the facilities already available with the Institute and the additional requirements as furnished by the Polytechnic. The Additional requirements were scrutinised by the Committee in consultation with the Joint Director of Technical Education and the Principal of the Polytechnic and following observations were made:-

BUILDINGS:

The Committee felt that the facilities already available with the Polytechnic by way of buildings were adequate for the present to run the diploma course in Fisheries Technology and no additional facilities by way of Building were necessary for the purpose.

EQUIPMENTS:

As regards equipment, a list of equipments available with the Institution for conducting diploma course in Fisheries Technology was furnished to the Committee, which may be seen at Annexure-II. The Committee was informed that all of them are in working condition. The additional equipment required for conducting the course is given in Annexure.III. The Committee recommends an amount of Rs.60,000/- for additional equipment to be procured for the course. The swampy area in the campus of the Polytechnic could be developed into ponds for studying fresh water fish culture.

LIBRARY:

A separate building has been constructed for library with provision for Library in the downstairs and for reading room in the upstairs. The total number of books as on 5.9.1975 is 6,798. In addition, there are more than 12,000 journals of various kinds viz. Engineering, technology and chemical engineering and general. The library contains quite a good number of standard books of Food Technology, Food Analysis etc. but quite a number of standard works on Oceanography, Marine, Biology, Inland Fisheries, Fishing gear, Fishing Craft, Fish Preservation and Processing, Fishery, Byeproducts etc. are still needed. For this purpose, the Committee recommends a sum of Rs.10,000/-. Besides, the Polytechnic should subscribe for some important fisheries periodicals.

The course needs qualified and competent staff with knowledge of Food Technology, Fishery Biology, Fish Processing, Marine Fisheries, acquaculture, analytical chemistry, bacteriology etc. To begin with experienced persons from the Fisheries Departments could be got on deputation. Persons with atlest 3 to 4 years experience would be desirable. Graduates with All

India Fisheries Training certificate or the present post graduate of CIFE, Bombay could be drawn for appropriate subjects. The following pattern of staff is recommended by the Committee for conducting diploma course in Fisheries Technology:-

Head of Section	..	1
Lecturer	..	1
Asst. Lecturer	..	1
Demonstrators	..	1
Attenders	..	2
Skilled Fisherman	..	1

The following are therefore the estimates of Non-Recurring and Recurring expenditure for the starting of a course in Fisheries Technology at Kerala Government Polytechnic, Calicut. In recommending the additional equipment, the Committee had duly taken into consideration the equipment worth Rs.1,50,000/- which had been previously sanctioned for the Food Technology and Fisheries courses at Government Polytechnic, Kalamassery later on transferred to Kerala Government Polytechnic, Calicut since most of the equipment had become absolete, the Committee considered the following amount essential to provide the necessary facilities to run the course effectively.

NON-RECURRING:

1. Buildings		...	Nil
2. Equipments *		...	Rs.60,000/-
3. Library		...	Rs.10,000/-
	Total	...	Rs.70,000/-

* The list of equipment is given in Annexure-III of the Report. The Committee, however, recommended, that the Polytechnic may be given the freedom to substitute any item of equipment, according to the actual requirement of the syllabus, which may prove to be more useful at the time of purchase. The ceiling for the equipment, however, should not be exceeded.

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RECURRING: (PER ANNUM)

Staff Salaries (as per State Scales of Pay.)	₹	Rs. 64,000/-
Scholarship for Sandwich practical training @ Rs.150/- per student per month.	₹	Rs. 27,000/-
Honorarium to Guest Speakers etc.		Rs. 5,000/-
Total ...	₹	Rs. 96,000/-

The Committee wishes to thank the Southern Regional Committee for giving it an opportunity to tackle such an important problem as the opening of a Fisheries Diploma course. The Committee is grateful to the Joint Director of Technical Education, Trivandrum, Kerala State, the Principal, Kerala Government Polytechnic, Calicut and members of its staff for making necessary arrangements for its visit and for rendering all assistance to the Committee in considering its assignment.

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LIST OF FISH PROCESSING PLANTS, COLD STORAGES AND ICE MAKING FACTORIES IN KERALA STATE.

Sl. No.	Name and Address	capacity in Tonnes
1.	2.	3.
PROCESSING PLANTS.		
1.	M/s. Abad Fisheries, P.B.No.313, Cochin-2	3
2.	M/s. Amrut & Company Ice & Cold Storage, P.B.No.823, Palluruthy Road, Thoppumpady, Cochin-5.	2.5
3.	M/s. Bharat Seafoods, P.B.No.911, Palluruthy, Cochin-6.	10
4.	M/s. Blue Borizhon Fisheries, 19/23, Kochangadi, Cochin-5.	2
5.	M/s. Bluewater Fisheries Company, 21/948 Edacochin, Cochin-6.	4
6.	M/s. The Canning Industries Cochin Ltd., Edacochin, Cochin-6.	5
7.	M/s. Castlerock Fisheries, 27/559, Cochin-5	5
8.	-do-	5
9.	M/s. The Chemmeens Exports Pvt. Ltd., Kochangadi, Cochin-5.	2.5
10.	-do-	10
11.	M/s.Choice Canning Company, 9/328, Manthare Road, Post Bag No.325, Cochin-2.	6
12.	M/s. Coastal Food Packers, P.B.No.840,Cochin-5.	2.5
13.	M/s. The Cochin Company Pvt. Ltd., XXX/682, M.G. Road, Ernakulam, Cochin-16	10
14.	-do-	10
15.	M/s.Cochin Fish Canning Co., P.B.No.907, Edacochin, Cochin-6.	1
16.	M/s. Coromandal Fisheries, P.B.No.920, Cochin-6.	3.5
17.	M/s. Crown Fisheries, Jew Town, Cochin-2	3.5
18.	M/s. Delhi Food Packers, Marakkadavu, Cochin-2	2
19.	M/s. Dennis & Thomas, Sadiq Manzil, Cochin-2.	2
20.	M/s. Faiz Fisheries, Cheraikadavu, Kannamaly, Cochin-7.	6.5
21.	M/s. Fanci Foods, XXX/3, Palluruthy Main Road, Cochin-682002.	10
22.	M/s. Four Season Fisheries Company, Edacochin Cochin-682006	3.5

....2.

1.	2.	3.
23.	M/s. George Maijo & Co., P.B.No.831,Cochin-5.	12
24.	M/s. Geo Seafoods, P.B.No.906, Palluruthy, Cochin-6.	5
25.	M/s. Igloo Refrigerating Co., C/o. Southern Fisheries Corpn., H.C Lane, Cochin-5.	10
26.	M/s. Indian Seafood Industries, P.B.No.300, Cochin-2.	3
27.	M/s. India Seafoods (Regd.) P.B.No.818,Cochin5	12
28.	M/s. Indo Marine Agencies (Kerala) Pvt. Ltd., P.B.No.151, Kochangadi, Cochin-2.	2
29.	-do-	2.5
30.	-do-	2
31.	-do-	1
32.	-do-	2.48
33.	M/s. International Canning Co., Thoppumpady, Cochin-5.	1
34.	M/s. Island Seafoods Pvt. Ltd., Vypeen, Cochin-3.	18
35.	M/s. John Cherady & Sons Pvt. Ltd., Convent Road, Ernakulam, Cochin-11.	7.5
36.	K.E. Kesavan & Sons, 7/380 (1) Kochangadi Road, P.B. No.322, Cochin-2.	3
37.	M/s. Kerala Fisheries Corpn. Ltd., P.B.No.1115, Sanmugham Road, Ernakulam, Cochin-11.	Location Alleppey 3
38.	-do-	Neendakara 6
39.	-do-	Cannanore 6
40.	-do-	Calicut 3
41.	-do-	Cochin-5 12
42.	M/s. Kerala Food Packers, P.B.No.66, Alleppey-688001.	4.5
43.	K.K. Raghavan & Co., P.B.No.851, Cochin.6.	3
44.	M/s. The New India Fisheries Ltd., Karuvelipady, Cochin-5.	2
45.	M/s. Ocean Fisheries, Edacochin, Cochin-6.	2
46.	M/s. Oceanflag Fisheries, 28/820-A, Pallichal Road, Cochin-5.	4.5.
47.	M/s. O.K. Industries, P.B.No.23, Cochin-1	2.5

...3.

1.	2.	3.
48.	M/s. Paragon Seafoods, 28/221, Thoppumpady, P.B.No.817, Cochin.5.	3
49.	M/s.Pearl Fisheries, River View, Edacochin, Cochin-6.	4
50.	M/s. Polar Fisheries, Old Power House Lane, Thoppumpady, Cochin-5.	5
51.	M/s. Seafoods (Export) Pvt. Ltd., Cheriakadavu, Kannamali P.O., Cochin-7.	1.5
52.	M/s. Southern Fisheries Corpn., H.C. Lane, Cochin-5.	10
53.	-do- (Karuvatta)	1.25
54.	M/s. Sterring Seafoods, H.O. Abad Building, Jew Town Road, Cochin-2. (Ambalapuzha	3
55.	M/s. Super Seafoods, Palluruthy, Cochin-5.	3.5
56.	M/s. The Travancore Cochin Prawn Curers Co-operative Marketting Society Ltd., No.2831, Cochin-2.	4
57.	M/s. T. Thomas & Company, Cheriyakadavu, Cochin-7.	12
58.	M/s. United Exporting Co., P.B.No.833, Cochin.5	1
59.	M/s. United Industries (Cochin) Ltd., P.B.No.182, Cochin.	12
60.	-do-	20
61.	M/s. Universal Trades Corpn.,P.B.No.287, XIII/3 Main Road, Cochin682002	3.5
62.	XL Seafoods, P.B.No.846, Cochin-682005.	6
63.	M/s. Veejaycee Freezing & Cold Storage, Prop. Victor Josesam & Co., Cochin-5.	3
64.	M/s. XL Seafoods, P.B.No.846, Cochin-682005	1
65.	M/s. Toyo Sea Foods, Building No.VII/395-396, Kochangady, Cochin-2.	2.5

COLD STORAGE.

1.	M/s. Blue Water Industries Co., Edacochin, Cochin-6.	15
2.	M/s. Choice Canning Co., 9/328, Manthara Road, Cochin-2.	50
3.	M/s. Binny & Co., P.B.No.6, Cochin-1.	200
4.	M/s. Geo Sea Foods, Palluruthi, Cochin-6	100
5.	M/s. K.E. Kesavan & Sons, Kochangadi Rd., Cochin-2.	60

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1.	2.	3.
6.	M/s. India Sea Food (Regd.) Thoppumpady, Cochin.5.	245
7.	M/s. Sea Star Industries, Palluruthy Road, Cochin-5.	25
8.	M/s. Cochin Co. Pvt. Ltd., M.G. Road, Cochin-16	80
9.	M/s. -do-	55
10.	M/s. Super Sea Foods, Palluruthy, Cochin-5.	50
11.	M/s. Veejaycee Freezing & Cold Storage, Cochin.5	150
12.	M/s. Indo-Marine Agencies (Kerala) Pvt. Ltd., P.B.No.151, Cochin-2. (Calicut)	18
13.	-do-	30
14.	-do-	25
15.	-do-	12
16.	-do-	10
17.	-do-	125
18.	-do-	10
19.	M/s. Indian Sea Food Industries, P.B.No.300 Cochin-2.	50
20.	M/s. New India Fisheries Ltd., Karuvellipady, Cochin-5.	625
21.	M/s. Kerala Fisheries Corpn., Shanmugham Road, Cochin-11. (Alleppey)	30
22.	M/s. Kerala Fisheries Corpn., Shanmugham Rd., Cochin-11. (Kayamkulam)	50
23.	-do- (Neendakara)	150
24.	-do- (Vizhinjam)	30
25.	-do- (Tanur)	30
26.	-do- (Quilandy)	50
27.	-do- (West Hill)	95
28.	-do- (Cochin)	300
29.	-do- (Cochin)	600
30.	M/s. Universal Trades Corpn., P.B.No.287, Cochin-2.	60
31.	M/s. -do-	40
32.	John Cherady & Sons, Convent Rd., Cochin-11	100
33.	-do-	100
34.	M/s. George Meijo & Co., P.B.No.831, Cochin-5.	50

...5.

1.	2.	3.
35.	M/s. XL Sea Foods, P.B.No.846, Cochin-5.	50
36.	M/s. O.K. Industries, Cochin-1.	50
37.	M/s. Chemmeen Exports (Pvt.) Ltd., Kochangadi, Cochin-5.	50
38.	M/s. Abad Fisheries, P.B.No.330, Cochin-2.	100
39.	M/s. United Industries (Cochin) Ltd., P.B.No.182, Cochin-2.	100
40.	-do-	60
41.	-do-	41
42.	-do-	100
43.	M/s. Castlerock Fisheries, Palluruthy Rd., Cochin-5.	160
44.	-do-	100
45.	M/s. Coramandel Fisheries, P.B.No.920,Cochin	100
46.	M/s. The Canning Industries Cochin Ltd., Edacochin, Cochin-6.	100
47.	M/s. Sakthi Ice Factory, Palluruthy Road, Cochin-5.	50
48.	M/s. Polar Fisheries, Thoppumpady, Cochin-5.	50
49.	M/s. Paragon Seafoods, P.B.No.317Cochin-5.	50
50.	M/s. Ocean Fisheries, Edacochin, Cochin-6.	100
51.	M/s. M.K. Fisheries, Kannamali, Cochin-7	600
52.	M/s. Crown Fisheries, Jew Town, Cochin-2.	40
53.	M/s. The Travancore Cochin Prawn Curers Co-op. Marketting Society Ltd., Cochin-2.	45
54.	-do-	15
55.	M/s. Sterling Seafoods Abad Building, Cochin-2	60
56.	M/s. Chemmeens (Regd.) Kochangadi, Cochin-5.	75
57.	-do-	50
58.	M/s. Faiz Fisheries, Kannamally, Cochin-7	110
59.	M/s.K.K. Raghavan & Co., P.B.No.851, Cochin-5.	50
60.	M/s. Coastal Fodd Packers, Cochin-5(P.B.No.840)	100
61.	M/s. Southern Fisheries Corpn., H & C Lane, Cochin-5.	50
62.	M/s.Igloo Refrigeration Co., C/o. Southern Fisheries Corpn., H & C, Cochin-5.	150

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1.	2.	3.
63.	M/s. Island Seafoods (Pvt) Ltd., Vypeen, Cochin-1.	175
64.	M/s. T.Thomas & Co., Cheriya Kadavu, Cochin.7.	100
65.	M/s. Four Seasons Fisheries Co., Edacochin, Cochin-6.	75.
66.	M/s. Amrut & Co., Cochin-5 (PB No.823) (Tonnes)	30
67.	M/s. Geo Sea Foods, Pallichal Rd.,Cochin-6.	2.8
68.	M/s. Bharat Seafoods, P.B.No.911,Cochin-6.	100.
69.	M/s. Blue Bay Fisheries, Cochin-2(Kochangadi Rd)	150
70.	M/s. Seafoods (Export) Pvt. Ltd., Kannamally, Cochin-7.	50
71.	M/s. Delhi Food Packers, Marakadavu, Cochin-2	45
72.	M/s. Fanci Seafoods, Palluruthi Main Rd., Cochin-2.	170
73.	M/s. Blue Water Fisheries Co., Edacochin, Cochin-6.	75

ICE MAKING:

1.	M/s. Amrut & Co., Ice & Cold Storage,Cochin.5	10
2.	M/s. Arabian Ice & Industries Manchery, Mundamveli, Cochin-5.	12
3.	M/s. Beena Fisheries, Karuvelipady, Cochin-5	10
4.	M/s. Berg Ice, Old Railway Station Rd., Cochin-18.	18
5.	M/s. The Coastal Ice Factory, Edavankad,Vypeen	6
6.	M/s. The Cochin Company Pvt. Ltd., M.G.Rd., Cochin-16.	10
7.	M/s. The Corporation Ice Factory, Marukkumpeda, Cochin-1.	6
8.	M/s. Everest Ice & Industries, Cochin	10
9.	M/s. Four Seasons Fisheries Co., Cochin	10
10.	M/s. Gopal Ice Factory, Pachalam,Ernakulam	7
11.	M/s. Indo Marine Agencies (Kerala)Cochin	25
12.	M/s. Island Ice & Cold Storage, Narakkel	10
13.	M/s. K.A. Thomas, Palluruthy Rd., Cochin.5	9
14.	M/s. The Narakkel Ice Factory, Narakkel	6

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1.	2.	3.
15.	M/s. Periyar Ice & Cold Storage, Edevankad	10
16.	M/s. Sekthi Ice Factory, Cochin-5.	12
17.	M/s. The Saroma Ice Factory, Cochin-5.	10
18.	M/s. The Southern Fisheries Corpn., Cochin-5.	24
19.	M/s. Stella Ice, Thoppumpady, Cochin-5	6
20.	M/s. Venus Ice & Industries, Cochin-5	4.75
21.	M/s. Vijaya Ice Plant, Cochin-2	10
22.	M/s. Vijaya Industries, Cochin-5(Chandrapuri)	10
23.	M/s. West Coast Ice Factory, Pallipuram, Cochin.	12
24.	M/s. Stelle Ice, Thoppumpady, Cochin-5.	6
25.	M/s. Everest Ice & Industries, Cochin-5	16
26.	M/s. Four Seasons Fisheries Co., Cochin.	10
27.	M/s. Amrut & Co., Cochin-5.	10
28.	M/s. Island Ice & Cold Storage, Narakkal	10
29.	M/s. The Coastal Ice Factory, Vypeen	6
30.	M/s. Corporation Ice Factory, Murukkumpadam	6

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LIST OF EQUIPMENTS AVAILABLE WITH THE INSTITUTION FOR THE FISHERIES TECHNOLOGY COURSE.

1. Centrifuger
2. Air Over
3. Muffle furnace
4. Vacuum drier
5. Bomb Calorimeter
6. Refractometer
7. Soxhlet extraction set
8. Polarimeter
9. Flash and fire point apparatus
10. Viscometer
11. Constant temp. bath
12. Homogenizes
13. Filter press
14. Jacketted kettle
15. Autoclane
16. Baby Boiler
17. Hammer mill
18. Ball mill
19. Distilled water still.

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LIST OF ADDITIONAL EQUIPMENT REQUIRED FOR THE FISHERIES TECHNOLOGY COURSE.

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Total value ..Rs.60,000/-

BIOLOGY:

Microscope : High Powers ... 1.

Microscopes: Low Power ... 4.

Microtome

Plankton samplers

OCEANOGRAPHY:

Current meter

Deep Water Sampler (Nansen-type).

Deep Water thermometer

Bottom dredge (Peterson grab).

INLAND FISHERIES:

Equipments for induced breeding

Plastic Pools - circular

Polythene or Fibre glass tubs.

Fish measuring boards

Scale-projector

Centrifuge. Oxygen Cylinder with regulator

GEAR LABORATORY:

Instruements for testing the strength of yarn, twist counter etc. Models of nets.

CRAFT:

Models of fishing boats, winches etc. cut-out model of diesel engines.

TECHNOLOGY-PROCESSING:

Minifreezer. Meat mincer

Sharples Centrifuge

Hand-seaming machine

Vacuum tester

Driers

Smole chamber.

BACTERIOLOGICAL:

Incubator
Anaerobic Jar
Petri dishes & Test-tubes.

N.B. The Institution would be free to substitute any item according to their felt need, which may prove more useful at the time of the purchase.

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APPENDIX-7.

REPORT OF THE EXPERT COMMITTEE CONSTITUTED TO EXAMINE THE PROPOSAL FROM THE GOVERNMENT OF TAMILNADU REGARDING RECOGNITION OF POST-DIPLOMA IN PRODUCTION ENGINEERING AND POST-DIPLOMA IN INDUSTRIAL ENGINEERING AWARDED BY THE STATE BOARD OF TECHNICAL EDUCATION, GOVERNMENT OF TAMILNADU.

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The State Government of Tamilnadu submitted a proposal to the Ministry of Education and Social Welfare, New Delhi for the recognition of Post-diploma in Production Engineering and Post-diploma in Industrial Engineering awarded by the State Board of Technical Education, Government of Tamilnadu, Madras.

Post-diploma in Production Engineering and Post-diploma in Industrial Engineering are conducted at the P.S.G. Polytechnic, Coimbatore, established in the year 1956 as an adjunct to P.S.G. and Sons Charitable College of Technology, Coimbatore. The institution was approved for conducting diploma courses in Civil, Mechanical and Electrical Engineering subjects with an annual intake of 120 students. Subsequently a diploma course in Textile Technology was also introduced at the institution with the approval of the Government of India with an intake of 30 students. The diploma courses in Civil Engineering and Textile Technology were discontinued with effect from the academic year 1966-67. The institution is at present approved for conducting diploma courses in Mechanical and Electrical Engineering branches with an intake of 45 students for each course.

The State Board of Technical Education, Government of Tamilnadu at its meeting held on 6th May, 1960 sanctioned the introduction of Post-diploma course in Production Engineering and the course was introduced at the P.S.G. Polytechnic, Coimbatore. However, at its

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subsequent meeting, the course was split into two separate courses, viz., Post-diploma in Production Engineering and Post-diploma in Industrial Engineering and from the academic year 1962-63, the institution is conducting these courses with a sanctioned intake of maximum 10 students. The actual admission made by the Polytechnic, however, are less as the candidates not fulfilling the required standards are not granted admission.

Both these post-diploma courses were, however, introduced without the approval of the Southern Regional Committee and the All India Council for Technical Education. Before considering the question of recognition of these diplomas, the Government of India, therefore, forwarded the proposal to the Southern Regional Committee to consider the same and make recommendations.

The Southern Regional Committee constituted an Expert Committee consisting of the following to examine the matter in detail:-

1. Prof. R.G. Narayanamurthy,
   Prof. & Dean of Mechanical Engg.,
   Indian Institute of Technology,
   Madras.

2. Shri S.K. Handa, Member-Secretary &
   Asst. Educational Adviser (T),
   Ministry of Education & S.W.,
   Madras.

The Expert Committee visited the P.S.G. Polytechnic, Coimbatore on 18th August, 1975. The Committee examined the standard and contents of the courses and had detailed discussions with the Principal and members of the staff about the need and utility of these courses with reference to the actual requirements of Industry. The Committee also went round the institution to see if adequate facilities were available by way of buildings, equipment and staff to run

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the course in accordance with the approved standards. On the basis of its visit and detailed discussions, the Committee made the following observations and recommendations:-

MINIMUM ADMISSION QUALIFICATION AND DURATION OF THE COURSE:

The minimum qualification for admission to Post-diploma in Production Engineering is a diploma in Mechanical or Automobile Engineering and for the post-diploma in Industrial Engineering, a diploma in Mechanical or Electrical Engineering or Textile Technology. The duration of the course is one year at the institution followed by 6 months practical training in a leading Industry. Though admission is not restricted to sponsored candidates, preference is given to candidates sponsored by Industry.

STANDARDS & CONTENTS OF THE COURSES:

The Post-diploma courses in Production Engineering and Industrial Engineering are full time courses. The syllabus of the courses cover a wide range of specialities. The following are the common subjects of study for the two courses:-

1. Work study
2. Industrial Psychology and Industrial relations.
3. Industrial Safety.

In addition to the above common subjects, the Production Engineering course is designed to give specialised and advanced training in (1) Production Processes (2) Engineering Materials and (3) Tool Engineering and Design. The Industrial Engineering course, on the other hand, is designed to specialise in (1) Applied Statistics (Quality Control) (2) Production Planning and Control and (3) Job Evaluation - merit rating - Incentive schemes and wage payment.

These Post-diploma courses are intended to give an intensive training both in theory and practice to the candidates in the above 2 branches to enable them to introduce the modern production techniques in Industry. Inplant training at the P.S.G. Industrial Institute and other industries in Coimbatore provides the students opportunity to learn shop floor techniques and practices. During the inplant training the students are exposed to live problems in the Industry. At the end of the course, they make specific recommendations on the problems studied, applying the various productivity techniques.

After the written examination, the candidates take up the project work in Industry on full-time basis for a period of about 6 months. The candidates may select problems of their own or problems suggested by the management and after detailed study and analysis, they have to submit a dissertation of an accepted standard. On submission of the dissertation, the candidates will have an oral examination based on the project work.

In the light of the above details, the Committee was satisfied with the standard and contents of the courses prescribed for theoretical instructions and practical training for the Post-Diplomas in Production Engineering and Industrial Engineering.

EXAMINATION AND AWARDING AUTHORITY:

The syllabus and scheme of examination for the various subjects prescribed for the Post-diploma coursesare followed as approved by the State Board of Technical Education. The final examination for the Post-Diplomas held by the State Board. The candidates completing satisfactorily the examination and all other requirements are awarded the diploma in Production

Engineering or Industrial Engineering by the State Board of Technical Education, Tamilnadu.

COLLABORATION WITH INDUSTRY.

The courses are run in collaboration with Industry in and around Coimbatore and are offerred in accordance with the full needs of the Industry. The objective is well achieved, as besides having collaboration with other industries the P.S.G. Polytechnic has a very close collaboration with P.S.G. Industrial Institute and other Training Centre at Nilambur. The students are, therefore, provided with an unique opportunity to take up Industrial problems of varied nature for their case study analysis and project work. As the students spend 3 afternoons in a week for their regular case study assignments during their course work and a period of 6 months full-time practical training during their project work, they acquire good familiarity to different industrial processes and production techniques.

EMPLOYMENT OPPORTUNITIES AND NEED FOR THESE COURSES:

The Committee observed that the students of Production Engineering course are well exposed to latest production methods in Foundry, Forging, Welding, Turning, Milling and Grinding, selection of materials for various products and treatment of products to get the required qualities, through the courses of instruction in subjects of Production Processes and Industrial/Engineering materials. Besides, they get very good knowledge and training in design and fabrication of production tools and equipment such as jigs, fixtures, Press tools and Inspection gauges etc. for which a special subject of "Tool Engineering and Desig has been included in the course. They are thus very well trained in actual shop floor production practices

and are most suited to take up jobs of Process Assistants, Inspection Assistants, Tool Design Assistants etc., for which there is a definite demand from Industry, for the students trained in such courses.

Similarly, the students of diploma course in Industrial Engineering get very good training in planning of machines, men and material, planning requirements for production, fixing the quality standards and ways and means of achieving the same, fixing the educational experience, skill required for the various jobs and in designing the evaluation methods. Thus the candidates passing this diploma course would be very useful in these specific aspects of production i.e., Planning, Scheduling, Quality control, job evaluation and men evaluation. They are therefore, in a position to take up the assignment as Planning Assistants, Quality Control Assistants, Progress chargers etc.

Besides, the students of both the diploma courses get very good knowledge and training regarding improved production methods, time fixation techniques, improved methods of increasing productivity in industries, selection and training procedures, for various level of activities in industries, Factory's act details, methods of dealing industrial disputes, safe practices in handling machines and industrial hazards, details of occupational disseases through courses on work study, Industrial psychology, industrial relations and industrial safety which are prescribed under the syllabus for the Post-diploma courses. The holders of these diplomas are therefore, in a very good position to work as Maintenance and Safety Engineers and Work Study Assistants for which there is a demand from Industry.

The Committee was informed by the P.S.G.

Polytechnic, Coimbatore that so far all the candidates who have passed the diploma courses in Production Engineering and Industrial Engineering have been employed and some of them were occupying fairly senior positions.

FACILITIES:

Buildings:

The Committee observed that the institution is not having adequate accommodation for conducting the course. At present the classes are conducted with the accommodation available for other courses. The students of these courses also share the laboratory and other physical facilities provided for other courses. The Committee recommended that additional area of 3000 sq.ft. was necessary to provide adequate facilities for these two post-diploma courses.

Equipment:

In so far as equipment is concerned, the institution have provided certain essential items of equipment for conducting the course. The Committee, however, observed that the equipment available for the post-diploma courses was not adequate to run the courses effectively. Having regard to the equipment already available, the Committee recommended that additional equipment for Rs.3.00 lakhs should be provided to the polytechnic for the proper conduct of these courses. The list of equipment may be seen in Annexure-I. The Committee recommended that the institution may be given freedom to substitute any item of equipment according to the actual requirement of the syllabus, which may prove to be more useful at the time of the purchase. The ceiling of the equipment, however, should not be exceeded.

The Committee also recommended an amount of Rs.10,000/- for Library and Rs.10,000/- for furniture.

STAFF:

The Committee observed that the institution did not have necessary staff for the post-diploma courses. At present, subjects for these courses are handled by the members of faculty of the department of Mechanical Engineering. The Committee recommended that there must be one Lecturer specifically provided for each of these courses.

Based on the above, the summary of the additional facilities recommended by the Committee, is given below:-

NON-RECURRING:

Buildings (3,000 sq.ft. @ Rs.35/- (per sq.ft.)		Rs. 1,05,000/-
Equipment		Rs. 3,00,000/-
Library		Rs. 10,000/-
Furniture		Rs. 10,000/-
Total	...	Rs. 4,25,000/-

RECURRING:(PER ANNUM)

Staff Salary (Lecturers 2)		Rs. 20,000/-
Maintenance (at Rs.350/- p.a. for 20 students)		Rs. 7,000/-
Total	...	Rs. 27,000/-

RECOMMENDATIONS:

Having regard to the duration, the minimum admission requirements, the standard and contents of the courses as also the demand for the personnel trained through such courses, the Committee recommende that Post-diploma in Production Engineering and Industrial Engineering awarded by the State Board of Technical Education, Tamilnadu may be recognised for the

purpose of employment to subordinate posts such as Workstudy Assistants, Maintenance and Safety Engineers, Process Assistants, Inspection Assistants, Tool Design Assistants, Planning Assistants, Quality-Control Assistants etc., for which a Post-diploma in the appropriate subject is prescribed as a qualification. However, before the diplomas are recognised, the Committee recommended that it was necessary that additional facilities required to ensure the proper standards, should be made available.

The Committee wishes to place on record its appreciation and thanks to the Principal and Staff members of the Polytechnic for rendering all possible assistance and making suitable arrangements for its visit.

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ANNEXURE-I (7)

LIST OF EQUIPMENT REQUIRED FOR THE CONDUCT OF POST-DIPLOMA IN INDUSTRIAL ENGINEERING AND PRODUCTION ENGG.

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I. WORKSTUDY FILMS:

1. Man Machine Chart - How they are made and used -
2. Motion Study applications - 2 Reels
3. Safety in Material Handling - 2 Reels
4. Production Control Part I & II.

II. METALLURGY AND FOUNDRY EQUIPMENT:

1. Oil fired crucible furnace to melt 30 kg. of alu
2. Thermocouples - PI-P1-Rh with indicator and chro
3. Metal spraying equipment Alum
4. Vacuum Desicator for keeping Metallographic spec
5. Vacuum pump, 10-6 mm. of Hg.

III. METROLOGY LAB. EQUIPMENTS:

1. Slip gauge set - Range 87 pieces and 103 pieces (carb
2. Optical bevel protector
3. Height Master with digital Read out
4. Accessories for auto collimeters
5. Pneumatic gauges
6. 3-Lobe dial bore gauge
7. Magnifying lenses and angle measuring protractor optical profile projectors.

IV. WORKSHOP MACHINERY LIST:

1. Gear shaper (HMT)
2. Cylindrical grinder K 130 HMT
3. Optical dividing head
4. Gyrwheel - grinding head for SIP Jig Boring mac
5. Tool and cutter grinder.

TOTAL AMOUNT FOR THE ABOVE EQUIPMENTS:

1. Work study films	..Rs.	5,000/-
2. Metallurgy & foundry equipments	Rs.	75,000/-
3. Metrology lab. equipments	Rs.	40,000/-
4. Workshop equipments	Rs.	1,80,000/-
Total	Rs.	3,00,000/-

N.B. The institution would be free to substitute any item according to their felt need, which may pro more useful at the time of the purchase.

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APPENDIX-8.

REPORT OF THE EXPERT COMMITTEE SET UP TO EXAMINE THE PROPOSAL OF THE STATE GOVERNMENT OF TAMILNADU FOR THE INTRODUCTION OF THE SANDWICH COURSE IN TEXTILE TECHNOLOGY AT THE NACHIMUTHU POLYTECHNIC, POLLACHI.

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The State Government of Tamilnadu submitted a proposal to the Southern Regional Committee for the introduction of the Sandwich course in Textile Technology at the Nachimuthu Polytechnic, Pollachi. The Nachimuthu Polytechnic, Pollachi was established in the year 1957 under the auspices of Nachimuthu Industrial Association. The Polytechnic offers the following courses of studies:-

Diploma courses offered	Sanctioned intake	Duration
FULL TIME.		
Civil	40)	
Mechanical	60)	
Electrical	40)	
Commercial Practice	40)	3 years
POST-DIPLOMA		
Auto.	30	1½ years

The proposal for the introduction of the above course was considered by the Southern Regional Committee at its 38th meeting held on 9th December,'72 at Bangalore and the Committee resolved to refer the proposal to the Standing Committee. Accordingly, an Expert Committee consisting of the following members was set up to examine the various aspects of the proposal in detail and make recommendations:-

1. Shri A. Mani,
   Principal,
   P.A.C. Ramaswamy Raja Polytechnic,
   Rajapalayam,
   Tamilnadu.

...2.

2. Shri B.K. Handa, Member-Secretary & Asst. Educational Adviser (T), Ministry of Education & S.W., Southern Regional Office, Madras-600006.

The Committee paid a visit to the Nachimuthu Polytechnic, Pollachi on 18th August, 1975. The Committee had detailed discussions with the Principal and members of staff to collect information on the various relevant points for examing the proposal in all its aspects. The Committee also went round the laboratories and workshops and examined all the facilities available with the institution by way of building, equipment, staff, library etc.

The Committee noted that in accordance with the present policy of the All India Council for Technical Education any course meant to meet the felt needs of technical personnel for industry, and having assurance of collaboration from Industry can be given the necessary approval. However, the course started in an academic way without any relation to the needs of manpower may be difficult to support.

The Principal informed the Committee that there were good prospects of employment for students of Textile Technology Diploma course as there were a number of Textile mills functioning in the district. A list of textile mills was also furnished by the Principal which is placed at Annexure-I.

The Principal explained that Coimbatore District which has about 50% of the spindles installed in Tamilnadu has no educational institution offering a diploma course in Textile Technology. P.S.G. Polytechnic which was offering the diploma course was upgraded into a degree college and the candidates were mainly trained to occupy the higher managerial posts in mills and not to serve as technicians and supervisors which require only diploma holders.

To improve and maintain high standards of production and quality, every mill is putting up its own quality control departments and textile trained personnel are needed to man these departments. Also for training the technical personnel for the industry under the quality improvement programmes, compulsory apprenticeship scheme etc. some technicians are required to be appointed to the cadre of Instructors and normally diploma holders are assigned this job. Further, a due allowance has to be given for vacancies caused due to industrial accident, incapacitance, death in harness and superannuation.

The Principal was, therefore, of the view that present out-turn of textile diploma holders was far below the requirement of the technically trained personnel especially at the diploma level. The Committee, however, observed that three diploma institutions in the State viz. Institute of Textile Technology, Adyar, P.A.C. Ramaswamy Raja Polytechnic, Rajapalayam and Thiagarajar Polytechnic, Salem were already conducting the textile course with a total annual intake of 100 students. The information furnished by the Principal did not give exact particulars and enough evidence of employment opportunities for the candidates trained through textile diploma course to justify the additional demand. From the information gathered, the Committee felt that the number of technician required to fill the vacancies arising due to death or retirement of anticipated growth in industry could be met from the existing annual out-turn. Further Nachimuthu Polytechnic, Pollachi had started only an institutional course and the Committee did not find any justification for a purely institutional course for a diploma in Textile Technology without any relationship to the actual needs of Industry.

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The Committee realised that there were a large number of textile mills in the district as also in and around Pollachi which could sponsor candidates for the course and offer training facilities for the students of the institution. The Committee, therefore, was prepared to support if the course was organised on sandwich basis in close collaboration with Industry. The theoratical instructions in the Institute and the practical training in Industry should be closely integrated to provide overall training with reference to actual requirements of Industry. The Committee noted that in fact the proposal received from the State Government of Tamilnadu was for a Sandwich type diploma course. The Polytechnic had also a plan to organise the course only on sandwich basis for which they were making arrangements with Textile mills. The Committee accordingly recommended that necessary approval should be accorded for the introduction of Diploma course in Textile Technology at Nachimuthu Polytechnic, Pollachi but only on a Sandwich pattern. The annual intake to the sandwich diploma course in Textile Technology should be restricted to 20 which should be within the overall sanctioned capacity of the Polytechnic. The Committee further recommended that at least 50% of the intake i.e. 10 students should be sponsored by Textile Industry so that they are immediately employed after they successfully complete the diploma course.

The Committee then examined the requirements for the proposed sandwich course having regard to the facilities already available. The Committee recommended the following facilities for the proper conduct of the sandwich diploma course in Textile Technology.

NON-RECURRING:

A. Buildings:

General:

Head of the Department, Office Room and Staff Room.		1000 sq.ft.
Class Rooms		1350 "
		2350 "

@ Rs.30/- per sq.ft. (2350 x 30) ..Rs. 70,500/-

Workshop type Buildings:

Textile testing Lab.	1,500	sq.ft.
Spinning Lab.	4,500	"
Weaving Lab.	4,000	"
Textile Chemistry Lab.	1,500	"
Stores	1,000	"
	12,500	"

@ Rs.25/- per sq.ft. (12,500 x 25) Rs.3,12,500/-

Rs.3,83,000/-

B. Equipment * Rs.6,90,400/-

C. Furniture Rs. 20,000/-

D. Library Rs. 20,000/-

Total ..Rs. 11,13,400/-

* The list of equipment is given in Annexure-II.of the Report. The Committee, however, recommended that the Polytechnic may be given the freedom to substitute any item of equipment according to the actual requirement of the syllabus, which may prove to be more useful at the time of purchase. The ceiling for the equipment, however, should not be exceeded.

RECURRING (PER ANNUM)

Staff Salaries (as per State Scales of Pay) (As per Annexure-III)	Rs.1,35,000/-
Library, Journals etc.	Rs. 2,000/-
Maintenance	Rs. 21,000/-
Scholarships for sandwich practical training @ Rs.150/- per student.	Rs. 3,000/-
Total ...Rs.	1,61,000/-

The Committee wishes to place on record its thanks to the Principal, Nachimuthu Polytechnic, Pollachi and other members of its staff for rendering all possible assistance and for making suitable arrangements for its

LIST OF COTTON SPINNING MILLS IN COIMBATORE DISTRICT.

