Report of the Reviewing Committee of Regional Engineering Colleges

Ministry of Education & Social Welfare
Government of India

New Delhi
February 1974

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V. C. Lodge,
Roorkee University,
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——February 1974

From

Dr. Jai Krishna,
Vice-Chancellor,
Roorkee University,
(Chairman, Reviewing Committee
for Regional Engineering Colleges),
Roorkee (U. P.).

To

The Minister of Education,
Social Welfare & Culture,
Government of India,
Shastri Bhavan,
New Delhi.

Dear Minister,

I have the honour to forward herewith the report of the Reviewing Committee appointed by the Ministry of Education in their letter No. 19-33/ 711-T. 4. dated 17th January, 1972, to review the progress of the Regional Engineering Colleges and recommend the lines on which they should be further developed including pattern of financing from Central and State resources.

Yours faithfully,
JAI KRISHNA

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CHAPTER 0

FORMATION OF THE REVIEWING COMMITTEE

0.1. Following the decisions of the Government of India taken in 1958 and 1960, 14 Regional Engineering Colleges were established, one in each of the major States, during the period 1959-1964. One more (15th) in Silchar (Assam) is under establishment. With a view to (a) assessing the financial requirements of the R. E. Cs. during the latter part of the 4th Plan period and in future, and (b) finding ways of distributing responsibilities between Central and State Governments for funding the R. E. Cs., the Planning Commission discussed the subject with officers of the Ministry of Education at a meeting held on 16th February, 1971.

0.2. At that meeting of the Planning Commission, it was decided that the Ministry of Education might constitute a high powered committee to consider the question of the future set-up of the Regional Engineering Colleges and the pattern of their financing from central and state resources. This committee should inter-alia consider the question of affiliation of the Regional Engineering Colleges to the Zonal Institutes of Technology, and other academic and administrative matters pertaining to the scheme, like the recruitment of staff and their inter-changeability amongst different institutions. Accordingly, the Ministry of Education appointed a Committee, vide their letter No. F. 19-33/71-T. 4, with the following composition and terms of reference :—

Composition :

1. Dr. Jai Krishna, Vice-Chancellor, Roorkee University. — **Chairman**
2. Prof. P. J. Madan, Pro-Vice-Chancellor, M. S. University, Baroda. — **Member**
3. Prof. N. C. Saha, Principal, College of Engineering, Aligarh University, Aligarh.

4.	Prof. R. G. Narayanamurti, Professor of Mechanical Engineering, Indian Institute of Technology, Madras.	Member
5.	Prof. D. Y. Phadke, Professor of Electronics, Tata Institute of Fundamental Research, Bombay.	,,
6.	Prof. Moonis Raza, Professor of Geography, Jawaharlal Nehru University, New Delhi.	,,
7.	Shri O. P. Mohla, Deputy Financial Adviser (Education), Ministry of Finance, Shastri Bhavan, New Delhi.	,,
8.	Shri K. B. Sivaramakrishnan, Education Division, Planning Commission, Yojana Bhavan, New Delhi.	,,
9.	Prof. E. C. Subbarao, Professor of Metallurgical Engineering, Indian Institute of Technology, Kanpur.	,,
10.	Dr. M. G. Krishna, Director, Indian Institute of Petroleum, Dehra Dun.	,,
11.	Shri D. V. Narasimhem, Dy. Educational Adviser (T), Ministry of Education & S. W., New Delhi.	Member-Secretary

Terms of Reference :

(a) To visit the Regional Engineering Colleges and report on their present stage of establishment and development. including courses of study and

standard faculty, admissions and other instructional facilities.

(b) To report on the present organisational and administrative structures of the Regional Engineering Colleges **vis-a-vis** the aims and objects for which the colleges have been established.

(c) To recommend the future set up of the colleges, including pattern of financing from Central and State resources to ensure their functioning as all-India institutions of High quality and standard.

(d) To report on the practicability and desirability of affiliating or associating the Regional Engineering Colleges in a suitable manner, with their respective Institutions of Technology for all academic purposes, including exchange of faculty, common courses, etc.

0.3. Working of the Committee :

After preliminary discussions by the Chairman of the Committee in the Ministry of Education, the visits to the Colleges commenced in April, 1972. The Committee visited all the colleges and the last visit was on 19-9-'73. Dr. Krishna and Prof. Subbarao visited only those R. E. Cs. that had Chemical and Metallurgical Engineering departments respectively. During visits to the colleges, members went round all the departments and assessed their present stage of development. The committee had discussions with members of the Boards of Governors, State Government representatives, teaching and non-teaching staff associations and representatives of student bodies, on various issues covered in the Terms of Reference, concerning progress, development, management and future of the colleges. All R. E. Cs. supplied to the Committee detailed reports on their growth, present state of development and future needs and also additional information when required by the Committee.

CHAPTER I

ESTABLISHMENT OF REGIONAL ENGINEERING COLLEGES AIMS AND OBJECTIVES AND THE SCHEME

Historical Background

1.01. A large number of industrial projects were contemplated for the 2nd Five-Year Plan period (1956-61). In order to ensure the supply of trained personnel to man these projects, the Planning Commission, in September 1955, appointed an Engineering Personnel Committee (EPC), to undertake an overall assessment of the demand and supply position in respect of engineering personnel—graduates and diploma-holders—during the 2nd Plan period and to recommend the extent to which facilities for technical education should be expanded. The EPC has estimated that by 1960-61, there would be a large gap in the supply position and the shortage will be of the order of 1,800 engineering graduates and 8,000 diploma-holders.

1.02. For fulfilling the recommendations of the EPC, a scheme was formulated for (a) expansion of the then existing 19 engineering colleges and 50 polytechnics and (b) the establishment of 3 new engineering colleges and 23 polytechnics.

1.03. The Government of India decided to implement the first part of the EPC recommendations in 1957. As regards the establishment of the new institutions, it was decided that the matter should be re-examined in the light of the following considerations :

(a) New institutions, both for degree and diploma courses should be spread more evenly to ensure progressively equal opportunities for training all over the country.

(b) In planning the capacity for training courses both in the existing and the new institutions, the requirements of future five-year plans should also be kept in view.

The Central Government also decided that the new institutions to be established, after a review of the whole matter, should start at least with

effect from the academic year 1958.

1.04. In order to decide the number of engineering colleges that should be started on the initiative of the Central Government, a statistical and integrated approach on the basis of the nature and scope of the future 5-year plans was called for. However, at that stage these details were not available. Nevertheless, expansion of technical education facilities to the extent possible, could not be delayed since institutions had to be established and courses organised well in advance of the initiation of the development projects. The problem was one of keeping a distant situation in mind and plan for technical education in stages.

1.05. With this end in view, it was decided that during the 2nd Plan period, facilities for first degree courses may be extended to about 11,000 seats from the then estimated figure of 9,000 places that would be available by the end of the 2nd Plan period. The extra 2,000 places were sought to be created in establishing 8 new engineering colleges, each with an annual admission of 250 students.

1.06. These are large-sized institutions judged by the standards then prevailing in the country. The considerations that weighed in this decision were : (1) a large-sized college would be more efficient than the equivalent small colleges, (2) the proposed colleges have to meet the additional requirements of the country as a whole and for that purpose should have to function on an all-India basis. Therefore, the smaller they are in number and the larger in size, the better, and (3) for the same reason as in (2) their location is important from an all-India point of view.

1.07. It was decided that the 8 new colleges should be established two in each region, as follows :

Eastern Region	— Durgapur and Jamshedpur.
Western Region	— Nagpur and Bhopal.
Southern Region	— Hyderabad and Mangalore.
Northern Region	— Delhi and Allahabad.