Sl. No.	Name of the Mill and Place.	Capacity No. of ring spindles.	Remarks
1.	2.	3.	4.
1.	Anandakumar Mills, Siravananpatti, Coimbatore-6.	20 304	
2.	Asher Textiles Ltd., Tirupur	26 400	Has bleaching & mercerising also
3.	Avanashi Spinning Mills (P) Ltd., Peelamedu	2600	Has waste spinning also.
4.	The Bhavani Mills Ltd., I.E. Coimbatore-21.	12 280	
5.	The Cambodia Mills Ltd.,Ondiputhur	36, 144	
6.	Cardwell Spinning Mills (P) Ltd., Narasimhanaickenpalayam	6, 040	
7.	Chandraprabha Cottage Spg. Mills, Chitode	3, 888	
8.	Chandra Textiles (P) Ltd., Peelamedu	17,303	
9.	Coimbatore Dist. Coop. Cotton Spg. Mills Ltd., Dharapuram.	14, 420	
10.	Coimbatore Kamala Mills Ltd., Uppilipalayam	27, 376	
11.	Coimbatore Pioneer Mills Ltd., Peelamedu	22, 440	
12.	DPF Textiles (P) Ltd., Coimbatore	25, 056	
13.	Dhandapani Waste Spinners, Vellakoil	736	Waste spinning
14.	Essorpee, Ganapathy	25, 088	
15.	Ganga Textiles, P.N. Palayam	15, 840	
16.	Gitanjalai Mills, Srigomathipuram	12, 248	
17.	Gnanambigai Mills Ltd., Coimbatore	25, 168	
18.	Gobald Textiles, Tirupur	12, 096	
19.	The Jayalakshmi Mills (P) Ltd., Singanallur.	24, 800	
20.	Jothi Mills, Coimbatore-19.	25, 000	
21.	Kadiri Mills (CBE) Ltd., Cbe.16.	28, 420	
22.	Kandaswami Spg. Mills, Bhavani	12, 064	
23.	The Kasthuri Mills Ltd., Ondipudur	27, 420	
24.	Krishnaveni Textiles Ltd., Uppilipalayam	10, 520	NTC control
25.	Kumaran Mills Ltd., Narasimhanaicken palayam	24, 924	
26.	Kwality Spinning Mills, Pollachi	38, 208	

1.	2.	3.	4.
27.	Lakshmi Textile Yarn Products, Pollachi.	344	Waste spindles
28.	Lakshmi Mills, Palladam	21,888	
29.	Om Parasakthi Mills Ltd., Ganapathi	15,048	NTC control
30.	Palni Andavar Mills Ltd., Udumalpet	50,400	
31.	Pankaja Mills, Puliakulam	30,796	-do-
32.	The Pioneer Textiles, Vedapatti	12,312	
33.	Pongalur Waste spinners	800	Waste spinning
34.	The Prakash Mills (P) Ltd., Peelamedu	14,652	
35.	Premier Mills (CBE) Ltd.,Pulankinar	38,652	
36.	Radha Spg. Mills Ltd., Tirupur	1,224	
37.	Rajalaksmi Mills Ltd.,Singanallur	50,000	
38.	Rajalakshmi Mills, Karamadai	12,000	
39.	Ramalakshmi Mills, Peelamedu	1,036	Waste spinning
40.	Ramanathan Textiles, Tirupur	324	-do-
41.	Ravindra Mills Ltd., Singanallur	15,083	
42.	Saravanabhava Mills Pvt. Ltd.Tirupur	360	
43.	Sarguna Textiles (P) Ltd. Ondipudur	9,240	
44.	Saroja Mills Ltd. Singanallur	20,080	
45.	Selvaraja Mills (P) Ltd.,Ondipudur	15,920	
46.	Selvi Textiles (P) Ltd., Tatabad	750	Waste spinning
47.	Shree Aruhachaleswarar Mills, Myvadi	776	-do-
48.	Sivalakshmi Waste Cotton Spg.Mills, Tirupur	744	-do-
49.	Sivananda Mills Ltd., Saravanapatti	34,496	
50.	Sivashakthi Spg. Mills,Udumalpet	776	-do-
51.	Somasundaram Textiles, Ondipudur	332	-do-
52.	Southern Textiles Ltd., Sulur	12,532	
53.	The Sri Balasubramania Mills Ltd., Singanallur	23,024	
54.	Sri Gopalakrishna Mills (P) Ltd., Ganapathi	25,328	
55.	Srihari Mills, Ondipudur	25,056	
56.	Sri Kamapiran Mills Ltd., Cbe.4	26,396	
57.	Sri Karunambikai Mills Ltd., Somanaur	25,056	
58.	Sri Lakshmi Narayana Textiles Pvt. Ltd., Palladam	13,640	
59.	Sri Ramakrishna Mills (CBE) Ganapathi	34,780	

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1.	2.	3.	4.
60.	Sri Ramnarayana Mills Ltd., Perianaickenpalayam	25,040	
61.	Sriranga Spinners, Komarapalayam	338	Waste spinning
62.	Sri Sakthi Textiles (P) Ltd.,	Pollachi 25,032	Our sister-concern
63.	Sri Naradaraja Textiles (P) Ltd., Peelamedu	13,792 6,204	Staple fibre
64.	Suguna Mills Pvt. Ltd.,	Kuniamuthur 12,000	Has bleaching also
65.	Sujani Textiles Pvt. Ltd., Souripalayam	13,392	
66.	Sundaram Spg. Mills, Komarapalayam	25,228	
67.	Suryaprabha Mills Pvt. Ltd., Kuniamuthur	14,080	
68.	Tamilnadu Spg. Mills Ltd., Tirumuruga Poondi	4,040	
69.	Tirumurthi Mills Ltd.,	Udumalpatti 28,384	
70.	Tirupur Textiles Ltd., Tirupur	24,000	
71.	Unity Mills (P) Ltd., Kappalur	1,680	
72.	V.R. Textiles, Peelamedu	12,000	
73.	Venkateswar Textiles Pvt. Ltd.	Annur 12,000	
74.	Venugopal Spinners Pvt. Ltd., Tirupur	1,308	Waste spinning
75.	Vijayalakshmi Mills Ltd.	Kuniamuthur 39,960	
76.	Vijayaeswari Textiles (Ltd.) Puliampatti	15,016	
77.	Vyas Textiles, Pinganallur	2,280	Waste spinning
78.	Bagavathi Textiles (Kerala)	12,360	Our sister-concern

A LIST OF COMPOSITE MILLS IN COIMBATORE DISTRICT.

Sl. No.	Name of the Mills and Place.	Spindles	Looms	Remarks
1.	The Cambodia Mills Ltd., Ondipudur	36,144	4	Has waste spg. also. NTC control
2.	Central Jail Spg. Weaving & Dyeing Factory, Coimbatore	4,100	178	Has Dyeing also
3.	The Coimbatore Cotton Mills Ltd, Uppilipalayam.	54,464	110 (Auto)	Terycotton Wvg.
4.	The Coimbatore Murugan Mills Ltd.,	28,420	100 (Auto)	NTC control

1.	2.	3.	4.	5.
5.	The Combatore Spg. Weaving Co.	80,316	288 + NTC control 96 (Auto looms)	
6.	Divya Cotton Fabrics, Tirupur	...	24	
7.	The Dhanalakshmi Mills Ltd., Tirupur	54,716	434 (Auto)	
8.	The Kaleeswarar Mills Ltd.	50,314	310 NTC control has bleaching Dyeing also	
9.	Kothari Mills, Pinganallur	43,000	300	
10.	Lakshmi Mills, Coimbatore	59,596	394 Has bleaching also	
11.	Lotus Mills Ltd. Sundarapuram PO Coimbatore	27,088	Data not available	
12.	Radhakrishna Mills Ltd., CBE.	65,264	300 (Auto)	
13.	The Somasundaram Mills Ltd., CBE	..	308 plain looms & 60 Autolooms	Has processing unit.
14.	Sri Karthkeya Spg. & Weaving Mills (P) Ltd., Uppipalayam, CBE	28,624	...	
15.	Sri Natesar Spg. & Weaving Mills Pvt. Ltd., Erode	22,448	...	
16.	The Sri Ramalinga Choodambikai Mills Ltd., Tirupur	39,132	192 (Auto)	
17.	Sri Ranga Vilas Ginningm Spg., Weaving Mills Ltd., Peelamedu, Coimbatore.	42,340	Data not available	NTC
18.	Sri Rani Lakshmi Ginning, Spg., & Weaving Mills (P) Ltd., Arasur PO. Via Pulur, CBE	12,096	-do-	
19.	Sri Sarada Mills Ltd., Podanur	20,796	200 Nos.	NTC
20.	The Sri Venkatesa Mills Ltd., Udamalpet CBE Dist.	68,484	330 Nos.	
21.	Tirupur Cotton Spg. & Weaving Mills Ltd., Tirupur	15,344	Data not available	
22.	The Vasantha Mills Ltd., Cbe.	53,394	266 Looms	

In addition to the textile mills which demand textile technology Diploma holders, the undermentioned openings are also therefor them to get job opportunities.

1. United Bleachers, Mettupalayam
2. Textile Commissioners Office, as Surveyors
3. Handloom Board.Advisers, Surveyors
4. South India Textile Research Association
5. Educational Institutions - as Teaching staff
6. Lakshmi Machine Works - as erection supervisors.
7. Machinery sales Section as Engineers
8. South India Viscose
9. Textool Company Ltd., as Erectors and Supervisors.

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Sl. No.	Name of Equipment	Qty.	Cost
I.	SPINNING LABORATORY.		
1.	Carding machines:		
	a) Semi high production card	1 No.	9,000/-
	b) High production card with metallic clothin crosrol varga attachment.	1 "	70,000/-
2.	Drawing Frames		
	a) 2 Delivery high speed draw frame	1 "	70,000/-
3.	Fly Frames section		
	a) Fly frame equipped with 3 or 4 different types of Drafting system (spl. order)	1"	80,000/-
4.	Ring frame section		
	a) Ring frame with 80 spindles and SKF drafting systems (special order)	1 "	35,000/-
	b) Ring frame with 80 spindles GX2 or NGM Drafting system (spl. order to accommodate different drafting systems in one frame)	1 "	35,000/-
5.	Doubling frame with 100 spindles (spl. order on request)	1"	30,000/-
6.	Reeling machine with 40 spindles	1 "	1,000/-
7.	Reconditioned New Model Nasmith Comber with Preparatory Machines.	1 Unit	35,000/-
			3,65,000/-
II.	WEAVING LABORATORY:		
1.	Power looms plain	1	9,000/-
2.	Power looms - Dobby MMM (Bross border type)	1 "	
3.	Power loom - Satin & Twill	1 "	11,000/-
4.	Silk Loom with Drop box	1	10,000/-
5.	Terry towal power looms with drop box	1	12,000/-
6.	Power Loom-CIMMCO Board width 70/72" Reed space with Drop box - with - Hardekar	1	13,000/-
X.	Jacquard - 300 hoobs double lift, double cylinder.	1 set	10,000/-
		C/o.	4,30,000/-

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		B/f.	4,30,000/-
7.	Automatic Loom (CIMMCO Sakamotor)	1	15,000/-
8.	Automatic Loom (MMM-RUTI)	1	30,000/-
9.	Cone and cheese winding machine-High Speed (CIMMCO MULLER or Textool)	1	20,000/-
10.	Automatic Pirn winding machine	1	7,000/-
11.	Sectional warping machine	1	5,000/-
12.	Bobbin winding machine (Local make)	1	1,000/-
13.	Piano Card cutting machine	1	2,000/-

III. <u>TEXTILE TESTING LABORATORY:</u>

1.	Kamal Sorter with miniature draw box	1	1,500/-
2.	Bear Sorter - Kamal	1	2,000/-
3.	Micronair Fibre Fineness tester with shadow balance	1	15,000/-
4.	ATIRA Fibre fineness Tester	1	1,500/-
5.	Trash Analyser	1	15,000/-
6.	Microtome	1	700/-
7.	Microscope with projection screen	1	900/-
8.	Wrap block with balance	1	900/-
9.	Beesley's balance	1	500/-
10.	Quadrant balance	1	450/-
11.	Knowels type balance (KMI)	1	4,200/-
12.	Crimp tester	1	500/-
13.	Yarn Examination machine (Indian) with ASTM standard Boards-D) 2255 Grading cotton yarn for appearance 5 frames)	1 1	750/- 1,000/-
14.	Twist tester (Hand operated)	1	750/-
15.	Twist tester (Power operated)	1	1,500/-
16.	Wrap reel	1	1,500/-
17.	Lea Tester (Indian)	1	4,500/-
18.	Cloth Tester (Indian)	1	7,500/-
19.	Single thread tester	1	4,500/-
20.	Ultra-violet lamp unit	1	1,000/-
21.	Abbrasion tester	1	6,000/-
22.	Bursting strength Tester	1	1,500/-
23.	Ballastic tester	1	3,000/-
24.	Hydrometers - Dry and Wet Bulb type	1	150/-
25.	Automatic Thermo-Hydrograph	1	4,500/-
26.	Whirling type hygrometer	1	200/-

27. Counting glasses ($\frac{1}{2}$" size)	B/f. 6		5,91,500/- 50/-
28. F.CIT Calculator	1		2,200/-
29. Textile slide rule	2		250/-

TEXTILE CHEMISTRY LABORATORY.

1. Air Compressor	1		2,400/-
2. Printing machine (Lab. type)	1		4,200/-
3. Jigger Dyeing Machine (Lab. type)	1		3,990/-
4. Two Bowl padding mangle	1		3,200/-
5. 1000 Watts immersion Heater	6		500/-
6. $7\frac{1}{2}$" x 7" Tumblers	60		300/-
7. G.I. Water bath (Dye bath)	6		300/-
8. Distilled water plant	1		2,200/-
9. Laboratory Dyeing machine	1		2,500/-
10. Aerograph Spray Gun-blocks for Hand block Printing tables with pad, stencils and Screens	1		5,000/-
11. High pressure Yarn Dyeing machine	1		9,000/-
		Total ...	6,27,590/-
		or say ...	6,27,600/-
Freight and Installation @ 10%		...	62,760/-
		Total ...	6,90,360/-
		or say ...	6,90,400/-

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STAFF SALARIES.

Sl.No.	Name of post	No.	Scale of pay	Amount
1.	Head of Department	1	800-40-1000-50-1250	12,300/-
2.	Lecturer	2	600-40-1000	19,200/-
3.	Senior Instructor	3	400-15-475-20-575-25-650	13,900/-
4.	Junior Instructor	2	325-15-550	10,550/-
5.	Machine Operator	4	250-10-400	15,600/-
6.	Attender	6	150-4-170-5-225	13,500/-
			Total ...Rs.	90,000/-

Staff Salaries	...	Rs. 90,000/-	
D.A. & Other (50% of the above)		Rs. 45,000/-	Rs. 1,35,000/-

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APPENDIX-9.

REPORT OF ONE MAN EXPERT COMMITTEE OF THE SOUTHERN REGIONAL COMMITTEE OF THE ALL INDIA COUNCIL FOR TECHNICAL EDUCATION ON STARTING OF DIPLOMA COURSES IN MECHANICAL AND ELECTRICAL ENGINEERING AT SRI RAMAKRISHNA MISSION VIDYALAYA POLYTECHNIC, COIMBATORE.

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The State Government of Tamilnadu submitted a proposal for starting diploma courses in Mechanical and Electrical Engineering at the Sri Ramakrishna Mission Vidyalaya Polytechnic, Coimbatore. The institute has been running the three year Diploma course in Civil and Rural Engineering since 1956. This course is now affiliated to the State Board of Technical Education, Tamilnadu. The PTC course run by them is as per the State pattern and the students are given at the end of the PTC course a compulsory training for 4 weeks in work experience.

The proposal for introduction of diploma courses in Electrical and Mechanical Engineering was put up for consideration at the 33th meeting of the Southern Regional Committee held on 9th December, 1972 at Bangalore. The Regional Committee decided to refer the proposal to the Standing Committee to examine the matter in detail and make recommendations.

In pursuance of the recommendations of the Regional Committee, one man Expert Committee with Prof. G.R. Damodaran, Chairman, Southern Regional Committee of the All India Council for Technical Education and Dean of Post-Graduate Studies, P.S.G. College of Technology, Peelamedu P.O., Coimbatore-641004 was set up to visit the institute to examine the various aspects of the proposal.

Prof. G.R. Damodaran paid a visit to the Ramakrishna Mission Vidyalaya Polytechnic on 11th June,'75. On the basis of the visit, discussions with the Principal and other members of teaching staff of the Polytechnic and detailed study of the proposal, the one man Expert Committee made the following observations and recommendations:-

....2.

NEED OF THE COURSE:

The Committee felt that there was a demand for trained technicians in Mechanical Engineering to serve in the field of Agriculture Engineering in rural areas. The Committee, therefore, recommended that the diploma course in Mechanical Engineering be offered from the Academic year 1975-76. The Committee noted that Management of the Polytechnic also was at present interested in instituting the diploma course in Mechanical Engineering with affiliation to the State Board of Technical Education, Tamilnadu.

As regards diploma course in Electrical Engineering, the Committee recommended that this may be instituted only after the need for the same is firmly established.

DURATION AND ADMISSION QUALIFICATIONS:

The minimum qualification for admission to the diploma courses in Mechanical and Electrical Engineering shall be S.S.L.C. or its equivalent with eligibility for admission to college course. The duration of the courses shall be 3 years leading to diplomas in Electrical and Mechanical Engineering awarded by the State Board of Technical Education, Tamilnadu.

INTAKE CAPACITY:

The ultimate intake capacity should be 25 each in Mechanical and Electrical Engineering.

FACILITIES:

The additional facilities required for running the diploma course in Mechanical Engineering were examined by the Committee. In this connection, the Committee noted that Shri Ramakrishna Mission Vidyalaya Polytechnic have the following physical facilities:-

Administrative Building	..	13,082 Sq.ft.
Laboratory	..	18,604 "
Workshops	..	9,693 "

...3

The teaching staff are the heart and soul for the development of the Institution. The institution has adequate faculty strength for running the existing DCRE course. The Committee realised that the following additional teaching staff may have to be recruited if the diploma course in Mechanical Engineering is to be started.

Head of the Department	...	1
Lecturer	...	1
Senior Instructor	...	2
Workshop Superintendent	...	1

The Committee recommended that of the above ~~xhx~~ teaching staff, one Lecturer, one Senior Instructor in Mechanical Engineering and Workshop Superintendent must be recruited by the Management in 1975-76. The Head of the Department of Mechanical Engineering, and the other Senior instructor in Mechanical Engineering likewise must be appointed during 1976-77.

Having regard to the above infrastructure and the facilities already available with the Polytechnic, the following is the summary of the additional facilities recommended for running the Diploma course in Mechanical Engineering at Sri Ramakrishna Mission Vidyalaya Polytechnic, Coimbatore.

NON-RECURRING:

Building (1500 sq.ft. @ Rs.35/- per sq.ft.)		Rs. 52,500/-
Equipment.		Rs.1,00,000/-
Library	...	Rs. 20,000/-
Total	...	Rs.1,72,500/-

RECURRING (PER ANNUM)

Staff Salaries (as per State Scale of Pay) ..	..	Rs. 66,000/-
Maintenance (@ Rs.350/- per student)		Rs. 26,250/-
Total	...	Rs. 92,250/-

...5.

The Institution has three drawing halls and three lecture halls. The laboratory block consists of material testing, Hydraulic, Heat Engines, Electrical, Physics, Chemistry, Survey, Automobile Engineering and Agricultural Engineering. The workshop houses carpentry, smithy, fitting and Machine shop.

The Polytechnic established in rural surroundin with simple structures to house the laboratories and class rooms has the necessary physical facilities to institute a diploma course in Mechanical Engineering on semester basis. The Committee, however, recommended that additional accommodation of 900 sq.ft. for two class rooms may be sanctioned for the Diploma course in Mechanical Engineering. Also an additional area of 600 sq.ft. may be given for staff rooms and Library and Reading Room. The Committee noted that three hostel blocks with total capacity to accommodate 150 studen are already available in the campus.

The one man Committee noted that the Institutio has the necessary equipments to begin with for the introduc tion of diploma course in Mechanical Engineering. Another Industrial Institute run by the Management has an array of machine tools (lathes, capstan lathe, milling and plannin machines, and a cupola) which can be benificially used to train the students. The Committee, however, recommended that an amount of Rs.1.00 lakh may be sanctioned to supple ment the equipment to run the course in accordance with approved standards. The Committee recommended that the institute may be given freedom to buy the equipment which may prove to be more useful with reference to the require of the syllabus, at the time of purchase.

As regards library facilities the Committee not that library contains about 800 titles and institution sha strive to acquire more titles in MKS/SI units to meet the immediate needs of the students and faculty. The Committee recommended an amount of Rs.20,000/- to supplement the Library facilities:

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For Diploma course in Electrical Engineering, the Committee observed that additional requirements can be assessed after its need has been established and it is decided to approve the introduction of the course.

The one man Committee wishes to place on record its thanks to the Principal and the Management of the Polytechnic for rendering all possible assistance and making suitable arrangements for its visit.

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APPENDIX-IC.

REPORT OF THE EXPERT COMMITTEE OF THE SOUTHERN REGIONAL COMMITTEE ON INTRODUCTION OF A DEGREE COURSE IN TELE-COMMUNICATION ENGINEERING AT THE B.V.B. COLLEGE OF ENGINEERING AND TECHNOLOGY, HUBLI.

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A proposal from the State Government of Karnataka for introduction of a degree course in Telecommunication Engineering at the B.V.B. College of Engineering and Technology, Hubli was received for consideration of the Southern Regional Committee of the All India Council for Technical Education. B.V.B. College of Engineering and Technology, Hubli was established in the year 1946. The following are the courses of instruction offered at the College:-

Courses	Sanctioned intake	Duration
DEGREE.		
Civil	60	5 years
Mechanical	60	
Electrical	60	

In order to examine the proposal in all its aspects, an Expert Committee consisting of the following members was set up with the approval of the Chairman of the Southern Regional Committee:-

1. Prof. K.S. Hegde,
   Executive Secretary,
   Indian Society for Technical
   Education, I.I.T., Campus,
   Madras-600036.
2. Shri S.K. Handa, Member-Secretary &
   Asst. Educational Adviser (T),
   Ministry of Education & S.W.,
   Southern Regional Office,
   Madras-600006.

The Committee paid a visit to the B.V.B.College of Engineering and Technology, Hubli on the 11th Sept.,'75. The Asst. Director of Technical Education, Karnataka, also

...2.

accompanied the committee in its visit. The Committee had a meeting with the Principal of the College and other staff members to have the necessary information on all the relevant points to examine the proposal in detail. The Committee also went round the different laboratories, workshops and the main buildings of the college, to see the facilities already available with the College and the additional facilities that would be necessary to run the degree course in Tele-communication Engineering in an effective manner. On the basis of its visit and detailed discussions it had with all concerned, the Committee made the following observations and recommendations.

NEED OF THE COURSE:

There has been, in the past few years, a great spurt in the demand by engineering students for specialist training at the undergraduate level especially in Electronics and related areas. Consequently many engineering colleges have or are in the process of establishing independent faculties in Electronics and Communication Engineering as distinct from Electrical Engineering (Power). Electronics being a newly emerging engineering discipline in India, it is necessary to carefully assess the additional needs of manpower in this area for our national needs as well as other pertinent factors before approving educational institutions to multiply expensive training facilities. Though accurate data on employment is not readily available there is a feeling amongst knowledgeable circles that at present there is a slight excess production of electronics graduates as compared to our actual needs. From the point of view of educational planning, this is not alarming firstly because we are in a growth area where the demand for personnel can be expected to increase more rapidly than in other traditional areas and secondly because, it is precisely such a situation that will stimulate technician entrepreneurship which is very appropriate and relevant to the field of electronics. The imbalance between supply and demand of

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engineering personnel at present in the traditional fields of electrical and mechanical engineering is considerably more than what it is in the case of electronics, Still there is general optimism about unemployment prospects and potential in these areas. If the same criteria are applied to Electronics, there should be no cause at all for any anxiety on this score.

Electronics today is a very fast growing discipline that has not only revolutionised communications, but has opened vast new vistas in computation, data processing, instrumentation and control. Each of these areas is now a vital support of all industrial business and economic activity. Consequently electronic engineers are needed in large numbers not only to man the large communications network of the country and the growing electronic industry, but also in the modernisation and optimisation of established industry and business. National defence is another area where the importance of electronics has been well appreciated.

In the last few years, nationwide growth of electronic industry has been very encouraging though there is noticeable tendency for concentration of such industry in a few favoured centres such as Bombay, Delhi, Bangalore and Hyderabad. The heavy engineering industry's location is largely dictated by sources of raw material, availability of power, land and water and the proximity of railheads and ports. Electronics industry, by and large, has no such constraints and could be established in areas not particularly suited for the location of heavy engineering industry. Perhaps the one major single requirement for the electronics industry is skilled manpower with higher levels of education and training. A not uncommon pattern of the growth and development of electronic industry in the West and particularly in USA is to cluster around educational and research centre of standing, that could directly assist the industry in its developmental activities and help the industry to

tide over the ever present threats of scientific and technological obsolesence. If such a policy of industrial dispersal is to be conciously persued, it would be more advantageous to develop educational and training facilities in Electronics in Institutions located in industrially under-developed areas of the country. Hubli (in Karnataka) is one such area that has no significant heavy industry but could easily create and sustain an electronic industry.

It is worthy of note that Hubli is well situated geographically in relation to three major centres of electronics industry in the country, viz. Bombay, Bangalore and Hyderabad all of which are within 300 miles of Hubli. Electronic components, equipment and services produced at Hubli could easily and conveniently be marketed at the above centres. Besides, trained personnel from institutions in Hubli could also seek employment and careers in the electronic industry at these 3 centres which have good communication facilities with Hubli . The commercial and business activity of Hubli and its importance as a centre of the Indian Railways are added arguments in favour of developing a centre for training in electronics at this place. The Committee further noted that B.V.B. College of Engineering and Technology, Hubli has already got some infrastructure to conduct successfully a degree course in Tele-Communication Engineering. Some of the staff members at the institution specially qualified in the field and availability of some of the electronics equipment is a factor in favour the proposal. The Committee, accordingly, recommended that the B.V.B. College of Engineering and Technology, Hubli may be approved to start the degree course in Tele-Communication Engineering.

DURATION OF COURSE AND MINIMUM ADMISSION QUALIFICATION:

The duration of the course will be five years consisting of 10 semesters. The minimum qualification for admission to degree course in Tele-Communication Engineering will be P.U.C. or its equivalent with mathematics and Physical Science.

...5.

INTAKE: The admission to degree course in Tele-Communication Engineering shall be 20 to be readjusted within the overall sanctioned intake capacity of the College.

FACILITIES: Keeping in view the instructional facilities available with the institution, the standard of instructional facilities approved by the Southern Regional Committee for a degree course in Electronics and communication Engineering, the additional requirements for the course as furnished by the Institute, the Committee felt that the requirements of the college by way of building is reasonable. The Committee accordingly recommended that a building of 6,000/- sq.ft. area at an estimated cost of Rs.2.10 lakhs be approved for the introduction of the course. The Committee also recommended an amount of Rs.5.00 lakhs for equipment for the proper conduct of the course. The Committee recommended the following additional staff for introducing the degree course in Tele-communication Engineering:-

Professor	...	1
Asst. Professor	...	2
Lecturers	...	4
Instructor	...	1
Mechanics	...	2
Helpers	...	2

The Committee did not provide separate provision for maintenance, contingencies and consumables, as the intake for the course shall be within the overall sanctioned intake capacity. However, a sum of Rs.5,000/- for "Books and Magazines" under recurring is recommended by the Committee.

The summary of the recommendations made by the Committee is given as below:-

NON-RECURRING:

Buildings (6000 sq.ft. of R.C.C. type @ Rs.35/- per sq.ft.	Rs. 2.10 lakhs
Equipment	Rs. 5.00 lakhs
Furniture	Rs. 0.50 lakhs
Library including Furniture	Rs. 1.00 lakhs
Total ..	Rs. 8.60 lakhs

RECURRING (PER ANNUM)

Staff Salaries (as per State Scale of Pay).	Rs.	90,000/-
Books & Magazines	Rs.	5,000/-
Total ...	Rs.	95,000/-

The Committee wishes to place on record its appreciation and thanks to the management, the Principal and staff members of the College for the co-operation extended and assistance rendered for making necessary arrangement for its visit.

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APPENDIX-11.

REPORT OF THE EXPERT COMMITTEE SET UP BY THE SOUTHERN REGIONAL COMMITTEE TO EXAMINE THE REQUEST OF THE STATE GOVERNMENT OF TAMILNADU FOR INCREASED CENTRAL ASSISTANCE FOR THE PURCHASE OF EQUIPMENT AT THE GOVERNMENT POLYTECHNIC FOR WOMEN, MADURAI.

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The Government Polytechnic for Women, Madurai was established during the year 1963-64 by the Government of Tamilnadu. The State Government submitted the proposal for the establishment of the Government Polytechnic for Women for the approval of the Southern Regional Committee. The proposal of the State Government was considered by the Southern Regional Committee at its 33rd meeting held on 30th April, 1969. On the recommendations of the Southern Regional Committee, the All India Council for Technical Education approved the establishment of the Government Polytechnic for Women, Madurai for conducting diploma courses in (a) Civil Engineering (Draughtsmanship), (b) Commercial Practice and (c) Library Science with a sanctioned intake of 30 in each course with the following estimates of cost:-

NON-RECURRING:

Buildings	...	Rs. 6,69,440/-
Equipment	...	Rs. 6,69,865/-
Hostel for 150 students	...	Rs. 6,29,700/-
Total	...	Rs. 19,69,005/-

RECURRING (PER ANNUM)

Staff Salaries	...	Rs. 1,90,060/-
Maintenance	...	Rs. 29,700/-
Library and other amenities	...	Rs. 15,000/-
Total	...	Rs. 2,34,760/-

The State Government of Tamilnadu subsequently approached Government of India, Ministry of Education for increased Central assistance by way of minimum outlay of Rs.14.78 lakhs for equipment as against an amount of Rs. 6.69 lakhs approved by the All India Council for Technical Education. The State Government confirmed that the neces-

plan provision for the increased central assistance had been made in their State Plan. The Ministry of Education, accordingly requested the Southern Regional Office that the proposal may be examined by the Southern Regional Committee.

In order to examine the request of the State Government of Tamilnadu for increased Central assistance for equipment, an Expert Committee, consisting of the following members, was constituted, in consultation with the Chairman, Southern Regional Committee:-

1. Shri M. Narayanan,
   Principal,
   Women's Polytechnic,
   Trivandrum.

2. Prof. G.P. Asthana,
   Director,
   Thiagarajar School of Management,
   Madurai.

3. Shri M. Kothandaraman,
   Principal,
   C.N.T. Institute,
   Madras.

4. Shri S.K. Handa, Member-Secretary &
   Asst. Educational Adviser (T),
   Ministry of Education & S.W.,
   Southern Regional Office,
   Madras-6.

The above mentioned Expert Committee visited the Government Polytechnic for Women, Madurai on the 6th September, 1975. Shri S.K. Handa, was represented by Shri A.P. Srivastava, Education Officer (T). Shri V.Srinivasan, Controller of Examinations, Directorate of Technical Education, Tamilnadu representing the State Government of Tamilnadu also attended the Expert Committee meeting.

The above mentioned Expert Committee had a meeting with the Principal and member of staff of the institution.

...3.

The Committee observed that the institution was running the following two courses:-

Civil Engineering (General)	...	3 years
Commercial Practice (Sandwich)	...	3½ years

The Committee noted that Diploma course in Civil Engineering (General) was offered against the Civil Engineering (Draughtsmanship) course approved for the Polytechnic. Out of the other two approved courses, viz. Diploma in Commercial Practice and Library Science, the latter had not yet been started by the Polytechnic.

The Expert Committee visited the various laboratories to ascertain the facilities already provided at the institution and the facilities proposed to be provided according to the requirements of the Polytechnic. The Committee examined the lists of equipment purchased so far and ordered or proposed to be purchased for the courses approved by the All India Council for Technical Education. The information furnished earlier by the State Government was not classified and therefore the institution was now requested to submit for consideration of the Committee laboratory-wise lists of equipment. These lists were examined by the Committee and it was observed that the expenditure already incurred was mostly on the approved items included in the model list but a few items were also purchased outside the model list. The Committee also examined the lists of items which the Polytechnic further proposed to be purchased according to the requirements of the courses offered.

Having regard to the equipment already purchased for the different Laboratories for the approved courses, the additional requirements as furnished by the Polytechnic, the standards laid down by the Southern Regional Committee

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Appendix-I.

LIST OF THE EQUIPMENT LABORATORY WISE APPROVED BY THE GOVERNMENT OF INDIA COST OF EQUIPMENT PURCHASED AND PROPOSED TO BE PURCHASED BY THE GOVERNMENT POLYTECHNIC FOR WOMEN, MADURAI.

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Name of the Lab.	Cost approved	Cost of equpt. purchased As per Standard list	Outside the list but acceptable to the Committee	Additional requirements as assessed by the Committee	Total amount now recommended by the Committee
1.	2.	3.	4.	5.	6.
CIVIL ENGINEERING.					
a) Survey Lab.	51,210/-	42,730.13	...	18,500/-	61,230/-
b) Civil Engg. Lab.	15,840/-	133.32	...	25,000/-	25,133/-
c) Field Engg.	4,500/-	...	...	5,000/-	5,000/-
d) Drawing Office	10,250/-	3,958.17	...	...	10,250/-
e) Models	7,000/-	10,734.24	...	Not for apprd. course.	10,000/-(+3000 for
f) Applied Mechanics	6,240/-	...	...		6,240/-increase o
g) Materials Testing Labl	1,02,075/-	...	...	1,55,000/-	1,55,000/-in prices
h) Hydraulics	1,04,650/-	...	...	1,45,000/-	1,45,000/-
WORKSHOPS.					
a) Carpentry	25,850/-	...	...	31,000/-	31,000/-
b) Blacksmithy	15,000/-	...	...	17,500/-	17,500/-
c) Fitting	17,200/-	...	...	19,500/-	19,500/-
d) Masonary & Plumbing	11,000/-	...	...	11,000/-	11,000/-
e) Physics Lab.	20,000/-	18,938.50	11,980.62	1,235/-	32,000/-
f) Chemistry Lab.	37,000/-	15,043.50	959.71	1,146/-	17,000/-
C/o.	4,27,815/-				5,45,853/-

1.	2.	3.	4.	5.	6.
B/F.	4,27,815/-				5,45,853/-
Commercial Practice	45,300/-	32,980.84	...	12,000/-	45,300/-
Library including Library Furniture	75,000/-	...	...	...	75,000/-
General Furniture & Office Equipment.	60,000/-	...	...	22,000/-	60,000/-
Audio Visual Equipment	16,000/-	...	...	16,000/-	16,000/-
Furniture for Students Amenities:					
Co-operative Stores	1,000/-				
Medical Dispensary	10,000/-				
Gymkhana.	750/-	...	...	...	20,000/-
Water Cooler (No.1)	4,000/-	...	...	...	...
	6,39,865/-				7,98,153/-
Add cost of installation	30,000/-				36,000/-
	6,69,865/-				7,98,153/-
				or say	Rs.8.00 lakhs

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APPENDIX-12.

REPORT OF THE EXPERT COMMITTEE ON INTRODUCTION OF DIPLOMA COURSE IN "TELE-COMMUNICATION" ENGINEERING AT GOVERNMENT POLYTECHNIC FOR WOMEN, BANGALORE.

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The State Government of Karnataka submitted a proposal for consideration of the Southern Regional Committee for introduction of a diploma course in "Radio Engineering" in Government Polytechnic for Women, Bangalore. The Southern Regional Committee, at its meeting held in April, 1969 approved, in principle, starting of a diversified course in "Radio Engineering" at diploma level in the Women's Polytechnic, Bangalore with an annual intake of 30, within the overall sanctioned intake for the institute. The Government of India also approved in principle the recommendations of the Regional Committee for starting the course. In the meantime the Government of Karnataka made a request to change the nomenclature of the course as "Tele-Communication Engineering" in view of its wider applicability.

In order to examine the proposal in all its aspects and also to assess the estimates of cost, an Expert Committee consisting of the following members was appointed with the approval of the Chairman, Southern Regional Committee:-

1. Prof. K.S. Hegde,
   Programme Director,
   I.S.T.E.,
   Indian Instt. of Technology Campus,
   Madras-600036.

2. Shri S.K. Handa, Member-Secretary,
   Asst. Educational Adviser (T),
   Ministry of Education & S.W.,
   Southern Regional Office,
   Madras-600006.

The Asst. Educational Adviser (T) visited the institution on 4th April, 1975. Prof. K.S. Hegde visited the institution on the 12th September, 1975.

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The Committee met the Principal of the Polytechnic and the Members of the Faculty and held detailed discussions to get the necessary information to examine the proposal. Shri K.S. Ballal, Director of Technical Education, Karnataka State was also present and participated in the discussions to render necessary assistance to the Committee. The Committee also went round the institution and the laboratories to see the physical facilities already available by way of buildings, equipment and staff as also the scope for introducing the diploma course in "Tele-Communication Engineering".

The Committee observed that the Government Polytechnic for Women, Bangalore was started in the year 1961. The institution has been running the diploma courses in (i) Civil Engineering (ii) Secretarial Practice (iii) Library Science and (iv) Costume Design with an annual intake of 30 in each discipline. The Diploma course in "Radio Engineering" was also introduced in the institution from the academic year 1970-71.

The Committee observed that pending assessment of the facilities required and the final sanction by the Government of India, the State Government had approved the introduction of "Tele-Communication Engineering" Course at the Government Women's Polytechnic, Bangalore, with an annual intake of 30 students, with effect from the academic year 1969-70, with the following instructional facilities:-

NON-RECURRING:

Buildings	...	Rs. 1,31,250/-
Equipment including Furniture & Library		Rs. 4,78,640/-
Total	...	Rs. 6,09,890/-

RECURRING (PER ANNUM)

Staff Salaries	...	Rs. 26,568/-
Maintenance	...	Rs. 15,000/-
		Rs. 41,568/-

The Committee considered in detail the proposal of the State Government for starting the diploma course in "Tele-Communication Engineering" and examined the information and data made available in this behalf. The Committee noted that All India Council for Technical Education had recommended that starting of all diversified diploma courses should be accepted in principle. However, the courses should be started only when the demand for technicians in the branch of diversification and specialities is re-assessed and justified by the employment potential. The Committee, therefore, took into consideration the various aspects to examine the real need for such a course.

At the outset, the Committee noted the vast changes and developments in the field of Tele-Communication Engineering and its wider applicability in the present day situations. The Committee also felt that the employment opportunities are ample for the diploma holders in Tele-Communication Engineering, particularly in and around Bangalore where the industrial complex is on the increase. The Committee observed that organisations like Bharat Electronics Ltd., Indian Telephone Industries, Chief Inspectorate of Electronics, Electronics & Radar Development Establishment, Hindustan Aeronautics Ltd., Radio & Electrical Manufacturing Co. (REMCO) Ltd., and the Post and Telegraph Department absorb the bulk of the students coming out from the institutions in this specific branch. Besides, the Committee also noted that about 100 Small Scale Industries, the feeders to cater to the needs of the big establishments, also offer employment opportunities to the holders of Diploma in this field.

The Committee also noted that there was a constant demand for admission to this course and the demand was further increasing. In this context, the Committee also took into consideration the trend of the women student population to opt for "Tele-Communication Engineering" and

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greater employment chances in the industries for the women. Further, the Committee was of the view that out-turn of tele-communication diploma holders in general, was very meagre to meet the demand of the industries for such personn

Having regard to the above considerations, the Committee was of the view that there was a need for diploma course in the field at Government Polytechnic for Women, Bangalore. Accordingly, the Committee recommended the introduction of diploma course with an annual intake of 30 to be readjusted within the overall sanctioned intake capacit of the Polytechnic.

After taking into consideration the facilities already available with the polytechnic, the additional requirements for the courses as furnished by the institute and the standards laid down by the All India Council for Technical Education for diploma course in Electronics, the Committee recommended the following instructional facilities for conducting the course:

NON-RECURRING.

Buildings:

R.C.C. type - 7700 sq.ft. at the rate of Rs.35/- per Sq.ft.		Rs. 2,69,500/-
Workshop buildings 990 Sq.ft. at the rate of Rs.25/- per Sq.ft.		Rs. 24,750/-
		Rs. 2,94,250/-
Equipment	...	Rs. 3,75,000/-
Furniture	....	Rs. 50,000/-
Library Including Library furniture	...	Rs. 50,000/-
Grand Total ..		Rs. 7,69,250/-

NOTE: The Committee noted that in view of rapid increase in prices, implementation of the development scheme sho be completed as early as possible in order to avoid further increase in the cost as has already happene with reference to earlier estimates as were approved by the State Government.

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RECURRING (PER ANNUM)

Staff Salaries	...	Rs. 35,500/-
Maintenance	...	Rs. nil
Total	....	Rs. 35,500/-

The Committee did not recommend maintenance expenditure for the students in Tele-Communication Engineering, since the intake for this course shall be within the overall sanctioned intake capacity for the institution.

The details of the facilities recommended by the Committee by way of building, equipment and staff may be seen at Annexure-I, II and III. As given in Annexure-II out of the total provision for equipment, the Polytechnic has already purchased equipment worth Rs.2.35 lakhs having an amount of Rs.1.40 lakhs for further purchasing the necessary items for which a list has been suggested. The Committee recommended that the institution may be given freedom to substitute any of these items of equipment to suit the needs of the changing pattern of the syllabus, which may prove to be more useful at the time of the

The Committee wishes to place on record its appreciation and thanks to the Principal and Members of staff of Government Polytechnic for Women, Bangalore for the assistance rendered and co-operation extended in its deliberations.

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BUILDINGS RECOMMENDED FOR THE DIPLOMA COURSE IN "TELE-COMMUNICATION ENGINEERING" WITH AN ANNUAL INTAKE OF 30 STUDENTS.

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BUILDINGS:

	Sq.ft.	
1. R.C.C. Type:		
a) Room for Head of Department	200	
b) Staff Common Room	400	
c) Electronics Laboratory	2,000	
d) Radio Engg. Lab.	2,000	
e) 2 Class Rooms for theory classes (2 x 450)	900	
	5,500	
Add 40% for walls, passages etc.	2,200	
	7,700	
Cost at the rate of Rs.35/- per Sq.ft. 7700x35	....	Rs. 2,69,500/-
2. Workshop Buildings:		
Repairs and Maintenance, including Test branch and Fitters Shop.	900	
Add 10% for walls, passages, etc.	90	
Total ...	990	
Cost at the rate of Rs.25/- per Sq.ft. (990x25)	....	Rs. 24,750/-
GRAND TOTAL		Rs. 2,94,250/-

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ANNEXURE-II

EQUIPMENT ALREADY PURCHASED.

1.	Amplifier (Ahuja Make 35V)	1
2.	Pre-amplifer -do-	1
3.	Mike connectors-do-	12
4.	A.F. Signal Generator	1
5.	Microphone Scheme	2
6.	-do-	2
7.	Mike Green Bullet	2
8.	Power OUtput meter	4
9.	Regulated stablised power supply	3
10.	Vacuum Voltmeter Phillips	2
11.	Phillips RCL Bridge	2
12.	Test Oscilator BPL make	2
13.	Phillips Vaccume Bridge	2
14.	Phillips RCL Bridge	
15.	Gerand Record Changer	1
16.	Transister Check (Sanva)	1
17.	Head phones	8
18.	Morse Keys	9
19.	Pannel Mounting	3
20.	Power Transformers	27
21.	Output Transformers	18
22.	I.F. Transformers	6
23.	Sterio Amplifier	1
24.	B.P.L. Multimeter	6
25.	Ahuja Speaker	2
26.	Voltmeter	5
27.	Rega Volts	2
28.	Double Beam Oscilloscope Camera Attachement Trollery	1 1 2
29.	Stabilised Power Supply	4
30.	Power Supply	4
31.	Double Beam Oscilloscope	1
32.	Electroids	2
33.	-do-	2
34.	-do-	2
35.	-do-	2

36.	Signal Generator Std.	2
37.	Phillips 6" Speakers	4
38.	Avometer	4
39.	Stablised Unit power	2
40.	Power Supply Unit	8
41.	Transister Regulated Supply	1
42.	Audio Amplifier	5
43.	A.C. Mili voltmeter	2
44.	L.F. Amplifiers	4
45.	Transister Power Supply	4
46.	Multimeter	3
47.	Sterio Speaker	2
48.	Gramo Turn Table	1
49.	Phillips Record Player and amplifier	1
50.	Avometer	4
51.	Decade Resistance Units	4
52.	Decade capacitance	4
53.	-do-	4
54.	-do-	4
55.	Decade Resistance	4
56.	Decade Inductor Box	1
57.	Decade Resistance	4
58.	Decade Resistance	4
59.	Decade Resistance	2
60.	Decade condenser Box	1
61.	Attenuameter	1
62.	Osciliator Amplifer	1
63.	Audio Oscillator	1
64.	Radio Receiver	2
65.	Decade Resistance	5
66.	Decade Resistance	7
67.	Decade Resistance	8
68.	Decade Registance	6
69.	Decade Capacitance	2
70.	Decade Capacitance	2
71.	Decade Capacitance	2
72.	Ahuja Amplifer	1

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73.	D.C. Micrometer	1
74.	Decade Inductor Box	3
75.	Head Phones	6
76.	D.C. Micro meter	2
77.	Regulated H.T. Supply	1
78.	Beat Frequency Oscillator	1
79.	Signal Tran	1
80.	Audio Oscilator	2
81.	Transisterised amplifiers	2
82.	Wheatson Bridge	1
83.	Regulated Voltage	1
84.	H.F. Osciloscope Single Beam	1
85.	Tape Recorder (Ahuja)	1
86.	Digital Signal Generator	1
87.	Q Meter	1
88.	Impedance Bridge	1
89.	Dual Beam attachment to	1
90.	Decae Inductor Box	1
91.	Capacitance Bidge	1
92.	Inductance Bridge	1
93.	Transister Teaching Aid	1
94.	Digital Multimeter	1
95.	Timer counter	1
96.	Transmitter Power Supply	1
97.	Transmitter Power Supply	1
98.	Transmitter Excuter	1
99.	Modulator Unit	1
100.	V.F.O. & Relay pak	1
101.	Audio Oscilator	2
102.	Valve Tester	1
103.	Low Function Generator	1
104.	V.T.V.M. with HF Probe	1
105.	Radert AFM & AF Signal generater	1
106.	Video IF Sweep Generator	1
107.	CCTV Set	1
108.	dB Attenuator	1
109.	X-Y Display Unit	1 ...Rs.2.3

...4.

ADDITIONAL EQUIPMENT NECESSARY: B/f. £.[illegible]

1.	R.F. Oscillators	2
2.	Wavemeters	1
3.	Digital Voltmeter	1
4.	Wave Analyser	1
5.	T.V. Receiver	1
6.	Teleprinters	1
7.	Telephone Instruments	--
8.	Telephone Relays	
9.	Uniselectors, Group Selectors and Final selectors	
10.	Relays & Sounders	
11.	Meters: Volt & Ampere	12 each
12.	Cable Fault Tester	1
13.	Walkie-Talike	1
14.	Printed Circuit Kits	
15.	T.V. Sweep Generators	1

Test scar & Measuring Instruments:

Milliammeters R.F.
Oscilloscopes (Low Freq.)
Pulse Generator

Accustics.
Horns & Driver Units, Matching Transformers
Accoustic material.

Wireless Equipment:

A.M. WT/RT - Transmitter Low power

Hardware & Machinery:

Hand Tools including soldering irons, drilling, grinding, engraving and spot welding machines.
Coil winding machines .... 1.[illegible]

Grand Total .... 3.[illegible]

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ANNEXURE-III (12)

STAFF RECOMMENDED FOR THE DIPLOMA COURSE IN "TELE-COMMUNICATION ENGINEERING" WITH AN ANNUAL INTAKE OF 30 STUDENTS.

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STAFF (Full-time)	No.	Scale of Pay	Amount
1. Head of Tele-Communication Department.	1	Rs. 350--900	Rs. 7,500/-
2. Lecturers	2	Rs. 270--550	Rs. 9,990/-
3. Asst. Lecturers	2	Rs. 175--450	Rs. 7,500/-
4. Mechanics	2	Rs. 90---200	Rs. 3,480/-
5. Attenders/Helpers	2	Rs. 80---140	Rs. 2,715/-
6. Store-keeper cum typist-clerk.	1	Rs. 130--290	Rs. 2,520/-
(A) Total of Full-time staff salaries		...	Rs. 33,615/-
STAFF (Part-time)			
1. Lecturer in Electrical Engineering	1	at Rs.75/- per month.	Rs. 900/-
2. Lecturer in Science	1	at Rs.75/- per month.	Rs. 900/-
(B) Total of part-time staff salaries		...	Rs. 1,800/-
GRAND TOTAL OF (A) and (B)		..	Rs. 35,415/-
		Say, ..	Rs. 35,500/-

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REPORT OF THE EXPERT COMMITTEE SET UP BY THE SOUTHERN REGIONAL COMMITTEE TO EXAMINE THE REQUEST OF THE STATE GOVERNMENT OF TAMILNADU FOR INCREASED CENTRAL ASSISTANCE TOWARDS ESTABLISHMENT OF THE GOVERNMENT POLYTECHNIC FOR WOMEN, COIMBATORE.

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The Government Polytechnic for Women, Coimbatore was established by the State Government of Tamilnadu during the year 1964-65. The State Government then submitted the proposal for the establishment of the Polytechnic to the Southern Regional Committee for approval. The proposal was considered by the Southern Regional Committee at its 33rd meeting held on 30th April, 1969. On the recommendations of the Southern Regional Committee, the All India Council for Technical Education approved the establishment of the Government Polytechnic for Women, Coimbatore for conducting diploma courses in Civil Engineering (Draughtsmanship), Commercial Practice and Electronics with an intake of 30 in each of the courses with the following estimates of cost:-

NON-RECURRING:-

Buildings	...	Rs. 7.81 lakhs
Equipment	...	Rs.10.70 lakhs
Hostel for 150 students	...	Rs. 6.30 lakhs
Total	...	Rs.24.81 lakhs

The State Government of Tamilnadu, however, sanctioned the following estimates of cost for the establishment of the Polytechnic:-

NON-RECURRING:

Building	...	Rs.10.40 lakhs
Equipment	...	Rs.14.78 lakhs
Hostel	...	Rs. 5.00 lakhs
Total	...	Rs.30.18 lakhs

...2.

The State Government accordingly requested the Government of India for the approval of the above facilities and for increased central assistance on that basis. In support of their request, the State Government stated that in addition to the above mentioned courses, they also proposed to conduct Diploma courses in Civil Engineering (Structure) and Mechanical Engineering (Drawing & Design). Further they have increased the intake from 30 to 60 for the diploma course in Commercial Practice. Besides, in due course they have to diversify and the additional facilities thus made available would be utilised for the new diversified courses that may be offered by the Polytechnic.

In order to examine the request of the State Government of Tamilnadu for increased Central assistance, an Expert Committee consisting of the following members was constituted in consultation with the Chairman of the Southern Regional Committee.

1. Dr. P.S. Sarma,
   Prof. of Electronics & Commn. Engg.,
   P.S.G. College of Technology,
   Peelamedu P.O.,
   Coimbatore.
2. Shri R.G. Gopalakrishnan,
   Prof. of Civil Engineering,
   Coimbatore Institute of Technology,
   Coimbatore.
3. Shri S. Shanmugasundaram,
   Prof. of Commerce,
   P.S.G. Arts College,
   Coimbatore.
4. Shri S.K. Handa, Member-Secretary &
   Asst. Educational Adviser (T),
   Ministry of Education & S.W.,
   Southern Regional Office,
   Madras-6.

The above mentioned Expert Committee visited the Government Polytechnic for Women, Coimbatore on the 18th August, 1975. The Committee had discussions with

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the Principal and members of the staff of the Institution. The Committee also went round the institution and various laboratories to ascertain the facilities already provided and the additional requirements with reference to the approved standards. The Committee was informed that the following courses were being conducted at the Institution:-

Diploma courses.	Intake
Diploma in Commercial Practice	60
Diploma in Electronics	30
Diploma in Civil Engg.(Structure)	30

The Committee observed that Diploma in Civil Engineering (Structure) had not been approved and the Civil Engineering (Draughtsmanship) course which had been approved was yet to be started in the institution with an intake of 30 students. However, in estimating the requirements, the Committee took into consideration the Civil Engineering (Draughtsmanship) course which has been approved. The Committee noted that complete requirements for an additional course for Diploma in Civil Engineering can be examined only when a proposal with full details alongwith the necessary justification for the need of such a course in the Womens Polytechnic is received from the State Government.

The Committee accordingly requested the institution to furnish details of the facilities available by way of Buildings and Equipment. The position as given by the Institution and analysed by the Committee is as follows:-

EQUIPMENT: The Committee examined the list of equipment purchased and proposed to be purchased by the institution and made the following observations and recommendations.

...4.

CIVIL ENGINEERING (Draughtsmanship)

The total amount sanctioned for the purchase of equipment for the various laboratories listed under Civil Engineering is Rs.4,27,815/-. The amount spent by the Polytechnic so far is Rs.1,41,813/-. The Institute has further proposals for purchase of equipment worth Rs.72,545/- only. The Committee, therefore felt that the total amount of Rs.4,27,815/- sanctioned for the various laboratories in the Civil Engineering was adequate. The Committee, however, recommended that the Poly / technic may be given the freedom to deviate from the list approved by the Regional Committee and to substitute any item of equipment to suit the need of changing pattern of syllabus, but the overall ceiling, as given above, should not be exceeded.

COMMERCIAL PRACTICE:

The Committee observed that against a total amount of Rs.45,300/- approved for a sanctioned intake of 30, the Polytechnic had spent a total amount of Rs.1,09,785/- on equipment for Laboratory for Commercial Practice. The Committee noted that the additional expenditure had been because of the fact that the Polytechnic purchased several equipments like Electrically operated Gestetner Machine, Printing Card Punch Machine, Selector Electric Printing Machine with accessories, electric embossing machine which were not approved for the course.

The Committee considered the requirements for additional intake of 30 students to the course. The Committee noted the Polytechnic was already having 40 Typewriters and as such 20 typewriters more will meet the requirements of increased intake. The Committee, therefore recommended the sanction for additional grant of 20 typewriters with necessary tools and auxiliaries The Committee in this connection noted that the Southern Regional Committee at its meeting held on 12th Jan., 1972 had already approved a sum of Rs.36,500/- for Equipment

and general furniture for increase in intake from 30 to 60 in the Diploma in Commercial Practice course at Government Polytechnic for Women, Coimbatore, and issue of necessary sanction was pending for want of confirmation from the State Government about the availability of the plan provision. The Committee felt that the above additional requirements would be adequately met by this grant already approved by the Regional Committee.

However, to make the students conversant with the use of modern office equipments, the Committee also recommended the sanction of additional grant for the purchase of one Electric Typewriter and one Electric Printing Calculator at a cost of Rs.11,000/-.

For the other equipments mentioned in the list of items proposed to be purchased, such as accounting machine, Card punches, Card verifier etc. the Committee recommended that the Polytechnic may be advised to avail the facilities of the nearest Computer Centre.

ELECTRONICS:

The total sanctioned amount for purchase of equipment for the various laboratories in Electronics Engineering as per the sanctioned list is Rs.4,13,720/-. The Committee noted that the Polytechnic had spent so far a sum of Rs.1,94,009/- for purchase of equipment for Electronics Engineering.

The Committee felt that the total amount of Rs.4,13,720/- sanctioned for the various laboratories under Electronics Section for the sanctioned strength was adequate. The Committee however, recommended that the Polytechnic may be given freedom to deviate from the approved list and to substitute any item of equipment which may prove to be more useful at the time of

purchase to suit the needs of changing pattern of syllabus, but the overall ceiling, as given above, should not be exceeded.

The Expert Committee thus recommended a total sum of Rs.11.17 lakhs for equipment for the three approved courses as against the total of Rs.10.70 lakhs earlier approved by the Regional Committee. The break-up of the cost of equipments approved earlier, and the requirements now recommended by the Expert Committee are given below:-

Name of the Course	Equipment approved earlier	Equipment approved now.
Civil Engineering	4,27,815/-	4,27,315/-
Commercial Practice	45,300/-	92,800/-
Electronics	4,18,720/-	4,18,720/-
Library including Furniture, General Furniture & Office Equipment, Furniture for Students Amenities, Audio-Visual equipment, & cost of installation.	1,77,750/-	1,77,750/-
Total...	10,69,585/-	11,17,035/-
or say..	10,70,000/-	11.17 lakhs

The Committee further observed that the request from the State Government for increased Central assistance for equipment also included the requirements for Diploma course in Mechanical Engineering (Design and Drawing). The Committee noted that this course had not been approved and the question of assessing the requirements for the same can be considered only after the proposal in this behalf, alongwith necessary details and justification for the need of such a course in the Women's Polytechnic is received from the State Government. Similarly the requirements of any other diversified courses proposed to be started in the future

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can be assessed only at the appropriate time after the receipt of the necessary proposals from the State Government.

BUILDING: The Committee noted that the following areas for the buildings were sanctioned for the three approved courses, viz., Civil Engineering - Draughtsmanship, Commercial Practice and Electronics.

R.C.C. Type 35,500 Sq.ft. @ Rs.20/- per Sq.Ft.	Rs.7,10,000/-
Workshop Type 4,410 Sq.Ft. @ Rs.16/- -do-	Rs. 71,040/-
Total	Rs.7,81,040/-
or Say ...	Rs.7,81,000/-

The institution has already constructed the following areas so far,

R.C.C. Type	...	27,559 Sq.ft.
Workshop Type	...	7,556 Sq.Ft.

The Committee noted that in place of R.C.C. type , some of the laboratories have been constructed as workshop type which can only decrease the cost but should not change the overall requirements. The Committee after examining the needs of the Polytechnic felt that the Space already sanctioned for the approved courses was adequate. The Committee, therefore, did not recommend any additional area for these courses. However, for increase in intake from 30 to 60 for Diploma course in Commercial Practice, the Committee recommended that an additional area of 2,540 Sq.ft. at a cost of Rs. 50,400/- may be sanctioned on receiving the necessary confirmation about the availability of plan provision for the same from the State Government which was at present awaited.

The Committee, accordingly, recommended that the amount of Rs.7.81 lakhs sanctioned for the Building may be increased to 8.314 lakhs on account of increase in Commercial Practice. The Committee did not find any other basis to further increase the cost of Building. In case the Polytechnic wanted increase in cost on account of rise in prices and cost of construction, the Committee felt that it was a different issue and the matter should be taken up separately by the State Government with the Government of India with all the necessary details for examination by appropriate Expert Technical Committee.

The summary of the estimates approved earlier and recommendations now made by the Committee are given below:-

Building	Approved earlier	Now recommended
Buildings	7.81 lakhs	8.314 lakhs
Equipment	10.70 lakhs	11.170 lakhs
Total ..	18.57 lakhs	19.484 lakhs

The Committee would like to place on record its thanks and appreciation for the assistance rendered and co-operation extended by the Director of Technical Education, Tamilnadu, the Principal and Staff of the Polytechnic in its deliberations.

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APPENDIX-14.

REPORT OF THE EXPERT COMMITTEE SET UP BY THE SOUTHERN REGIONAL COMMITTEE TO ASSESS THE COST OF FACILITIES FOR THE DEVELOPMENT OF S.J. COLLEGE OF ENGINEERING, MYSORE AS PER THE STANDARDS OF THE ALL INDIA COUNCIL FOR TECHNICAL EDUCATION.

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A proposal was received from the State Government of Karnataka for the development of Sri Jayachamarajendra College of Engineering, Mysore to bring it upto the standards laid down by the All India Council for Technical Education. The S.J. College of Engineering, Mysore was started in the year 1963 by the J.S.S. Maha Vidya Peetha with the permission of the State Government of Mysore and the University of Mysore with an intake of 120 students in three branches of engineering. The College has been conducting the first degree courses in Civil, Mechanical and Electrical Engineering of five years duration with affiliation to the University of Mysore. The College is located in a campus of about 60 acres of land adjoining to the post-graduate campus of the University of Mysore. Till the year 1972, the College was run on its own resources, contributed partly from the Philonthraphic public and partly from J.S.S. Maha Vidya Peetha. During this period it had constructed buildings with an area of 66,400 Sq.ft. at a cost of Rs.29,47,875/-, purchased equipment worth of Rs.14,87,491/- furniture worth Rs.1,19,640/-, books worth Rs.88,600/- and provided students' amenities to the extent of Rs.15,000/- for the institution.

The J.S.S. Maha Vidya Peetha was started under the aegis of the Suthur Shivarathreeswara Mutt which has established so far 28 educational institutions and 20 hostels. Over 12,000 students have received education in the colleges and schools run by the Society and 4000 students are provided with hostel facilities every year.

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The College has been admitted by the State Government of Karnataka under their grants-in-aid code from the year 1972-73. Under the grants-in-aid code, the Management share of expenditure for the non-recurring and recurring portion is now met out of the resources of the J.S.S. Maha Vidya Peetha.

In order to consider the above proposal of the State Government of Karnataka and to assess the estimates of cost for the development of the College in accordance with the standards of the All India Council for Technical Education, an Expert Committee consisting of the following members was constituted:-

1. Dr. R. Subbayyan,
   Principal,
   P.S.G. College of Technology,
   Peelamedu Post,
   Coimbatore-641004.
2. Prof. B.R. Narayana Iyengar,
   175, First Main Road,
   Seshadripuram, Bangalore.
3. Prof. K.S. Hegde,
   Programme Director,
   Indian Society for Tech. Education,
   Indian Instt. of Technology Campus,
   Madras-600036.
4. Shri S.K. Handa, Member-Secretary &
   Asst. Educational Adviser (T),
   Ministry of Education & S.W.,
   Southern Regional Office,
   Madras-600006.

The Committee noted that in its proposal the State Government had requested the Regional Committee for consideration of the development of the college in two stages, with the following financial implications in regard to the non-recurring and recurring expenditure to be incurred to bring the college on par with the standards laid down by the Mysore University, as follows:-

...3.

NON-RECURRING:

	1st stage	2nd stage	Total Rs. Lakhs.
1. Buildings (56000 sq.ft.)	1.00	12.00	13.00
2. Equipment	2.90	4.35	7.25
3. Furniture	0.35	...	0.35
4. Library Books & Library Furniture	1.00	1.00	2.00
5. Miscellaneous	0.20	...	0.20
Total ...	5.45	17.35	22.80
Hostel for 150 students			10.68
Grand Total ..			33.48

RECURRING: (PER ANNUM)

1. Expected total expenditure	...	Rs. 5.00 lakhs
2. Expected total income	...	Rs. 1.20 lakhs
3. Deficit	...	Rs. 3.80 lakhs
4. State Government share (including Central Govt. share) 75% of the net deficit		Rs. 2.85 lakhs
Total	.....	Rs.12.85 lakhs

The first stage is for the development of the degree courses in Mechanical and Electrical Engineering and the second stage is for development of degree course in Civil Engineering. In its proposal, the State Government had recommended consideration of the first stage of development only relating to degree courses in Mechanical and Electrical Engineering (with Electronics Engineering as Elective) involving an amount of Rs.5.45 lakhs under the State Plan Scheme. The State Government had also confirmed the necessary plan provision only for the expenditure pertaining to 1st stage of development. The State Government had furth added that development of Civil Engineering course in the college involving an expenditure of Rs.17.35 lakhs in the second stage should not be now undertaken as the

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were enough facilities in Civil Engineering available in other institutions in the State. The Committee, therefore, examined the question of development of the College only for degree courses in Mechanical and Electrical Engineering.

The Committee visited the S.J. College of Engineering, Mysore on 2nd September, 1975. The Committee had detailed discussions with the Management, Principal and faculty of the institution. The institution submitted a report to the Expert Committee about the plan of development of the Institution. The note contained the growth and proposed future growth of the S.J. College of Engineering, Mysore, enumerated the facilities already available in the college by way of Buildings, equipment and staff and additional facilities required for the development of the College.

The Committee also went round the institution and the various laboratories to see the facilities already created in the institution. The Committee also examined all other information made available to it by the College.

The Committee noted that the College was started in the year 1963. Till the year 1968 response to the admission to the college was very good and it admitted upto 144 students, but from the year 1969 onwards the admissions to the College went down. However, the position inproved since the year 1974 and the College has again admitted 120 students in the year 1974-75. The College is situated in Mysore, which has been traditionally encouraging higher education. The State Government of Karnataka has also extended to Mysore all the required help for its industrial growth. A large number of medium and small scale industries have been coming up in the city in recent years. The Committee noted that College had by now about 12 years experience and was in a good shape for being developed as an institution

in accordance with the approved standards. The Committee, however, observed that the College should satisfy all such conditions such as Constitution of Governing Council, Staff Selection Committee etc. as prescribed by the Government of India. The College shall also not receive donations or capitation fees from the students seeking admission to the courses offered by it. The institution would also have to fall in line with all the other approved non-Government Engineering Colle in the State, regarding provision of instructional facilities recommended by the Committee, implementation of various decisions of the All India Council for Technical Education ascommunicated by the Government of India from time to time and fulfilment of all other conditions of grant prescribed by the All India Council for Technical Education for private Colleges.

The Committee then examined financial aspect of the whole project with reference to the present stage of development, the report of the State Expert Committee and other related factors. The Committee noted that the College has been able to provide considerable facilities by way of Buildings, equipment etc. and it was desirable that additional facilities necessary to bring the college upto the approved standard should be provided. Having regard to the facilities already created by the College before admission to the State grant-in-aid code, the additional requirements as furnished by the College and the standards prescribed by the All India Council for Technical Education, the Committee recommended the following additional facilities for the development of the College.

NON-RECURRING:

Buildings 17,000 sq.ft. @ Rs.30/- per sq.ft. (Class Rooms, Drawing Halls, Science Lab., Physics Lab., Chemistry Laboratory and Administrative wing.)	₹	Rs. 5,10,000/-
Equipment		
Mechanical	₹	Rs. 6,60,000/-
Electrical (including Electronics)	₹	Rs. 1,06,000/-
Physics	₹	Rs. 60,000/-
Chemistry	₹	Rs. 60,000/-
Furniture	₹	Rs. 50,000/-
Library (including Library Furniture		Rs. 1,00,000/-
Hostel for 150 students:		
(including Warden's quarters, Servant's quarter & Furniture)		Rs. 9,56,000/-
Students' Amenities	₹	Rs. 1,14,000/-
Total ..	₹	Rs.26,16,000/-

RECURRING (PER ANNUM)

Staff Salaries for the full complement for Mechanical & Electrical Engineering (as per All India Council for Technical Education Scales of pay)	Rs. 5,00,000/-
Maintenance Expenditure	Rs. 2,20,000/-
Library	Rs. 30,000/-
Total ...	Rs. 7,50,000/-

(The above is the ceiling of the gross expenditure. The actual recurring expenditure shall be governed by grant-in-aid code of the State Government)

The detailed list of equipment already procured by the Institution and the detailed list of additional equipment considered necessary and recommended by the Committee for the development of the College is given at Annexure-I and Annexure-II respectively. The Committee recommended that the College should be given the freedom to substitute any item which may prove to be more useful at the time of the purchase to suit the requirements of the changing pattern of syllabi, but the overall ceiling should not be exceeded.

The details of the students' amenities approved are given in Annexure III. The details of estimates of hostel for 150 students are given in Annexure-IV.

The Committee noted that the State Government had confirmed the necessary plan provision only for an assessment of Rs.5.45 lakhs for the first stage of development. The Committee recommended in order to bring the College upto the standards of the All India Council for Technical Education even for degree courses in Electrical and Mechanical Engineering, the State Government should provide the entire amount of Rs.25.00 lakhs assessed as above for the development of the College. The Committee further recommended that in order to ensure the maintenance of proper standards, the implementation of the development scheme should be completed as early as possible.

The Committee wishes to express its appreciation and thanks to the Management, Principal and other staff members of the College for the assistance rendered, co-operation extended for making the necessary arrangements for its visit.

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SRI JAYACHAMARAJENDRA COLLEGE OF ENGINEERING,
MYSORE.

Department of Mechanical Engg.

LIST OF EQUIPMENTS AVAILABLE.

Sl.No.	Name of Equipment

HEAT ENGINES AND BOILER HOUSE.

1. Locomotive Type boiler, coal fired, 80 p.s.i.
2. Simple Steam engine, non-condensing, vertical, 25 H.P.
3. Compound Steam Engine, non-condensing, 45 H.P.

ENGINE MODELS:

1. Steam Engine with D-slide valve
2. Models of steam boilers - Fire Tube and Water-Tube

I.C. ENGINES.

1. Diesel Engine, 10 H.P. horizontal type
2. Single Cylinder Vertical Diesel Engine, 5 H.P., coupled with Hydraulic dynamometer.
3. Air Compressor, 2-stage, air-cooled.
4. High speed engine indicator
5. Tools for the above equipment

FUEL LABORATORY.

1. Bomb Calorimeter
2. Junker's Gas Calorimeter
3. Closed cup flash and fire point apparatus
4. Orsat's Gas Analysis apparatus.

METALLURGY.

1. Universal Sand testing apparatus
2. Perenoability apparatus
3. Moisture Teller

LUBRICANTS.

1. Open type Flash and Fire point apparatus
2. Redwood Viscosimeters, No.1, and No.2.
3. Conradson's Carbon residue apparatus
4. Thurston's oil tester
5. Electric Hot plate.

Sl.No.	Name of equipment

6. Saybolt Viscosimeter
7. Chemical Balance - 1 No.
8. Apparatus for testing pressure gauges.

DYNAMICS LAB.

1. Dynamic balancing apparatus for rotating masses with motor drive.

MACHINE SHOP

1. S.S. and S.C. Lathes (Make - Kirloskar, Harihar) 16 nos.
2. Shaping Machine - 24" stroke - 1 no.
3. Shaping Machine - 12" stroke - 2nos
4. Horizontal type milling machine - 1 no.
5. Pillar Drilling machine - $\frac{1}{2}$" capacity - 1 no.
6. Radial Drilling machine - $1\frac{1}{2}$" capacity - 1 no.
7. Bench grinder - 1 no.
8. Power Hacksaw (Make: Kirloskar) - 1 no.
9. Surface Plate - 1 no.
10. Hand tools such as hammers, chisels, files, etc.
11. Planing machine (Make: Champion) - 1 no.
12. Universal Tool and Cutter Grinder (Make: Addison) 1 no.

FITTING

1. Work Benches with Fitter's vices - 10 nos.
2. Marking-off table with stand - 1 no.
3. Surface Plate - 1 no.
4. Double Wheel grinder - 1 no.
5. Bench Drilling Machine, $\frac{1}{2}$" capacity - 1 no.
6. Assorted tools such as files, chisels, etc.

CARPENTRY.

1. Work Benches with vices - 20 nos.
2. Woodworking lathes - 5 nos.
3. Circular Saw - 1 no.
4. Tool kits for the above

Sl No.	Name of equipment

SMITHY

1. Blacksmith's Forges - 8 nos.
2. W.I. Anvils - 18 nos.
3. C.I. Swage blocks - 2 nos.
4. Blower for forges - 1 no.
5. Sledge hammers, flatners, Fullers, tongs etc.

FOUNDRY.

1. Pit Furnace - 1 no.
2. Sand sieves - 2 nos.
3. Moulding Boxes - 20 nos.
4. Tool Kits

WELDING.

1. Electric Welding Transformer Set - 1 no.
2. Electric Welder's Tool kits.
3. Welding Tables and stands - 2 nos.

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SRI JAYACHAMARAJENDRA COLLEGE OF ENGINEERING, MYSORE.

DEPARTMENT OF ELECTRICAL ENGINEERING

LIST OF EQUIPMENTS AVAILABLE

Sl. No.	EQUIPMENT	Quantity
	ELECTRICAL MACHINE LABORATORY:	
1.	A.C. Motor driven D.C. Generator Set - 15 KW	1
2.	Rectifier Unit - 15 KW	1
3.	Two similar coupled shunt machines with at least 20% compounding 220 V 5 to 7 KW provided with field regulators etc. One set provided with suitable starter.	2
4.	Two similar coupled shunt, machines-230V, 5 to 6 HP 1000 RPM, provided with suitable starters and field regulators etc. (one of the machines to be provided in the dynamo-meter fitting)	2
5.	Self starting synchroncus motor (400 V. 3 phase) driven generator, 230V, 7.5 KW provided with necessary starting and control gear.	1
6.	7.5 H.P. D.C. compound Motor, 230 V, 1000 RPM with detachable fly-wheel	1
7.	5 H.P. D.C. compound motor, 1000 RPM, 230 V, with break drum	1
8.	110 V. 20A Balancer set with necessary starting and control gear (to have 230 V, 3 wire)	1
9.	Synchronous generator 400V, 3 phase, 50 cycles, 7.5. to 10 KVA coupled to a suitable 230 V. D.C. shunt motor (The D.C. side to be provided with dynamo-meter fitting)	2
10.	Synchronous Converter, 4 to 5 KW, 6 ring rotary converter (DC 220V) with transformer preferably designed for Zig-Zag connections and accesories	1
11.	A.C. Motors, 3 phase, 230 V. 50 cycles, 10 HP slip ring Induction motor with starter and axilliary equipment. One motor designed for cascade operation, preferrably three machine set (two motors and a D.C. generator coupled together, D.C. side with dynamometer fittings)	1
12.	3 phase 400 V. 50 cycles, 5 HP cage induction motor with star-delta starter	1
13.	3 phase 400 V, variable speed commutator motor of the schrage type 7 HP with tappings brought out and equipped with suitable starter	1

...2.

Sl. No.	EQUIPMENT	Quantity
14.	3 phase, 400V, 50 cycles, squirrel cage motor with thestator wound for winding study and suitable for connection as a pole changing motor.	1
15.	Single phase, 220V, 50 Cycles, 1 HP capacitor motor	1
16.	3 phase, 400 V. 50 cycles, 5 H.P. induction start synchronocus motor with starting and control gear.	1
17.	Transformer - single phase, 230 V. 50 cycles, 2 to 3 KVA, 1/1 ratio in two equal halves and providing with tapping at 86.6% on one side suitable for Scott connection also.	6
18.	Single phase, 230/0, 270 V, 50 cycles, 5 KVA variac (continuounsly variable ratio auto transformer)	4
19.	3 phase, 400/440 V. 50 cycles, 5 KVA, varia (continuously variable ration auto-transformer)	1
20.	Selinium rectifier set (1 KW)	1
21.	Two similar coupled series machines, 230 V 5 to 6.5 HP provided with suitable stator field regulators, detachable field regulators detachable fly-wheel, drum controller etc., for use as as fraction set	1
22.	5 HP DC series motor 100 RPM 230 V with an electro-dynamometers for Torque measurements	1
23.	3 phase, 230V, 50 cycles, 5 HP 1000 RPM reaction synchronous motor	1
24.	A.C. series, motor	1

ELECTRIC MACHINE LABORATORY.

25.	Portable D.C. moving coil ameters -0-10 ma	
26.	-do- -0-25 ma	
27.	-do- -0-100mA	
28.	-do- -0-250mA	
29.	-do- -0-500mA	
30.	-do- 0.1.to 1.5 mA	
31.	-do- -o.3A	49
32.	-do- -0.5A	
33.	-do- -0-10A	
34.	-do- -0-20A-0-25A	
35.	-do- -0-50A	

Sl. No.	Equipment		Quantity
36.	Portable Moving Iron Ammeters	-0-1A	
37.	-do-	-0-2A	
38.	-do-	-0-3A	30
39.	-do-	-0-6A	
40.	-do-	-0-10A	
41.	-do-	-0-15A	
42.	-do-	-0-25A	
43.	Portable D.C. moving coil voltmeters	-50mV	
44	-do-	-0-50Mv.	
45.	-do-	-0-500 mV	
46.	do-	-0-1V	
47.	-do-	-0-3V	
48.	-do-	-6/12 V	
49.	-do-	0-15V	30
50.	-do-	-0-50 V	
51.	-do-	-0-150 V	
52.	-do-	-0-300 V.	
53.	-do-	-0-150V-300V	
54.	-do-	-0-300-600V	
55.	Portable moving iron Voltameters:	-0-5-10V	
56.	-do-	0-15 V	
57.	-do-	0-30 V	
58.	-do-	0-250 V	
59.	-do-	0-75/150 V	
60.	-do-	0-150/300 V	
61.	-do-	0-300/600 V	
62.	Portable thermo couple hot wire meters		--
63.	-do- Voltmeters of various ranges		--
64.	-do- Ammeters of various ranges		2
65.	Rectifier type ammeters and voltmeters of various ranges		2
66.	Dynamometer voltmeters UPF. Woltmeters volts 75/100/300/600-I-24 or SS/110/220/440/ - 2-5-5-10-20 A		12
67.	Portable dynamomo for watt-meters - L.P.F. volts: 75/150/300/600-1-2A Volts: 75/150/300/600-5-10A and 10-20 A		11
68.	Portable polyphase Wattmeters Volts: 75/150/300/600-5-10A;10-20A		6

Sl. No.	EQUIPMENTS	Quantity
69.	Portable power factor meters 0-150/300V and 10/20 Amp.	2
70.	Frequency meters 115/230 V 40-60 Cycles	4
71.	A.C. potentiometer and components	1
	SWITCH BOARD INSTRUMENTS OF DIFFERENT RANGES:	
72.	Moving iron voltmeters	37
73.	Moving iron Ammeters	37
74.	Synchroscope	2
	RECORDING INSTRUMENTS	
75.	Ammeters	-
76.	Voltmeters	-
77.	Circuit breakors for different laboratory circuits.	-
78.	Single pole, double pole, treple pole, knife switches and iron clad switches for various experiements in the laboratory	LS.
	PANEL AND WIRING ACCESSORIES.	
79.	Switch board panels of various sizes, wiring clasts and wiring accessories, wire and cables	LS
80.	Wire wound rheostatsof various ranges from 100 to 1000 watts. 40	
81.	Carbon rheostats	LS
82.	3 phase choke coil	
	MISCELLANEOUS.	
83.	Megger	3
84.	Bridge Megger	1
85.	Earth tester	1
86.	Tachometers	10
87.	Energy meters - 1 elements	3
88.	Energy meters - 2 elements	2
89.	Energy meters - 3 elements	2
90.	Various domestic appliances such as kettle, iron drier, oven etc.	
91.	Torminals, brass screws and units angle iron materials	LS
92.	Stroboscopes of different types	2

....5.