1.08. Later, however, the college proposed for Hyderabad was established in Warangal. It was initially the intention that the college to be established in Delhi was to take over the degree courses in engineering and technology at the Delhi Polytechnic and that the Polytechnic should be developed only for diploma courses both on full-time and part-time basis. However, the college at Delhi became a separate entity by itself and in its place, the Regional Engineering College at Srinagar in the Northern Region was established. Thus, the 8 Regional Engineering Colleges in the first phase, came to be established.

1.09. The Government of Orissa was pressing for the establishment of a Higher Institute of Technology at Rourkela, ever since the Government of India decided to locate the first state-owned steel plant there. Rourkela is located in the very heart of the most important mineral belt to India and combined with the facilities that would be afforded in the most modern steel plant along with its ancillary industries, provided the argument for a higher Institute of Mineral Technology and Metallurgy there. This view was also supported by Dr. S. S. Bhatnagar, the then Chairman of the UGC, and the then Central Minister for Commerce and Industry, Shri T. T. Krishnamachari. The all-India Council for Technical Education had taken the decision in 1958 that in each of the steel producing centres, Durgapur and Tatanagar, Engineering Colleges should be established because of the special facilities that would be available for engineering education and training in these industrial areas. On the strength of all these factors, the State Government of Orissa pressed for a full-fledged engineering college at Rourkela.

1.10. The all-India Council for Technical Education at its 13th meeting held on 30th of April, 1960, having regard to the fact that Rourkela was fast developing into a centre of Industrial activity, recommended that a Regional Engineering College should be established at that place.

1.11. The Council at this meeting also observed that with the college at Rourkela, 9 out of the 15 States would each have a Regional Engineering College. The Council, therefore, recommended that the question of establishing Regional Colleges in the remaining States should be considered on merits of each proposal that may be received. As a measure designed to provide each State with a Regional Engineering College, 7 more colleges were approved for establishment during the 3rd Plan period.

1.12. Thus, 15 Regional Engineering Colleges were established one in each of the major States. The dates and places in the various States where they were established are as follows :—

1.	Andhra Pradesh	Warangal	1959
2.	Mysore (now Karnataka)	Surathkal (Mangalore)	1960
3.	Maharashtra	Nagpur	1960
4.	Madhya Pradesh	Bhopal	1960
5.	West Bengal	Durgapur	1960
6.	Bihar	Jamshedpur	1960
7.	Jammu & Kashmir	Srinagar	1960
8.	Uttar Pradesh	Allahabad	1961
9.	Gujarat	Surat	1961
10.	Kerala	Kozhikode (Calicut)	1961

11.	Orissa	Rourkela	1962
12.	Rajasthan	Jaipur	1963
13.	Punjab (Haryana)	Kurukshetra	1963
14.	Madras (Tamil Nadu)	Tiruchirapalli	1964
15.	Assam	Silchar	Is in the process of establishment

1.13. The colleges were intended to have all-India character and to serve the whole country for providing technical personnel required for the successive five-year plans. The all-India character was to be ensured, by each college admitting students from all the other States and appointing the best available teaching staff, on an all-India basis.

Aims and objectives of the colleges

1.14. The foregoing historical narrative shows that the original aim of the decision to establish R. E. Cs. was to create institutional facilities for providing under-graduate education and training in different branches of engineering, with a view to supplying the engineering manpower for the industrial projects and development envisaged under the successive Five-Year Plans. Although this aim has not been further detailed in the official documents, several RECs have attempted to identify specific objectives in their reports to this Reviewing Committee. The common objectives stated by many were : to impart instruction in different branches of engineering ; to maintain high standard in education and training ; and to promote co-operation with industry and other technical institutions.

1.15. Considering the background, intentions and later developments, the aims and objectives of the RECs, can be stated as follows :—

(1) To offer courses of instruction in different branches of engineering, mainly at the under-graduate level, to start with, in the overall perspective of general education with a view to developing an integrated personality.

(2) to make the instruction and training oriented towards creating in the students an awareness of and meeting the technological and socio-economic needs of the country ;

(4) to promote research effort among various faculties, preferably on inter-disciplinary projects and undertake post-graduate instruction and training, keeping in view the needs of techno-

(3) to promote co-operation with industry and other sectors of economy ;

logical growth and taking special note of the requirements of Regional Development;

(5) to maintain an all India character in regard to student admissions and requirement of faculty of high quality; and

(6) to act as an important link in the interaction between the Central and State sectors of technical education.

1.16. In view of the foregoing aims and objectives, we recommend that the Regional Engineering Colleges should appropriately be renamed as Central Engineering Colleges. Accordingly, we refer to these Colleges as Central Engineering Colleges from Chapter II onwards in this report.

Elements of the scheme

1.17. Each college is to be regarded as a joint and co-operative enterprise of the Central Government and the State Government concerned. Maximum amount of autonomy—both financial and administrative—was envisaged for each college so that their establishment and development could proceed with speed and efficiency. For this purpose, the colleges are registered under the Societies Registration Act XXI, 1860. According to this, each college is to have a Board of Governors registered with full powers for the administration and management of its affairs and finances. Provision was, however, made in the Articles of Association of the Society that in case the college is not functioning properly, the State Government will have the power to take over the administration and assets of the College but with the prior approval of the Central Government.

1.18. The composition of the Board of Governors and its powers and functions may be seen in Annexure 1.

1.19. The important provisions in the scheme for the establishment of Regional Engineering Colleges are as follows:—

1.20. The colleges will not give their own degrees, but will be affiliated to universities. They may, however, conduct refresher and short-term courses in branches for which a clear need is felt, as and when they are developed and find themselves in a position to offer such facilities. It will be open to the colleges to provide facilities in branches other than those provided for in the scheme, depending upon the need of the State and the region. Such provision will, however, be made in accordance with the normal procedure, viz., on the advice of the All-India Council for Technical Education.

1.21. Not more than 50 per cent of the seats in each college may be

utilised by the States in which it is located. At least 30 per cent of the seats shall be made available to other States in the region and the remaining 20 per cent of the seats shall be open to students from other parts of the country. For this purpose, the regions will be as demarcated by the All-India Council for Technical Education.*

1.22. In the larger interests of technical education in the country, the Regional Engineering Colleges will join the scheme of common admission examination for all the higher technological institutes and other technical institutes in the country.

1.23. The first Principal of the College will be appointed by the State Government in consultation with the Central Government. Periodical meetings and conferences will be convened by the Central Government for the purpose of co-ordinating the work and development of the institutions so far as major issues are concerned.

1.24. The following estimates of cost and sharing between the Central and the State Governments concerned were provided for:

(a) **Instructional Buildings:** A total area of 1,78,000 sq. ft. plinth is provided for colleges offering courses in Civil, Electrical and Mechanical Engineering. This includes administrative block, lecture halls, drawing halls, tutorial rooms, library and reading room, laboratories and workshops. For colleges conducting courses in Chemical Engineering, Metallurgy and Architecture, the following areas are provided in addition to 1,78,000 sq. ft.

Chemical Engineering	22,168 sq. ft.
Metallurgical Engg.	17,160 ,, ,,
Architecture	14,875 ,, ,,

(b) **Equipment:** Estimates of equipment were made as follows :—

Civil, Mechanical, Electrical Engg.	Rs. 29 lakhs
Chemical Engineering	Rs. 5.82 lakhs
Metallurgy	Rs. 6.16 lakhs
Architecture	Rs. 0.64 lakhs

1.25. To facilitate staffing of the colleges on a satisfactory basis, the Central Government may create a pool of teachers, recruit competent persons on an All-India basis, arrange for their training wherever necessary, either in India or abroad and assign them to the individual institutions. Similarly, for the procurement of equipment, both within the country and from

* With establishment of a Regional Engineering College in each major State, the admission pattern was modified as 50% of the seats to be filled from within the State and the other 50% seats to be filled from students of other States.

outside, the Central Government may make suitable arrangements through the Directorate General of Supplies and Disposals or any other central agency. This will also facilitate the grant of import licences, release of foreign exchange and other facilities.