Sl. No.	EQUIPMENT	Quantity
	ELECTRICAL MEASUREMENTS LAB.	
93.	Induction type energy meter 22 V, 5 Amp.	2
94.	Induction type energy meter 3 phase, 230 V, 5 Amps. 3 wire	1
95.	Induction type energy meter 3 phase, 230 V, 5 Amps & 4 wire	1
96.	Phase shifting transformers 3 phase and 400 V	1
97.	Stop watches	8
98.	Rheostats 1180 OHMS - 1A	20
99.	Rheostats 735 ohms - 1.5A	
100.	Rheostats 300 ohms - 2A	
101.	Rheostats 50 - 5-A	
102.	Rheostats 27 - 12 A	
103.	Relays for everload, eatch ~~leakage, reverse~~ power protection	4
104.	Integrating photometer and summer brodum photometer	1-1
	ELECTRONICS AND COMMUNICATIONS LAB.	
1.	Decade Inductor, milli-harries	2
2.	Short wave demonstration Apparatus 85 Mcs - 105M/cs.	1
3.	Radart Vaccum tube voltmeter 1-1000	1
4.	Radart S Trouboscope	1
5.	Radat Audio Oscilator, 4.50 Kc/s. 300-4000, 15-300 Kc/s.	1
6.	Phillips - Audio Frequency generator	1
7.	Philips - R.C. Generator	1
8.	Universal measuring bridge	1
9.	Stoboscope	1
10.	Philips Transistor tester	1
11.	Phllips vaccum tube voltmeter	1
12.	Philips L.F. oscilloscope	1
13.	Phlips L.C.R. bridge	1
14.	Philips Multimater	4
15.	Valve tester 230 V	1
16.	Regulated power supply unit	3
17.	valve moltmeter	1
18.	(a) V.T.V.M.	5
	(b) -do- inkit form	1

Sl. No.	EQUIPMENT	Quantity
20.	H.F. service oscillator, 250 kc/sto 25 mc/s output H.F. 10 mv-100mv. L.F.=0-5 v. modulation 400 c/s.	1
21.	Hartley oscillator	1
22.	Fadart C.R. oscilloscope	1
23.	Null detector	1
24.	Decade resistor box	1
25.	Decade capacitor box	1
26.	Decade condenser box	1
27.	Battery Eleminator	1
28.	Wide band oscillator 20 c/s to 200 kc/s	1
29.	B.P.L. signal generator	2
30.	Universal measuring instruments	1
31.	Milliammeters 0.500 ma	2
XX.	0-100 ma	2
	0.10 ma	2
32.	Micro ammeter 0.500 Ma (micro ammeter)	2
	0.100 ma -do-	2
	0.50 ma -do-	2
33.	A.E.C. wave meter	1
34.	Resistance substitute boxes	3
35.	Transistorised power supply 0.30 v, with load currents 1 a in steps of .1, .3. .5 & 1 A	2
36.	A.E.C. Transisterised regulated power supply	2
37.	Adjustabled regulated power supply unit	2
38.	A.E.C. capacitance substitution box	4
39.	Electronics base board	1
40.	Invertor type SB1	1
41.	Power supply unit for Opams (Ic's) + or - 15 V. 1 Amps.	1
42.	Jiffy Board	1
43.	Triac, UJT, Photo transistor, point contact diode, I.C. holder etc.	80
44.	Photo conductive cell	2
45.	ICBs HE 555 + 710	70
46.	Radart output meter	1
47.	Microwave bench unit	1

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Sl. No.	EQUIPMENT	Quantity
48.	Radart RF signal generator	2
49.	Systronics Standard signal generator	1
50.	Rdaratoutput meter	1
51.	Microvave bench unit	1
52.	Radart RF Signal generator	2
53.	Systronics standard signal generator	1
54.	Radart siggle beam oscilloscope	1
55.	ScR	8
56.	Audio oscillator	1
57.	Digilog computer. Lab. along with all accessories for Analog Computer	1
58.	Beltrani power supply (transistorised) for digital integrated circuits	1
59.	Beltranix audio frequency signal generator	1
60.	Radart 25 MHZ timer/frequency counter	1
61.	Radart VTVM	1
62.	Amplifier set with accessories	1

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SRI JAYACHAMARAJENDRA COLLEGE OF ENGINEERING

MYSORE-6.

DEPARTMENT OF CHEMISTRY.

LIST OF EQUIPMENTS AVAILABLE.

Sl. No.	EQUIPMENT	Quantity
1	2	3
1.	Burettes 50 mil with stop cock	40
2.	Pipettes 10 ml. "	9
3.	Pipettes 20 ml.	4
4.	Pipettes 25 ml.	52
5.	Beakers 400 ml.	8
6.	" 250 ml.	92
7.	" 100 ml.	59
8.	China Dish 3"	19
9.	Weighing bottles 10 ml.	10
10.	Conical Flask 250 ml.	92
11.	Wash bottles 1000 ml.	28
12.	Test Tubes 5" x 5/8"	1440
13.	Test Tubes 1" x 6" hand gloves	72
14.	Desiccator - 4"	2
15.	Funnels 3" x 1½"	65
16.	Measuring Flasks 250 ml.	35
17.	Measuring Flasks 100 ml.	30
18.	Watch glasses 3"	14
19.	Specimen Tubes glass	36
20.	Bunson Burners	48
21.	Filter stand double	13
22.	Burette Stand	25
23.	Test Tube stand	61
24.	Triped Stand	34
25.	Wire gauge 6" with asbestos	72
26.	Tongs 8" cong.	4
27.	Asbestos sheet 6" Square	48
28.	Pipettes 2,5,10 ml. graduated	2
28a.	Measuring Cylinder 500 ml.	2
29.	Beakers 1000 ml.	4

...2.

1.	2.	3.
30.	Reagent Bottle 250 ml.	514
31.	-do- 500 ml.	12
32.	-do- 1000 ml.	12
33.	Winchesters - 2½ Ltres	32
34.	-do- 5 Litres	1
35.	-do- 9 Litres	1
36.	Kipp's Apparatus - 1 Litre	1
37.	Pestle and Mortar 8" x 6", 4½"	1
38.	Spatalas Horn & Nickle	7
39.	Water tap with goose neck	20
40.	Gas Taps two ways	20
41.	Beranger Balance 2 Kg.	1
42.	Gas Generator Kit for 75 burners	1
43.	Distilled water Plant	1

FURNITURE.

1.	Lab. Tables 5' x 10' x 3'	10
2.	Side tables 2½" x 5' x 3'	3
3.	Ordinary tables	7
4.	Almirahs 4' x 6' x 12'	6

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SRI JAYACHAMARAJENDRA COLLEGE OF ENGINEERING

MYSORE.

DEPARTMENT OF PHYSICS

LIST OF EQUIPMENT AVAILABLE

Sl. No.	Name of Equipment	Quantity
1.	2.	3.
	MECHANICS.	
1.	Vernier Calipers	6
2.	Spherometer	12
3.	Balance with Wt. boxes	12
4.	Stop Clocks	12
5.	Nicholson Hydrometer	2
6.	Torsion Pendulum	6
7.	Clement and Desarmes Apparatus	1
8.	Micrometer Screw Gauge (Precision type)	12
9.	Spherometers	12
10.	Searle's Double bar with frame	2
11.	Sp. Gravity bottles	24
	HEAT.	
12.	Coefficient of linear expansion apparatus	6
13.	Thermometers	28
14.	Boilers	12
15.	Electrical heaters (hot plates)	2
16.	Calorimeters	12
17.	Lee's disc apparatus	6
18.	Pyknometer	12
19.	Joule's calorimeter	6
	SOUND AND ELECTRICITY	
20.	Sonometer	6
21.	Tuning Forks	4
22.	Kundt's Tube	6
23.	Bar magnets	18 prs.
24.	Deflection magnetometer	6
25.	Compass needles	6
26.	Lead Accumulator, 6 Volts	24

1.	2.	3.
27.	Laclanche cell	12
28.	Danial Cell	9
29.	Plug keys	24
30.	Table galvanometer	13
31.	Rheostats (ordinary type)	18
32.	Metre Bridge	6
33.	Potentiometer	6
34.	Resistence cofls	37
35.	Resistence boxes	11
36.	Post Office Boxes	6
37.	Ammeters (different ranges)	16
38.	Voltmeters (different ranges)	14
39.	Resistence elements (Temp. coefficent coils)	6
40.	Ammeter (milli-amps. range)	4
41.	Diode with base	6
42.	Discharge key	2
OPTICS.		
43.	Lenses (convex and concave)	4 doz.
44.	Travelling microscope	2
45.	Telescope	2
46.	Spectrometers	6
47.	Plane diffraction grating	3
48.	Prisms (optically worked)	6
GENERAL EQUIPMENTS - MISCELLANEOUS I		
49.	Lens holder (wooden)	10
50.	Magnifying glasses	4
51.	Beakers	40
52.	Measuring jars	10
53.	Screws and nuts	2 doz.
54.	Tripod stands	12
55.	Hydrostatic bench	3
56.	Metro scales	48
57.	Retort stands	19

..3.

1.	2.	3.
58.	Sets of weight with hangers	15 sets
59.	Clamps	12 g.
60.	Pulleys	1 set 1 single
61.	Rubber stoppers	3 doz.
62.	Bark corks	3 doz.
63.	Tesla coil	1
64.	Battery charger	1
65.	Crocer's balance	1
66.	Sodium vapour lamp with choke	1
67.	Mercury lamp	1
68.	Sine Galvanometer	6
69.	Dip Circle	1
70.	Nicol prism	2
71.	Metrononomal	2
72.	Neon lamp	2
73.	Spare trough	2
74.	Spare heating coil (for Joule's calorimeter)	6
75.	Spare wire gauge	6
76.	Spare pencil jockey	6
77.	Terminals assorted	6 doz.
78.	Standard vibrating bar	1
79.	Temperature coefficient coils	6
80.	Optical tank	1
81.	Battery eliminator	6
82.	Helmholtz double coil galvanometer	3
83.	Gold leaf electroscope	1
84.	Photo cell relay	1
85.	Photoelectric relay	1
86.	Aluminimum scale pan	12
87.	Bar pendulum	3
88.	Sinclair steam heater	6
89.	Retort rings	10
90.	Fly wheel (1 with meter and 1 without)	2

1.	2.	3.
91.	Universal table lamps	12
92.	Soldering iron	1
93.	Buzzer	1
94.	Lamp and scale with C.T.	4
95.	Tape sockets	1 set
96.	Young's modulus elasticity (Searles stretching)	2
97.	Aspirator bottles	3
98.	Valve bases	6
99.	Ultraviolet lamps	1
100.	Iron stands	6
101.	Ice Pail	1
102.	Searles double bar stand	1
103.	Stop watches	2

APPARATUS FOR ADVANCED EXPERIMENTS AND DEMONSTRATION.

1.	Cathode ray oscillograph	1
2.	Multimeter (preferably AVC model 5)	1
3.	Valves etc., other electronic components	6

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ANNEXURE II(14)

SRI JAYACHAMARAJENDRA COLLEGE OF ENGINEERING

MYSORE 6

DEPARTMENT OF MECHANICAL ENGINEERING

LIST OF EQUIPMENT RECOMMENDED BY THE COMMITTEE.

S.No.	Name of the equipment

STEAM LABORATORY:

1. Steam flow meter, indicating type
2. Steam traps, separators, pipes and fittings.
3. Separating calorimeter
4. Throttling Calorimeter
5. Apparatus for studying heat transfer of different types
6. Slow speed engine indicator

ENGINE MODELS:

1. Steam turbine models - impulse and reaction
2. Boiler accessories such as safety valves, feed valve, etc.
3. Section models of I.C. engines, 2 stroke, 4 stroke, petrol, diesel and semi-diesel
4. I.C. Engine Components

I.C. ENGINES:

1. Petrol engine test rig 4 or 6 cylinder, about 20 HP
2. Exhaust Calorimeter
3. Stroboscope
4. Instruments for the lab.
5. 2 Stroke oil engine test rig, about 5 HP

REFRIGERATION AND AIR CONDITIONING:

1. Refrigerating Unit, experimental type about 1 ton capacity
2. Air Conditioning plant experimental type about 3 tons capacity.
3. Instruments & Components such as expansion valve, thermometer, thermostat, etc.
4. Absorption type refrigerating unit - Test type - about $\frac{1}{2}$ ton.

...2.

1	2

FUEL LABORATORY:

1. Radiation pyrometer
2. Optical pyrometer
3. Electric hot air oven with temperature control

METALLURGY:

1. Muffle furnace, for temperature upto 1350 Deg.C. with pyrometer and heat control panel
2. Specimen mount press
3. Grinding and polishing machine
4. Metallurgical Microscope (1 No.)

LUBRICANTS:

1. Portable grease penetrometer
2. Grease dropping point apparatus
3. Cloud and pour point apparatus

DYNAMICS LABORATORY:

1. Slider Crank mechanism, hand operated
2. Epicyclic gear train - 2 types
3. Bevel gear train
4. Apparatus for study of cams and followers
5. Differential gear
6. Static balancing apparatus
7. Dynamic balancing apparatus for reciprocating masses
8. Whirling of shafts
9. Models of various types of Kinematic chains
10. Spring vibration apparatus
11. Double beam Oscillograph with accessories
12. Vibration Exciter
13. Vibration pick-ups - different types
14. Photo-elastic bench with all standard accessories
15. Profilometer
16. Strain gauge equipment with strain indicators

...3.

1	2

WORK STUDY LABORATORY (ELECTIVE SUBJECTS)

1. Slow motion camera for micro-motion study
2. Stop Watches - decimal - second type
3. Micro-chronometer
4. Time study Boards
5. Work Study Charts

MACHINE SHOP:

1. Universal Milling machine
2. Marking off table
3. Precision lathe
4. Capstan or Turret Lathe
5. Arbor Press

TOOLROOM EQUIPMENT FOR MACHINE SHOP:

6. Precision surface plate - grade 1 (1 No.)
7. Angle plate (ribbed) (1 No.)
8. Cast Iron V. Blocks (4 Nos.)
9. Spirit levels
10. Precision Gauges such as surface gauges, Feeder gauges, thickness gauges, thread gruges, height gauges, depth gauges etc.
11. Micrometers of different sizes
12. Vernier Calipers
13. Comparator, Solex or any othertype

FITTING SHOP:

1. Heat Treatment set

CARPENTRY SHOP:

1. Tool grinder
2. Band Saw
3. Portable Sander
4. Circular Saw Grinder
5. Universal Wood Working machine

...4.

1	2

SMITHY SHOP:

1. Power Hammer

FOUNDRY SHOP:

1. Cupola with blower - ½ ton capacity
2. Crucibles of different sizes
3. Drying oven
4. Moulding boxes - 20 sets
5. Portable grinder
6. Ladles of assorted sizes
7. Platform weighing machine

PAINTING AND SHEET METAL:

1. Shear
2. Folding and bending machine
3. Circular cutting machine
4. Tin, Copper, Sheet metal workers' Tools
5. Spray painting unit with air compressor

WELDING:

1. Electric arc welding motor generator set
2. Oxy- Acetylene welding set
3. Gas Welding tool kit, brazing and soldering equipment.

Approved cost of equipment: Rs.6.60 lakhs.

sd/-

SRI JAYACHAMARAJENDRA COLLEGE OF ENGINEERING,
MYSORE-6.

DEPARTMENT OF ELECTRICAL ENGINEERING

LIST OF EQUIPMENTS RECOMMENDED BY THE COMMITTEE

Sl. No.	Equipment	Quantity
1.	Moving coil flux meter	1
2.	Rotating substandard suitable for 1 & 3 phases	1
3.	Relays for new load, earth leakage reverse power.	1
4.	16 mm projector complete with accessories	
5.	A.C. Millimmeter & micro ammeters(various ranges)	
6.	Magnetic amplifier	1
7.	Inverters	2
8.	Synchro transmetters and receivers	LS
9.	Sounders - polarised and non-polarised	2 each
10.	Telegraphic relays polarised and non-polarised	16
11.	Key single current and double current	16
12.	Magnetic exchange	1
13.	Battery eliminators	2
14.	C.B. non multiple exchange	1
15.	Attennators	4
16.	Filters assorted	16
17.	V.H.F. Wave meter Absorption	1
18.	S.W.R. Meter -do-	1
19.	Microphone (crystel, condensation etc) & loud speakers	LS
20.	Tape recorder	1
21.	Strawger P.A.O. 10 lines, 2 junction complete automatic exchange	1
22.	Equipments for preparation of printed circuit boards	1
23.	Servo motors, servo equipments	LS

...2.

1.	2.	3.
24.	I.C. Tester	1
25.	I.C. System Analysis	1
26.	Pulse Generator	1
27.	Timer Counter	1
28.	Servometer	1
29.	L.F. Oscillator	1
30.	IC.s	LS
31.	IC.s power supply	1
32.	XY Recorder	1
33.	Consumable articles, like resistors, capacitors inductors, various domestic appliances, ferrite rods, etc.	LS

Approved cost of equipment Rs.1.60 lakhs.

sm/-

SRI JAYACHAMARAJENDRA COLLEGE OF ENGINEERING

MYSORE-6.

DEPARTMENT OF CHEMISTRY.

LIST OF EQUIPMENTS RECOMMENDED BY THE COMMITTEE.

Sl. No.	EQUIPMENT	Quantity
1.	Burettes 50 ml. with stop cock	144
2.	Butettes 25 ml. "	6
3.	Pipettes 10 ml.	144
4.	Pipettes 20 ml.	24
5.	Pipettes 25 ml.	144
6.	Beakers 400 ml.	180
7.	Beakers 250 ml.	288
8.	Beakers 100 ml.	216
9.	China Dish 3"	72
10.	Crucible Porcelain 25 ml.	36
11.	Blow Pipe	12
12.	Weighing bottles 10 ml.	96
13.	China Dish 4"	6
14.	Conical Flask 250 ml.	288
15.	Wash bottles 1000 ml.	144
16.	Wash bottles 100 ml.	72
17.	Gooch Crucibles (with rubber cones)	6
18.	F.B. Flasks 250 ml.	6
19.	F.B. Flasks 500 ml.	6
20.	Test Tubes 5" x 5/8"	2160
21.	Test Tubes 1"x 6" hand gloves	36
22.	Filter Flasks 250 ml.	2
23.	Buchner Funnel 3"	4
24.	Desiccator - 4"	4
25.	Funnels 3" x 1½"	180 each
26.	R.B. Flasks 500 ml.	6
27.	Measuring Flasks 250 ml.	108
28.	Measuring Flasks 100 ml.	144
29.	Measuring Cylinder 10 ml.	36
30.	Measuring Cylinder 100 ml.	3

.....2.

1.	2.	3.
31.	Porcelain Plates 5"	96
32.	Watch glasses 3"	288
33.	Specimen Tubes glass	144
34.	Pipeclay Triangles	36
35.	Filter stand double	48
36.	Burettee Stand	72
37.	Test Tube stand	36
38.	Water bath	12
39.	Triped Stand	86
40.	Wire gauge 6" with asbestos	288
41.	Tongs 8" Cong.	12
42.	Test Tube holders	36
43.	Sand Bath	6
44.	Asbestos sheet 6" Square	210
45.	Measuring Flasks 1000 ml.	2
46.	Measuring Flasks 500 ml.	3
47.	Pipettes 50 ml. & 100 ml.	3 each
48.	Pipettes 2,5.10 ml. graduated	6+6+4= 16
49.	Measuring cylinder 250 ml.	3
50.	Measuring cylinder 500 ml.	1
51.	Measuring cylinder1000 ml.	2
52.	Calcium chloride Tower 18"	2
53.	Porcelain Dishes 120 mm.	3
54.	Porcelain Dishes 105 mm.	6
55.	Porcelain Dishes 245	2
56.	Beakers 1000 ml.	8
57.	Beakers 800 ml.	6
58.	Liebig condensers 12"	2
59.	Liebig condensers 18"	1
60.	Reagent Bottle 250 ml.	180
61.	Reagent Bottle 500 ml.	36
62.	Reagent Bottle 1000 ml.	36

....3.

1.	2.	3.
63.	Winchesters - 2½ Litres	18
64.	Winchesters - 5 Litres	5
65.	Winchesters - 9 Litres	2
66.	Kipp's Apparatus - 1 Litre	1
67.	Filter Flask 500 ml.	2
68.	Buchner Funnel 6"	1
69.	Thermometer	12
70.	Aspirator bottles 5 Lit.	3
71.	Funnels, 10, 15 cm.	1 each
72.	Funnels 20 Cm.	1
73.	Burner Ring type 6"	1
74.	Burner Meker	3
75.	Burner Fish tail	1
76.	Burner Blow pipe with blower	1
77.	Cork borer with sharpner	1 set
78.	Cork press	1
79.	Drying Oven Hot air	1
80.	Drying oven Hot water	1
81.	Filter pumps	4
82.	Hot water funnel	1
83.	Condenser clamps	6
84.	Pestle and Mortar 8" x 6", 4½"	2
85.	Agate Mortar & Pestle 4"	1
86.	Iron Morter & Pestle	1
87.	Glass cutting Knife	1
88.	Spatalas Horn & Nickle	36
89.	Retort Stand 8" x 4" x 24"	36
90.	Burette stands	3
91.	Burette Clamps	36
92.	Filter stands double	6
93.	Rings (3") with boss head	18
94.	Clamps with boss heads (Gun Metal)	36
95.	Water tap with goose neck	20

....4.

1.	2.	3.
96.	Gas Taps two ways	20
97.	Lead dish 3"	2
98.	Pinch cock & Screws	24 each
99.	Draining Boards 3' x 2'	2
100.	Beranger Balance 2 Kg.	1
101.	Chemical balance 200 g, sensitivity o.1 mg. with weight boxes.	16
102.	Rough weight box set 1 g. - 2 Kg.	1
1.	Conductance bridge with sliding contact and connecting screws - Bridge wire 100 cm. long with metre scale.	2
2.	Conductance cell with sturdy platinum electrodes for strong electro-cycles.	2
3.	-do- Dip type	2
4.	-do- for weak electrocycles	2
5.	Audio Oscillator output 1000 - 2000 cycles A/C at 0.5 Volt. to work on 230 V A/C or 6V. battery.	1
6.	Earphones to suit above	2 sets
7.	Standard Resistances, manganin coils set in Resin containers, 1,2,3,5,10,20,50,100,200, 500, 1000, 2000 ohms.	2 each
8.	Resistance box standard make 1 ohm to 10000 ohms	1
9.	Semi micro qualitative analysis sets. Wooden cabinet with dropping bottles	10 sets
10.	Semi micro test tubes corning 2"x1/4"	288
11.	Lab. Centrifuge - hand driven to hold two centrifuge test tubes	6
12.	Centrifuge test tubes cornint to suit above	288
13.	Platinum loops 2" wire sealed to glass rod	6
14.	Dropping bottles polythene 25ml. with dropper	72
15.	Platinum wire electrodes 2" long wire fused to corning glass tube.	6
16.	Nessler tube	12

...5.

1.	2.	3.
17.	Hydrogen Electrode: Hide band type	2
18.	Gas washing bottle 125 ml.	12
19.	Potential vessels	6
20.	Graduated pipettes' Standard Corning make 5 ml. x 1/20 ml.	2
21.	-do- 2ml. x 1/50 ml.	2
22.	-do- 1ml. x 1/50 ml.	2
23.	Automatic burette with storage vessel - 2 lit. capacity with rubber squeezer.	2
24.	Lead Storage Cells 60 A Hr. Cap.	6
25.	Calomel Electrode large	2
26.	Potentiometer 2 wire with Jockey (standard)	1
27.	Table model sensitive galvanometer (suspended coil) sensitivity o.01 micro amp. with built in lamp and scale.	1
28.	PH Meter 0-14 PH sensitivity 0.92 PH with accessories (to work on 230 V. A/C. marks or 12 V. battery.)	1
29.	Compound microscope with eye pieces with 10 x 100 lens systems	1
30.	Beaker with spout 25 ml. corning	36
31.	Distillation flask corning, 100 ml. and 250 ml.	6 each
32.	Separating funnel 100 ml. and 250 ml.	2 each
33.	Flask, R.B. Corning, 1000 ml. & 500 ml.	6 each
34.	Flask, 100 ml.	12
35.	Fractionating column bulb type	1
36.	Air condenser corning 18"	2
37.	Burette clamps (Iron)	36
38.	Bos heads (gun metal)	36
39.	Acid Rests Polythene 3½"	72
40.	Assorted India rubber stoppers six sizes	24 each
41.	-do- Cork stoppers	24 each
42.	Rubber tubing 5/8" int.dia to suit burners	100 Mtrs.
43.	Carboys Polythene high density 5 & 10 Ltrs.	6 each
44.	-do- 32 Litres (all with spouts)	2

...6.

1.	2.	3.
45.	Wooden stand Richangular to hold 60 pipettes.	2
46.	Copper wire clad in cotten for electrical connectors	2 Kg.
47.	Adopters (Glass)	6
48.	Semi micro analysis units with heating block etc.	10 sets
49.	Analytical weight box 100 gm. to 5 mg. with 10 mg. radiers - (standard)	1 set.

FURNITURE.

1.	Side tables 2½" x 5' x 3'	5
2.	Ordinary tables	1
3.	Almirahs 4' x 6' x 12'	6
4.	Lab. Stools 27" high	16

Approved cost of Equipment: Rs.60,000/-

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SRI JAYACHAMARAJENDRA COLLEGE OF ENGINEERING

MYSORE-6.

DEPARTMENT OF PHYSICS.

LIST OF EQUIPMENTS RECOMMENDED BY THE COMMITTEE.

Sl. No.	LIST OF EQUIPMENT	Quantity.
1.	2.	3.
1.	Searle's Double bar with frame	2 prs.
2.	Thermometers	4
3.	Electrical heaters	2
4.	Resonance apparatus	4
5.	Deflection Magnetometer	2
6.	Oscillation magnitometer	4
7.	Campass meedles - 2 volts	6
8.	Lead accumulator - 6 volts	8
9.	Rheostate (high resistance)	4
10.	Power Packs (H.T. & L.T.)	4
11.	Voltmeters (0-50V)	8
12.	Triode with base	8
13.	Thermo couples	8
14.	Capacitor	8
15.	Inductance coils	6
16.	Lenses (Convex & Concave)	
17.	Travelling microscope	8
18.	Telescope	4
19.	Spectrometers	2
20.	Biprieam	4
21.	Optical bench (Normal metal onst)	1
22.	Newton's rings apparatus with microscopes	4
23.	Plane defraction grating	1
24.	L.B. Photo meter	1
25.	The attachment for resolving a telescope with a Microhed	2
26.	Knife edges (with weights)	4 sets
27.	Clamps	4 doz.
28.	Pulleys	
29.	Steel & Brass wire	8 Reels
30.	Copper wire	4 Reels
31.	Manganim on constatam wire	2 Reels

1.	2.	3.
32.	Tool set	1
33.	Cork bore set	1
34.	Dimond point cutter	1
35.	Spirit level	1 doz.
36.	Neon tester	2
37.	Variac (single phase)	4 - 8 Amp.
38.	Grocer's balance	1
39.	Sodium Vapour lamp	1
40.	Mercury lamp	1
41.	Helmhold's double coil	6
42.	Induction coil	1
43.	Thermopile	1
44.	Bar pendulum	3
45.	Fly wheel	2
46.	Hot & cold air blower	1
47.	Aspirate bottles	6
48.	Stop watches	4
49.	Inertia dis(rectangular, circular, irregular)	12 each
50.	Capillary tubings	2 Kgs.
51.	Hysteresis apparatus complete	2
52.	Callender & barnes continuous flow caloremeter A.C. arrangements	2 Sets
53.	Callender and Barnes continuous flow calorimeter Apparatus only	2
54.	Coils for finding frequency of A.C. using sonometer (with Transfs.)	10
55.	Simple hormonic demonstration apparatus with chart	1
56.	Demonistration of lissa jous figures with chart	1
57.	Demonstration burnolis theorem with chart	1
58.	Venturimeter model	1
59.	Heat engine carnot's cycle model with charts	1
60.	Direct vision spectroscope	1
61.	Constant deviation spectroscope	1
62.	Eye piece models Ransdens and Huygans	1 each
63.	Wave theory Hygon's principle interphearence of light charts	1

1.	2.	3.
64.	Seebeck and peltier effect demonstration with charts	1
65.	Epidiscope	1
66.	Projector 35 mm, eomplete	1
67.	Quarter and half wave plate	1 each
68.	Diffraction and double refraction and demonstration charts	Complete set
69.	Polarimeter with solution tubes	4
70.	Electric field by gypsum plates	1
71.	Magnetic field by iron filings	1
72.	Connection of magnetic and electric fields (Rogowski's coil)	1
73.	Electromagnetic demonstration apparatus and vandegraph generator	1
74.	Electrostatic demonstration apparatus and vandegraph generator	1
75.	Set of gas discharge tubes and cathode ray tubes	1 set
76.	Thermo couple elements	8
77.	Set of charts of physical experiments & Atomic energy.	1 set
78.	Work benches	10
79.	Work tables	5
80.	Table with cub boards	5
81.	Hexagonal table	1
82.	Stools	30
83.	Writing tables	4
84.	Chairs	6
85.	Tables for staff	6
86.	Almirahs	3
87.	Racks	3
88.	Shelf cubboards for demonstration apparatus	4
89.	Lockers	4

Approved cost of Equipment: Rs.60,000/-

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ANNEXURE-III (14)

DETAILS OF STUDENTS' AMENITIES.

Canteen 2400 sq.ft.	..	Rs.	48,000/-
Cycle Shed - 300 Nos.	..	Rs.	6,000/-
N.C.C. Block 1000 sq.ft.	..	Rs.	20,000/-
Water Cooler 1 No.	..	Rs.	6,000/-
Co-operative stores, Furniture	..	Rs.	1,000/-
Gymkhana - 1380 sq.ft.	..	Rs.	28,000/-
Dispensary Equipment	..	Rs.	10,000/-
Dispensary Building 500 sq.ft.	..	Rs.	10,000/-
			1,29,000/-
Already provided	..	Rs.	15,000/-
	Total	..Rs.	1,14,000/-

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ANNEXURE-IV(14)

HOSTEL FOR 150 STUDENTS.

1. Triple seated hostel for 150 students @ 180 sq.ft. per student - 27000 sq.ft. @ Rs.30/- per sq.ft.		Rs. 8,10,000/-
2. Warden's qrs. 1200 sq.ft. @ Rs.30/- per sq.ft.		Rs. 36,000/-
3. Sevant's quarter 12 Nos. @ 270 sq.ft. - 3240 Sq.ft. @ Rs.20/- per sq.ft.		Rs. 64,800/-
4. Furniture for 150 students @ Rs.300/- per student.		Rs. 45,000/-
	Total ...	Rs.9,55,800/-
	or say...	Rs. 9.56 lakhs.

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REPORT OF THE EXPERT COMMITTEE OF THE SOUTHERN REGIONAL COMMITTEE SET UP TO ASSESS THE ESTIMATES OF COST FOR THE DEVELOPMENT OF BASAVESWAR COLLEGE OF ENGINEERING, BAGALKOT, AS PER THE STANDARDS LAID DOWN BY THE ALL INDIA COUNCIL FOR TECHNICAL EDUCATION.

-4-

A proposal was received by the Ministry of Education, Government of India from the State Government of Karnataka to admit Basaveswar College of Engineering, Bagalkot to the Grant-in-aid Code and develop it in accordance with the standards laid down by the All India Council for Technical Education.

Basaveswar College of Engineering, Bagalkot in Karnataka State was established in the year 1963 and has been running degree courses in Civil, Mechanical and Electrical Engineering. The College is affiliated to the University of Karnataka for offering these courses. The College is run by Basaveswar Vidya Sangh, established by philonthropists of the area in 1906 for the main purpose of educational advancement of the area at all levels. The Sangha is running a number of institutions. In order to meet the increasing demand of engineers, the Sangh mooted the idea of starting this engineering college and realised the same in 1963 when the college was started. The management of the college is vested in the Governing Body constituted by the Sangh.

The College is situated on Hubli-Sholapur South Central Railway line, 153 KMs from Hubli and 200 KMs from Sholapur. Bagalkot is an industrially advanced city in this part of the State having also a Cement Factory and a Spinning Mill in addition to various other industrial establishments.

The Central Government agreed, in principle, to the proposal of the State Government and requested the Southern Regional Committee to assess the estimates of cost for the development of the college. The Southern Regional Committee considered the matter at its 34th meeting held on 24.4.1970 and

decided to appoint an Expert Committee consisting of the following to examine the proposal in detail and make recommendations:

1. Prof.B.H.Karakaraddi,
   Principal,
   Regional Engineering College,
   SURATHKAL.

2. Sri S.Ramasami,
   Managing Director,
   Chemicals & Plastics India Ltd.,
   MADRAS.

3. Prof.P.S.Manisundaram,
   Principal,
   Regional Engineering College,
   TIRUCHIRAPALLI.

4. Dr.T.Thimmaiah,
   Managing Director & Chairman,
   Mysore Minerals,
   BANGALORE.

5. Sri S.K.Handa,
   Member-Secretary, &
   Asst.Educational Adviser (Tech),
   Ministry of Education &S.W.,
   Southern Regional Office,
   MADRAS.

The Committee paid a visit to the College on 11th September 1975. Sri Manje Gowda, Asst.Director of Technical Education, Karnataka representing the Director of Technical Education also accompanied the Expert Committee and participated in its deliberations. Prof.P.S.Manisundaram and Dr.T.Thimmaiah could not accompany the Committee for the above visit. Prof.P.S.Manisundaram was, however, able to attend the second meeting of the Committee held at Madras on 17.9.1975 to finalise the recommendations. Dr.T.Thimmaiah could not attend this meeting also.

During its visit to the college, the Committee had detailed discussions with the management, Principal, and Members of the staff to examine the proposal in all its aspects. The Committee also went round the part of the new building of the col-

which has been already constructed and also the polytechnic, whose facilities are at present utilised for conducting the courses. In order to ... the additional requirements for running the degr courses in accordance with the approved standards, the Committee requested the institution to furni... full details about the facilities already availa... and the additional facilities required. The detai... furnished by the institution were examined by the Committee with reference to the standards appro... the All India Council for Technical Education. The Committee also examined the other information made available about the college.

The Committee noted that the college has been running the courses with its facilities created at the new campus and the facilities available at B.V.V.Sangha's Polytechnic. The Committee examined the statement of intake and out-turn of the college from the year 1965 to 1974. The Committee noted that the college has been attracting a good number of students. The Committee further observed that the college had acquired experience for more than 10 and was in a good shape for being developed as ... institution in accordance with the approved stand... The Committee, therefore, recommended that the college may be taken up for development in accord... with the standards prescribed by the Council for intake of 120 students; 40 each in Civil, Mechani... and Electrical Engineering. In this connection, Committee noted that the college has already been admitted to the State Grant-in-aid Code from the year 1968 onwards. The Expert Committee constituted by the State Government which visited the college in June 1969 had recommended the following facilities:-

Buildings.	...	Rs. 15,48,000/-
Equipment.	...	Rs. 15,20,000/-
Furniture.	...	Rs. 50,000/-
Library & Library furniture.	...	Rs. 1,25,000/-
Students' Amenities.	...	Rs. 1,80,000/-
	Total	Rs. 34,23,500/-

The Expert Committee of the Regional Committee examined the whole project with reference to the present stage of development of the college report of the State Expert Committee and other relevant factors. The Committee noted that the college in its new campus has been able to build only its workshop buildings. Having regard to the facilities already created by the college before admission to the State Grant-in-aid Code, the additional requirements as furnished By the college and standards laid down by the All India Council for Technical Education, the Committee made the following observations and recommendations:-

BUILDINGS:

The Committee noted that the State Expert Committee had estimated the requirements of the college on the basis of the 4-year course. The Karnatak University to which the college is affiliated has since adopted an all India pattern of 5-year course and as such, the requirements for space for the courses in Civil, Mechanical and Electrical Engineering for the college have to be assessed on that basis. The Committee noted that after taking into account the Carpet area of workshop type building already constructed, the college will require an additional plinth area of 76,000 Sq.ft. in accordance with the standards laid down by the All India Council for Technical Education. Further, the cost of the building has also considerably gone up. Accordingly, the Committee recommended the following amount for the buildings for the development of the college. The details of the building, as approved by the Committee may be seen at Annexure-I.

1. Construction of RCC type building:

76,000 Sq.ft. at the rate of Rs.35/- per Sq.ft.	Rs. 26.60 Lakhs
2. Amount required for the completion of the workshop building already constructed by the college	Rs. 00.80
Total.	Rs. 27.40

EQUIPMENT:

Equipment worth Rs.3.43 Lakhs has already been procured by the college before admission to the State Grant-in-aid Code. The Committee examined the additional requirements for equipment furnished by the college for its development. The Committee examined these requirements with reference to the standards laid down by the All India Council for Technical Education and recommended that an amount of Rs.32.00 Lakhs, the break up of which is given below, would be necessary to equip the different laboratories and workshops adequately:

1. Civil Engineering.	..	Rs. 5.83 "
2. Mechanical Engineering.	..	Rs. 8.16 "
3. Electrical Engineering.	..	Rs.10.13 "
4. Workshops.	..	Rs. 4.88 "
Total.	..	Rs.29.00 "
ADD 10% for installation and freight.		Rs. 2.90 "
Total.	..	Rs.31.90 "
Say, Rs.32.00 Lakhs.		

The laboratory-wise list of equipment that should be provided by the college, as per the recommendations of the Committee, is given in the statement which may be seen at Annexure-II. The Committee recommend that the college should be given freedom to substitute any item of equipment which may prove more useful at the time of purchase to suit the need of changing pattern of syllabii. However, the overall ceiling for the equipment should not be exceeded.

HOSTELS:

The Committee noted that hostel accommodation for 100 students has already been provided in the college. On the basis of an intake of 120, the college will have an overall student body of 600 in the college and it may be necessary to provide hostel accommodation for atleast 50% of the student-body. The Committee, therefore, recommended that an additional hostel accommodation for 200 students may be provided for the colle-

On the basis of 3-seated rooms, the Committee recommended that an amount of Rs.12.41 Lakhs may be required for the hostels, which may be provided. The details of the estimates may be seen in Annexure-III.

STUDENTS' AMENITIES:

The Committee estimated the requirements of students' amenities in accordance with the standards approved by the All India Council for Technical Education and recommended that an amount of Rs.1.29 Lakhs should be provided for the purpose. The details of the students' amenities may be seen at Annexure-IV.

FURNITURE:

The Committee noted that an amount of Rs.60,000/- has already been spent by the College for the furniture. According to the standards laid down by the All India Council for Technical Education, the Committee recommended that an additional amount of Rs.1.40 Lakhs would be necessary for the purpose in view of the increased prices of furniture. The Committee, therefore, recommended that an amount of Rs.1.40 Lakhs may be approved for the college for the purpose.

LIBRARY:

The Committee noted that an amount of Rs.56,000/- has already been spent by the College on library. In accordance with the standards laid down by the All India Council for Technical Education, the Committee recommended that an additional amount of Rs.1.50 Lakhs may be approved for the library for the college.

STAFF:

The Committee noted that teaching staff sanctioned for the college was by and large in accordance with the standards laid down by the All India Council for Technical Education. The Committee, however, observed that some of the positions were vacant and it was necessary that the vacant posts

The Committee further recommended that the college should satisfy all the conditions such as the constitution of the Governing Council, Staff Selection Committees etc., as prescribed by the Government of India. The college shall also not receive donations or capitation fees from the students for admission to the courses offered by it. The institution should also fall in line with the other approved private technical institutions in Karnataka State in all matters of day to day administration of the affairs of the college, provision of approved instructional facilities, implementation of various decisions of the All India Council for Technical Education as communicated by the Government of India from time to time and in fulfilment of all other conditions of grant prescribed by the All India Council for Technical Education for private colleges.

The summary of the facilities recommended by the Expert Committee for the development of the college, is given as below:

NON-RECURRING:

Buildings.	-	Rs.27.40	Lakhs.
Equipment.	...	Rs.32.00	"
Furniture.	-	Rs. 1.40	"
Library.	...	Rs. 1.50	"
Students' Amenities.	-	Rs. 1.29	"
Hostels.	...	Rs.12.41	"
	Total.	Rs.76.00	"

RECURRING:

Staff salaries (as per AICTE scales)	.....	Rs. 6.90	Lakhs	p.a.
Maintenance expenditure including consumables.	--	Rs. 3.30	"	"
Library.	.....	Rs. 0.50	"	"
	Total	Rs.10.70	"	"

(The above is the ceiling of the gross expenditure. The actual recurring expenditure shall be governed by the Grant-in-aid Code of the State Government).

The Committee noted that the State Expert Committee had earlier estimated the non-recurring cost at Rs.34.25 Lakhs. The prices in meantime have considerably risen. The Expert C. felt that an outlay of Rs.76.00 Lakhs on account of non-recurring expenditure was necessary for the development of the college in accordance with the approved standards. The Committee, therefore, recommended the necessary provision for the above amount should be made in the State Plan and steps should be taken to implement the development scheme as early as possible to ensure the maintenance of proper standa-

The Committee wishes to place on record its appreciation and thanks to the Management, the Directorate of Technical Education, the Principa- and Members of the Staff of Basaveswar College of Engineering, Bagalkot for necessary assistance re- and cooperation extended for making arrangements its visit.

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ANNEXURE I (15)

DETAILS OF BUILDINGS AS RECOMMENDED BY THE COMMITTEE.

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Sl.No.	Particulars	As per AICTE list in S.ft.
I.	Class Rooms	5100
II.	Drawing Halls	11100
III.	Rooms for Tutorials	900
IV.	General Administration Staff rooms, Library, Stores, Students common rooms etc.	14200
V.	Laboratories	
1.	Concrete Laboratory	900
2.	Roads Laboratory	600
3.	Soil Engineering Lab.	900
4.	Structures Laboratory	1600
5.	Public Health Engg. Lab.	600
6.	Surveying	1000
7.	Applied mechanics and Dynamics Lab.	1600
8.	Strength of materials Lab.	2000
9.	Hydraulics Laboratory	3000
10.	Geology Laboratory	1200
11.	Engineering Chemistry	2000
VI.	Heat Engines Laboratory	9600
VII.	Science Laboratory	8000
VIII.	Electrical Engg. Lab.	10000
IX.	Electrical Workshop	3000
X.	Workshop (General)	
	a. Machine shop	4800
	b. Fitting, Smithly and Foundry shop	7200
	c. Carpentry shop	2000
	Grnd Total Carpet area (I to X)	91300

...2.

ABSTRACT

1.	Carpet area required for the college	91300
2.	Carpet area of the Workshop type Buildings already constructed	38000
3.	Balance carpet area to be constructed	53300
4.	Add 42% for walls passages	22386 sq.ft
5.	Total plintn area of R.C.C. buildings to be constructed	75686
	say	76000 sq.ft.

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sm/-

ANNEXURE -II (15)

ABSTRACT OF LABORATORYWISE REQUIREMENTS RECOMMENDED BY THE COMMITTEE:

Sr.No.	Name of the Laboratory.	Amount Required.
1.	2.	3.
	A. CIVIL ENGINEERING -TOTAL VALUE OF RS.5.83 LAKHS.	
1.	Concrete Laboratory	32,250.00
2.	Soil Engineering Laboratory	53,304.00
3.	Structures Laboratory	89,800.00
4.	Public Health Engg. Lab.	37,750.00
5.	Survey Laboratory	1,23,310.00
6.	Roads Laboratory	53,400.00
7.	Geology Laboratory	20,000.00
8.	Drawing office	5,000.00
9.	Models	10,263.00
10.	Applied Mechanics	9,515.00
11.		1,49,000.00
	B. MECHANICAL ENGINEERING -TOTAL VALUE OF RS.8.16 LAKHS	
12.	Dynamics Laboratory	67,500.00
13.	Heat Engines Laboratory	4,16,000.00
14.	Engineering Chemistry	86,160.00
15.	Hydraulics & Hydraulics Machinery Laboratory.	1,69,500.00
16.	Instrumentation Engg. Laboratory	77,000.00
	C. WORKSHOP -TOTAL VALUE OF RS. 4.88 LAKHS.	
a.	Carpentary and pattern making	32,700.00
b.	Smithy	28,400.00
c.	Fitting	40,700.00
d.	Machine Shop	2,63,400.00

...2...

1.	2.	3.
		B/f 17,34,952.00
e.	Foundry	25,300.00
f.	Welding.	17,600.00
g.	Metrology	35,350.00
h.	Painting and sheetmetal Workshop.	15,000.00
	D. ELECTRICAL ENGINEERING-TOTAL VALUE OF RS.10.13 LAKHS.	
18.	Electrical Machines Lab.	
19.	Electrical Measurements Lab.	1,44,790.00
20.	Applied Electrorics Lab.	1,06,080.00
21.	High voltage Engineering Lab.	1,19,000.00
22.	Control system Laboratory	56,000.00
23.	Electrical Workshop	20,000.00
24.	Physics.	1,27,038.00
25.	Chemistry	93,406.00
		29,02,253.00
	Add 10% for installation and freight.	2,90,225.00
	Grand Total	31,92,478.00

Say Rs. 32,00,000

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ANNEXURE-III(15)

HOSTEL FOR 200 STUDENTS

1. Triple seated hostel for 200 students @ 180 sq.ft. per student - 36000 sq.ft. @ Rs.30/- per sq.ft.		Rs.10,80,000
2. Warden Quarters 1 No. 1200 sq.ft. @ Rs.30/- per sq.ft.		Rs. 36,000
3. Servant's quarters 12 Nos. @270sq.ft. - 3240 sq.ft. @ Rs.20/- per sq.ft.		Rs. 64,800
4. Furniture for 200 students @ Rs.300/- per student		Rs. 60,000
	Total....	Rs.12,40,800
	or say	Rs.12.41 lakhs.

TMN.

ANNEXURE - IV (15)

DETAILS OF STUDENTS' AMENITIES

Canteen 2400 sq. ft.	Rs.	48,000
Cycle Shed - 300 Nos.	Rs.	6,000
N.C.C. Block 1000 sq.ft.	Rs.	20,000
Water Cooler 1 No.	Rs.	6,000
Co-operative stores, Furniture	Rs.	1,000
Gymkhana - 1380 sq.ft.	Rs.	28,000
Dispersary Bldg. 500 sq.ft.	Rs.	10,000
Dispensary Equipment	Rs.	10,000
Total.	Rs.	1,29,000

TMN.

APPENDIX 16

REPORT OF THE COMMITTEE SET UP BY THE SOUTHERN REGIONAL COMMITTEE TO REVIEW ITS FUNCTIONS IN THE LIGHT OF THE CHALLENGES POSED BY THE LATEST DEVELOPMENTS.

- 8 -

THE All India Council for Technical Education at its meeting held on 17th May 1974 authorised its Chairman to examine the existing functions of the Regional Committees and to revise them wherever necessary, in consultation with the Chairman of the respective Regional Committee in accordance with the major responsibilities entrusted to them.

In pursuance of the above recommendations, a draft for the revised functions of the Regional Committee was prepared and was put up to the Southern Regional Committee at its last meeting held on 1st April 1975 for consideration. The Regional Committee observed that in the light of the latest developments there were a number of important functions which shall have to be performed by the Regional Committees without duplicating in any way the work of other institutions/organisations set up in the different States. The Committee felt that in order to meet the challenges posed by latest situations in the field of technical education, the role of the Regional Committee had assumed great importance. The members expressed the view that it had become necessary that a serious thought should be given to spell out the important functions to which the Regional Committee should pay greater attention. Accordingly, the Regional Committee decided to set up the following Committee to examine the entire position in detail, the major areas of importance and report to the Regional Committee:

1. Prof.T.R.Doss,
   Vice-Chancellor,
   Jawaharlal Nehru Technological University,
   HYDERABAD

2. Dr.K.A.V. Pandalai,
   Director,
   Indian Institute of Technology,
   MADRAS

3. Sri M.V. Rajagopal,
Director of Technical Education I/charge,
Government of Andhra Pradesh,
HYDERABAD .

4. Dr. S.Vasudev,
Director of Technical Education,
Government of Kerala,
TRIVANDRUM

5. Sri K.S. Ballal,
Director of Technical Education,
Government of Karnataka,
BANGALORE

6. Dr.V.C.Kulandaiswamy,
Director of Technical Education,
Government of Tamilnadu,
GUINDY, MADRAS

7. Prof.K.M.Bahauddin,
Principal,
Regional Engineering College,
CALICUT

and 8. Sri S.K.Handa,
Member-Secretary &
Asst.Educational Adviser (Tech),
Ministry of Education & S.W.,
MADRAS

The above Committee held a meeting on 15th September 1975 to consider its assignment. The following were present:

1. Dr.K.A.V. Pandalai,
Director,
Indian Institute of Technology,
MADRAS.

2. Prof.K.M.Bahauddin,
Principal,
Regional Engineering College,
CALICUT

3. Sri S.Vaiyapuri,
Addl.Director of Technical Education,
Government of Tamilnadu,
MADRAS

4. Sri S.K.Handa,
Member-Secretary &
Asst.Educational Adviser (Tech),
Ministry of Education & S.W.,
MADRAS.

Sri A.P.Srivastava, Education Officer (Tech), Ministry of Education & SW., Southern Regional Office, Madras

Dr.K.A.V.Pandalai acted as Chairman

The Committee reviewed the present scene of Technical Education, the institutions already developed for organising technical courses at different levels, the total amount being spent on technical education, the problems at present faced for making further advancement and other related factors. The Committee also reviewed the functions which were previously performed by the Southern Regional Committee and the new challenges that were being posed by the latest situations in the field. In the light of the discussions that took place at great length elaborating all relevant aspects, the following observations were made:

1. FEED BACK:

The Committee noted that large sums of money have been spent for the establishment of new technical institutions and development of existing institutions at the various levels. The development schemes of most of the institutions today have been completed and the institutions concerned have the necessary facilities by way of buildings, equipment, staff, library and other requirements. The most important task now for the institution was to consolidate their position and make further advances in improving the standards and achieving excellence. For this purpose, the Committee felt that a regular and constant feed back of the various activities of the institutions, the lines on which the institutions were further growing and developing was very necessary. It was only in the light of this feed back that appropriate measures can be formulated to really make the best use of the money already invested and also of the efforts that are now to be put for further growth.

In this connection, equally important is the documentation of the information concerning feed back thus received from the technical institutions. The compilation, the analysis and the presentation the different types of data that may be received from the institutions is very important. Also this data has to be linked with systematic planning in which

individual institutions shall also have to be involved in an appropriate manner. The Committee felt that these were the task which were not so simple and therefore, someone has to pay deliberate attention to achieve the same.

2. MONITERING:

The Committee noted that the Regional Committee has been playing a very important and effective role in coordinating the development of technical education in Southern Region. The Committee felt that today the need for the same has been further multiplied. The requrements of the Industries are expanding. New areas of technologies are emerging. On the other hand, the training of technical personnel in the specialised branches has to be carefully planned and related to the felt needs of Industry. The State Governments have already set up machineries like State Boards of Technical Education and Industrial Liaison Boards to promote the development of technical education in the areas where there is a local need and facilities have to be developed. Nevertheless, in order to bring to bear upon the experience of one State on the other, to co-ordinate the development in the entire region in an integrated manner and to correlate the same with the National Policies and requirement is all the more important. For this purpose, some Agency to moniter the entire development activities is necessary. The Committee felt that the Southern Regional Committee has been playing this role very effectively for all these years and the role of such an experienced body has only to be given new dimensions and greater importance to enable it to steer through the present days of new challenges.

3. EVALUATION:

So far the major attention was being devoted to the expansion of the physical facilities of technical institutions. A stage has been reached when attention has now to be paid to the improvement of standards and achieving excellence in different aspects. For this purpose, it is very necessary to review critically the academic aspects of training, levels of performance

of the laboratories and the faculties of the institutions and the standard of instruction and examinations at the degree and diploma levels. It is also necessary to assess the progress of the institutions from time to time both qualitatively and quantitatively and review their further requirements to achieve the highest efficiency at the existing level and to lay firm foundations for future development and growth. Also important is to locate the deficiencies and to highlight the merits of the institu[illegible] with a view to formulating suitable measures to acc[illegible] rate the development of all the institutions on the sound lines. In the present day context, it is a very important task and someone has to perform it. The Committee felt that the Southern Regional Committ[illegible] which has been functioning for the last 20 years in development of technical education can serve this pu[illegible] pose most satisfactorily and effectively.

4. COLLABORATION BETWEEN TECHNICAL INSTITUTIONS AND INDUSTRY:

The need of close collaboration betwee[illegible] technical institutions and industry has been emphas[illegible] by all concerned time and again. The need has becom[illegible] all the more urgent in view of further challenges bei[illegible] posed by the latest situations which require greater attention towards a number of important problems including improvement of quality and standards of technical education, development of facilities on proper lines, diversification of courses to meet the changi[illegible] requirements of the industry, development of faculti[illegible] of technical institutions by way of training and re-training of teachers, development of curricula to m[illegible] the courses more alive and organisation of sandwich courses to meet the actual demands of Industry. In spite of the urgent need for this close collaborati[illegible], the progress made in this behalf is not as it should have been. Industrial Liaison Boards have been set [illegible] in the States. The individual institutions are also making efforts to have collaboration with the surroun[illegible] ing industries through different ways including train-

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ing facilities for their students, deputation of personnel from Industry to teach on part-time basis, participation of Industry in framing syllabii, offering of stipends by Industry to students of polytechnics and engineering colleges, participation of Industry in the development programmes of technical institutions etc. However, a lot has yet to be done to accelerate the progress in this particular area. The Committee noted that the Regional Committee would be the most suitable organisation to coordinate the efforts put in at different ends and suggest from time to time the additional measures necessary for this purpose.

5. IMPROVEMENT OF QUALITY AND STANDARDS:

Improvement of quality and standards is today engaging the attention of all concerned. However, unless appropriate measures are evolved and the situation is watched from time to time to ensure the required progress, it may not be possible to make the real impact in this direction. For instance, it has already been recognised that the crux of the problem of technical education is the Teacher who is the heart and soul of every educational institution. It is the quality of staff that in the final analysis makes for the success and healthy growth of the institution. Not only that the teachers should be of the right calibre and possess the requisite qualifications but he should also prove to be a living force in the institution. All first grade technological institutions in the world have been built up by the teachers who have the aptitude and depth of knowledge and who are constantly engaged in professional, industrial or other academic activities that keep them in close contact with current developments in the field. In order to achieve this objective, a number of Quality Improvement Programmes schemes have been already formulated and being implemented in accordance with the guide lines formulated by the Ministry of Education. This is, however, not enough but a stage has been reached when the whole matter shall have to be dealt with at a greater depth

become apparent that unless the detailed plans for faculty development are formulated involving all concerned including the individual institutions, Directorates of Technical Education, the Industry, the Regional Office etc., it will not be feasible to make a rapid progress which is essential for further development. These plans must spell out every factor responsible for the Faculty development, the facilities available at different quarters, the resources of the State Governments, the machinery necessary to implement different programmes, the mechanism for having a quick and prompt feed back and other necessary systems to develop quickly corrective measures, wherever required.

Similarly, the Committee felt that the structure and pattern of courses was equally importan . How the different courses aimed to fulfil the goals set by the institution was regarded as important. efforts were made by the institutions to keep the courses alive and alert and responsive to the changi needs of the technology was crucial for the quality and standards of engineers and technologists trained by the technical institutions. The Committee felt that marching ahead with the time and having a system of constant up-dating of the curricula was the only way to keep the courses and curricula relevant to actual requirements and needs of Industry. Here also the Committee felt that detailed plans for the curriculum development and up-dating of curricula shall have to be formulated involving all concerned including the institutions, the State Directors of Technical Education, the Regional Office and the special institutions set up for the purpose. The importance of th Regional Committee which has been intimately involved in all these activities, cannot be under rated at this juncture when an organisation of this stature has to take the responsibility of co-ordinating and promoting these much desired plans.

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Having regard to the views expressed above, the Committee proceeded to formulate the revised functions of the Regional Committee to suit the changing requirements. In this connection the Committee suggested that the following functions should be entrusted to the Regional Committee which will enable it to render a great service in the development of technical education and also help all other organisations concerned with technical education to benefit from its valuable advice:

1. To survey the facilities for technical education in all States and to make recommendations to the Co-ordinating Committee/ All India Council for Technical Education on the consolidation and development of existing institutions and establishment of new institutions, wherever necessary.

2. To watch closely the progress of development of the different technical institutions in the region and advise the State Governments and the institutions concerned for the introduction of appropriate measures, wherever required.

3. To promote liaison between technical institutions and Industry and other technical establishments.

4. To survey from time to time the position regarding close collaboration between technical institutions and industry and suggest concrete measures to accelerate the progress and ensure the optimum utilisation of the facilities in the technical institutions for training right type of technical personnel to meet the requirements of the Industry and R.D.organisations.

5. To ensure effective coordination and feed-back of the productive activities of the technical institutions, the State Boards of Technical Education and Industrial Liaison Boards with a view to promote the interests of the Technical Educa-

6. To review critically and objectively as well as monitoring the academic aspects of training, the levels of performance of the laboratories and the faculties of the technical institutions and the standards of instruction and examination at the first degree level as well as at the diploma level.

7. To correlate the results of its evaluation with the local and State evaluations and suggest supplementary measures to achieve better results.

8. To review the implementation of different measures for improvement of quality and standards of technical education and make suggestions for improvements, modifications and new suggestions, wherever necessary.

9. To promote coordination between technical institutions, industry and all other agencies Central, State and local in the related areas to ensure optimum contribution under the total effort for economic growth of the country.

After defining the above revised functions and appreciating the importance of the revised role of the Regional Committee, the Expert Committee felt that in fact a stage had been reached when the Regional Committee should be made a statutory organisation. This will enable the Regional Committee to make a real impact as conceived in formulating the above functions.

The Committee terminated with a Vote of thanks to the Chair.

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The following details will indicate the effectiveness of the various training programmes offered by this Institute.

Teach-aid centres are being initiated in some of the Polytechnics and the trained teachers are being given the responsibility by the Principals of the Polytechnics. When assigned by the Principals, the trained teachers have been involved in the preparation of curriculum materials in their polytechnics.

Subject to the basic facilities made available, considerable percentage of the trained teachers are using multimedia approach to the extent possible in class-room teaching for effectiveness. These teachers are also using objective type test items and structured essay items for evaluation of instruction wherever it is feasible. By and large it can be said that the trained teachers are taking up the responsibilities of specific developmental works in the Institutes, whenever they are asked by the authorities.

DETAILS OF SHORT COURSES CONDUCTED BY TTTI, MADRAS UNDER QUALITY IMPROVEMENT PROGRAMME (from 15.1.71 to 15.9.75)

I. Number of courses and participants:

Year	No. of short courses organized under QIP	Number of participants						Total
		A.P.	Karnataka	Kerala	Pondicherry	Tamil Nadu	Others	
1970-71	5	10	15	8	1	23	..	57
1971-72	5	26	8	5	1	52	..	92
1972-73	15*	27	31	22	8	153	..	241
1973-74	13*	51	38	44	1	86	13	228
1974-75	20*	49	18	13	-	124	14	218
1975-76	5*	25	4	6	3	31	1	70
Spl.courses conducted in association with ISTE on All India basis at Bombay, Jaipur & Hyderabad	3							97
	71	188	109	98	14	469	28	1003

* 10 courses were conducted as Extension Centre courses at Polytechnics at Tuticorin, Mysore, Bangalore, Hyderabad, Kottayam, Trivandrum, Vijayawada, Kakinada and Coimbatore

II. Types courses

1.	Principals' Conferences	3 courses
2.	Modern Educational Practices for Heads of Sections	6 "
3.	Preparation of Audio Visual Aids	5 "
4.	Lab. Centred Instruction Engg. subjects	6 "
5.	Curriculum Development Workshops	14 "
6.	Orientation Workshops in the use of prepared curriculum materials	5 "
7.	Development of Demonstration Models	7 "
8.	Production Techniques in the use of Educational Television	3 "
9.	Subject Matter courses in Engineering	3 "
10.	Modern Edl. Practices for Non-Engg. Teachers (English, Mathematics and Commercial Practice)	6 "
11.	Workshop on Project Method of Teaching	1 course
12.	Orientation Workshop for Curriculum Developers	1 "
13.	Course for Officer-incharge of training in Polytechnics and Industry	1 "
14.	Seminar on Development of Library Services	1 "
15.	Course on Methods of Testing & Evaluation in Technical subjects	1 "
16.	Spl. course on Methodology & Teaching (in association with ISTE on All India basis at Bombay, Jaipur and Hyderabad)	3 courses
		71 "

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TECHNICAL TEACHERS' TRAINING INSTITUTE, J(SOUTHERN REGION), ADYAR, MADRAS-20, 2[illegible].

Statewise Number of candidates trained under long term programme
(Dip. T.T., Dip. in Sc. Teaching & B.Tech. Education)

Year of Admn.	Andhra Pradesh			Karnataka			Kerala			Pondicherry			Tamilnadu			Others.	TOTAL
	Engg. Deg.	Dip.	Sci. Deg.	Engg. Deg.	Dip.	Sci. Deg.	Eng. Deg.	Dip.	Sci. Deg.	Eng. Deg.	Dip.	Sci. Deg.	Engg. Deg.	Dip.	Sci. Deg.		
1966-67	-	1	-	3	8	-	1	6	-	-	-	-	6	31	-	-	56
1967-68	-	9	-	3	9	-	2	6	-	-	-	-	4	22	-	-	55
1968-69	2	12	-	1	8	-	-	5	-	-	-	-	1	21	-	-	50
1969-70	3	5	-	4	9	-	3	8	-	-	-	-	3	13	-	-	48
1970-71	3	9	-	3	14	1	-	2	-	-	1	-	7	12	3	-	55
1971-72	7	12	-	3	12	4	-	3	-	-	1	-	7	14	1	-	69
1972-73	12	19	1	5	11	3	-	8	-	-	-	-	4	19	4	1*	87
1973-74	10	15	-	5	12	5	-	17	1	-	-	-	3	15	2	1**	86
1974-75	2	-	-	2	-	-	2	-	-	-	-	-	3	-	-	-	9@
1975-76	-	9	-	-	11	-	-	21	-	-	1	-	-	19	3	-	64+
B.Tech.Ed.	3	-	-	2	-	-	-	-	-	-	-	-	3	-	-	-	8
Total:	42	91	1	31	94	13	8	81	1	-	3	-	41	166	13	2	579

* Trainee from Thailand (U.C.P.)
** Trainee from Cambodia (U.C.P.)
@ would be completing the course in May 1975
+ would be completing the course in April 1976

sm/-

Copy of letter No.EI-3/153113/74 dated 23rd June,1975/ 10th July, 1975 from Shri P.H.N.B. Sarma, Director Incharge, Department of Technical Education, Andhra Pradesh, Hyderabad-500001 addressed to the Asst. Educational Adviser (T), Ministry of Education & S.W., Southern Regional Office, Madras-6.

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Sir,

Sub:- EXAMINATIONS - Technical Education - First Year Government Examinations for three-year diploma courses in Engineering - permission to failed candidates to appear for the examination upto a maximum of 5 times - regarding -

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Ref:- Lr. No.F.12-95/58-T.2 dated 6.6.1959 of Government of India, Ministry of Scientific Research and Cultural Affairs, New Delhi.

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In pursuance of the recommendations of the co-ordinating Committee of the All India Council for Technical Education communicated in the reference cited, the State Government issued orders to the effect that the appearance of the candidates for the first year diploma examinations be restricted to three chances including the first appearance as a pupil candidate to pass the first year examination in a period of two years failing which the failed candidates would not be permitted to appear for the examination any more, now join as a student of first year class. This position is obtaining since 1959.

On receiving representations that the candidates who have failed in the first year diploma examinations in Engineering completely three times loose their future as they can not continue their studies in the diploma courses and that such candidates be permitted to appear for the examination at least upto five chances to enable them to continue their studies in the Polytechnics after completing the first year examination,

...2.

Government directed me to obtain the views of Government of India on this. I, therefore request that Government of India may kindly to reconsider the matter and communicate their views whether the candidates failing in the first year diploma examination in Engineering may be given maximum of five chances within a period of slightly over two years.

Yours faithfully,

Sd/.....
(DIRECTOR)

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grm

APPENDIX-19.

Copy of letter No.H2/35568/74 dated 6th June, 1975 from Shri P.H.N.B. Sarma, Director-in-charge, Department of Technical Education, Hyderabad-500001 addressed to the Asst. Educational Adviser (T), Ministry of Education and Social Welfare, Southern Regional Office, Madras-600006.

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Sir,

Sub:- Technical Education - Admission to Govt. Polytechnics in the State of Andhra Pradesh- Reimposition of upper age limit for admissions into Diploma courses in Engineering - regarding -

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Ref:- 1. Lr. No.F1-23/69-T.2 dated 1.12.69 of Govt. of India, Ministry of Education & Youth Services (Mech. Division),New Delhi.

2. G.O.Ms.No.995, Edn., dt. 19-6-1971.

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In the light of the views expressed by the Education Commission and based on the recommendation of All India Council for Technical Education, the Government of India, Ministry of Education have recommended that no rigid age limits should be prescribed for admissions into Degree and Diploma courses in Technical Institutions and requested that suitable orders may be issued by Government of Andhra Pradesh in the matter of implementing the decision of the Government of India with effect from academic session 1970-71. Accordingly the Government of Andhra Pradesh in their G.O. last cited have removed both the upper and lower age limits for admissions to the Degree and Diploma courses in Engineering and Technology in the Technical Institutions in this State with effect from academic year 1970-71.

The removal of both lower and upper age limits have created certain problems in Polytechnics of this State. Due to disparity in age groups, there is a lot of indiscipline among the students as some of the over aged students

...2.

are in the habit of taking lead in defying authorities, violating the rules and regulations of the Institution and indulging in various acts of indiscipline such as boycotting of classes and monthly slip tests and disturbing the examination work etc. Generally the over-aged students do not show any interest in studies. Further they force the younger students to follow them in their acts of indiscipline.

In view of these facts the Andhra Pradesh State Board of Technical Education and Training at its Twelfth Meeting has resolved that the matter relating to the reimposition of upper age limit may be taken up dinovo with Government of India. I, therefore propose for reimposition of upper age limit of 21 years in respect of admissions to the Diploma courses in the Polytechnics of this State with effect from academic year 1975-76 and request you to kindly obtain the concurrence of Government of India and communicate the same at an early date. In this connection, I state that such of those over aged candidates who were desirous of acquiring the diploma qualification may do so either by appearing for the diploma examination privately or seeking admission to the part-time diploma courses. I request an early reply as a notification inviting applications for admissions to diploma courses in the Polytechnics of this State for the year 1975-76 is to be issued shortly.

Yours faithfully,

Sd/.....,
for DIRECTOR.

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LEAD PAPER BY DIRECTOR OF TECHNICAL EDUCATION
TAMILNADU

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MANAGEMENT OF TECHNICAL EDUCATION

Synopsis

This paper projects a perspective of the present state of affairs in the management of technic institutions. It points out the deficiencies and difficulties in the present system of management an suggests remedial measures keeping in view of the current trends and policies of the society both at the regional and national levels. The suggested measures attempt only to reorient the present patte of management and not to revolutionise it, so that the goals of technical education set forth at the national level are achieved with optimum use of available resources.

1. INTRODUCTION

'Educational planning without management is empty; but management without planning is blind.' If innovations to improve efficiency are to become a regul way of life for educational systems, the main initiative must come from the managers of educational systems. The main preoccupation of educational management even today, seems to be that of essentially a regulatory and caret role, setting of rules and 'standards' and supervising of their observance. The system with its rules and procedures, its organisational arrangements and staffing, its inbred attitudes and self-conception of its role seem to be ill-adapted to dealing with management tasks and challenges which now confront all educational management, much more so in technical education. The tasks and challenges are concerned mostly with development of technical education, mobilization of human energies, the ingenuity and spirit and the physical resources and their optimum utilisation. Such a situation demands a system which should unleash initiative and imagination instead of stifling them as it does at present. The obvious conclusion then is that there is a need for reorienting or modernising the 'management' in order that the educati system be made efficient.

2. MANAGEMENT: SIGNIFICANCE

The term 'Management' gains new dimension in the present context and it connotes

i. exercising of foresight in determining the policies and priorities and costs having due regard for economic and political realities.

ii. organising "resources", and

iii. adopting such strategies and tactics as the situation demands so that the ultimate objective of making 'the system' (technical education) truly efficient is achieved.

It is thus concerned with the major activities of planning, organising executing and evaluating the broad areas of academic, financial and administrative matters.

3. SOCIO-ECONOMIC BACKGROUND

The prevailing socio-economic conditions of the nation present a combination of contradicing forces which confront the various phases of activities in educatio process. There is a continued rapid rise in the social de for technical education, resulting in expanding enrollment, time when the accepted policy of the Government is to shift the emphasis from expansion to consolidation. The students population comprises students from different strata of social life, of different background and havi expectation and demand. The unit cost of technical educ tion has beco exorbitant resulting in a tightening economic squeeze on educational system. Relevance of technical education to me variety of social needs is insisted upon. Added to this here is growing unemployment among technical personnel and the attendant discontent of educated youth.

4. EXISTING SYSTEM

4.1. Regional level

The scope of this paper mainly concerns with t management of Technical institutions and therefore the exist systems of management of technical education at the national nd state levels are not elaborated. The Ministry of Educat being the prime organisation concerned with the technical education at the national level decides the broad policies a

purposes of technical education, sets up norms, lays guide lines and coordinates the activities of the various agencies both at the national and state levels. The All India Council for Technical Education and its Committees and Boards serves as an advisory machinery to the Government. In this context the recommendations of the Special Committee on the Reorganisation and Development of Polytechnic Education in India are to be recalled and need to be implemented as expeditiously as possible. The system, as of today, functions fairly well. However, it requires certain adjustment in the organisational structure and financial control to suit the changing pattern of the Technical Education and Technical development.

4.1.1. State level

That the technical education is a State subject under the constitution only implies that the major responsibility in the management of Technical Education rests with the State Government. The management system at the state level decides the policies and priorities at the regional level within the frame work of the national policy, allots funds through legislature for Technical Education, and regulates and controls the finance through its organisations viz the Department of Education and the Directorate of Technical Education. The system establishes effective co-ordination between general education and technical education and extends it further to technical development. The Directorate of Technical Education with its limited powers allocates funds for the various institutes under its control and impose checks and controls both in financial and administrative matters concerning the institutions. The system has its limitations and requires to be reoriented in view of the rigidity inherent in it.

4.1.2. Institutional level

As of now, we have in this country the following major categories of technical institutions

1. Apex institutions like I.I.Ts.
2. Regional Engineering colleges
3. State and Private Colleges affiliated to the various Universities

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4. State and Private Polytechnics
5. Technical High Schools

The first three institutions are concerned with graduate and Post-graduate education and the Polytechnics are concerned with technician programme. The first two institutions have been adequately financed by the Centre, with a substantial measure of foreign aid and they enjoy administrative autonomy appropriate to their objectives.

Category 3 i.e. State and private colleges are financed mostly by the state government and party by the Centre. Management of these institutions continues to follow the same methods and procedures as were followed even two decades back and does not lend itself to cope up with the fast decision-making and follow-up action needed for the institutions to keep pace with the rapid development in technological education.

4.2.1. Colleges - Government and Private

Institutions offering degree and P.G. courses and engaging in research and development activities are headed by Principals who are normally senior professors entrusted with certain powers and responsibilities. The Principal of an institution is guided in administrative [illegible] by a limited secretarial assistance. The organisational structure of the colleges comprising the Principal and the members of the faculty, both teaching and non-teaching at various levels and the administrative set up are such that the system turns out to be a tool to merely carryout instructions with regard to academic and administrative matters, received from the University or the Directorate or the State Government and is devoid of flexibility in decision-making and executing of programmes. The system needs to be re-oriented to the current conditions.

4.2.2. Polytechnics (Government and Private)

The organisational set up, the functions and responsibilities at the various levels follow more or less the same pattern as is followed in the colleges. Even

private institutions where major decisions are taken by governing councils follow the same procedures and methods as are followed in the Government institutions. The syste is sick with the same ailments affecting the general growt of Technical Education.

4.2.3. Technical High Schools

The establishment of Technical High Schools although limited in number was perhaps with the motto "catch the young one's and train" in the technical area. They are supposed to be feeder institutions to the Polytec offering vocational programmes at the secondary school lev The organisational structure is none better than that of a basic high school excepting the addition of a small works or a laboratory. These institutions are at present attached various polytechnics and are under the control of the principals of the respective polytechnics. Funding for th institution is at present entirly borne by the state govern

5. DIAGNOSIS STRATAGIES AND TACTICS

Whatever be the category of the technical institutions the general picutre of the management system and its organisational structures seems to be rigid systems, not responsive and adaptable to the changing conditions of Technical Education. The powers and functions vested at the various levels are limited and repetitive retarding progress. Functions are not fully defined; powers are not fully accounted, methods and procedures are rigid and some times responsibilities are shirked. The decision-making is delayed and most often arbitrary. Implementation decision is either improper or casual. Intergroup harmony is totally absent. Men become prisoners of procedures and action becomes mechanical or ritual and precedence is much quoted for. The system is devoid of feed back, self-evaluati and criticism. The system as of today requires to be remedi so as to be adaptable to the continuing change and demands of the technological education.

The following remedial measures are suggested.

...6.

. Directorate of Technical Education

The Directorate of Technical Education being the Government chief executive agency to organise, administer control and evaluate technical education programme, the Director of this organisation should be vested with more powers and expanded functions.

The procedure for getting government sanctions through the department of education proves more often to be a delayed process because of its inherent checks and controls at various levels, and therefore there is a need for either to simplify the procedures or to enhance the powers to the Director. In this context it is for consideration whether the Director may be made Ex-Officio Additional Secretary to the State Government for Technical Education. As an alternative it is suggested a separate statutory board for Technical Education at the state level may be formed so that all the ailments associated with the rigid and conservative system may be avoided.

. Colleges

Research and development should be given priority and necessary adequate funds should be made available to the institutions. The Central Government has to play a major role in this. It is high time that one realises that the highest education for a few is as important as the basic education for all.

As regards the academic matters the Universities are the organisations concerned with the formulation and evaluation of programmes. Facilities should be made available at the institution level so that teaching faculty should be able to assess the needs of the regions and to suggest relevant programmes.

The institutional head namely the Principals should be vested with more powers and funds so that he will be able to enjoy administratively and academically, to set definite guide lines for growth and give directions to the progress.

Pay scales of Principal of Engineering Colleges may be made comparable to those of the heads of the Indian Institutes of Technology and Regional Engineering Colleges. The financial powers of the Principals of the Engineering Colleges

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may be enhanced so that the procedural difficultires result in retarding the progress in development programme will all be avoided.

The status of teaching faculty should be raised and there should be recognition and incentive for good teaching. It is to be realised that the responsibility for good teaching must be shared with the teacher by the college administration. The pay structure of the teaching faculty of Engineering Colleges should be made comparable to those recommended by the University Grants Commission.

Decision making is to be decentralised and the various heads of faculties should be made involved in this process. The heads of faculties are to be vested with such powers and responsibilities as will enable them to take active interest in the management of the programmes.

. Polytechnics.

The status of the Principals and the Heads of Departments need to be raised. The faculty structure may be three tiered one commencing with Lecturer, Assistant Professor, Head of Department or Professor. The Principal may be a senior professor/Heads of Department. The heads of the institutions should be given adequate powers to formulate innovating programmes and to run them successfully.

The work load for the faculty members needs to be reconsidered in view of the additional responsibilities added to them due to the introduction of various innovations in the educational programmes. Faculty Heads or Heads of departments who will be actively concerned with academic and administrative decision should be provided with secretarial services.

For recruitment of teachers to polytechnics, the minimum qualification shall be fixed as a degree and a pre-training in padagogical aspects shall be insisted upon.

In all institutions a limb organisation is to be set up to establish liaison with the industries.

The ways and means of getting over the difficult position of providing adequate finance to the various institutions should be seriously considered. Mobilisation of resources by way of great individual participation in educational expenditure

increased participation of industries and other employers, self-financing of institution are to be considered in the present context of economical depression. To augment the state finance to be exclusively set apart from the technical education, introduction of a levy as Apprenticesnip Tax of about 3 to 5 percent on the total profits to be collected from various industries towards the training of technical personnel and the development of technical know-how is suggested.

4. Technical High Schools

With regard to Technical High Schools, it is desirable that they are made to function as independent institutions without attaching them to the Polytechnics. A reconsideration seems necessary in view of the fact that there is emphasis at present on vocationalisation of even general education programmes at the high school level and also due to poor response from students with proper aptitude.