1.26. The final estimates will, however, depend upon (i) the rate of construction at each location as certified by the State PWD, (ii) cost of services to be provided in each college, and (iii) the current prices of equipment. The detailed estimates will be worked out in stages by the Boards of Governors and submitted to the Central Government for examination and sanction. In preparing the detailed estimates, the actual requirements of special fields, namely, Mining, Metallurgy, Chemical Engineering, etc., in which the colleges would conduct courses will also be included.

1.27 The cost of establishing and running these colleges will be shared between the Centre and the concerned State Government in the following manner :—

(i) The entire non-recurring expenditure on buildings and equipment will be provided by the Central Government.

(ii) The State Government concerned has to provide free land and also bear expenditure on its development.

(iii) The recurring expenditure will be shared in equal parts by the Central Government and the State Government concerned, initially for a period of five years. After this initial period, the question of meeting the recurring expenditure would be reviewed.

(iv) The Central Government will provide interest free loan for the construction of student hostels.

(v) The Central Government will also provide 50% of the amount for staff quarters as grant-in-aid and the balance 50% as loan at current rate of interest.

1.28. In the scheme, estimates for recurring expenditure were as follows :—

(a) Staff salaries	Rs. 14 lakhs
(b) Maintenance	Rs. 2 lakhs
(c) Scholarships	Rs. 3 lakhs
Total	Rs. 19 lakhs

1.29. There is also provision in the scheme for staff quarters at a cost of Rs. 35 lakhs and hostels at a cost of Rs. 43 lakhs.

1.30. The student to staff ratio for the Regional Engineering Colleges was envisaged as 10 : 1, although in the initial period, due to various considerations, including the shortage of staff, it may be necessary to work on the basis of a larger ratio. The staff structure and the scale of pay of various categories of the staff of the colleges may be seen in Annexure II.

FINANCIAL RESPONSIBILITY FOR THE COLLEGES—APPOINTMENT OF REVIEWING COMMITTEE

1.31. As already mentioned, the scheme for the Regional Engineering Colleges provides for 50% of the recurring expenditure to be met by the State Governments and the other 50% by the Central Government in the initial five-year period. At the end of this period, the responsibility for recurring expenditure was to be reviewed.

1.32. All the colleges completed their initial five-year period by 1969, but the Ministry of Education continued to provide Central assistance in respect of the recurring expenditure to the extent of 50% till 1969-70.

1.33. In September 1969, the Ministry of Finance pointed out that consultations with the Finance Commission showed that the recurring liability by the State Governments had been taken into account and this was covered by the Finance Commission's scheme of devolution of resources and, therefore, the State Governments should meet the entire recurring expenditure from 1970-71.

1.34. This suggestion of the Ministry of Finance was conveyed to the State Governments by the Ministry of Education. Except for Maharashtra, the State Governments have expressed their inability to meet the entire recurring expenditure on this account.

1.35. The arguments advanced by the State Governments for their inability are their difficult ways and means position and the non-fulfilment of the States' entire commitment by the Finance Commission. One of the State Governments even pointed out that in the absence of the Central assistance it was not possible for them to maintain the All-India character of the Regional Colleges or even to retain the existing pay structure of the staff.

1.36. A difficult situation had thus arisen because for the remaining years of the 4th Plan period, continuation of Central assistance to the Regional Engineering Colleges would mean an expenditure of Rs. 4-5 crores.

The Planning Commission was not prepared to agree to this amount being met from either the Technical Education Plan allocation or the overall plan allocation for all the schemes of the Ministry of Education during the 4th Plan period. In principle, this expenditure was to be met only from non-plan funds. However, there is no sufficient provision in the non-plan funds either. The colleges were facing a difficult financial crisis which would lead to deterioration of standards and possibly a compromise on their All-India character.

1.37. It was recognised by all concerned that the Regional Engineering Colleges have attempted to maintain higher standards in Technical Education and have also served as catalysts for State Institutions in this regard. They also helped in promoting national integration by admitting students from other States. It was thus recognised that these colleges should not be allowed to languish for want of funds.

1.38. With this back ground, a meeting was convened by the Planning Commission to find ways and means of continuing central assistance till the end of the 4th Plan period and to give some thought to the future set up of the Regional Engineering Colleges and the ways of ensuring them a continuous flow of financial assistance so that they could retain their All-India character and help in the improvement of standards of education in the adjoining technological institutions.

1.39. At this meeting, the Ministry of Education expressed the following views :

It is important that the national character of the Regional Engineering Colleges should be maintained and this could be ensured only by continuing to participate in the scheme as hithertofore. Serious consideration might be given to the possibility of developing these institutions as second line central institutions which could relieve the Institutes of Technology in course of time from considerable burden of under-graduate teaching—the Institutes of Technology would thus concentrate mainly on post-graduate education and research.

A number of Regional Engineering Colleges were running industry-oriented courses. Some progress has been made in these courses with U N assistance. The Institutes of Technology could support this programme by providing assistance of its faculty members and other facilities.

To implement the programmes for continued effective collaboration between Regional Engineering Colleges and the Institutes of Technology involving exchange of staff, use of other facilities etc., would necessitate some changes in the structure of both and in the event of these changes being

made, the responsibility of financing the Regional Engineering Colleges also would necessarily devolve on the Central Government.

1.40. To an enquiry made at this meeting whether the staff of the Regional Engineering Colleges was interchangeable, the Ministry of Education clarified that at present the staff of the colleges was recruited by the respective autonomous governing bodies. There is no arrangement for interchangeability of staff. However, it was pointed out that the University Grants Commission was contemplating a scheme to facilitate the interchangeability of academic staff of the University institutions. The Institutes of Technology had already evolved a system under which service benefits accruing to a member of staff of an Institute of Technology was carried forward in the event of his moving from one Institute to another. This arrangement could also be extended to the Regional Engineering Colleges.

CHAPTER II

ADMISSIONS, FACULTY AND STANDARDS

ADMISSIONS

A—Under-Graduate Courses

2.01. All the Central Engineering Colleges, except the one at Srinagar, have been approved for a total annual admission of 250 students from the very beginning. The Srinagar College was approved for an annual admission of only 120 students initially. From 1960, however, this college also started admitting 250 students. From the year 1968-69, however, owing to the difficult employment position amongst engineering graduates, there was a cut back in the admissions to the Institutions. The admissions from that year ranged from 160-200.

2.02. 50% of the students admitted to each college every year, as per the scheme, are to be from the State in which the college is located and the other 50% of the students are admitted from other States. The other States seats are allotted to each State on the basis of its population and the domicile of the candidate is determined by the location of the qualifying examination authority. Where the number of seats allotted to a State are not taken by students from that State, in the other States group, they are allotted to the students from the remaining other States to a group. The institutions also reserve seats for Scheduled castes and scheduled tribes in accordance with the constitutional obligations.

2.03. Most of the colleges are following the 5-year integrated degree course after a pass in the Higher Secondary examination or equivalent. Some of the colleges are also following the 4 year course after a pass in the intermediate examination.

2.04. Eligibility for admission is laid down by the colleges individually. These are variations, and examples showing the variations are given below :—

(a) 5-Year Integrated Degree Course

College	Eligibility for admissions
1. Regional Engineering College, Warangal.	Higher Secondary or equivalent examination with mathematics, physics, and chemistry and not less than 50% of the total marks in mathematics (for a maximum of 200) and physics and chemistry (for a maximum of 100).
2. Karnataka Regional Engg. College, Surathkal.	Higher Secondary or equivalent examination with not less than 35% marks in physics, chemistry and mathematics.
3. Regional Engineering College, Tiruchirapalli.	Higher Secondary or equivalent with 60% of the marks in Mathematics Physics and Chemistry put together and at least 50% in each of the two subjects-mathematics and physical sciences (Physics and Chemistry).
4. Regional Engineering College, Kurukshetra.	Higher Secondary or equivalent examination with not less than 50% marks in English, Physics, Chemistry and Mathematics.
5. Regional Engineering College, Srinagar.	Higher Secondary or equivalent examination with Mathematics, Physics and Chemistry.

(b) 4-year course

Motilal Nehru Regional Engineering College, Allahabad.	Intermediate or equivalent examination (with at least 50% marks) with Mathematics, Physics and Chemistry.

2.05. Information regarding admissions was collected from the institutions for the five years 1968-69 to 1972-73. This information was anaiysed and presented in annexure III, in four parts. Part A shows the distribution of under-graduate admissions between the state in which the college is located and the other states. Part B shows the quality of under-graduate admissions in each college. Part C gives the number of applications received by the colleges and the quality of such application for admis-

sions. Part D shows the admissions secured by students from each state in all the Central Engineering Colleges.

2.06. In what follows, our observations on the quality of admissions is purely based on the information received from the various colleges. We have also noticed some discrepancies in the information so furnished. We are also fully conscious of the fact that there are highly varying standards in the various qualifying examinations for admission. Since 50% of the admissions are from within the State and the rest are distributed all over the country, the quality referred to will largely be related to the standard of the qualifying examinations in the State itself. Therefore, the classification of the institutions from the observations on the quality of their admissions may not represent a very true position. Nevertheless, we believe it would give a general indication of the quality of admissions.

2.07. A study of the distribution of under-graduate admissions as shown in part A of the statement will enable us to place the different institutions in three categories. In the first category of institutions may be placed the colleges which have admitted 45-50% of the students every year from other states. These are the colleges located in Warangal, Tiruchirapalli, Nagpur, Surat, Bhopal, Allahabad and Rourkela. Of these, again, the colleges at Surat, Bhopal and Rourkela have admitted practically 50% of the students from other States, although, a tendency is noticeable in these institutions that this percentage is decreasing. In the second category of institutions, we may consider those colleges which have admitted 25-40% of the students from other states. These are colleges located at Surathkal, Calicut, Jaipur, Kurukshetra and Jamshedpur. The third category of institutions are those which have admitted from outside states only upto 25%. These are the colleges located at Durgapur and Srinagar.

2.08. It will thus be seen that only half the number of colleges have adhered to the agreed pattern of admissions and the other half, for some reason or other, have not been able to comply with this requirement. It is necessary to understand the various reasons for the institutions not being able to fully comply with this important condition aiming at national integration so that suitable measures may be considered to ensure all the colleges complying with this requirement and thereby help national integration.

2.09. After a perusal of part B of the statement, which shows the quality of admissions, we may place the institutions again in three categories on the basis of total number of candidates admitted with first class performance (60% and above) in the qualifying examination. The first category of institutions may be regarded as those which have admitted

70-100% of the candidates with first class qualifications. The colleges at Tiruchirapalli, Jaipur, Surathkal, Bhopal and Nagpur may be placed in this category. It may be particularly observed that the colleges at Tiruchirapalli and Jaipur have admitted 100% of the students with first class performance in the qualifying examination. In the second category of institutions we may place the colleges located at Warangal, Calicut, Srinagar, Allahabad and Durgapur which have admitted between 50-70% of the students with first class performance in the qualifying examination. In the third category of institutions we may place the colleges located at Surat, Kurukshetra, Rourkela and Jamshedpur which have admitted less than 50% of students with first class performance in qualifying examination. In particular it may be observed that the colleges at Surat and Jamshedpur have admitted less than 1/3 of the students with first class performance in the qualifying examination.

2.10. It will be observed from part B of the statement that students admitted to the colleges in the State quota of seats are in almost all the colleges those with first class performance in the qualifying examination. The quality of students admitted in any college from other states is, however, comparatively much poorer than the quality of students admitted from own state. It will also be observed that other states students prefer to go to any other college which is located in their own region, nearer to their homes if they cannot get admission to the Central Engineering College of their own state. This is now possible because facilities for engineering studies are available throughout the country and there is a natural reluctance on the part of students to go far away from their own homes in pursuance of such studies. On account of reservations for other states students, it is also possible that much weaker students from other states have often an advantage for admission to a Central Engineering College if they choose to go far away from their own homes.

2.11. On account of the factors mentioned above, the colleges, in general, are not able to attract students with first class performance in the qualifying examination for other states quota of seats. This is supported by the statement which shows that only 10 colleges have been able to admit over 25 students or more from outside states with first class performance in the qualifying examination.

2.12. Part C of the statement shows the applications received by each college and the quality of such applications. The number of applications with first class performance, to any college from other states, it will be observed, is very small. Moreover, any such applicant when offered an admission is not sure to join if he obtains admission in an Institution nearer to his home. The above facts of insufficient response and poor quality of admissions to Central Engineering Colleges from students of

other states lead us to emphasise that appropriate measures are necessary to improve the situation.

B—Post-graduate courses

2.13. Students who complete their first degree courses join post-graduate courses if they can obtain a stipend. Such a stipend is admissible, according to present rules, only to those candidates who obtain not less than 55% of the marks at the first degree examination. It may, therefore, be presumed that all the students admitted to the post-graduate courses as shown in the statement in part E of Annexure III would have obtained at least 55% marks.

2.14. The sanctioned admission capacity for each post-graduate course is 10. It will be seen from the statement that in almost all the colleges the utilisation of post-graduate facilities is not 100%. Assuming that utilisation of at least 50% of the facilities is satisfactory, we may say that in almost all the colleges the utilisation can be regarded as satisfactory. However, there is some wastage if we consider the out-turn of students from any batch and intake of the corresponding batch at admission. This wastage is much higher—about 70-90%.

2.15. This high wastage occurs because immediately after graduation, the students take up post-graduate courses, but look for suitable employment. As soon as they get good employment, they leave the course, because they derive no additional benefit by acquiring a post-graduate qualification. On the contrary they may have again to compete with the first degree-holders for the same type of jobs.

2.16. We would recommend the closure or postponement of admissions to post-graduate courses where the wastage is higher than 70% of the intake in the corresponding year or where the admission is less than 30% of the sanctioned intake for some years in succession. In doing so the national priority needs should be kept in view.

2.17. In our view, post-graduate courses can be a success, where at least 50% of the admissions are through sponsored candidates. Specialised post-graduate training offered at these colleges would be of benefit to both Government Departments and public sector organisation and efforts should be made to get sponsored candidates from them.

2.18. The Central Engineering Colleges are intended to have an all-India character and to serve the whole country for the training of technical personnel required for the successive five-year plans. A very important objective of national integration was also incorporated in the scheme by

laying down that 50% of the admissions to each college should be from the state in which the college is located and the other 50% should be from other states.

2.19. The analysis of admissions as shown in the foregoing paragraphs reveals the fact that the objective of national integration through admissions has only been partially fulfilled. Only 7 colleges have been able to admit 45-50% of the students from other States.

2.20. The main reason for this is that at present facilities for engineering education are available throughout the country. Students are, therefore, reluctant to go to far off places for pursuing technical studies in engineering colleges, as it would cost them extra, not only on travel, but also on having to reside away from their homes and the environment to which they are used. The very same reasons also make it possible for students of comparatively less merit gaining admission in Central Engineering Colleges far away from their homes, in the ex-state quota of seats.

2.21. We place great importance on the realisation of the objective of national integration through admissions all over the country. To make this possible, it is necessary to offer financial incentives to good quality students.

2.22. Incentives can be provided without much additional cost, but by some suitable adjustment of the facilities already provided. As regards travel to far off places, the Indian railways already allow concessional fares for students for their travel, between their places of study and homes. We suggest that, in addition, the college should provide full rail concessional fares by third class once in a year to students from other states whose homes are more than 500 km from the colleges, with the proviso that the fare for the first 500 kms, will be borne by the students.