6. CONCLUSION

It has been repeatedly stressed in this paper that the management system should be dynamic and be built up with an inherent capacity to continuously revitalise itself. It should be capable of assimilating new concepts and flexible in formulating and organising programmes and providing mobility of trained personnel. The organisational structure is to be so set up as to provide these essential characteristics. Considering these aspects, it is suggested that all the institutions may be made autonomous though not simultaneously but at a phased rate. In such institutions decisions regarding academic matters will be a collective effort of the members of the faculty and funds will be regulated according to the institutional needs and evaluation and feed back methods will be more scientific and corrective measures employed in time. Caution is however necessary in the matter of choice of institutions to be made autonomous. The minimum financial and administrative control are still to be retained at the level of controlling authority namely Directorate of Technical Education.

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The suggestions made above to improve the efficiency of the management are only indicative and are not the final say. They need to be discussed, commented upon and improved. This might prove to be worthy contribution for the betterment of technical education.

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FACULTY DEVELOPMENT

TO MEET THE CURRENT CHALLENGES IN OUR TECHNICAL EDUCATION

(Lead paper by Prof. S. Sampath)

INTRODUCTION:

The purpose of this lead-paper is to highlight certain basic issues which confront those who wish to grapple with the problems of Faculty development and create conditions in which our programmes in technical education will make rapid progress. These are concerned with:

i) the impact that the spectacular advances in knowledge acquisition makes on our educational curricula and the demands that these make on teachers' abilities and attitudes;

ii) the tempo of rapid technological change that makes 'adaptability for tomorrow' the corner-stone of an effective educational process;

iii) the need for establishing a living link between technical education and the demands of society, the community and the country;

iv) the value of good teaching and the means whereby it may be recognised and suitably rewarded.

Arising out of a discussion of these, a strategy of development is outlined for the adoption of concrete steps that will move us nearer to the desired goals.

The basic ideas and the suggested steps for positive action are not exhaustive but only illustrative. It is hoped that the participants at the Seminar will propose several other new and innovative measures, and, in the result, we will have a consensus on a blueprint for concerted activity in this important sector of educational development.

I. THE KNOWLEDGE EXPLOSION AND ITS IMPACT ON THE PROCESS OF EDUCATION:

Bernard Lovell, in his foreward to the Book "Explosion in Science", says: "Historians will see the 20th century as a clear-cut period of revolution much more sharp and stormy than the age of exploration or the industrial revolution.

The rate of accumulation of our knowledge about the World is galloping ahead more than hundred times as quickly as at the turn of the century. Scientific activities are doubling every ten years. And there could be two million scientists working by the end of the century."

Lovell adds this note of caution: "Their efficiency will become poor because communication will be inadequate to prevent them from duplicating each other's work."

The output of books, on a world-scale, is about 1000 titles per day. Scientific and technical literature pours out at the rate of 60 million pages per year. A stage has been reached where the most highly skilled and intelligent members of society find it difficult to keep up with the deluge of new knowledge even in extremely narrow fields of interest. A Nobel Laureate in Physics says:"On K, Mesons alone, to wade through all the papers so far published is an impossibility". A specialist in oceanagraphy declares:"I really do not know the answer, unless we declare a moratorium on publications for the next ten years".

An American Industrial concern came to the conclusion that, for any piece of research costing less than $ 100,000, it is simpler to repeat the research than to hunt for all the existing information on the subject.

An educationist, Dr. Robert Hilliard, describes the current situation in these picturesque words:

> "At the rate at which knowledge is growing, by the time a child that is born to-day graduates from College, the knowledge around him would be four times as much. By the time, he reaches the age of 50, it would be 32 times as much; and, in other words, 97% of everything known in the World around him will have been learnt since the time that he was born"

This stupefying rate at which knowledge and information descend on us make a strong impact on the educational curriculum. Unobtrusively, we include, in our first College course in Mathematics, more of Calculus than Issac Newton dreamed of; and in our first Course in Chemistry, more the nucleus of the atom than Rutherford, the discoverer, knew in his life-time.

A great challenge confronts the teacher. Himself advancing in years and his keenness getting blunted, he has to keep pace intellectually with the strides that are being made in several areas of human endeavour and the quest for the unknown. Much of what he is called upon to teach to-day is not what he learned as a student. Advances in techniques and new ideas are coming through in flood-tides all the time.

To cite an example, the electronics of the solid state and the developments that it has triggered off through micro-miniaturization and integrated electronics had not been dreamed of 30 years ago and a major part of the curricula of those days has become irrelevant and inconsequential today. It is not as though only new devices and techniques have appeared and that all the old fundamentals remain intact. Some of the fundamental ideas themselves are new discoveries and the consequential situations have to be approached in a new light and a decisive mental reorientation is called for in many technological areas and disciplines. A senior teacher brought up in the tradition of the old school has to brace himself to meet this challenge - if he wishes to succeed in satisfying the hunger and curiosity of the youngsters entrusted to his care.

At the Bell Telephone Laboratories, U.S.A., there is a band of highly gifted scientists at work on the problems of communication technology. There are about 2500 of them. The average age is 25-35. There are very few above the age of 35 and practically none above 40. It is said that the challenge of creative output is so intense that the older men move over to areas where the intellectual pressure is not so great - like educational institutions, industrial enterprises and administrative services. A similar situation may overtake educational institutions also - when young men, gifted with a quicker grasp of relatively recent developments in science and technology, will fill the ranks of the teaching profession and the seniors may have to move over and find other useful avenues for themselves.

II. ADAPTABILITY FOR MEETING THE CHANGING NEEDS OF THE PRESENT AND THE FUTURE:

Whatever be the kind of political set-up that a country may have, the programmes for her economic uplift will undoubtedly call for better educated and more competent men and women, in increasing numbers, in the technical, managerial a administrative fields. There will be a sharp rise in the number of people who are required to be highly skilled and professionally trained and a decline in the ranks of those who are in the categories of unskilled workers, farm-hands, proprietors etc.

The tendency toward specialization so prevalent at the end of the last century no longer fits the needs of our times. Engineers, skilled workers, managers, and specialists of all kinds will have to receive broad-based general education if they are to retain a position of leadership in their own jobs.

The demand for talented manpower is firmly rooted in the technological complexity that characterizes our life and social organisation today. More important is the rate of innovation or change in both the technological and social spheres. In a world that is socking with change, we need, more than anything else, a highly developed capacity for adjustment to changed and changing circumstances. The solutions of today will have become out-dated tomorrow. Only a highly developed level of ability, coupled with sound education, can equip a person with the capacity for the continu seeking of new solutions. We do not know what kind of skills will be needed in the years ahead. The challenge before our teachers is to be able to train our young men and women in the fundamental fields of knowledge and equip them, in this process to understand and cope with change - give the young pupils the critical quality of mind and the durable quality of character which will serve them in circumstances that we cannot foresee today.

The student who learned the skills of a profession [illegible], for instance, used it all his life. As he made progre in his calling, the chances were that he remained in the same field and often in the same enterprise. But now, every indivi faces the need to acquire two or even three skills - some of th not inter-related - between the time that he starts his caree

and the time that he retires from it. There is thus a crystal-clear necessity to devise ways by which young people may be educated and trained so thatthey may play their roles and enjoy a stable existence within a continually changing pattern of professional work.

It is clear that the very best form of institutional training that we may provide to young people cannot ensure that th become fully ready to face countless and largely unforeseeable technical developments and changes in their careers without furtner education. It is also clear that some form of education that individuals will receive throughout their working lifes needs to be developed. But the methods by which such education may be imparted are far from clear. We may only surmise that they will not be on the traditional patterns that we have used along.** The new kind of teaching, so essential if creative as well as practical talents are to be developed, will produce an ever-increasing number of individuals whose values differ from those of industrial society and who will be avid for emancipation. The great challenge before the teacher in the conditions of today is to ensure that a balance is maintained between the promotion of individual lifes and liberty on the other and the willingness to subordinate these to the higher calls of a collective organization and a common social purpose.

III. <u>THE MISSING FACTOR IN OUR EDUCATIONAL SYSTEM - RELEVANCE</u>

Educationists all the world over are deeply conscious of the wave of unrest sweeping through educational campuses. There are those who have pondered over this problem and come to the conclusion that the root-cause of the trouble is excessive tolerance on the part of teachers of mental and behavioural laxity on the part of students. They point out that discipline is a thing of the past in our halls of learning. Looking at it from the students' angle, there is some point in the story of an American College Senior Student who was taken to task by his Faculty-adviser for his remissness in attending classes and the boy's response was this: "I am here in your College, Sir, because anyone

**A further complexity arises from the fact that teaching, to be meaningful, cannot be directed to technical objectives alone.

...6.

with my IQ is a national asset. I could be making $ 150 per week working in a factory. So you and your institution are costing me $ 5 for every hour that I spend in class. A show in Broadway is much less expensive to attend. Are your teachers that good?"

The attitude of this student may appear to be somewhat crude and blunt but it is to be recognized that it is caused by a system of education and teaching practices that have become mechanical, seen incoherent, evasive of the basic issues and unreleated to the social needs of our times. It cannot be denied that all around us we see the system producing a climate in which the students feel bored, empty and deprived. The problem, on deep analysis, will be seen to be a fundamental one, stemming from a deficiency for which no single teacher or a collection of teachers can be blamed.

The growing dichotomy between spectacular advances in science and technology and the failure to make right use of them for the betterment of society was highlighted by one of the guest-speakers at the Silver Jubilee Celebration of the Tata Institute of Fundamental Research in April, 1971 - Prof. Hannes Alfven - one of the world's most illustrious living scientists:

> "Medical Science has successfully fought epidemics but has forgotten that the resulting population explosion is an even more serious threat in the long run.
>
> Electronics makes communication all over the World easier but communication between the rich and the poor in society is worse than even before.
>
> Even with the most sophisticated observational techniques, scientists are unable to observe and understand the social conditions prevailing just outside the walls of their laboratories.
>
> In this age of Science, the number of illiterates is increasing at a fast rate. And Science appears to have forgotten what was its primary, and still its most important, task, which is to flight ignorance, prejudice and superstition wherever they appear.

...

> It is obvious that in many respects the relation between science and society has to change and this calls for new thinking and many bold initiatives."

It has been pointed out often that we in this country are in a situation where a large fraction of our intellectual community - teachers and scientists - reside and work in centres that are far removed from where the action lies.

Dr. William Gouse, of Carnegie-Mellon Technical University, USA - an ardent exponent of the philosophy of 'design-project experience' as an integral part of the engineering education curriculum - had these remarks to offer, after a first-hand study of working conditions in some of the leading institutions of engineering and technology in this country:

> "These institutions command the use of appreciable quantities of fine and sophisticated equipment. They have highly qualified Faulty-members. A lot of praise-worthy work is being done in the class-rooms and laboratories. But what filled me with uneasiness was that so little of this effort had any relevance to the problems faced by the country at large."

Prof. Gouse also recorded his feeling of dismay that many engineering institutions in India were attempting to slavishly imitate the higher institutes of technology instead of turning their attention to the training of engineers to start new enterprises, to learn to operate power-plants efficiently, to design sanitary systems appropriate to rural areas and to perform such other tasks.

In January 1975, speaking at the Indian Institute of Technology, Madras, Dr. H.N. Sethna, Chairman of India's Atomic Energy Commission, took the IIT's to task in these terms:

> "In our country, while the Institutes of Technology have been useful in developing an elite cadre of technical personnel, their role in the dissemination of knowledge among the large masses of India and in the cultivation of proper scientific values has been negligible. There is a pressing need for appropriate educational policies to serve our people rather than to create an elite class."

...8.

Inspite of the opportunities that we have had over the last 25 years to re-orient our educational policies and re-design our instructional schemes, our Universities and Technical Institutes have continued to function in isolation from the surrounding community as well as the industrial scene in their vicinities. The teaching institutions, with rare exceptions, are unmindful of the pressing and immediate problems of our industrial enterprises. The latter return the compliment by doing nothing by way of sponsoring an interaction that will effect the teachers and students alike while the process of institutional learning is still in progress. Manager in industrial establishments do not find the new recruits readily usable and find it necessary to devise programmes to train them from the elemental beginnings of industrial practice. Teaching institutions adopt the defensive attitude that their task is to promote the acquisition of basic knowledge and basic skills and that it is upto the industrial undertakings that wish to employ the products of the educational institutions to organize the required on the job specialized training.

The absence of a living link between the programmes of institutional training and the needs and aspirations of industrial life have been recognized to be the major weakness of our national endeavour in technical education. No speedy remedial measures are in sight yet. The main reason why we have not been able to overcome our difficulties and make worthwhile progress is that most Faculty-members in our technic institutes may be scholars in their own right but command littl or no practical skill or industrial experience relevant to our current needs, being themselves the by-products of our traditio educational system that tended to over-emphaize theory and had little scope for meaningful practice.

In German Technical Universities, no member is considered fit to be assigned a teaching job unless he has, to his credit, a few years of meritorious work in industry. It is this basic attitude and pragmatic approach that have given Germany the leading place that she has earned for herself in the World community in matters relating to technological education and industrial development.

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According to the eminent educationist, Prof. Alfred North Whitehead: "The function of education is to impart vision and inculcate technique. Its purpose is to produce a pupil who knows what he knows well and does what he does well". We, in India, do not yet respond to this dual challenge in adequate measure. Teachers in our technical institutions have the opportunity to make a distinctive contribution in this regard.

IV. THE PRIMARY ROLE OF THE FACULTY AND ITS RESPONSIBILITIES AND REWARDS:

If we want good dividends from our educational system, we should do all we can to provide the infrastructure in which good teaching and effective learning can take place.

There are two attributes that will mark out an outstanding teacher in a technical institution.

One, his personal involvement in seeking solutions to the problem of the community in which he is placed or of an industrial enterprise which attracts his interest, and the extent to which he articulates this involvement in his role as a teacher and influences the minds and attitudes of his students;

two, the breadth of outlook that he shows in dealing with his area of specialisation, his willingness to cultivate an interdisciplinary approach and to contribute to the building up of team-spirit in approaching the problems of curriculum development and implementation of new study programmes.

Suggestions have been made that we should abolish conventional class-room teaching and rigid examination - schedules; and that we should adopt an open-environment system in which the student will be free to study any subject that he likes, at his own pace and he will be free to seek guidance, on an individual basis, from any teacher of his choice at his own convenience.

For a long time to come, these innovative steps will not be feasible or fruitful, and we should be reconciled to the system fashioned on the sheet-anchor of class-room instruction and the associated tutorial, design and laboratory exercises laid out to a prescribed time-schedule. We have wide scope to experiment with evaluation and assessment procedures. We should address ourselves to measures by which the process that has led to so much of the current dissatisfaction can be transformed and

Engineering Teachers owe allegiance to two professions, namely "engineering" and "teaching". To be good in this profession, one should know his engineering well; and then he should be able to teach this subject well. If he does not have an adequate knowledge of engineering based on personal experience and involvement, he has nothing worthwhile to contribut If he lacks teaching ability, despite all the knowledge that he possesses, learning will not take place in his class-room.

In considering any approaches to Faculty development, it is of paramount importance to be able to identify and place in position those who know their subjects well and have the ability to teach them with conspicuous skill.

There is an inhibitions factor militating against involvement in good teaching. While achievements in research, design and development activity are immediately recognised and rewarded, excellence in teaching does not attract similar recognition of rewards. The chief reason for this may be that they are no easy or reliable instruments for measuring the effectiveness of teaching or its quality. However hard and compl this task may be, some thought has to be given to the methods by which good teachers may be identified.

The most important function of an educational institution is the promotion of learning. It has been observed that in institutions where its teachers did not care to promote learning and were preoccupied otherwise, the students revolted. They cannot be expected to be concerned or excited about what other outstanding contributions their teachers are making. They wish to be beneficiaries of effective teaching. If this does not happen, they become dissatisfied and show it in no unmistakabl terms.

Speaking on the crucial role of teachers in Society, the late Dr. Vikram Sarabhai made the following signific observation:

"In ensuring educational standards, it is only the teacher in the class-room who can do anything in the matter. He has to be provided with the freedom to innovate in education in a changing world and, for this innovation, he has to receive the trust of those who back him up.

...11.

The most effective development of education can take place only when the teacher and the outside environment can interact with one another, free from regimentation and from irrelevant theories and principles."

At present, in our institutions, there is no adequate emphasis on good teaching. There are no serious programmes for identifying and rewarding capable teachers or for providing incentives for those who aspire to devote their energies and skills to becoming good teachers. Educational institutions have an obligation to keep in touch with educational research and continually seek opportunities to put into practice new tools and insights that are becoming available from time to time.

Whatever is being done in these respects at present does not even touch the fringe of the problem. Fuller commitment and reasonable inputs are urgently needed to improve the situation.

V. SOME THOUGHTS ON THE STRATEGY FOR FACULTY DEVELOPMENT IN OUR TECHNICAL INSTITUTIONS:

Educational Planners, the Faculty in our technical institutions, the world of industry and the community-at-large should unite in evolving a strategy for revitalizing, our educational process and investing it with the strength and the focus that it needs to serve the nation in the critical years ahead. It is proposed, from the lessons of past experience and the examples of advanced nation, that the following cardinal working principles govern the strategy. Not all of them are new and unknown before; but all of them need a new determination, a will to implementation and, in a measure not achieved before, coordinated effort on the part of all concerned.

1. Commendable work has been done in the last few years, at the national level, in Curriculum Development for Engineering institutions and in Quality Improvement Programme for their Staff.

   The time is now quite opportune to make a critical appraisal of the true benefits of the Quality Improvement Programme; to determine if the results achieved are commensurate with the investments that have been made; if the stronger motivation was the acquisition of new knowledge or the obtaining of a higher degree with its immediate material gains; and if the training programmes led to lasting attitudinal changes.

2. The more advanced and better equipped institutions should, as a matter of deliberate policy, require its Senior Faculty-member to work, for specified periods, in sister-institutions which aspire to reach higher standards of performance. In spite of all the platitudes, this process has not grown to any significant extent.

3. All Institutions, big and small, should be involved in modern techniques of library information service, e.g. s.d.i.(selective dissemination of information). While major institutions like the I.I.T.'s may establish national service centres, smaller institutes should pool their resources and be active partners in a wider net work.

4. Teachers must receive continual training to sharpen their capacity to understand and cope with technological changes. Facilities for training abroad should be fully utilized; as also the opportunities to witness, at close range, significant national achievements in science and technology and industrial r & d activities. The teachers will then be able to communicate to the young pupils committed to their care the vision and the self-confidence needed to face the future.

5. All technical institutes should, on an annual basis, depute an appropriate fraction of its Faculty-strength to industrial establishments with whom they have a bond of friendship and mutual trust, so that, over a reasonable time-frame, the main core of the Faculty would become industry-conscious and goal-oriented. Personnel and promotion policies should be re-oriented to reward those Faculty Members who prove their mettle in an industrial environment.

6. There should be a policy enunciation by which academic work, which puts a premium on results that can be published in reputed foreign Journals, will be rated as being in the lower national interest than a piece of development work that benefits an industrial enterprise, produces an inexpensive but reasonable substitute for a costly and hither-to-imported item or anything that contributes to the enhancement in the quality of life in the community. Any such piece of work, adjudged to be of outstanding merit from the national point of view, should be recognised by the

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award of a distinction such as a Doctorate Degree in Technology.

7. To fulfil the newly emerging responsibilities, to Society, all Technical Institutions should be called upon to use the talents of its Faculty and motivated students to embark on service-oriented projects that have social significance or can make an impact on the economy of the community or the State.

8. There should be a five-year review of the performance of Faculty-members and their individual contributions to industrial liaison work and community inspired project experiences should receive high priority in the assessment.

9. The Faculty should have the opportunities to study and understand the historical development of modern technical thought, its spiritual motivation and its impact on society and the economy of the developed and developing countries of the world.

10. There is an inescapable duty on the part of Technical Institutes to set store on "good teaching" and devise methods for showing its appreciation of those who discharge this responsibility with zeal and devotion. The identification of "good teachers" is a task that is fraught into many difficulties and uncertainties; but ignoring the task or by-passing it has led to the blunting and non-effective use of one of the most powerful instruments in education - the inspiration of the spoken word, the art of oral communication, and the opening of mental vistas by a skilled teacher.

If an Institute has a certain number of Departments or discipline, say six, there may be 'outstanding teacher' awards made to one staff-member in each Department each year. The Head of the Institute should leave it to the Faculty of each Department to devise such criteria of judgment as they consider fit to choose the best teacher amongst them. The students taking courses from the Faculty-member should be suitably consulted.

There will be initial difficulties; lack of uniformity between the different disciplines; questions as to impartiality of the procedures employed etc. But if there is a will and a high sense of purpose, the methods will get refined and the system would achieve an increasing measure of acceptance. With all its imperfections, the psychological benefits of the exercise would be highly beneficial.

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CONCLUSION:

Speaking recently on the perspectives of Higher Education in India, Dr. Malcolm Adiseshiah observed:

"The existing maladies call for a basic restructuring of the entire educational system of which higher education is a part. For this we need the political will to act, and to act quickly. Time is not on our side because the demands on our system of higher education are daily mounting and its cup of crisis is running over."

Faculty-development is a continuing and dynamic process. Faculty-members are the lamps that have the responsibility to light other lamps. They have a crucial role to play in our national reconstruction. To get the best out of them, the nation has to demonstrate its concern for their welfare and the continuous promotion of their skills and usefulness.

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INDUSTRY-INSTITUTION INTERACTION

(Lead Paper prepared by Dr. R.Subbayyan,
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1.0 NEED FOR INTERACTION

1.01 Industry is the user and utilizer of technology towards the production of goods and services. Its primary role is application of technology. Secondly it has to continuously improve its products and services as well as its productivity through Research and Development efforts. The technical institution occupies an equally pivotal position as it is the supplier of trained manpower for both industry and research. In addition it is, in its own right, one of the important agencies for technological monitoring and for fundamental as well as applied research. It has also a more specific and direct contribution to make to industry in several aspects of the latter's own immediate and long-range problems.

1.02 Unlike other streams of higher education, technical education is primarily governed by the needs of industry. The very nature of technical education and training and the limitations of institutions with regard to training facilities require that industry should assume the responsibility for giving a part or whole of the training for which they are best equipped. In technology, where developments and changes are particularly rapid, a very close and continuing awareness and contact with the problems, practices, trends and needs of society and industry are

essential if teachers are to frame courses and prepare the necessary manpower needed to man the industries of to-day and also of the future.

1.03 These point to the need for closer interaction between government, education and industry in the common national endeavour on the basis of a clearer appreciation of the common objectives. In this task neither the industry nor the technical institution can function in isolation.

2.0 PRESENT SITUATION

2.01 At present the partnership of industry in technical education is mostly confined to participation at a higher level in policy-making by way of the association of a few experts from industry in the All India Council for Technical Education and its Regional Committees and in some of the State level bodies concerned with policy decisions in technical education. At the unit level, barring a few sandwich courses, or in offering training facilities for students, there is little opportunity or incentive for establishing close partnership.

2.02 The courses offered at present by technical institutions are not entirely designed to meet the manpower specifications of industry. In the area of post-graduate education and research too there are many examples of wastage of effort and under-utilization of resources.

2.03 Collaboration in research, design and development activities and problem solving for industry has also been quite meagre. Only a very few institutions in the country have managed to set up organised consultancy and research activities.

2.04 At the State level, Industrial Liaison Boards have recently been set up in many States. But lacking in statutory backing, demarcated objectives, powers and responsibilities, their work has not had any worthwhile impact on industry institute collaboration.

2.05 It is therefore important to plan and implement viable measures of continuing and active industrial liaison and contact in several ways -in educational decision-making and curriculum framing, in teaching and training, in research and consultancy, in joint use of research and testing facilities, in joint planning of continuing education, and in exchange of personnel.

3.0 INTERACTION THROUGH EDUCATION AND TRAINING OF MANPOWER

3.01 One of the major areas of interaction is in the effective education and training of manpower to suit as closely as possible the diverse manpower needs of industry - both present and future.

3.02 This requires that industry should continuously assist the bodies concerned in the formulation of courses and curricula by (i) association with the technical education authorities at national, state and unit levels and in governing bodies, academic councils etc. (ii) spelling out clearly their plans for future development so that appropriate educational programmes could be designed, and (iii) liaising with technical institutions with regard to their need for refresher, short term and other specialised courses for providing updating and continuing education for their employees. National manpower surveys, national science and technology perspective plans etc. should be supplemented by industry's own reports on their future plans and requirements. A good deal of organised information dissemination and communication efforts are obviously necessary and this task should be undertaken by national and state level agencies and industrial associations through technical journals besides discussions across the table at joint forums. Industry should also have, freely available to it, the complete details of existing and proposed courses, and of teaching and training facilities available at the institutions.

3.10 Manpower spectrum and course formulation

3.11 Technical, technological and engineering activity covers a wide spectrum ranging from the technical skills, through techniques, technology and engineering on to research and development. This provides one set of rationale for the formulation of the needed courses of instruction.

3.12 A second dimension in the functional manpower spectrum is introduced by the different orientations of the activities of subgroups; for example, among the broad category of technicians we may identify such orientations as erection, operation, maintenance, draftsmanship, assisting in design and research, inspection and testing, servicing, sales, production and control, work study etc.

3.13 The third dimension of the manpower spectrum is based on speciality areas such as the major branches of engineering and their sub-divisions which are complicated further by the existence and emergence of what are called interdisciplinary areas.

3.14 If one approaches the problem of course formulation on the basis of tailoring the courses to suit each and every occupation, then obviously there can be as many courses in terms of contents, orientations, subject mixes, degree of emphasis, depth, skill and knowledge, as there are varieties of functions, occupations, technologies and processes and speialities. This is neither feasible nor desirable and very often may prove pointless in view of the dynamic and changing nature of engineering and technology. One has to take into account such requirements as broad comparability of various kinds of courses, economy in educational programmes, mobility of personnel, adaptibility to change and openness to self-development. Above all one has to keep in mind the problem of national level coordination and optimisation of the educational system.

3.20 Diversification and Industry orientation of courses

3.21 It is therefore advisable that we should essentially retain the basic diploma and degree structures already existing, with a certain degree of diversification in developed fields which are occupationally well demarcated and well established, and where the demand for trained manpower is comparatively large and sustained.

3.22 We should also take a close look at the exclusively design and research orientations and emphasis of our degree and postgraduate courses. There is also a need for engineers who have a wide and deep systematic knowledge related to the entire gamut of engineering activities, operations and functions appropriate to their field and not only in research and design. There is at present a trend in the UK to introduce a type of "total technology" curriculum into post-graduate as well as under-graduate engineering studies intended to correct the present lopsided pre-occupation with narrow academic specialisation at the expense of a high level of education and training comprehending the entire functional spectrum of industry viz. research, development, design, production, marketing and operation of plant. This has been occasioned by the conclusions of several studies including surveys of industry. In almost all cases, it was found that apart from technical ability, employers looked for some personal qualities in employees such as ability to work as part of a team, an analytical mind, ability to assimilate new techniques rapidly and ability to work flexibly in a veriety of disciplines and departments.

3.30 Organisational aspects in course formulation

3.31 A crucial question is how far the existing system of course formulation and administration in our Universities and Boards could meet the needs of the enormous increase in the variety of courses, content, methodology and instructional approaches. The necessity for a decentralisation of course-formulation, control and evaluation has been a recurrent theme in the recommendations of very many commissions and committees. Much, however, remains to be done in the nature of far-reaching educational innovations to realise these recommendations in practice.

3.32 The time has come when the idea that every college should have all the courses in the statutes should be discarded. On the one hand this is impossible in the face of the variety of courses needed and the changing requirements of trained manpower. On the other this idea has led to much wasteful duplication.

3.33 It is for serious consideration whether specialist courses for which there is only limited demand could not be left to the area of short term programmes, to be organised on request and with sponsorship from industries. Some courses could be organised at the industries themselves with faculty help. It is our duty to lay the foundation on which further continuous building up will be possible. In doing so we have to make maximum use of available resources. What is important is that we should realise that education is not a once and for all process but needs personnel to return to institutions frequently to learn new things and

update themselves, through specialised short-term updating and refresher courses.

3.34 Coordination of institutional efforts with regard to courses becomes a complex problem with increased flexibility in course-framing and choice of subjects; the problem of coordination is two fold, one related to academic comparability, the other related to the matching of educational output with manpower needs in qualitative and quantitative terms.

3.35 Coordination in terms of manpower requirements is very complex and requires information systems backed by continuing surveys, analyses and information dissemination. This is a lacuna at present and until such time organised and systematic arrangements are made, institutions will have to rely on their own limited surveys and analyses, and such indices as popularity of particular courses among students.

3.40 Need for manpower planning and surveys

3.41 There are limits to what can be done in institutions in the way of meeting precisely the manpower needs of industry. The task of formulation and implementation of suitable instructional programmes has been rendered difficult owing to the absence of any rational and precise occupational classifications in industry and precise manpower forecasts, based on their perspective plans of future development. Obviously some organised efforts in the direction of manpower planing and coordination are called for.

3.42 With the cooperation of industry teachers can help to provide the students a better base and a better appreciation for contributing to the special needs of the industrial environment. A clearer recognition of inter-dependence and mutual cooperation could, in addition to improved quality of manpower, lead to fruitful efforts in research and development.

4.0 TRAINING IN INDUSTRY

4.01 One of the major aspects of Industry - Institution interaction is the training of students in industry. The type and programming of any industrial training of students should be carefully designed as an integral part of the curriculum, using the joint experience of representatives from the institution and industry. Much of the industrial training that some of our institutions have managed to organise has tended to be work at the workshop floor involving practice in machine skills and manipulative skills or understanding of particular technologies and processes rather than an orientation into the overall problems and working of the industrial establishment. If industrial training is to be effective, it should be designed as an open-ended educational programme. It should create a deep awareness of the wide spectrum of organisational aspects and procedures of industry and the several engineering functions involved such as coordination, operation, production, maintenance human relations, management, quality control, design and development, judgment and selection of techniques for particular situations and so on.

4.02 In some instances where industry is initially unwilling to provide organized training, legislation may be necessary to recognize its provision as a national responsibility and to its form. The training may take place during the undergraduate education, as exemplified by sandwich type courses, or as graduate training programmes in industry. In this context, it is well to remember that industry might not take voluntary interest in student training. Therefore if student training in industry is to be put on a sound footing, systematic and organised mechanisms based on legal obligation, incentives and thorough supervision must be established. This arrangement may be on the model of the statutory Industrial Training Boards (a number of them for different kinds of industries) of UK, wit their system of Industrial Training cess and rebates, their thorough-going and meticulous training manuals for different levels, and their establishment of training inspectors who chec the quality of training programmes. Institutions should be allowed to set up Training and Placement offices to plan and implement training programmes.

5.0 R & D COLLABORATION AND CONSULTANCY ACTIVITIES

5.01 There is a broad range of research categories for whic industry is dependent on the institutions:

(i) Research which is vital to society and hence pert to industry's long range interests. These are the broad multi disciplinary studies, evaluations, technological assessment and research on methods of improving techniques for these.

(ii) Frontier research of significance to industry. The importance of advancement of scientific and engineering frontiers from the point of view of industrial development hardly needs explanation. For this type of research industry will almost exclusively have to rely on the institutions. Examples of the tremendous impact this frontier type research can have on industry, through industrial application, are readily apparent in such examples as the changes wrought in electronics by the transistor based on better understanding of solid state physics and the revolution in the fabrics and materials industries by the work on polymers. The development of the laser has provided a revolutionary tool in several industrial applications. Thus it is apparent that industry or industrial associations must support such basic and goal-oriented research.

(iii) Specialised research investigations directed at specific objectives and funded by industry such as product or process developments, improvements.

(iv) Another increasingly important need for which industry must call upon the capabilities of the institutions is for independent non-biased studies. Here industry and the society benefit from the greater credibility of independent research.

5.02 There thus is a vital stake for industry in R & D work in general and in institutional research in particular. However it has been generally felt that industry's approaches to R & D efforts, to scientific and technical collaboration and to creation and utilization of indigenous technology have been rather lukewarm.

5.10 Inhibiting factors

5.11 There are of course several factors that inhibit the progressive creation of a scientific and technological climate in industry. Incentives are lacking for the innovator owing to fiscal policies and cumbersome procedures. More crucial perhaps is our inability to appreciate the importance of magnitude and size of industry in the matter of their ability to undertake R & D activity and utilize its results. The very large number of small scale units in our country are not in a position to assimilate available technologies, not to speak of having their own R & D effort and innovation.

5.12 Even the large scale units, faced, as they are, with shortages of power and raw materials, labour unrest and so on are merely content to maintain the status quo, rather than making radical departures in the matter of improvement and diversification of processes, designs, products or marketing.

5.20 Institutional Constraints

5.21 Industry must appreciate that the institutions have their own values and functions. Institutions cannot always be tied down to the limits of money, time and proprietary pressures which industry would like to impose. Institutional research policy in general includes advancement of the frontiers of knowledge both basic and applied, vitalization of its teaching, encouragement of a spirit of enquiry in the faculty, training of research workers, and lastly public service by solving problems of general and public interest.

5.30 Communication Gap

5.31 The biggest deterrent to the initiation and promotion of joint activities is the institutions not knowing what the needs of individual industries are and, from the point of view of industry, the industry not knowing the capabilities of institutions. The problem of the communication gap could be solved by publication of directories of industrial needs and institutional facilities and capabilities. Agencies are also needed at national and regional levels to serve as clearing houses of such information. These agencies should also keep retrievable documentation on developments of products, processes etc. carried out by institutions, so that interested industries could take them up for commercial utilization. Publicity for developmental work at institutions is essential if industry is to approach them with their problems. Journals devoted to this aspect are a keenly felt need. Aid and encouragement must also be given to institutions to organise technical exhibitions highlighting their research and development work and facilities and expertise. These exhibitions should be arranged at institutions at get-togethers and conferences of industry and institutions. Institutions should also have financial aid to invite and host industrial people at special exhibits. The AIR could devote regular time in its broadcasts to institutional research findings and developments of industrial significance. These measures would go a long way to facilitate indigenous technology transfer.

5.40 Working Arrangements, Consultancy Activities

5.41 R & D work could be carried out through faculty and student project work with suitable financial aid arrangements. In many cases the facilities of both institution and industry could be jointly utilized. These could be coordinated by industrial liaison cells or consultancy bureaus in the institutions.

5.42 There are many workable arrangements that could operate; such as project grants and contracts, interchange of personnel and industrial liaison programmes. Frequent visits between the two, the movement of people back and forth by consulting arrangements and by the movement of students from the institution to the industry all help. Industry could also give projects which students can undertake as part of their course work. In this way, positive results can be obtained with least expense while exposing students to the problems and requirements of industry. Industry can also assign the production of simpler components to students who can do the work off-time in the institutional workshops.

5.43 Consultancy services could also include other areas where industries need the help of institutions such as special testing facilities, analytical techniques, problem solving related to manufacture and management, special exploratory surveys, data analysis, literature surveys, computer software development, feasibility reports and in-plant analysis for productivity which institutions are in a better position to do by virtue of their competence and facilities. In addition,

special services to industrial estates and small scale industries could comprise library and documentation service, utilization of special purpose machines and production of specialised components.

5.44 Collaborative efforts can have no real impact unless there are designated personnel in Industry with whom the academic people could meaningfully discuss problems of mutual interest and share their experience. For success, it is necessary that there are on both sides, people who speak on the same wave-length. Research and development units in industry could serve to bring together the industries and institutions for beneficial and purposeful collaboration.

5.45 An important prerequisite is for the institution to ensure that its faculty are conversant with industrial problems and that their competence is such that they are acceptable to industry, so that meaningful co-operation can occur. Industry should also have a voice in deciding the research and development programmes of institutions. In this connection special attention must be given to see that the solutions proposed for problems should be based on economic, psychological and technical considerations. It is of no use to propose a technically sound solution if it is too costly for the firm to adopt.

5.50 Finance

5.51 The question of finance for developing additional facilities for research and development work at institutions is important. R & D should be self-sustaining. There usually

are no problems about funding projects directed towards specific problems of development sponsored by particular industries. Broader research projects which would be of industrial significance as being likely to result in new materials or technologies or products, (but not bound or devoted to any specific industrial goals) also deserve industrial financial support. Here the funding could come from Industrial Associations rather than from specific units, and from public sector corporations. However, initially, the institutions will have to reach-out to industries, convince them about their capabilities in solving their problems and also bear a substantial portion of the additional expenditure involved. Necessary financial assistance should be provided by the Government of India to the institutions for a limited period of two to three years for this purpose as well as for the establishment of Liaison Cells at the institutions.

6.0 EXCHANGE OF PERSONNEL

6.01 The use of teachers drawn from industry either on part-time or on deputation basis constitutes a means of maintaining the essential contact between education and industry and of ensuring that teaching takes account of day to day industrial experience and of the latest developments. It is in the more highly specialised and advanced fields like industrial design and studies involving production techniques and practices and in guiding project work that the teaching services of experts from industry are valuable. In order to attract senior staff

of industry, it would be necessary to offer them a special place in institutional life besides attractive pay and incentives. Industry must be willing to accept, encourage and assist the transfer of experienced staff tc part-time or full-time teaching work. This could be done on some sort of sabbatical arrangement. In addition, experts from industry should be invited to discuss typical problems of the shop floor and explain through special lectures and seminars how they are solved. Such lectures and seminars are among the best ways of integrating industrial experience and technical education.

Likewise, teachers should go periodically to industry on secondment basis or under industrial training programmes or to work on special projects within industry.

Technical Institutions should organise, with active co-operation of industries, as many workshops as possible bringing together senior students, faculty members and engineers from industry to work as a team on problems and research projects of mutual interest.

Other measures of establishing close contacts would include meetings in panels and committees, special seminars, symposiums, open days and two way visits.

7.0 ORGANISATIONAL ASPECTS OF INTERACTION

7.01 The need for active collaboration between technical institutions and industry for their mutual benefit has been duly recognised for a number of years now. But so far little progress

has been made in this regard. Obviously, the entire structure is lacking some vital policy-backing, organisational strategies and machinery to correlate the resources and mobilise the same for achieving the desired objective.

7.10 Autonomy of Institutions

7.11 The fullest advantages of collaboration between technical institutions and industry in educational aspects, can be achieved only when institutions attain an autonomous status. This is so because the present rigidity in the system of educational administration and academic control leaves little scope for development of meaningful ties with industry. Uniform and inflexible syllabi and curricula are imposed on institutions which are not allowed to modify or frame courses from time to time according to the needs of industry.

7.12 Similarly, examinations are imposed with a strict time schedule, which makes it difficult to arrange the sequences of industrial training in sandwich courses according to the convenience of industry. Moreover, the present examination system offers little credit for industrial training and it is natural that neither students nor teachers take training seriously. Further, the institutions have hardly any freedom in the matter of exchange of personnel.

If institutions are given an autonomous status with flexibility and freedom in the above spheres, they will have the incentive to act and accelerate the process of collaboration with industry.