2.23. In addition, we also suggest that the existing number of scholarships (merit-cum-means) available in each college should be divided equally between students admitted from within the state and those admitted from other states. This measure, we are sure, will attract students of good quality from other states.

2.24. To further promote national integration, we suggest that each college should provide opportunities for students from other states to imbibe something of the language and culture of the state. Classes for providing instruction in this respect may be organised and students from other states may be encouraged to attend these classes. Institution of prizes in debate, drama and other activities in the language of the state for students from other states whose mother-tongue is not the language

of the state should prove very helpful in creating enthusiasm in students from other states to learn something of the life and culture of the state and understand its people better.

2.25. The analysis of quality of admissions made to the Regional Engineering Colleges shows that while it is satisfactory in some colleges, in the others immediate steps are necessary to step up the quality of admissions. We also referred to the fact that the quality of admission indicated for each college will largely be based on the quality of qualifying examination for students admitted within the state. We are all aware of the highly varying standard of these qualifying examinations.

2.26. We have earlier pointed out that the two groups of institutions. the Institutes of Technology and the Central Engineering Colleges have been established with substantial investments from the Central resources. The objectives of each group should, therefore, be complementary to the objectives of the other.

2.27. The Central Engineering Colleges should play the role of second line all India institutions to the Institutes of Technology. Primarily the Central Engineering Colleges should provide high quality first degree training and enable Institutes of Technology to shift their emphasis further to post-graduate courses and research work.

2.28. These complementary functions, visualised for the Central Engineering Colleges and the Institutes of Technology, can be successfully performed only if the quality of admissions is uniformly high in all the colleges. In this context, it may be observed that even within the State there may be more than one qualifying examination for entrance with variations in standards.

2.29. Therefore, the most direct answer to this question is a common entrance examination for all the colleges, preferably common with the Institutes of Technology, whether it be for admissions from the state quota or for admissions of students from other states. The scheme in fact envisaged a common admission examination (1.22) but it was never implemented which led to the present rather unsatisfactory situation.

2.30. During our discussions with the representatives of the State governments, in our visits to the Central Engineering Colleges, when the question of State Governments taking over the entire financial responsibility for recurring expenditure as provided for in the initial scheme was raised, their general reaction was that they should not have to do it if only 50% of the state students get admitted to the college (although this condition was provided for in the original scheme). We pointed out to

the State representatives that their students are being admitted to Central Engineering Colleges in other States in the ex-state quota. Thus, while they set apart 50% of the seats for students from other states, they can get an equal number of admissions for their students in colleges in other states. To illustrate this point, we have compiled part D of the statement on admissions which shows for each state, yearwise admissions made to the Central Engineering College in that State and admission secured by students from that State in the Central Engineering Colleges of other States. From this statement it will be seen that while students from all States have utilised the facility, in particular the students from Andhra Pradesh, Maharashtra, Rajasthan, Uttar Pradesh, West Bengal and Bihar have made good use of the opportunities.

2.31. We have suggested financial incentives to increase the admission of good quality students from other States in each Central Engineering College. In our discussions with the State Governments during our visits to the colleges, we gained the general impression that their main concern is that the present arrangement of 50% of admissions being made from students within the state, should not be disturbed. This certainly is possible even if admissions are made from a common entrance examination. We have also noticed a good measure of agreement on the part of the State Government representatives for a common admission test for all state as well as ex-state quota—if 50% seats are allotted to students from within the State.

2.32. We, therefore, recommend that admissions to all the Central Engineering Colleges should be made through a common entrance examination for both the state quota of seats and the quota of seats for other states according to the accepted pattern and choice of candidates. This common entrance examinaion may be the same as the one for entrance to the Institutes of Technology.

FACULTY AND STANDARDS

Selection of staff

2.33. In the scheme for the establishment of Central Engineering Colleges, to facilitate staffing of the colleges on a satisfactory basis, a provision was made that the Central Government may create a pool of teachers, recruit competent persons on an all-India basis, arrange for their training wherever necessary, either in India or abroad and assign them to the individual institutions (1.25).

2.34. To attract bright young graduates to these training programmes, Government also revised and improved the salary scales for technical teachers and made them applicable in the Central Engineering Colleges.

2.35. This central selection of teachers functioned in a very limited way, only in the first two or three years when the scheme for training of technical teachers in India as also under a US assisted programme was initiated. In the latter years the recruitment was left entirely to the colleges, although the names of trained teachers were circulated to various institutions to employ them against their vacancies. It should be mentioned here that the individual colleges did not always whole-heartedly accept such nominations.

2.36. Thus, although the concept of creating a central pool of technical teachers was excellent, the Central Government did not pursue the idea with perseverance and thus the maximum advantage of the scheme could not be gained.

2.37. In our attempt to study national integration achieved by the colleges, we also collected information regarding teaching staff and the states from which they originated. The information collected as on 1st July, 1973, is presented in Annexure IV which gives for each of the Central Engineering Colleges, teaching staff appointed from its own state and from other states separately for the category of professors and other teaching staff.

2.38. It will be interesting to study this distribution. In the category of professors there are a fair number of persons appointed from other states except in two or three colleges. In three or four colleges, persons appointed as professors are largely from outside states. In the category of teaching staff of other than professors, persons appointed from own state are in large numbers.

2.39. The first reaction that any one will get merely from these figures is that local considerations could have sometimes played their part. Yet, by and large, senior appointments satisfied the quality requirements.

2.40. We have no doubt that some of the states are particularly fortunate in having a large number of highly qualified people of the right type to be appointed as teachers. It is also quite normal that such people would like employment as near their homes as possible. Nevertheless, it will also be necessary to consider these facts along with some representations received from members of teaching staff during our visits to the colleges. Briefly the representations in this respect are discussed in the following paragraphs.

2.41. For any particular teaching post, the qualifications and experience prescribed by a Central Engineering College, often differ from those recommended by the All-India Council for Technical Education. There is also

a variation of such qualifications and experience prescribed for the same teaching post by different Central Engineering Colleges. The advertisement for the posts are not always made on all-India basis and do not always appear in widely circulated newspapers throughout the country. There are also instances where applications have been received in plain paper at short notice and selections completed within a fortnight. The experts appointed on the Selection Committees are sometimes those whose experiences have no relevance to the posts advertised. Some staff associations have also suggested that Selection Committees for Central Engineering Colleges' teaching and other staff should be statutory as in the case of the Indian Institutes of Technology.

2.42. A specific instance in one of the colleges of a mismatch between the job description as advertised and appointment as made was brought to our notice. In this case, the Selection Committee justified the appointment on the plea that amongst the candidates interviewed, none had the special qualifications or experience as advertised. The Selection Committee also recommended that the candidate selected may be sent for the specialised training required for the post.

2.43. The Board of Governors of the College approved the recommendation of the selection committee. In our view, this is highly improper because, in the first instance, according to our knowledge, there are people available with specialised qualifications in the concerned field. Secondly, if the selection committee did not find any suitable candidate, the correct procedure would have been to locate a suitable person by contacts. Instead, an unusual decision was taken.

2.44. The posts of teaching staff have been particularly given improved salary scales on an All-India basis to attract the best available persons from any where in the country through open advertisements.

2.45. The various Boards should, therefore, be obliged to have properly constituted Selection Committees for various categories of posts and to establish and maintain healthy conventions in the matter of appointing experts on the Selection Committees.

2.46. We recommend that (a) as far as practicable, experts should be chosen from different regions of the country; (b) advertisements for the posts should be given on an all-India basis with sufficient time for adequate response from qualified intending candidates any where in the country. Similarly, adequate time should be given to candidates who are called for interview to enable them to undertake long journeys where necessary; (c) contribution for travel expenses of persons called for interview should be paid in the same way as the Institutes of Technology or

the Union Public Service Commission does; (d) sufficient time should also be given to the experts to join the Selection Committees.

2.47. Elsewhere we are making a recommendation that a Co-ordinating Authority for the Central Engineering Colleges (Council for Central Engineering Colleges) may be set up which, amongst other things, should deal with maintenance and development grants to these colleges. This Co-ordinating Authority should be associated with all selections for teaching posts and other superior posts.

2.48. We recommend that the Selection Committees for various categories of staff in the Central Engineering Colleges should be constituted as follows generally on the pattern of the Selection Committee provided for in the Institutes of Technology Act.

A. For the posts of Principals

1. Chairman of the Board of Governors —Chairman
2 & 3. Two nominees of the Central Co-ordinating Authority
4. One nominee of the Board of Governors
5. Director of the I. I. T. in the Region

B. For other teaching posts, i.e. Professors, Assistant Professors and Lecturers

1. Principal of the College —Chairman
2. One nominee of the Board of Governors
3 & 4. Two experts in the field, one nominated by the Board and the other nominated by the Central Co-ordinating Authority.
5. An additional expert nominated by the Central Co-ordinating Authority for the post of Professor.
6. Head of the Department concerned, provided that he holds the same or higher grade to which selection is made.

C. For the posts of Librarian and Workshop Superintendent

The Selection Committee should be constituted in the same manner as for other teaching staff in category B above.

D. For the post of Registrar and higher administrative categories

such as Assistant Registrar, Accounts Officer, Stores Officer and Estate Officer.

1. Principal -Chairman
2. A nominee of the Board
3 & 4. Two nominees of the Central Co-ordinating Authority.

E. **In the case of posts not covered by above categories but a scale of pay, maximum of which exceeds Rs. 500 per month.**

1. Principal -Chairman
2. A nominee of the Board
3. Head of the Department concerned or Registrar, as the case may be.

TEACHERS' EMOLUMENTS AND SERVICE CONDITIONS

2.49. We have already emphasised the importance of working the Central Engineering Colleges as complementary to the Institutes of Technology. The present pattern of financing partly from the State Government sources has led to a number of problems and issues. We are elsewhere recommending that for smooth functioning of the colleges, it is necessary that the financing should be done only from one source and that this source should be the Central Government.

2.50. The pay scales of teaching staff of Central Engineering Colleges are practically the same as those of the teaching staff in the Institutes of Technology—Central scales—but the dearness and other allowances are in accordance with the respective State Government rules. This has resulted in a number of complications and irritations and has been represented to us by all the teaching staff associations.

2.51. The emoluments, service conditions and benefits should be the same for all the Central Engineering Colleges. Consistent with our recommendations above, we feel that it is necessary to place the salary scales, service conditions and benefits for teachers of the Central Engineering Colleges, on the same level as for the teaching staff of the Institutes of Technology. We accordingly recommend that the salary scales should be modified where necessary and that the various Boards be requested to revise the service conditions in accordance with those obtaining in the Institutes of Technology.

Other problems of teaching staff

2.52. A few Associations have represented to us that the colleges have been running post-graduate courses, although they are not approved by the Central Government, on both full-time and part-time basis. No additional teaching staff for these courses is, therefore, available and the teaching load is required to be taken by the existing teachers. This has resulted in heavier teaching loads, inefficient teaching, and fall in the standards. They have also suggested that the existing norms of teaching load for Professors, Assistant Professors and lecturers—8 : 14 : 18 hours per week respectively should be reduced to 6 : 10 : 14 hours per week.

2.53. Institutions consider so, and it is indeed prestigious to run post-graduate courses, but only if they are run with proper standards and requisite facilities. There is, however, an urge on the part of some institutions, to run such courses without additional staff and adequate facilities—principally because the A. I. C. T. E. has not approved them, when only Central Government provides funds. We strongly deprecate this tendency and emphasise the need for a more thoroughly prepared approach on the part of the Institutions in this regard.

2.54. We understand that the Institutes of Technology at present are working on a student to staff ratio of 10 : 1 in the under-graduate courses and 5 : 1 in the post-graduate courses. Further, we understand that a Committee of the All-India Council for Technical Education has made certain recommendations on this question. The teaching loads for the staff of the Central Engineering Colleges should also be in accordance with these.

2.55. Some of the Associations have also represented that 50% of the posts in the higher cadres should be filled by promotions from lower staff and the other 50% only should be filled by direct recruitment. The reason given for this is that the Selection Committee, in the short time available to them, will not always be able to assess the worth of a good teacher properly. They are, therefore, guided more by the paper qualifications and research publications. Dedicated teaching is not recognised for promotion to the higher posts.

2.56. We are in sympathy with the observations that Selection Committees appear to place more importance on published work than on dedicated and quality teaching. Dedicated and quality teaching is very important in all Institutes. In the recruitment of staff therefore, sufficient care and emphasis should be laid on the professional experience and competence of candidates. Teaching experience alone, or Research experience alone, will not produce the right quality of training in the colleges.

2.57. In our view, the faculty in any Department should be well-balanced by including members who are good in guidance of research activities and members who are good in guiding design and project work. The quality of both categories of staff as good teachers should receive adequate recognition. While we recommend that undue importance should not be given to published work unless it is of a high standard, we cannot agree with the suggestion that higher posts in teaching should be filled by promotion even if it were only to the extent of 50%. We have also no doubt that any Selection Committee always views the claims of internal candidates with sympathy and understanding. The present practice of all teaching posts being filled by advertisements and open selection on a competitive basis is very healthy and should continue.

2.58. Teaching staff of all the colleges represented that the posts of Associate Lecturers should be converted into those of Lecturers and the existing Associate Lecturers should be promoted. We are convinced that the lowest teaching post in the Central Engineering Colleges should be that of Lecturer. The ratio of the total number of teachers—Lecturers and above—to the total student body in the first degree courses should be 1 : 10 and for post-graduate courses 1 : 5.

2.59. We cannot, however, recommend the automatic promotion of all the existing Associate Lecturers to the new posts of lecturers when created. But we feel that the new posts need not be filled through open advertisement and selection of Associate Lecturers who possess the requisite qualifications and experience prescribed by the colleges for the posts of Leturers and who are acceptable to the appropriate Selection Committees should be fitted in the new posts. It is understood that the Central Government is already considering this question and we recommend that this upgrading of the posts should take place without further delay, and fresh recruitment should take place only at the level of Lecturers.

CHAPTER III

FUTURE SET UP OF THE COLLEGES

A. Academic set up

3.001. The primary objective in the establishing of the Central Engineering Colleges is to provide high-grade training facilities for the first degree courses in engineering and technology. The colleges are to function as all-India institutions and as pace setters for the training of standards in the Engineering Colleges of the region. There is at present a widely held view that the Central Government, having invested large sums of money in these colleges and the Institutes of Technology, should ensure that these two categories of institutions complement each other so that the inputs may yield best results.

3.002. Accordingly, the Institutes of Technology may, if necessary, adjust their work for undergraduate courses and concentrate on post-graduate courses and research work. The Central Engineering Colleges should, in consequence, concentrate on first-degree training and provide feeder material of the right type to the post-graduate work for which the Institutes of Technology are equipped.

3.003. This does not mean that the Central Engineering Colleges would only be doing the first degree courses. Some of these colleges have been deliberately located in centres of industrial concentration to derive the benefit of close links between industry and the institutions. Some of these colleges have also built close links with industry and with substantial assistance from UNDP/UNESCO have started post-graduate courses in specialisations oriented to the requirements of industries with which they are in collaboration. This collaboration has produced good standard post-graduate work.

3.004. If close links are established between the colleges and the Institutes of Technology, it should be possible for the post-graduate courses and research programmes emerging out of areas of excellence in the Central Engineering Colleges to draw on the highly sophisticated equipment available at the Institutes of Technology, in addition to inter-action with

the staff at these institutions, for mutual benefit.