7.20 Industrial Liaison Cells in Institutions

7.21 Industry is not very sure about the extent to which the individual institutions can contribute to its development and growth. It is therefore necessary for every institution to project adequately its image, to spell out its capability and expertise in different areas and the contributions it can make to industrial research, to locate its expertise suitable for the solution of the problems in the specialised areas and to create appropriate task forces, consultancy teams or groups for specific jobs/studies, for advancement of technology etc. For the proper discharge of these and other allied functions, every technical institution must set up a suitable organisation which may be termed as 'Industrial Liaison Cell'. These cells should be responsible for bringing the institutions concerned closer to the respective industries and of ensuring an active interaction leading to speedy progress in industrial research and development. How the information concerning the competency and potentiality of the technical institutions should be best disseminated, what steps need be taken to arrange for effective exchange of technical personnel between technical institutions and industry, how efficiently the results of research carried out by technical institutions in their laboratories should be made available to industry for utilisation, what measures should be adopted to create the interest of industry in the technical institutions, how best the resources of the technical institutions be integrated with those of industry, what arrangement

should be effected to solve the various administrative problems including ensuring the preservation of trade secrets of industry to their satisfaction, will be some of the important matters to be decided by the cells. As these cells will be the primary units for promoting collaboration, it is essential that these are managed properly for the success of the programmes.

7.30 Role of Industrial Associations

7.31 In promoting and coordinating Research & Development activities, Associations of industries such as Foundry Men's Association, Indian Machine Tool Manufacturers Association, and Mill Owners' Associations, could play a valuable role. These bodies are best placed for compiling and referring live problems of Research & Development to the appropriate technical institutions. They might also sponsor broad studies aimed at a general improvement of the particular industrial sector's practices and processes. The results of such studies would be of beneficial value to all member units of the association. These associations are well placed to suggest and sponsor special short-term updating programmes for practising engineers in their member units.

7.40 A National Technological Strategy

7.41 Besides these cells in the individual institutions, a national strategy and national organisation are equally essential to coordinate the activities of all the institutions and industrial undertakings.

7.42 It seems necessary therefore to formulate a series of well coordinated measures and implement them as a National Technological Strategy.

(i) A central agency should be formed to identify the capabilities available in our technical institutions and the precise industrial fields, in which the expertise could be applied and to act not only as a clearing house of information but also as a coordinating agency for Research and Development and technology transfer.

(ii) All Industrial enterprises must be required by legislation to set apart a certain percentage of their gross earnings for research and development either in the R and D wings of their own organisations or in technical institutions and other research laboratories.

(iii) Incentives including tax exemptions may be considered to attract larger R & D effort by industry.

(iv) Government should promote a new policy of consultancy activities in technical institutions so as to encourage faculty to utilize the facilities of their institutes freely without, however, jeopardising the interest of their teaching duties.

8.0 CONCLUSION

8.01 Industries and institutions are partners in the great endeavour of socio-economic progress, through the development and utilization of technology. To meet the future challenges, industry, government and educational institutions must assume

complementary roles. Efficiency in the use of human labour and in the use of resources is socially imperative and this challenge and this pressure for efficiency must be maintained.

8.02 In this lead paper, attempt has been made to highlight the issues involved in the matter of effective interaction between the industry and institutions. Some of the crucial issues are:

(i) Industry and institutions cannot work in isolation. Both stand to gain by the interaction and cross-fertilization of their ideas and efforts. Efforts must be made to create a greater awareness of the importance of such interaction in the national interest. This should be done (a) by local initiative in establishing closer contacts through discussions, seminars, visits, consultancy etc. (b) through greater publicity in this regard and (c) by Government initiative in defining the responsibility of industries - financial and otherwise and providing for the needed legal and organisational framework at all levels.

(ii) Collaboration at present is at a low level and needs to be actively promoted through deliberate, organised and coordinated action involving government, industry and institutions. This should lead to greater interaction in teaching and training, in R & D, in student project work, in exchange of personnel, in policy-formulation and framing of courses, in continuing education and in joint use of facilities.

(iii) Interaction should lead to effective and purposeful R & D effort. Institutions should reach out and help industry. Consultancy services should be vigorously expanded. Necessary financial support and organisational mechanisms should be provided to the institutions.

(iv) Information dissemination and R & D coordination are essential to fuller utilization of the technical potentialities available at the institutions. Publicity to institutional work and capabilities, through AIR Programmes, directories, exhibitions and other industry-institute contacts would be valuable. National and State level organisations (those existing and others to be created) for co-ordination and liaison should function as clearing houses of information.

(v) Training of students in industry is crucial and organised arrangements for effective training at different levels should be formulated including the creation of Industrial Training Boards, publication of training manuals and legislation to make training obligatory for industries.

(vi) There is a need for a national technological strategy for fostering industry institute interaction in the interest of development of indigenous technology. This would include legislation requiring (a) use of indigenous technology, (b) R & D efforts, R & D units and R & D budgets in industries coupled with incentives for collaborative effort; (c) legislation requiring industry's collaboration by way of training,

loaning of personnel and spelling out their plans for development and their future needs of manpower, expertise and research and (d) provision of continuing education for employees. A national agency for R & D co-ordination and development of indigenous technology with statutory powers should be set up, supported by regional branches.

(vii) Among organisational measures, there is an urgent need for granting institutional autonomy. Industrial Liaison Cells should be set up in all institutions, with necessary financial aid from Government.

(viii) Continual efforts with the participation of industry at several levels are needed to keep courses relevant and oriented to the present and future industrial manpower needs. These would include short-term specialised courses for practising engineers, introduction of total technology approach and careful formulation of diversified courses. Industrial experts should be associated with the educational bodies at all levels.

(ix) Organised efforts must be made in the direction of survey and forecasts of manpower and preparation of precise occupational classifications in industry, so as to enable the formulation of effective educational programmes.

REVIEW OF THE EXISTING SCHEMES FOR CURRICULUM DEVELOPMENT AND A PLAN OF ACTION FOR EFFECTIVE CURRICULUM DEVELOPMENT IN THE COMING YEARS.

1.0 The three elements that can be readily identified in the existing technical education system are: Syllabus, Institutions and Examinations. They are shown schematically in Fig.A.

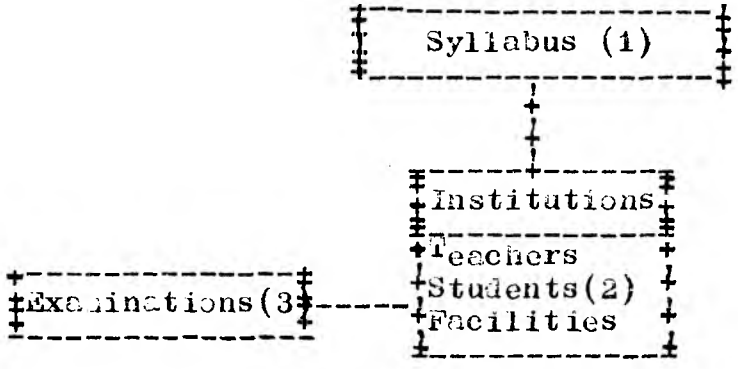

Fig.A.

The clarity with which a given syllabus expresses its educational intentions will determine to a great extent the effectiveness with which components (2) & (3) operate to produce technical manpower of required competence and quality. Any syllabus can be analysed for this built-in clarity of purpose by posing basic question namely,

Does the syllabus provide answers to any of the following questions?:

- WHAT should the teacher teach?
- WHAT materials and procedures will work best to teach the given syllabus?
- HOW does the teacher know when he has taught it?

It is possible to quantify the clarity of educational intentions of a given syllabus by expanding the above mentioned basic questions to relevant aspects. Evidence seems to suggest that the co-efficient of clarity of syllabii drafted on traditional lines is quite low.

2.0 Further, the analysis of syllabii as suggested earlier, reveals some of the following weaknesses in traditionally drafted syllabii:

a) Lack of emphasis on priorities and time allocation;

b) No indication of integration of different subjects of study;

c) Constraint on teaching order;

d) a, b, c often leading to narrow compartmentalisation and disjointed presentation;

e) The syllabus does not indicate the abilities to be developed in the students. In the absence of identified abilities, examinations are used to define the abilities, and from this, in most of the cases, they emerge as a single ability to remember specifics;

f) As there is no identification of abilities to be developed in the students, there is usually no link between teaching method and syllabus. Most teaching strategies adopted by the teachers, degenerate, as a result, into a routine with their base on precedent and the needs of the examinations.

3.0 The inadequacies of this type of 'syllabus-examination' approach to technical education has been one of the important reasons for the deterioration of the quality of technical man power coming out of the system with the consequent under-employment and unemployment.

4.0 Till a few years back, the production process by which the syllabii were originated have relied heavily on this 'syllabus-examination' approach. It has been realised since then that this approach has to be replaced by an approach based on

"THE DEVELOPMENT OF REQUIRED ABILITIES THROUGH APPROPRIATE LEARNING EXPERIENCES"

Content or subject matter, in such an approach, will then appear as only a frame work on which the desired abilities may be developed.

The process of developing objective-oriented content is broadly termed as the 'Curriculum Development' process.

...

It is only in recent years that educational administrators have given serious thought to this activity and as a result Curriculum Development Units have been functioning in the Southern Region with the task of developing curricula and curriculum materials both at the degree and diploma level for the past 5 to 6 years.

5.0 A STRATEGY OR PLAN OF ACTION FOR CURRICULUM DEVELOPMENT

5.1 Before outlining a strategy for curriculum Development from now on, it is to be emphasized that the two terms 'syllabus' (as understood by all at the moment) and 'Curriculum' are not one and the same.

Curriculum has three basic attributes:

- objective-oriented content;
- planned learning experiences to achieve the objectives; and
- element of teacher guidance.

Based on these attributes, Curriculum may be defined as all the "Learning which is planned and/or guided by the Institute, whether it is carried out in group or individually inside or outside the Institute to achieve a set of objectives.

5.2 It will be possible to take into account some of the following factors while developing any curriculum, if one accepts the meaning of the term 'curriculum' as enunciated earlier:

- Improved abilities of students now entering the system
- Students' need to adapt themselves to ever increasing technological changes
- Integration of subjects of study
- Use of different learning systems
- Use of self-instructional materials
- Use of technology in teaching
- Change in emphasis demanded by the social system from time to time.

...4.

5.3 Curriculum Development process can be considered as technique of ordering and arranging these and other factors so that teachers can operate with maximum efficiency. If one accepts the principle of individual differences among teachers, this process will then help to determine the minimum teaching performance.

5.4. A model for the Curriculum Development is suggested in Fig.B.

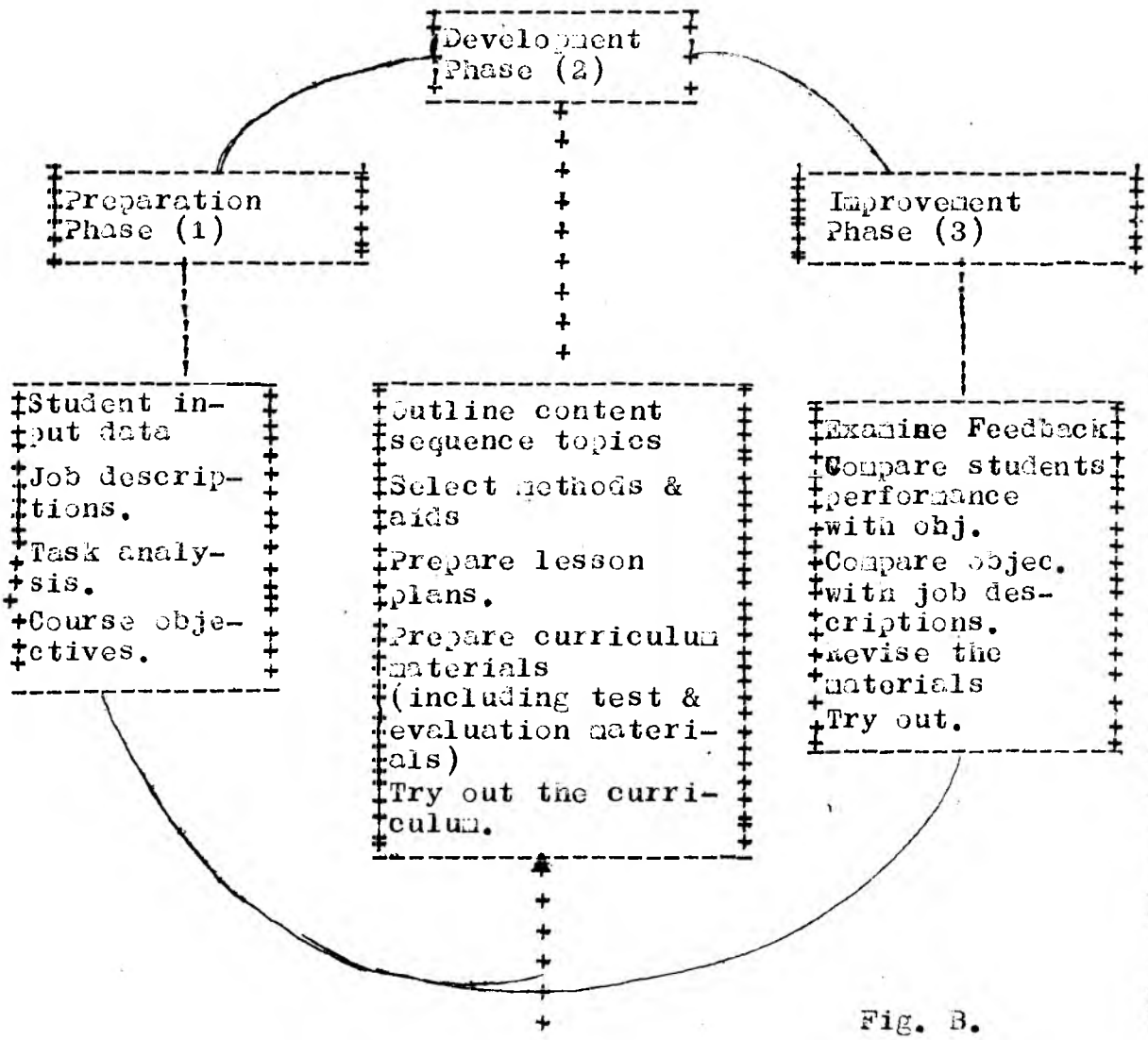

Fig. B.

5.5 Preparation Phase:

F r a selected area of curriculum Development, information regarding the available job descriptions is to be obtained. From these job descriptions, task analysis is to be performed. This can be done by

- Well designed questionnaires

....5.

- actual observation of jobs
- interview techniques
- a judicious combination of all the three methods mentioned above.

A detailed analysis of the different related jobs will reveal the clusters of knowledge and skills that these jobs demand from technical manpower. The knowledge and skills so identified are then written in the form of course objectives. These objectives will reveal in general and specific terms what the students can DO (which is observable and measurable) at the end of a specified period of instruction for achieving these objectives.

The emphasis, as one can easily realise, is on the SPECIFIC PERFORMANCES OF THE STUDENTS and not on the content itself. While drafting the course objectives, consideration must be given to the knowledge and skills that are already acquired by the students prior to their admission to technical educational system. In other words, one must determine

a. What abilities the students possess on entry into the course;

b. What abilities they will require on leaving the course (as identified from job analysis).

THE DIFFERENCE BETWEEN (a) AND (b) IS THE LEARNING GAP THAT MUST BE BRIDGED WHEN DEVELOPING THE CURRICULAM.

5.6 Development Phase:

From the course objectives the sequencing of the relevant subjects of study is to be completed. Also the following have to be developed:

- select the content in each subject
- sequence the content in each subject
- select the methods and aids
- prepare the lesson plans
- prepare the relevant curriculum materials including evaluation materials.

When these items are developed, they must be tried out, as a pilot-project, in a few selected Institutions.

5.7 Improvement Phase:

During the period of pilot-trials, the curriculum and curriculum materials must be constantly evaluated for their effectiveness. This can be done through:

- well designed questionnaires both for teachers and students
- actual observation of class room instruction
- discussing with teachers and students
- all the methods mentioned above in judicious combination

Based on this feedback information and its analysis, the needed revisions in the curriculum at the appropriate places will have to be completed.

The revised curriculum and the curriculum materials can then be reproduced to meet the requirements of teachers and students. Orientation workshops may have to be conducted to familiarise the teachers with the philosophy and mode of using these materials.

When this curriculum is being implemented in all Institutions, feed back information must be obtained for the purpose of improving the curriculum further.

6.0 The following organizational procedures for developing a given curriculum using the philosophy of the curriculum development process outlined earlier, is suggested:

6.1 A panel of practising teachers, curriculum specialists and representatives of employers will conduct a survey of a chosen curriculum area drawing on all available resources to survey the student input data, job descriptions. This team will analyse the job descriptions and based on this analysis draft the course/subject objectives in behavioural terms.

6.2 This team will analyse the draft objectives and then outline subjects, content, sequencing of topics relevant to the realisation of the objectives. As uniform job descriptions is the employing agencies may not be existing, the panel members will have to use, sometimes, their judgement and discretion based on their experience and trends of technological developments, in selecting and sequencing the content.

...7.

6.3 Circulation of the above mentioned draft materials to all teachers and employers will be the next stage. The draft materials are to be revised in the light of the suggestions received from teachers and employers.

6.4 Teams of volunteer teachers are to be selected for each subject area. These teams will then prepare the draft curriculum materials appropriate to the realisation of stated objectives.

6.5 Selection of Institutions for pilot trials. This will be followed by briefing and workshop sessions with teachers from these Institutions on the draft curriculum materials.

6.6 Trials in the use of these materials. Feed back information and revision of these draft materials in the light of effective evaluation.

6.7 Publication of these materials with intensive and wide-spread orientation programmes for teachers in the use of these materials.

6.8 Use of these revised mateerials in all the Institutions. Continuous evaluation and feed back with appropriate modifications.

7.0 This strategy for developing curricula on scientific lines, at least as a moderate beginning, can be accomplished with a good deal of success if

- there is an agency consisting of curriculum specialists for a set of related Institutions to co-ordinate, guide and assist the Institutions to develop curricula and curriculum materials;

- there is a good rapport with and involvement of employers in the curriculum development activity;

- there is an availability of large number of practising teacners who are willing and active in the development of curricula & curriculum materials; and

- there is a positive commitment on the part of educational administrators for this type of developmental activity with time bound programmes.

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PART B

Special measures to create conditions in technical institutions to keep curricula alive and alert to changing situations

1.0 It has been discussed earlier that curriculum development is a dynamic activity which should be sensitive to time and place. Curriculum should be alert and continually changing to take into account the changing needs of the society. In order to enable curricula to be alive and alert to the changing situations, the technical institutions which operate these curricula must have built-in elements to keep track of the different phases of curriculum development activities and to effect the needed modifications at the right time. The following special measures, if created, will go a long way in keeping the curricula dynamic with the consequent benefits of ensuring the quality of technical man power turned out from the institutions.

2.0 Advisory Committee for each Institution: An advisory Committee consisting of representatives of employers, Heads of educational institutions from which the student-input is drawn to the technical institute, educationists, parents and even students may be constituted for each technical institution. This committee can meet periodically, say once in two or three months, to discuss the academic problems and progress of the various courses. Such meetings will enable the concerned people to know what is going on in the institute and suggest timely solutions to the academic problems. These solutions may be of varying types, such as

a. Providing practical training facilities in situations where the Institutions cannot afford the expensive laboratory equipment

b. Providing in-plant training facilities to students during vacation.

c. Providing in-plant training facilities to teachers in specified areas

d. Providing second-hand equipment and gadgets at nominal rates. Industrial components and materials, rejected by the Quality Control Department, can be supplied to institutions for training purposes

e. Deputing in-service engineers to institutions to teach students on special subject areas on part time basis

f. Familiarising the students in other educational institutions with the advantages and facilities of technical education.

The actual detailsof the constitution of this Committee and its role and functions will have to be worked out, if this idea is acceptable.

3.0 Instructional media centre in each Institute: It is being realised by all engaged in teaching profession that multimedia approach to teaching is more effective in not only achieving the course objectives but also in creating and maintaining motivation and interest in the students than the conventional methods that are in use so far.

In order to introduce and maintain such an approach in class room teaching instructional media centres will have to function in every institute. Those things which are manipulated, seen, heard, read or talked about, plus the instruments which facilitate such activity constitute the instructional media. This media includes a wide variety of items ranging from the well established audio-visual media such as motion pictures, film strips, slides and charts to the sophisticated media like educational television (ETV) programmed learning materials, teaching machines and structured curriculum materials. Instructional media is an all pervasive term which provides both tools for teaching and avenues for learning in order to meet the changing requirements of technology.

...10.

Instructional media centre is a centralized agency to provide necessary services to the teachers and students to facilitate economical use of a variety of instructional materials and equipment for causing effective learning to take place.

A small number of specially trained teachers of Institute can form the nucleus of this centre. This team can assist, guide and arrange for basic facilities for the teachers to select, prepare, use and evaluate the relevant and appropriate instructional media for teaching in order to achieve the objectives of the curricula implemented by them. The traditional set-up of a library in the Institute will become an integral part of this centre for better utilisation This centre can be a focal point of academic activity in the Institute in the areas of curriculum improvement, effective instruction and optimum utilization of available resources.

Most of the curriculum problems can be effectively solved if the administration recognizes the need for the services of instructional media centres, deliberately plans for their functioning and consciously evaluates their effectiveness for improvement.

4.0 Faculty Development Scheme: The faculty of an institute forms the back bone of the system to keep curricula alive and alert to changing situations. The following brief description portrays the pattern of instruction in technical institutions: "Still most of the teaching is based on lecture system. Interaction of the teacher and taught is maintained at a minimum level. Curriculum materials used are of limited quality. The evaluation system suffers from a high degree of subjectivity, unreliability and doubtful validity." Comprehensive faculty development programmes at the Institute's level will go a long way in revising this picture and enable the quality of education to improve considerably.

4.2 A number of factors can be identified for designing suitable faculty development programmes. The following table show

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the dominating factors and the type of faculty development programmes. This list is not exhaustive and many other areas can be included.

Dominating factor	Types of faculty development Programmes (a suggested list only)
a. Professionalism in teaching	Teacher education or teacher training programmes specially designed for the requirements of individual faculty.
b. Obsolescence in teaching	Specific summer and winter courses in given disciplines
	Rotation of course assignments among teachers
	Taking special courses as if for credit on sabbatical leave
	Team teaching of courses with junior members of department
	Industrial/field/practical training
c. Advancing knowledge	Research projects with well defined objectives
d. Advancing methodology	Special short courses on curriculum development
	Educational Technology, Testing & evaluation
	Special educational practices
e. Administration	Management courses counselling & guidance courses

4.3 While initiating faculty development programmes, it is necessary to have a comprehensive plan of action prepared. Programmes initiated on an ad-hoc basis may not yield the desired results. The following procedure is suggested for initiating faculty development programmes (under the assumption that the faculty may not be displaced from the institute for the period for which the development programme is planned).

- ... ...jected growth of the activities for a period of say 5 years

Instructional media centre is a centralized agency to provide necessary services to the teachers and students [illegible]

- Briefing the faculty on what is expected of them as a result of their undergoing the specific faculty development programmes

- A detailed scheme of work for the individual faculty members on their return from training

- A scheme of supervision and co-ordination for the full utilization of the improved potentialities of the trained faculty.

5.0 Some of the measures, as suggested earlier, need to be introduced at the Institute's level without much loss of time. As a result of these measures, the quality of education and training obtained in each institute can be considerably enhanced. The administration, faculty, resources and learning environment can be made more dynamic and alive to the changing situations and demands over a given period of time. These measures will then enable the Institutes to obtain and then manage effectively the status of autonomy for playing their role with imagination, flexibility and appropriate resources to satisfy the demands of the localities in which they are situated.

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(based on the paper presented by Prof. A.P. Jambulingam, Principal, TTTI, Madras at the Colombo Plan Staff College for Technician Education, Singapore between August 18th - September 26th, 1975).

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ENTREPRENEURSHIP AND CREATIVITY
&
" EARN - WHILE - YOU - LEARN SCHEME "

Lead Paper
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1.0 INTRODUCTION

The country's progress is vitally linked with rapid industrial development. The infrastructure needed for this rapid industrialisation includes the training of qualified technical personnel who can carry out this task. The technological institutions of the country have a vital role to play in this direction.

1.1 It is a fact that compared to the resources of capital and men deployed in our technical education system, the outcome and achievements from the stand point of technological development and diversity in industrialisation have not been substantial.

1.2 It must be remembered that no amount of capital equipment, no amount of enthusiastic government planning and no team of foreign consultants can compensate for lack of individuals eager and able to seize the opportunity for development. This is particularly true of developing countries like India which is indeed an engineering entrepreneur's paradise. In contrast we see that the emphasis in engineering education is laid on producing engineers fit only for jobs without any motivation and competence for entrepreneurial activities. The current scene of technical unemployment, which is tragic in individual terms and paradoxical in terms of economic growth and manpower requirements, is thus symptomatic of mismatched educational objectives. The engineers that we are producing are looking for certain niches in society which do not exist, whereas tremendous opportunities exist for entrepreneurial efforts. It has also been felt that engineers have traditionally confined their interest all too narrowly to their technical speciality without evincing wider interest to take their place in the main stream of social activity.

1.3 To reverse this trend it is essential to do rethinking on our method of inculcating enthusiasm and entrepreneurship among our students. This would involve training our students towards practical application of technology, providing them the right motivation for improvement of existing technology, creating new technologies and offering solutions to pressing socio-technical problems leading ultimately to self-reliance in technology. We must give a new reorientation to our engineering education so that our new graduates will have the skills the incentives and the faculties to set up small manufacturing or consultancy of service units of their own either on an individual or a cooperative basis. An emphasis must be placed on inculcating wider interests in our training programmes at suitable stages to enable the graduate to discharge his responsibilities and obligations to society in the complexity of the modern age.

2.1 Creative thinking- Principles

2.11 Engineering by its very definition means a creative and innovative activity. Yet a very large majority of the engineers whom our educational institutions have been turning out have shown little initiative, interest or ability in creative and innovative work, preferring to play the part of dogs in the wheel maintaining and manning existing installations and services. Creativity and innovation refer to certain processes within an individual or a system. Innovation means producing a new, novel or unusual idea or product by applying logic, experience or artistry. Creativity on the other hand describes a human mental process that can recognise there is a problem and become motivated to formulate an imaginative solution which is both innovational and valuable.

2.12 All persons of normal intelligence possess some ability to think creatively and to engage themselves in imaginative and innovative effort. Unfortunately the vast majority of people are only partially aware of the range of their creative potential. One's social environment, home life, and educational experiences either stimulate or depress the urge to be creative. Social and

group compulsion towards conformity works in several ways and is a major depressant of creativity. Every one has some creative ability and this could be revived through exercise and stimulated into activity. The basic principles of innovative and creative thinking can be mastered.

2.13 Some of the qualities that make one more creative have been recognised and are briefly given below:

i) Keeping an open mind
ii) Non-conformist, aggressive, self-assertive and quick with ideas
iii) Not waiting for new ideas but trying to improve existing ideas
iv) Thirst for new and unusual experiences
v) Willingness to try new ideas even if they do not have success guaranteed.

2.14 Psychologists and educationists now agree that we are more creative than we think we are. Creativity can be systematically developed, since we are unfolding the in-born talents which are scarcely brought to the surface by the traditional educational processes.

2.2 Stages of creative thinking

2.21 While the importance of creativity is widely acclaimed, the art of developing and guiding intuition and inspiration - which are the very essence of creative expression - is virtually nonexistent in the field of science and engineering in contrast, say, to the arts. The ideal conditions for nurturing creativity probably rest somewhere between that needed for research and that required for artistic expression, since it blends science with creativity.

2.22 Every one of the stages that comprise the process of creative thinking towards innovation are amenable to cultivation.

2.23 Problem selection and formulation - This is perhaps the most crucial phase of the process, for the value of the

resulting idea is rooted in what the inventor starts to work on and the initial direction he takes. The manner in which a problem or technical objective is formulated sets the stage for invention. If the same boundary conditions that have created a problem are also imposed upon the inventor, then he is virtually precluded from making a significant advance.

2.24 Information gathering - Innovation can be regarded as the recombination of old knowledge in new ways to satisfy a need. The more knowledge he has, the more problem he has, and the potential of solving or even perceiving in the first place. Knowledge is the fuel of invention.

2.25 Incubation - This phase involves a period of intense reflection in which the pieces of a puzzle are put together, and is helpful in situations where a solution cannot be readily hit upon. In this phase the subconscious has a role to play.

2.26 Conception - Conception is the outgrowth of the preceding stages in the process of invention. If the inventor is motivated by a problem, has elements of its solution in mind, and is allowed time for incubation, the emergence of the right idea becomes highly probable. Even though the innate ability to conceptualize is an integral and deep element of a person's total psychological makeup, there are still a number of measures that can be taken to cultivate it. A means of cultivating this stage is to provide frequent occasions for crative expression. An inventor develops creative momentum with exercise. This conceptual stage can be stimulated through group interactions. It is essential that an environment for invention should be structured around individual creative expression; but group efforts could augment individual endeavours rather than replace them. The free exchanging of knowledge and ideas in such interaction is a valuable catalyst to conception and has a role in an ideal environment for invention.

2.27 Refinement - In this stage, the invention undergoes a metamorphosis from a nebulous idea to an operative proto-type. Through feedback from objective analysis and experimental work, the idea is brought closer to something of value. While rigorous logical and judicial thinking inhibits incubation and conception, it becomes the fire that permits the idea to be sharpened and refined into something useful. It demands the discipline and attention to detail that goes into scientific research.

2.3 The Value Engineering Model

One method of promoting creativity is to create a curriculum unit dedicated specifically to promoting pioneering ideas. We already have a precedent, in part, for such a unit in the concept of value engineering. Though there are many variations of value engineering, the essence of its methodology includes the following steps:-

(1) problem selection (2) reduction to basic functions (equivalent to problem formulation) (3) information gathering (4) speculation, development of alternatives (equivalent to conception) and (5) cost analysis (equivalent to refinement)

2.31 What we have in value engineering is the process of invention adapted to the specific objective of reducing costs. As shown above, the steps involved are very close to those that have been identified in the process of creative thinking.

2.32 The inventive abilities of participating inventors would be developed by broadening their knowledge bases and by giving them frequent opportunities to use their creative talents. The collective endeavour of individuals with knowledge and intuitions in the fields of physics, materials, chemistry, and mechanics has been very productive in a number of innovative endeavors. Gordon in his work with synectics groups has found that the key to many problems lies in the field of biology. Nature is a rich storehouse for solutions to a myriad of riddles.

2.4 Developing creativity

2.41 To develop creativity several methods are adopted in advanced technical institutions and research laboratories and these can be systematically introduced in our curriculum.

(a) A positive, optimistic attitude towards finding a practical solution to a problem is essential for creativity. This should be cultivated among the students by suggesting problems to them and making them work on it either in the laboratory or in the workshop.

(b) Selecting or defining a problem is required to enable the mind to grasp the problem and work hard at it.

(c) The sense of hard work must be instilled in the minds of students; creativity results from hard work. It rarely occurs by chance.

(d) The raw material for finding solutions is knowledge (i.e.) gathering, refining, digesting and organising information. This can be taught to the students only if they are made to frequent the library, call the information on specific topics and present it in a logical, coherent way. Literature survey is an essential training for a creative person. His knowledge should be not only wide but specialised on a topic.

2.5 Techniques of inducing creativity

2.51 The following techniques are adopted to intensify creativity among students:

2.52 Brain storming (Free-association technique)

The purpose of this technique is to bring out as many ideas as possible to bear on the problem. The following cardinal principles are observed in a brain storming session.

(i) Criticism of another man's view is absolutely barred

(ii) Modifications of ideas or their combination with other ideas are encouraged

(iii) Quantity of ideas is sought. A large number of possible solutions are gathered

(iv) Unusual or wild ideas are sought.

2.53 Analytical techniques

These techniques force people to seek ways to adapt, modify or eliminate products or parts of products to improve them. Writing down a check list of questions such as given below is a part of one such analytical technique:

i) Can this part be put to other uses?

ii) Can it be modified?

iii) Can it be reversed in position?

iv) Can it be simplified in design?

2.54 Forced relationship technique

This aims at gathering together unnatural or unusual combination of things or ideas. For instance, how about combining metallic gears and nylon gears in a machine, or coating plastics on metals?

2.55 Idea Transplantation technique

Idea transplantation from one situation to another where the problems exhibit similarities, is another useful technique of developing creativity.

Example: Radar navigation system developed on the same lines as the flying around of a bat.

2.56 Listening to complaints

Customer complaints on products provide often an useful source for generating creative ideas on new products.

Example: "I have to spend time to fill up the pen and also make my hands dirty". This has led to the development of ball point pen.

2.6 A Programme for Education in Creativity

2.61 The principles and techniques of training for creativity are well understood and sufficient literature is available on the subject and the related areas of innovation, inventions, information and needs analysis etc. The question is how to fit creativity training into the curriculum of undergraduates. Several ways could be thought of. Two approaches which seem promising are:

(a) Reorientation of teaching methodology to give opportunity in every subject to exercise creative and innovative thinking.

(b) Developing diversified streams offering selected groups of students electives in creative thinking and work experience. The course work would include instruction in principles and techniques of creative thinking, exercises in creative thinking, seminar sessions on the extended value engineering model, and workshops on conceptual design and modelling leading on to projects of development, testing and refinement. In the seminars and workshops participation of working engineers and industrial research and development personnel and persons from other areas such as manufacture, marketing consumer survey would be valuable.

2.62 Obviously this programme could be effectively implemented only in an atmosphere of institutional freedom and flexibility, where the evaluation and assessment have to be purely internal.

As the approach is problem oriented rather than discipline oriented, the creativity programme could better be organised if students as well as guides are drawn from different disciplines. Creativity libraries and laboratories should be developed and case studies collected. Industrial collaboration would be valuable towards bringing in realism through suggestion, constructive criticism and evaluations as well as in making available needed fabrication facilities and informations.

3.0 Entrepreneurship

3.10 As is well known, many facilities are now being extended by the government and other agencies to young entrepreneurs, particularly those with technical qualifications.

3.11 Entrepreneurship requires a combination of individual talent, initiative, a certain social background and sound training in management as applied to local conditions, specifically of small scale industries. Our technical institutions can and should contribute substantially to the development of the needed perspective, confidence and skills among the engineering students.

3.12 Training for entrepreneurship could be structured at different levels as below:

i) As a total technology postgraduate programme towards entrepreneural work in a large scale environment

ii) As a systems engineering diversification in undergraduate programme

iii) As a postgraduate short term specialist programme or as an elective stream structured into the undergraduate programme

3.2 Total Technology

3.21 Industry comprises of several functional areas. The engineering education at higher level in our country at present stresses mostly the design and research functions only. Because of this, though the student achieves a high level of competence in design and development techniques, he is not sufficiently exposed to the other aspects of industrial management. It has been recognised that there is a need for a group of engineers who possess a wide and systematic knowledge related to the entire gamut of engineering activities, operations and functions in industry appropriate to their field. This concept which is termed as 'Total Technology' is already being experimented upon in a number of British Universities. It is a form of training in which the solution of any problem is not viewed in isolation but in the total context of market, finance, personnel and manufacturing considerations. It must be emphasised that this type of training should be imparted to those who are interested in practical/industrial careers and who wish to develop their entrepreneurship skills as applied to major industries.

3.22 In order to explain how total technology is relevant to an entrepreneur, it should be pointed out that the student, after study in a Total Technology programme will be competent to analyse problem in its total context. The student would have undertaken comprehensive studies in a wide spectrum of areas such as planning, organising, coordination and control, market analysis and intrepretation, production, quality control and maintenance, human relations, financial and cost analysis, besides advanced work in his chosen technical discipline.

3.23 Thus he will be able to analyse any problem considering the following aspects so that he can effectively function not

just as a conventional engineer but more as an entrepreneur:

- the environment of the problem
- the basic technology for its solution
- the time constraint
- the market potential
- the interrelationship to corporate goals
- the financial considerations
- the design and production aspects
- the project management
- the human and sociological implications.

3.24 What is being proposed above under Total Technology differs from the traditional approach of the management school. The emphasis here is on an amalgamation of the functions of an engineer and an entrepreneur. The proposal refers to not only the need for imparting knowledge in general management subjects but also to a training in subjects which the young engineering graduate can put to immediate use.

3.3 Systems Engineering Training

3.31 Similar to total technology but differing in approach and theoretical orientation is the system engineering course. This concept involves a study of the total system through dividing the system into a number of components which are connected by some kind of interaction or interrelationship and which collectively respond to some stimulus or demand and fulfil a specific purpose or function. Each component in the system responds to stimulation according to the intrinsic nature but the actual stimulation it receives and its subsequent actual behaviour are conditioned by the presence and interaction of the other system components. The sub-systems and their activities can be so designed that the total system works in the most efficient way. The curriculum for such a programme can be structured as below to follow the core studies in engineering:

Specialised courses in the particular engineering discipline, general industries studies, feasibility studies, design concepts, production, marketing, financial management, and personnel management.

3.4 Short term Specialist programme for entrepreneurship

3.41 This programme could be organised around instruction in the following topics followed by a comprehensive project leading to a feasibility report. If the programme is offered as part of the undergraduate course, the project could include the product design, fabrication and testing aspects as well.

3.42 The course work should consist of:

i) Studies relating to small industries in India
ii) Systems design of small enterprises including design process, morphology, needs and activity analysis, decision techniques, optimisation and case studies
iii) Management of small scale industry including human relations, marketing management, financial management, and management accounting
iv) Production planning and management.

3.43 The project should require participants to conduct the market survey, the preliminary technical planning and industrial planning in sufficient detail to produce a viable feasibility report. Relevant information should be made available about possible scope in the small scale industries. Large scale industrialists may be invited to guide the participants in terms of requirements of ancillary products.

3.44 Besides the formal courses aforementioned, opportunities should be provided for the students to come in contact with successful entrepreneurs so as to gain first-hand knowledge of the difficulties in starting industries and their experiences in overcoming them, perhaps by Case-Study method.

3.45 Seminars in which executives from financial institutions, taxation departments, Directorates of Industries and Commerce, Factory Inspectorate, and other related government departments participate could periodically be arranged with a view to strengthen the practical content of the courses.

3.46 The laboratory assignment for the students taking the entrepreneurship programme as part of their undergraduate course should not be on the conventional analytical type of set-experiments but should be devised so as to bring out their creative talents in designing new gadgets and products for manufacture and improving existing devices and processes.

3.47 Financial support should be provided by government for the above programmes. Industrial collaboration in several aspects of the programme is vital to success. Necessary follow-up assistance should be arranged through government agencies for viable feasibility reports to be translated into actual industrial enterprises.

4.0 'EARN-WHILE-YOU-LEARN' SCHEME

4.01 A feature of our present educational system is that the students are not introduced to the process of earning during their study period. They receive financial assistance from their parents as well as from Government for supporting their studies to an extent that there exists neither the opportunities nor the obligation to seek self-support. Introduction of 'Earn-While-You-Learn' Schemes could be valuable in improving student attitudes and motivation besides giving useful experience in many cases.