3.005. The objectives mentioned in the foregoing paragraphs can be achieved only by establishing appropriate linkages between the Institutes of Technology and the Central Engineering Colleges on the one hand and the Central Engineerring Colleges and other engineering degree institutions on the other.

3.006. We have already observed that the Central Engineering Colleges in general are functiong satisfactorily as first-degree institutions and in some cases have also established themselves as the leading first-degree institutions in their own states. However, the objective of the Central Engineering Colleges functioning as pace-setters in the regions has yet to be achieved.

3.007. We would like to make it very clear, in this context, that this objective is not to be achieved by any attempt on the part of the Government or a demand from the Central Engineering Colleges themselves that an artificially high status should be attached to them. The same criteria should apply to the Institutes of Technology as well. We need not stress the fact that reputation or excellence should be earned and not affixed by classifying the institutions.

3.008. We are constrained to make these observations because at present there seems to be a feeling that the Central Engineering Colleges are not quite of the same level as the Institutes of Technology but superior to the state colleges. We have an impression that this feeling in the Institutions, as well as in the general public, has set in, on the status that appears to have been attached by the Government themselves to the respective institutions. This outlook needs a change.

3.009. There is a need for a link up of the Central Engineering Colleges with other colleges in the State both in organisation and in programmes to realise the pace-setting objective. This objective not being achieved so far, may be partly due to the fact that the faculty members were busy—engaged in the establishment and consolidation of their own courses and programmes and partly due to rigid service rules which do not permit faculty exchange.

3.010. All the colleges have, however, not progressed in a like manner. There are quantitative and qualitative differences in their progress. The quantitative differences are in the prescribed courses of study. the extent of industry orientation in courses, and the extent of science base in the courses. There are differences in examination systems and also in the schemes of examinations. These factors will have to be kept in view while deciding the future set up of the colleges.

3.011. The existing stucture—academic as well as administrative —was reasonably satisfactory in the initial stages of development of the institutions. With the launching of research activities and intensive and extensive industrial collaboration at both under-graduate and post-graduate levels, this structure with bottlenecks at various stages needs modification. We discuss their requirements in the following paragraphs.

3.012. The colleges are at present affiliated to the universities in their respective areas. Many of these universities have other engineering colleges supported by state governments or private organisations, also affiliated to them. In Annexure V may be seen the university to which each college is affiliated and government and non-government engineering colleges also affiliated to the same university.

3.013. The affiliated status of the colleges has presented many problems. Where the Central Engineering College is the only engineering college affiliated to a university, the difficulties experienced in academic matters by the institution have not been so pronounced as in the case of colleges which are affiliated to universities along with other institutions or the universities also having engineering colleges of their own, as department or constituent colleges.

3.014. The Central Engineering Colleges have been able to attract good quality staff on account of better salary scales and amenities. They have also very good instructional, laboratory and other facilities as compared to other engineering colleges affiliated to the same university. In spite of this, the colleges do not appear to have made the progress in academic matters as they could have been expected to do. This may largely be attributed to the fact that the academic bodies of the universities which have several engineering colleges affiliated to them have larger membership from the staff of the university engineering colleges and older institutions with the universities. On account of the poor facilities in other engineering institutions, the academic standards that have been set by these bodies had always in view the capabilities of the poorest of the institutions affiliated to the universities.

3.015. Academic proposals in subjects like Applied Mathematics, Applied Sciences and Humanities are sometimes referred to as faculties of Science, Arts and Commerce. These faculties do not have a correct appreciation of their relevance and importance to Engineering Education and the proposals often get dropped.

3.016. There is also the traditional outlook of Same universities not to agree to changes and deviations from the conventional practice, even if they are important for progress in technical studies. As an illustration,

we may mention the great difficulty that had to be faced by the Central Engineering Colleges to introduce the M. Tech. industrially-oriented courses, in collaboration with industry. These courses, aimed at dealing with real problems in industry, had to depart from the conventional and entirely theoretical M. Sc. courses. Sometimes these new courses were opposed by the academic authorities of the universities, simply because corresponding facilities could not be created in their own institutions. It would, however, be interesting to observe that the courses have now well set and established their utility with the result that many other institutions are also organising courses on this pattern.

3.017. There is always a delay in the universities declaring the results of engineering examinations, since the candidates involved are very few as compared to the huge numbers in Arts, Science and Commerce subjects. This upsets the teaching schedule and training programmes in industry, for engineering students. Semester system and industry-oriented courses which are highly progressive innovations in engineering education, consistently suffer on account of late declaration of results. In fact, one of the colleges is seriously considering giving up the semester system owing to this difficulty.

3.018. In consideration of these facts, it is very clear to us that if we have to get the best results out of the investments made in the Centarl Engineering Colleges, it is very necessary that they should be fully autonomous in academic matters.

3.019. The burden of the song in the discussions between teaching staff of various colleges and us on academic matters is this academic autonomy to the colleges, for progress. The Boards of Governors with whom we had discussions also expressed the same view. In particular, we may mention that the Chairman of the Board of Governors of one of the Central Engineering Colleges who is also the Vice-Chancellor of the University to which the college is affiliated, has categorically stated that the colleges should be granted completely autonomous status.

3.020. Another Vice-Chancellor who is the Chairman of another Central Engineering College, stated that there is a big gap in the standards between the Central Engineering College and other colleges affiliated to the university, mainly because of the financial position of the other institutions. While he is fully convinced that the Central Engineering College should be granted an autonomous status, he apprehended some difficulties. We infer from this that if we leave the question of much needed autonomy of the colleges to the respective universities, we will not be able to achieve the results expected out of it.

3.21. We also record here some of the points raised in our discussions with the teaching staff associations of the colleges on the subject of academic autonomy to the college :

a. The staff of one of the colleges complained that their college has not been able to make the best use of all the facilities it had, due to its linking up with the university which took years for giving approval to starting new courses, changes, in syllabi, recognition of laboratories for research purposes, etc. The college has to be given academic autonomy to frame its own courses, syllabus, conduct examinations and declare results with some sort of built-in checks and supervision.

b. The staff of the Central Engineering College at Surathkal emphasised the need for the colleges to have academic autonomy as in the case of the Institutes of Technology to frame syllabi, curricula and conduct examinations independently and declare results. Consistent with the grant of academic autonomy, they have also suggested the following arrangements for the award of priority :—

(i) The Central Engineering Colleges may be made degree awarding institutions.

(ii) A Central Affiliating body be constituted to award degrees to all Central Engineering Colleges with full academic autonomy for the colleges.

(iii) Affiliation to an IIT with full academic autonomy for the colleges and powers to admit students.

(iv) Autonomy within the university to which the Central Engineering College is affiliated.

c. The staff associations of the Maulana Azad College of Technology, Bhopal, suggested the following two alternatives for academic autonomy of the institutions :—

(i) Grant of academic autonomy to the college within the framework of the university to frame syllabi for various courses and to conduct its own examination.

(ii) Creation of a Regional Technical University which may affiliate three or four Central Engineering Colleges located in that region.

3.022. The Central Engineering Colleges are in different stages of development and, accordingly the progress made by them has also con-

siderable variations. Nevertheless, it may be said that as a class they have made satisfactory progress.

We are fully convinced that for getting best results of the investments made and for continued development and progress of these institutions, they must have complete academic autonomy, but a system of checks and balances should be devised to make sure that academic standards are in no case allowed to be lowered. Moreover, we cannot, at this stage, recommend that each college should be converted into a degree awarding institution because it is only a few years back that they were set up and they have yet to formally establish their stability and consistent performance over a reasonable period of time. Therefore, we rule out the idea that each institution should be a degree granting institution by itself. The possibility of this status to selected institutions after sometime may however, be kept open.