4.02 As a general rule, students should preferably be given monetary assistances in return for some useful work rendered by them during their off-study hours. The work scheme should inculcate in the students a sense of responsibility in performing the job assigned and a sense of the dignity of labour. Further the importance of getting along with others on the job and a certain amount of financial discipline will be acquired by our students. They will also come to understand in this process, how a certain work could be done with cooperation from others involved or how to get work done from others. During the execution of such assigned work, the students might become aware of professional standards and codes, get to know trade names of engineering products, and pick up proficiency in the use of hand books, manuals or such other practical aids.

4.03 Such schemes which are already in vogue in many of the industrialised countries should be tried, keeping in view the local conditions. There are a number of jobs in any campus which need manpower at different times. Examples are: Computer operation/programming; library work; repair, trouble shooting and maintenance of laboratory equipment; job typing; book-keeping; laboratory assistance; sales promotion; students' co-operative stores. All such jobs require skills that can be acquired in a short time with little or no training. In addition, students can take up outside fabrication job work, testing assignments etc. utilising the facilities available in the laboratories and workshops. The students can also be encouraged to secure part-time jobs outside the campus in local industries, business establishments and farms which may be able to offer such jobs during evening-shifts, week-ends etc.

4.04 It is obvious that to implement such a scheme, suitable organizational structure such as a well-equipped Placement Office must be built into the institutional administration. The scheme must be thoroughly explained to the students at the beginning of their course; possibly even to their parents or guardians to avoid any misapprehensions. It may be necessary to

introduce minor modifications or adjustments in the time schedules to suit the scheme.

4.05 Since the jobs available will be limited compared to the number of students in the campus, a mode of selection should be devised for selecting suitable students for this scheme. As far as possible the students in the greatest need of financial support may be encouraged. It may not be out of place to emphasize that this scheme should not supplant but should supplement the existing scholarship schemes.

5.0 CONCLUSION

5.01 The importance of developing the creative and innovative potentialities of engineering students is emphasized. Creativity could be enhanced through educational programmes. The principles and methods as well as a curricular programme for creativity training have been outlined.

Training in Entrepreneurship skills is vital in the context of industrial development and national self-sufficiency. Such training could be organised in different ways including postgraduate total technology curricula, systems engineering diversification, and short term specialist programmes. Necessary follow-up assistance should be provided to enable participants to bring their projects to reality.

Implementation of Earn-While-Learn Scheme could go a long way to develop very desirable attitudes and skills among students, besides providing financial support to some extent.

APPENDIX - 22.

P.S.G. COLLEGE OF TECHNOLOGY, COIMBATORE-4.

Ref. B/275/75
Dated. 25.4.1975.

Dr. R. SUBBAYYAN
Principal.

To

The Asst. Educational Adviser (T)
Ministry of Education & Social Welfare
Government of India
New Delhi.

Through

The Secretary
Southern Regional Committee of AICTE
35, Haddows Road
MADRAS 600006.

Sir:

Sub: Establishment of Computer Centre at Coimbatore request for financial assistance

....

The State Board of Technical Education & Training at its meeting held on 28.11.1974 has agreed in principle to set up a Computer Centre at Coimbatore to meet the needs of the Educational Institutions, research centres and institutions in and around Coimbatore.

In this connection we are glad to inform that steps have already been initiated to establish a Computer Centre. The Centre will ultimately have

TDC-312 CPU with 16 K memory
Paper tape system

Magnetic Tape controller with 4 magnetic tape transports

Card reader and Line Printer.

It is planned to establish the Centre in three phases as follows:

		Rs.
Phase I	TDC-312 CPU with 12 K Memory and Paper tape system	4,58,870
Phase II	Additional 4 K memory and magnetic tape system	6,96,960
Phase III	Card Reader & Line Printer	4,98,150
	Ex. Factory cost	C/o. 16,53,980

		Rs.
	B/f.	16,53,980
Add: 15% Excise duty; 12.2% Sales Tax and handling charges 4%		5,16,042
20% physical facilities - buildings, furniture etc.		3,30,796
		25,00,818

As per this programme, we have already placed orders with the Electronics Corporation of India Ltd., Hyderabad for the first phase paying Rs.1,60,604/- as 35% advance to be paid along with the order. The delivery of the items of phase I is effected by the end of March 1975 and necessary civil work to house the unit, has also commenced. The first phase will meet all the scientific and research requirements and when all the phases are completely and fully operative, the system will definitely meet all the educational, research and industrial needs of Coimbatore.

TDC-312 is a third generation computer and will not be superceded by any other Indian make in the near future. In that sense it is a very modern system and its memory is also expandable upto 32 K.

In view of the above developments that have already taken place in establishing a computer centre at Coimbatore, we submit that this centre itself be taken up by the State Board for financial support and development. The gross capital expenditure of the centre would be aproximately:

Ex.factory cost of the system	...	Rs.16,53,980/-
15% Excise duty		2,48,097/-
12.2% Sales Tax		2,01,786/-
4% handling charges		66,159/-
20% physical facilities (Buildings, furniture, airconditioning etc.)		3,30,796/-
Grand Total:		25,00,818/-

The Governing Body of this College and Polytechnic considered this matter at its 42nd meeting held here on 10.2.1975 and resolved as follows:

...3.

"RESOLVED that the State and Central Governments be addressed through the Director of Technical Education and the Southern Regional Committee of AICTE respectively for necessary financial support for the development of Computer Centre at this Institution."

It is therefore requested that the Govt. of India will be pleased tosanction non-recurring grants for setting up a Computer Centre at this Institutions.

Soliciting your early compliance,

Yours faithfully,
sd/- R. SUBBAYAN
PRINCIPAL.

cc to:

The Asst. Educational Adviser (T)
Govt. of India
Ministry of Education & Social Welfare
Southern Regional Office
MADRAS 600006.

TRUE COPY

SUMMARY OF THE COMMENTS RECEIVED FROM CHAIRMEN OF THE GOVERNING COUNCIL OF FEW NON-GOVERNMENT TECHNICAL INSTITUTIONS IN THE SOUTHERN REGION.

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T A M I L N A D U.

Coimbatore Institute of Technology, Coimbatore.

The Governing Body normally meets once in a year. It seems very difficult to have more meetings as the members both Government and non-Government nominees, do not find suitable date as they are busy in their own spheres.

Due to revision of pay scales and allowance the net deficit is a increasing rapidly, bringing in a lot of strain on Private Management. The percentage of matching recurring grant of the State Government may be increased.

For each 5 year period, substantial non-recurring block grant may be made available.

Thiagarajar C[illegible] ing, Madurai.

The Governing Council is the supreme authority for the proper administration of the College and for the fulfilment of all conditions for recognition or for financial assistance from State and Central Governments. The Principal with the vested powers by the Governing Council is looking after the day to day administration of the College.

The release of grant from the State Government is governed by the Grant-in-aid code as prescribed by the State Directorate of Technical Education. The accounts of the college are audited by the Local Fund Auditors as per the

Grant-in-aid code. The College accounts are also subjected to audit by the Chartered Accountant as appointed by the Governing Council. The Local Fund Audit insists on routine matters like appointment of staff, grant of study leave to staff etc. for specific written approval from the Directorate of Technical Education and to satisfy the Audit it is causing unnecessary delay. As a result of this, the authority of the Governing Council which is the supreme authority for the administration of the College is very much minimised.

The selection of Teaching staff is made by a duly constituted Staff Selection Committee in accordance with the general orders of the Government from time to time. The recommendations of the Staff Selection Committee are approved by the Governing Council Before orders of appointment are issued. However, specific orders are to be obtained before appointment orders are issued to selected candidates. In almost all cases, the Directorate of Technical Education has to be approached and his orders obtained and in many instances even matters approved by the Governing Council have been negatived by the Directorate of Technical Education which is causing delay and inefficiency in administration of the College and hence the Principal has suggested that "appointment of staff can be made on the recommendation of the Staff Selection Committee and on the approval by the Governing Council".

The State Government at present gives 80% grant on the net deficit. With the increase of salary of various categories of staff and with introduction of CCA &

.....3/-

HRA to staff, the share of the Management has been steadily increasing during the last 5 years. The Managements present share of expenditure is about Rs.4.00 lakhs as against the amount Rs.1 lakhs, when the College was started. The Management therefore finds it extremely difficult to provide funds in time for payment of salary to staff, payment of bills etc. Therefore the college suggests that the assistance from the Government in the form of grant be increased from 80% to 95%.

The institution wants that a post of Bursar should be created for all the private Engineering Colleges also as that for other Government Engineering Colleges in the Government of Tamilnadu so as to relieve the Principal from the routine increased financial responsibilities.

The additional lumpsum provision of Rs.1.5 lakhs should be provided every year for each private Engineering College for purchasing new equipments in place of old ones or procuring new equipments to modernise the existing facilities or to suit the changes made in the course syllabi, as is done in the case of Government Engineering College.

The Physical facilities made available in Government and Regional Engineering Colleges are of a very high order compared to these found in private institutions. Large grants are made available to Government institutions and Regional Engineering Colleges and the institutions also receive more grants towards recurring expenditure. The students of Private Engineering Colleges are also coached for the same University Exam. and

....4/-

the standard of instruction has to be the same as for the students in Government Colleges or the Regional Engineering Colleges. This disparity in the physical facilities are agitating in the minds of the students of the Private Colleges (like Thiagarajar College of Engg., Madurai) sometimes it affects the displicine of the College. Therefore, the institution suggests that all institutions, irrespective of whether it is private, Government or Regional College, may be given same quantum of assistance in the form of grants from the Governments, so that undue comparison and disparity in their standards can be avoided.

The college suggests further that the hostel establishments and hostel office staff honoraria paid to Deputy Wardens, Tutors, Hostel Office staff etc., which are hitherto being met from the collection made from the students, be taken as admissible items for grant since with the present depletion in the strength of students in the hostel, the income by way of establishment charges etc. are found to be not sufficient to maintain hostels in the proper manner.

The College wants that certain precentage of cost of construction of the buildings be sanctioned every year, as is in Government institutions, in lieu of small lumpsum provision made for the repairs and upkeep of the buildings, since the lumpsum provision annualy is found to be very inadequate.

The Service canditions of staff in private Engineering Colleges must be improved as follows:-

....5/-

1. by allowing 50% of the vacancies upto Asst. Professors be filled up by promotion from the college and the remaining 50% vacancies by open selection.

2. As against the vacancy in a higher cadre, the college can have the option to upgrade an existing post so as to accommodate a qualified member of staff available in the College without increasing the total no. in the department as is done in Indian Institutes of Technology.

3. by extending the benefits like pension, gratuity Medical expenses reimbursement to staff of private colleges also.

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Sankar Institute of Polytechnic, Sankarnagar.

The Educational Trust desires to have the grants from the Governments in advance for the courses/electives whenever started. Hitherto, the Trust is receiving grants only after introduction of Electives.

Though the Governing Council is composed of members from Central Government, State Government and Management, the resolutions framed by the council seldom get the approval of the State Government when they assess the accounts. This is a drawback.

The Trust says that since the meetings convened by the Governing Councils are attended by the members from Central Government, State Government and the Management, the resolutions adopted should invariably be approved by the State Government.

V.S.V. Nadar Polytechnic:
Virudhunagar.

At present the State Government is meeting 80% of the

.....6/-

net deficit on recurring expenditure with effect from 1971-72 onwards. The Government of India, while approving the estt. of the Polytechnic had assured that the maximum contribution payable by the sponsoring Body towards recurring expenditure of the polytechnic would not be more than 40,000/- per year. But the share of the sponsoring Body exceeds the maximum contribution of Rs.40,000/- from 1965-66 onwards and the Management finds it difficult to meet its share of expenditure with its limited resources.

The Managing Board says that it would be of a great help if the Government of India come forward to extend its financial help by meeting certain percentage of deficit or the State Government consider the enhancement of grant-in-aid to atleast 90% instead of 80%.

The Staff is appointed by the duly constituted Staff Selecti Committee. In private polytechnics a staff selected by the Staff Selection Committee is not considered for promotion at all and he is treated on par with other outside condidates. He is also interviewed and chance of selection is not certain. This is a great disparity between the staff working in a private Polytechnic and a Government Polytechnic. The Government of India may consider this matter and permit the private polytechnics to select the staff through Staff Selection Committee when initial appointments are made and promote them subsequently to higher posts on seniority basis subject to approval by the Directorate of Technical Education, as per the

.....7/-

procedure being followed in Government Engineering Colleges and Polytechnics.

P.A.C. RAMASAMY RAJA POLYTECHNIC, RAJAPALAYAM.

The Capital expenditure is shared by the Central Government, State Government and the Sponsoring Body in the ratio of 40:25:35 and for the new courses started under IV Five Year Plan the sharing basis is in the ratio of $37\frac{1}{2}:37\frac{1}{2}:25$.

One or two Governing Council meetings in a year is arranged alternatively at Madras and Rajapayalam. Introduction of any new courses are considered only with the concurrence of the Governing Council. The Staff selected through the Staff Selection Committees are also placed at the Governing Council meetings and got approved then and there. Experts from all the five branches be appointed on the Governing Council (i.e. Civil, Mech. Elel. Text. and Dip. course in Comm. Practice) so that the guidance of the members of the Governing Council will be more useful.

The allotment of additonal funds for the institutions which have completed the ceiling of AICTE may be considered by the Governments to encourage the managements to start new courses and procure latest equipment for steady development of the institution to suit the time and needs of the future. The additional funds so sanctioned may be shared by the Central and State Governments at 50:50 ratio, which will be an incentive for the managements of the private institutions to start new courses.

.....8/-

The pattern of recurring assistance may be made uniform at All-India level.

The advance recurring grant now sanctioned by the Directorate of Technical Education in 3 instalments may be enhanced with reference to the 80% of actual share of State Government in the immediate preceeding year, since the expenditure will be increasing year after year.

A quality assessment team consisting of leading academic experts may periodically inspect the various polytechnics in the State and asked to prepare detailed report containing the teaching facilities, installation of equipment and training offered by the institution, administrative efficiency etc. with their recommendations for improvement to the Chairman for the benefit of the institution. Yearly conference of the Principals and chairman of all the Polytechnics in the State including Government Polytechnic may be held to have discussion and to find ways and means for the improvement of the technical institutions.

Staff pattern and all the financial benefits including pension scheme, reimbursement of Medical expenses, family benefit scheme or any other benefits given to Government servants may also be extended to private polytechnics.

Better representations by Principals of private Polytechnics may be given in the State Board of Technical Education Committee. It is further suggested the includion of representation of the Managements of private polytechnics in the State Board of Technical Education.

Valivalam Desikar Polytechnic, Nagapattinam.

There has been a steep rise in the recurring expenditure involved year after year, because of revision of staff salaries. The Management contribution being 20% of the net deficit comes to Rs.60,000/-. It is suggested that Management's share of expenditure may be reduced so as to minimise the financial commitment of the Management.

It is suggested that Managements' share of expenditure may be reduced further and a uniform pattern of sharing of expenditure be devised so as to minimise the financial commitment of the Management.

It is further suggested that future capital expenditure items in terms of building and equipment be fully met by the State and Central Governments. This will help very much in further growth of the private institutions which have already reached a stage of development and are handicapped due to financial resources.

Thiagarajar Polytechnic, Salem.

In the present setup, Principal takes care of all the day to day administration as per the guide-lines given in Grant-in-aid code of the State Government.

The Governing Council reviews the general administration of the Polytechnic and acts more as a suggestive body rather than with any financial sanctioning power except for the approval of the budget.

Under revised syllabus greater stress had been laid on lab. and W/s practices and of late, the cost of materials, electricity charges etc. have gone up very high. In the absence of any guidelines for recurring expenditure, very often recurring expenditure is kept at a low level so that none of the expenditure is disallowed for grants sacrificing the quality of training. It is, therefore, suggested that definit guidelines can be given to the private institutions so that the expenditure incurred as per guide-lines becomes admissible for grant purposes.

Each private institution needs to be sanctioned with Maintenance wing of 2 to 3 supervisors with suitable staff for the maintanance of buildings, roads, electrical installation, water supply etc. Separate grants must be made available for private institutions for proper maintenance of the buildings, roads, etc.

Suitable remedy must be found out for promotions of the staff members of private institutions in view of the very limited scope for promotions.

All the benefits enjoyed by the staff of Government institutions must be extended to the staff of private institutions.

Principals must be empowered to make temporary appointments against sanctioned posts in case of emergency, unlike in normal course through the Staff Selection Committee.

At present the accounts of private institutions are subjected to the following audits:

.....11/-

1. Local Fund Account Audit
2. Accountant-General Audit
3. Chartered Accountant Audit
4. Directorate of Technical Educations' verification of accounts. If possible duplicate of audit work can be eliminated.

The principals of private institutions have greater responsibility and in the present setup principals look after most of administrative work rather than the improvement of academic side. Hence, it is necessary that Principal is provided with a P.A.

Rajagopal Polytechnic, Gudivattam.

The Governing Council meets thrice a year. The Principal is the Administrative Officer of the Polytechnic and is responsible for efficient and proper running of the Institution. At present the capital expenditure are being shared by the Central, State Government and Management in the ratio of 50:25:25:.

The State Government is meeting at present 80% of the net deficit.

At present there is no provision for replacing the unserviceable or obsolete equipment with new one and to purchase additional equipment to suit the changes in syllabus from time to time. There is delay in the sanction of new electives with the result that the students are not given proper training in labs and W/s, due to lack of equipment.

....12/-

The Governing Council should be empowered to utilise the grant for purchase of equipment to suit the need for such equipment for further development of the institution without any restriction. (relating to a particular department or a particular machine).

The benefits like pension, gratuity and other schemes as applicable to staff in Government Polytechnics be extended for the staff of the private institutions also to remove the disparity and dissatisfaction of the staff members in private institutions, failing which it might affect the efficient discharge of duties on the part of the employees.

MCM POLYTECHNIC, AVADI.

To keep up with the developments in the field of technology, it is considered necessary to replace regularly old equipment and machinery with more modern ones. Hence, it is essential that Central Government should continue to extend financial assistance for providing further machinery and equipments in the W/sps and Labs. For installation of new machinery and to extend the present academic facilities it is necessary to expand the present buildings.

State's finances are limited as most of the funds are used for development of primary and secondary education and there is very litle left for Technical Education. It is therefore, strongly suggested that the Central Government continue to extend financial

.....13/-

assistance for development of private polytechnics.

As the Central Government had come forth with a specified pattern of assistance, this institution started sandwich courses in C.E.E Branches and the result has been extremely good. But the withdrawal of assistance suddenly and the State Government not being able to extend similar assistance has caused great anxiety and the starting of further courses has been dampened to a considerable extent.

When the private polytechnics were started it was indicated that the Management share of recurring expenditure would be in the order of Rs.40,000/- for 120 intake and for an intake of 180 students the share of the Management would be proportionately at the maximum of Rs.60,000/-. The maintenance costs have been increasing year after year. Consequently the Managements responsibility in sharing of recurring expendes has gone up to Rs.1,43,000/-. Hence, it is necessary that the Central Government makes either additional allotments to the States (or) meets directly the additional recurring expenditure beyond Rs.60,000/- in the case of private institutions with an intake of 180 students.

It is also necessary that a realistic view is taken of the costs of construction and allot suitable funds for providing additional accommodation by way of extension of existing buildings without adopting the

....14/-

pro-rata basis of Rs.20/- and Rs.16/- adopted 20 years back and still continue to use the same for making allocations for building grant. In this context, it is pointed out that this institution has spent Rs.14,77,490/- against buildings for an area for which the assessed value on the above pro-rata basis is only Rs.11,06,820/-.

Ramakrishna Mission Technical Institution, Madras.

The Governing Council normally meets twice in a year. This institution is functioning smoothly and extremely well. The State Government of Tamilnadu meets 80% of the nett deficit on recurring expenses. The Management is finding it difficult to meet its share of 20% of the nett deficit.

Regarding development, the Management is fully restricted by lack of funds.

Seshasayee Institute of Tech., Tiruchirapalli.

There is a vital need for additional area for conducting theory classes in various elective subject, which, if sanctioned, will be a great relief to the Management.

The State Government may give to the private institution some freedom and discreationary powers with regard to the appointment of staff, incurring expenditure

....15/-

etc. within the broad framework laid out by them for the qualitative improvement and development. To tone up the institution with modern developments, the institution has to introduce new electives. To handle classes for such new electives, the institution requires new specialised hands. In the absence of posts the institution has to resort to make staff arrangements which creat problems. It is, therefore, suggested that the Directorate of Technical Education be vested with powers to sanction additional posts if a case is made out to him and if there is full justification.

The existing set up for the efficient running of the institution is O.K and no alteration appears to be necessary.

The Government must help the Management by increasing their pattern of assistance and also permitting the introduction of new courses on 100% grant basis both in respect of recurring and capital expenditure.

Srinivasa Subbaraya Polytechnic, Puttur.

The Management always feels it difficult to subscribe its share of expenditure due to the increasing price of materials and enhancement of salaries etc., The difficulty of the management to contribute its share fully creates a handicap in the efficient running of the institution.

....16/-

K A R N A T A K A.
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Malnad College of Engineering, Hassan

For smooth running of theprivate Institution, the salaries of the staff have to be disbursed on 1st of every month. Due to paucity of funds in the Management and uniformity rules of State Government in advancing the grants, the private technical institutions are feeling difficult to disburse the salaries on the 1st of every month. The following points are suggested to avoid this.

I. For the smooth running of the institution the salaries of the staff have to be disbursed on 1st of every month. Due to pausity of funds in the Management and Uniformity rules of State Govt. in advancing the grants, the private technical institutions are feeling difficult to disburse the salaries on the Ist of every month. To avoid this I suggest the following points:

i) Fee reimbursement has to be done in the beginning of the year and any difference will have to be adjusted at the end of the year after finalisation of accounts by the department.

ii) Quarterly grants have to be released by the Director of Technical Education on

.....17/-

the basis of Budget figures of the concerned year instead of taking into consideration the expenditure of previous year.

II. In addition to the present structure of the Governing Body of the institution, One Senior most staff member of the institution should be included to represent and strengthen the growth of the institution.

III. Advance grants to the extent of 60% be paid for the purchase of equipment, Library books etc. under Plan schemes so that the amount can be fully utilised by the institution as per their Budget programme.

IV. After the introduction of Diversified course in Technical Institutions the teaching staff have to be assigned Project work and the expenditure on such project work should be approved by the State Government and Management.

V. i. The salary cheques of the staff have to be sent directly to the employee's account by the State Govt. as was being done in the case of High Schools employees. The procedure has also been recommended by the University of Mysore, Mysore recently to the State Government.

.....18/-

ii) As and when the Government orders are issued by the State Government the same should be made applicable to the aided institutions also instead of issuing the same separately after a lapse of several months.

NATIONAL INSTITUTE of Engineering, Mysore.

The Governing Body is functioning well and smoothly in accordance with rules framed by this institution and within the framework of both Central and State Governments.

The financial position of the Institution is sound. The Management is not finding any need for changes in their organisation setup

B.M.S. College of Engineering, Bangalore.

The Principal is the Chief Executive Officer and acts in close liaison with the State Government, the Central Government and the University. The General administration and governance of the college rests in a Governing Body called the Board of Management.

Because of non-availability of adequate and timely maintenance grants from the State Government due to procedural and audit difficulties, and with the sharp recurring expenditure, the management is finding it difficult to run the institution at its present

standards of administrative and academic efficiency.

The college has been finding it impossible to replace the depreciated and obsolete machinery and equipment in the W/s s and Labs. Most of these equipments were installed nearly 25 years ago and much of it are worn out owing to long usage and require to be immediately replaced if instructional standards are to be maintained. If only depreciation on equipment was allowed as an admissible item of expenditure under the State Grant-in-aid- c de, the institution could have easily built-up a depreciation fund from which it could have financed replacement costs.

The institution seeks greater autonomy in financial matter. The grant-in-aid code does not allow any grants for the expenditure incurred on staff employed for maintenance of buildings and estate.

With the increased financial responsibilities the Management finds it difficult to cope-up with the work having a very limited st ff. The staff pattern approved for the institution needs revision. The Directorate of Technical Education under the suggestion of the AICTE has appointed a Committee of Pr ipals to consider the question of revision of staff pattern. The recommendation of the Committee would show the immediate need for changes in staff pattern.

The Management finds it difficult to secure adequate grants for the over-all development of the institution.

....20/-

The grant-in-aid code prescribed by the State Government needs amendment to render it more useful and in conformity to the financial needs of the institution. The Management suggests to formulate a uniform grant-in-aid code applicable to all Engineering Colleges. The Central Government may consider renewal of its development grants on the III plan pattern of Central assistance.

The institution pays salaries to staff deputed for the quality Improvement Programme Scheme. No substitute is allowed to be posted. The workload inevitably is being shared which reduces the academic efficiency. The Management suggests to have a uniform staff pattern formulated by the AICTE to be made applicable to all the Engineering Colleges.

The institution should be given greater autonomy and be independent of the restrictions and regulations of the grant-in-aid code in the matter of maintenance grants and University in the matter of selection and recruitment of staff, internal evaluation, formation of curricula and award of degree. This would bring the institution at par with IIT and the Regional Engineering Colleges in the country.

Block grants for maintenance of the institution should be given on the basis of certain percentage of expenditure determined on costs involved per student

.....21/-

per year. This institution should be left free to meet the remaining per centage of the expenditure by charging such fees as becomes necessary. The Management wants to have the Central Developmental grants during the Vth and succeeding periods on more liberal scales and terms on the pattern as existed during the IIIrd Plan. It is also stressing the necessity of sanctioning Post-Graduate Course for the institution by the Central Government.

B.V.V.Sangha's Polytechnic, Bagalkot.

The present organisational and administrative set up be continued as they are working effectively. The finances may be advanced from the State and Central Governments as and when it is required by the institution and be allowed to spend out of the amounts so released even if the share of private institutions are not available. The State Governments share of recurring expenditure at 85% of the nett deficit be further raised to 95% of the nett deficit. The reason as to why the non-Government institutions are not developed continuously in the limited time alloted is because of lack of finances made available to them.

Acharya Pathasala Polytechnic, Bangalore.

The major problem faced by the Management of the Polytechnic is mainly financial. The development programmes which were started during II Five Year Plan

.....22/-

has not been completed due to lack of funds. The management finds it difficult even to meet the Maintenance expenditure of the Polytechnic. This is due to increase in staff salaries, even though the staff position remains the same. The present system in Administration and Development of the institution is quite satisfactory.

The Management requires increased quantum of State Government assistances at 95% of the nett deficit (or) atleast 100% of the recurring and non-recurring expenditure. The Management feels that a ceiling limit of Rs.10,000/- should be fixed as Management share of maintenance grant and by inclusion of the actual expenditure incurred as admissible item of expenditure.

Whenever there is revision of pay scales and D.A the expenditure must be met by Government and ad-hoc grants released in advance for disbursement of arrears instead of the existing system.

Payment of salaries directly by cheque system to staff as is done by the Department of Public instruction is absolutely necessary to avoid any difficulty in payment of salaries.

A N D H R A.

Central Institute of Commerce, Hyderabad.

The present system of administrative and organisation set-up has been functioning very smoothly

.....23/-

and effectively. The institute has not faced any problem in running the institution. Hence, no alteration in the existing system is desirable.

K E R A L A.

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T.K.M.College of Engineering, Quilon.

Organisational and Administrative set up.

The tendency on the part of the State Government especially after the system of direct payment was introduced, is to treat private Engineering Colleges as Government institutions subject to the control of the Director of Technical Education. The powers of the Principal in the matter of administration and functioning of the College should be well defined with more powers delegated to the Principal for taking decisions.

Governing Body:

The Governing Body is represented by the nominees from Central and State Governments and from managements. Eventhough the Governing Body is considered to be a decision making body and supreme in all respects, its powers are now very much curtailed due to direct payment. Recent trends in the approach of State Government to issues exclusively within the powers of the Governing Body has given rise to embarrasing situations in the relationship between the State Government on the one hand and the Management and Governing Body

on the other. There have been many instances of interference on the part of the State Government after decisions have been taken by the Governing Body. The functioning of the Governing Body has become a formality since any decision taken by the Governing Body can be questioned by the office of the Director of Technical Education later.

Problems felt or faced.

(i) When the institution was established a pattern of assistance was agreed upon between the Central and State Governments and the management. Model list and Staff Pattern approved by Central Government was followed and which is not in force now after the introduction of direct payment by State Government. The intake of students branch-wise can be changed by the department (DTE) without the approval of the Universi-ty.

(ii) The equipment purchased initially require repairs and replacements. There is no provision towards this with the result that conditions in the workshops and laboratories have been deteriorating. The depreciation of machineries have not taken into account so far.

Chairman's office. The Chairman of the Governing Body has to discharge responsibilities imposed on him. The management cannot insist on the non-teaching staff of the college to attend to the work of the Chairman's office in addition to their normal work. It is essential, therefore, to make provision for the Chairman's office and establishment.

(iv) At present there is no provision for further development and expansion. Provision may be made for Central and State assistance covering additional accommodation and equipments, replacement of furniture etc.

(v) As it is, even short term vacancies have to be filled up on the advice of the Selection Committee. A provision that short term vacancies not extending 3 to 6 months may be made by the chairman with appropriate safeguards against circumventing the powers of the selection committee will avoid a lot of delay in the appointments to short vacancies.

(vi) The Managements have been deprived in many instances of eligible items of grant by audit objections in the Director of Technical Education's office. It may be submitted that Leave surrender, House rent allowance, special increments paid to employees before direct payment have been disallowed, with retrospective effect.

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Changes or alterations necessary:

(i) The State Government considers that the entire responsibility or burden of development of the Institution is the Management's concern. The academic as well as the administrative standards suffer due to unnecessary correspondence with the State Government for implementing decisions taken by the Governing Body. Such instances have taken place in cases of appointments, admission of students etc.

(ii) For running the institution and to meet the day to day expenditure the only source is, income from special fees and meagre grants from Government. Both these are considered inadequate and the allotments are unscientific and irrational. Hence a more liberal view is to be taken by the Government in this matter.

Conclusion.

It is felt that more autonomy may be given to private college Governing Bodies, more or less, on the same lines as the Governing Bodies of Regional Engineering Colleges.

Swami Nithyananda Polytechnic, Kanhangad.

The Governing Body meets 3 to 4 times a year. 50% of the expenditure on capital is met by the Government of India and the remaining 50% being borne by the State Government and the management equally.

The institution is facing lack of accommodation both for institution and for the hostel.

It will be desirable if the present Mech. Engg. course is changed as Mechanical Engineering (Servicing & Repairs) as recommended by the AICTE (or) it may be still better to introduce new courses like Agricultural Engineering in the place of Mech. Engg. course. The course in Commercial Practice must also be started immediately. Regarding administrative side, it will be desirable to create the required posts immediately and fillup such posts.

The Management of the institution is looked after very well. For further growth of the institution it will be desirable to divert the activities here more, so as to convert this into a production-cum-training (or) Service Centre. The location of the campus is such that there will be great scope in these lines especially with reference to Automobile Engineering and Agricultural Machinery etc.

Mar Athanasius college of Engineering, Kothamangalam.

Powers of Governing Body:

There have been instances of needless interferance by the State Government in matters which are within the private agency or Governing Body. The instance in point is the insistance of the part of

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the State Government that appointments to higher categories in the teaching staff shall be made by promotion of qualified hands from lower categories under threat of refusal to pay salaries of teachers appointed by selection to vacancies in the higher categories, when such vacancies can be filled up by promotion. The State Government ignores all such relevant considerations as suitability and fitness essentially for the managements and Governing Body to decide. The Chairman of the Governing Body of the college says that it goes counter to the instructions given by the Central Government that promotions to higher categories in the teaching staff shall be made by selection as in the case of direct appointments to lower categories.

Provisions of the Kerala University Act in many matters may supersede the considered decisions of the Governing Body and the terms and conditions of the original agreement between the private agencies, the Central Government and the State Government. In view of above, the whole question of the powers of the Governing Body has to be defined, and made free from all interference from the State and the Central Goverment except for such control as the University has to exercise in all academic matters.

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Direct payment system in Kerala and its impact on the rights and obligations under the terms of the original agreement.

The tendency of the State Government is to treat private Engineering Colleges and Polytechnics as Government Institutions wholly subject to the control of the Education Department even in regard to matters which are essentially within the purview of managements or the Governing Body. Appropriate provisions have to be incorporated in the original agreement to define and delimit the functions and authority of the Governing Bodies as well as the Private agencies to avoid needless interference on the part of the State Government embarrassing alike to all concerned.

As at present there have been occassions when the State Government representatives on the Governing Body had to subsequently go back from the position they took up at the meeting of the Governing Body.

Other problems that have arisen after the New University Act and the system of Direct Payment was introduced in Kerala:

(A) As it is, the managements experience a lot of hardships since there is no provision for establishment of the Chairman's office expenditure. The

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Chairman requests to treat the above expenditure as an admissible item expenditure for purpose of grant.

(B) . The Chairman requests that a provision for making appointments for short term vacancies not exceeding 3 to 6 months may be made by the Chairman.

(C) Provision may be made for State assistance covering additional accommodation and equipments, replacements of furniture and library books and also expenditure in respect of additional courses newly introduced.

Screening Committee for selection of candidates for Q.I.P.

(D) The screening Committee for Quality Improvement Programme selection is yet another instance of avoidable interference with the right of the management and the Governing body. It is for the management to decide the subjects and the personnel to be considered for the QIP. Any control if that be necessary in the selection of candidates has to be exercised by the Governing body in which the State and the Central Governments are adequately represented.

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(E) Sanction is requested to raise the rate of special fees.

(F) Better provisions may be made as regards such items as surrender salary, H.R.A and special increments etc.to avoid the embarrassing objections leading to cuts in items which are admissible.

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APPENDIX No.25

BOARD OF APPRENTICESHIP TRAINING (SOUTHERN REGION)

MADRAS - 5.

NOTE REGARDING THE IMPLEMENTATION OF THE GOVERNMENT OF INDIA PROGRAMME OF APPRENTICESHIP TRAINING DURING THE YEAR 1974-75 AND THE IMPLEMENTATION OF APPRENTICES (AMENDMENT) ACT 1973 AS IT PERTAINS TO THE TRAINING OF GRADUATES AND DIPLOMA-HOLDERS IN ENGINEERING/TECHNOLOGY DURING THE YEAR 1975-76.

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The Board of Apprenticeship Training (Southern Region) sponsored by the Ministry of Education and Social Welfare, Government of India has been implementing the Government of India Programme of Apprenticeship Training since 1969. Under this Scheme, Graduates and Diploma-holders in Engineering/Technology were provided with an opportunity to undergo practical training for a period of one year in various industrial establishments coming under the Private and Public Sector and Departments coming under the State and Central Governments. During the period of training, an Engineering Graduate received a minimum rate of stipend of Rs.250/- p.m. and a Diploma-holder a minimum rate of stipend of Rs.150/-p.m. The expenditure towards payment of stipend was completely met by the Government of India with the exception of a few Establishments who had come forward to contribute towards the payment of stipend.

During the year 1974-75, as against a provision of Rs.32.8 Lakhs, an expenditure of Rs.31.18 Lakhs has been incurred towards the payment of stipends to the apprentices. In addition to the candidates continuing from the year 1973-74, a total number of 765 degree holders and 833 diploma holders have joined training under the Scheme during the year 1974-75 as per Statement given below:

Statement showing degree and diploma-holders who were posted and joined the scheme during the year 1974-75

NAME OF THE STATE.	Degree (Senior) holders Award letters issued.	Total actually joined	Diploma (Junior) holders Award letters issued.	Total actually joined
ANDHRA PRADESH.	228	146	302	240
KARNATAKA.	364	282	250	174
KERALA	217	180	204	175
TAMILNADU	226	157	401	244
	1,035	765	1,157	833

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During the year 1975-76, Rs.27.00 Lakhs has been sanctioned for the Southern Region towards the payment of stipend. Out of this approximately Rs.18.00 Lakhs will be utilised for the 341 graduates and 354 diploma-holders who were placed during 1974-75 and who are continuing their training during 1975-76.

In order to ensure that the trainees get a gainful and effective training during the period of training, the following steps were taken by the Boards:

1. A guideline was prepared for formulating training programmes and circulated to the Industries.

2. The apprentices were required to submit periodic training reports.

3. The training establishments were requested to furnish periodic assessment reports.

4. Establishments were visited by the officers of the Board to supervise the training programme.

The Apprentices Act 1961 which was hitherto covering the training of Trade Apprentices was amended in 1973 to cover the training of Graduates and Technician apprentices. This amendment was brought into effect w.e.f. 1st December 1974 through a Gazette Notification. In view of this change, the Ministry of Education, Government of India informed the Board while releasing the Stipendiary Funds for the year 1975-76 that the placement of candidates during the year 1975-76 should be as per the provisions of the Apprentices (Amendment) Act 1973. Accordingly, necessary action was initiated to implement the provisions of the Apprentices Act as it pertains to the training of Graduate/Technician apprentices.

As per the provisions of the Apprentices (Amendment) Act 1973, every Employer will be required to train a prescribed number of Graduate and Technician apprentices in relation to the number of technician supervisory/managerial persons employed in the organisation and the training facility actually available in the organisation. These numbers are to be determined by this office after obtaining the necessary statistical information from the Establishments. The period of training for the Graduate and Technician apprentices has been prescribed as one year. An enabling provision has also been made to cover the training of sandwich course students both at the degree and diploma levels under the Act. The minimum rates of stipends prescribed for the various category of apprentices are as given below:

a) Graduate in Engineering/Technology (for post institutional training) Rs.250/-p.m.

b) Sandwich course student from degree Institute. Rs.200/-

c) Diploma-holder (for post institutional training) Rs. 150/- p.m.

d) Sandwich Course student from diploma Institute. Rs. 100/- "

As per the provisions of the Act, 50% of the minimum rate of stipends paid to the apprentices by the Employer would be re-imbursed by the Government of India through this Office. The employers will be required to train the apprentices as per a planned training programme which has to be approved by the Central Government. The apprentices will be required to enter into a Contract of Apprenticeship with the Employer before joining the Establishment as apprentices. On successful completion of the training, the apprentices would be awarded with a Certificate by the Central Apprenticeship Council. The necessary Rules for operating the Act has been published on 27th May 1975.

Nearly 750 Establishments coming under the purview of the Act in the Southern Region have been addressed bringing to their notice the provisions of the Apprentices Amendment Act 1973 as it pertains to the training of Graduate/Technician apprentices. They have also been asked to furnish the required statistical information for enabling this office to determine the number of graduates/technician apprentices to be engaged by them. Till now, nearly 1300 training places have already been located and nearly 200 candidates have already been engaged as apprentices. The remaining Establishments have been asked to engage the apprentices.

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