3.023. We had also discussion with one of the Directors of the Institutes of Technology, on the feasibility of the Central Engineering Colleges being directly affiliated to an Institute of Technology in their region. While he welcomed the idea of strong academic links between the two types of institutions, he expressed the view that such an arrangement—affiliation to an IIT—would have some inherent difficulties and may not be feasible. At the same time from the governing bodies and teaching staff associations of the Central Engineering Colleges, we had the same sort of reaction to the question of their affiliation to an Institute of Technology.

3.024. It appears to us that a number of real and psychological problems are involved in this. The Institutes of Technology have set and established their own patterns. The Central Engineering Colleges have their patterns. Affiliation to an Institute of Technology may not make it possible for the Central Colleges to pursue their development in industry-oriented courses. They may lose their capacity for bold and imaginative schemes and end up as imitative institutions or mere appendages to the Institutes of Technology. It was also pointed out to us that the staff of the Central Engineering Colleges while they welcome establishment of academic linkages and relationships with the Institutes of Technology, they would not appreciate the status of these colleges to be that of junior partners with the Institutes of Technology.

3.025. In view of the above, we do not recommend the affiliation of the Central Engineering Colleges to the Institutes of Technology.

3.026. In the circumstances explained above, the arrangement that appeals best to us is that there should be a Council of the Central Engi-

neering Colleges, with overall powers for both academic and administrative purposes. The colleges may be autonomous in so far as courses, syllabi and examinations are concerned. The academic awards should, however, be made under a common seal of the Council. The Council should be established by an Act of the Parliament to give it the necessary powers. We have suggested the composition of the Council under Administrative set up.

3.027. The organisation for checks and balances necessary in the academic performance of the individual institutions should be a part of this Council. The Council should periodically review the academic performance of the individual institutions. Such a review once in five years by a body set up by the Council of the Central Engineering Colleges consisting of representatives from the Council of Institutes of Technology, universities having departments of engineering, professional bodies, industry and representatives of the All India Council for Technical Education, will, in our view, be an effective arrangement for maintaining standards.

3.028. Each college should have its academic set up similar to a university. It should have a College Academic Committee and Departmental Boards of Studies. The Academic Committee may have the following composition :—

1. Principal—ex-officio Chairman
2. All Heads of Departments
3. 20% of departmental faculty with the provision that at least 1 professor, 1 Assistant Professor and 1 Lecturer is taken from each department.
4. 3 outside experts from industry/teaching/ research nominated by the Board.
5. Student Representatives (three) nominated from final year class seniors. They are to be invited when academic matters of general interest are discussed.

The Departmental Boards of Studies may have the following composition :

1. Head of the Department—ex-officio Chairman
2. All members of the Departmental Faculty
3. Class senior (student representative).
4. One to three experts from outside.
5. Two faculty members from other departments of the College.

For healthy academic and administrative functioning of the department, the Departmental Boards of Studies should constitute broad-based committees for discharging various functions, such as making time-tables, faculty development, Research, etc.

3.029. An alternative to this arrangement could be that each college will function as a completely autonomous body within the framework of the university to which it is at present affiliated. The colleges should be empowered to formulate their own courses, frame their own syllabi and conduct examinations. The awards will, however, be given under the seal of the university to which the college is affiliated. The university periodically will exercise a check on the academic performance of the institution and its fitness to continue as an autonomous institution.

3.030. We support only the arrangement first mentioned, viz., the Council of Central Engineering Colleges having authority to award degrees and supervise the academic performance of the individual institutions. This is so because it will be much easier to establish the understanding and ensure the complementary functioning of the Central Engineering Colleges and the Institutes of Technology when dealing with one body—the Council of Central Engineering Colleges—instead of a number of universities which, in any case, have not so far substantially contributed to the progress of the Central Engineering Colleges. At the same time, as one of the Vice-Chancellor Chairmen pointed out, there may be too many colleges in a university claiming autonomous status and this may make it difficult for the Central Engineering Colleges to be declared as such. Moreover, all the universities do not have a built-in mechanism to provide necessary supervision for the maintenance of adequate standards in Technical Education.

Other Academic Matters

Role of the Departments with particular reference to Departments of Science, Mathematics and Humanities :

3.031. Modern engineering practice and solution of real problems of industry and economy require a multi-disciplinary approach. This calls for a great deal of cooperation among the various departments in the Central Engineering Colleges in the teaching and more importantly in research and development. We are constrained to observe that an adequate amount of such cooperation has not developed among the engineering departments and more so between engineering departments on the one hand and the departments of science, mathematics and humanities on the other. For the healthy growth of these colleges and [illegible] the mission that is assigned to them, greater cooperation [illegible] particularly in

problem-oriented research is essential.

3.032. Modern engineering education is based on a strong scientific foundation. Therefore, the departments of mathematics, physics and chemistry have a special role in the Central Engineering Colleges for the teaching and preparation of engineering students. However, teaching of these subjects in these colleges continues to be not much different from the teaching of the subjects in science colleges or university departments. Further, the close mutual interaction between the faculty members in the science departments and those in engineering departments to develop appropriate specialisations has not taken place. As a result, the academic interest of the senior staff members continues to be nearly the same, as if, they were functioning in universities or science colleges. We must hasten to add that we had come across some fruitful exceptions.

3.033. We would suggest that in future these positions in the science departments should be filled as far as possible, by persons initially recruited in engineering institutions and who have applied themselves to the specilc needs of engineering studies and established their further work and achievement in this direction.

3.34. This approach to staffing should apply for the future development of departments of mathematics, physics and chemistry. Engineering and the Science departments together should develop project-oriented inter-disciplinary programmes. They can conduct joint short courses for persons from industry, government, educational and R & D organisations.

3.035. The Departments of Science and Mathematics have also been pressing for introduction of post-graduate courses. We have dealt with the policy of establishing post-graduate courses in the Central Engineering Colleges separately. We do not support the science and mathematics departments offering undergraduate or post-graduate courses in pure science as such. We do not find any justification for these departments running 2-year M. Sc. courses after B. Sc.

3.036. The entire emphasis should be that these departments should develop as aides to engineering studies at both undergraduate and post-graduate levels. Teaching plans at the under-graduate level should be worked out through joint committees of Science and Engineering Departments.

3.037. The Humanities and Social Science programmes in the Central Engineering Colleges have, by and large, not emerged from a clear understanding about the role of these courses in the education of an engineer and the all sided development of his personality. With the teaching of

languages being an unequal common component, these programmes generally constitute aggregates of ad-hoc courses. It is, therefore, necessary that the objectives of the Humanities and Social Sciences programmes in technological institutions are properly defined.

3.038. The objectives of these programmes may be looked upon from the following points of view :

(i) the requirements of the training of an engineer as an engineer;

(ii) the role of liberal education in the all-sided development of the learner's personality;

(iii) the contribution to the strengthening of national outlook, to which these institutions are specially wedded; and

(iv) the development of social sciences in the special milieu of technological institutions of higher learning.

3.039. There is an increasing realisation that the traditional distinction between the generalist and the technocrat is false, and that the engineer in a developing democracy, with a fast expanding industrial sector, needs to be equipped with an expertise which will enable him to shoulder with competence non-technical responsibilities as well.

3.040. This aspect of the training of the engineer has two components :

(i) Communication skills : Training in language skills is as much a part of the training of the engineer as that, e.g., in Engineering Drawing. This should not be confused with education in Humanities.

(ii) Social science sub-disciplines : The engineer requires a certain level of training in some sub-discipline of the social sciences to enable him to effectively shoulder his responsibility as an engineer. Unfortunately, the identification of such areas has not been given adequate attention so far. Joint committee of engineering and social science faculties should work out appropriate courses in Humanities and Social Sciences.

3.041. Since a large number of students join the engineering degree programme after Higher Secondary Examination at 17+, the component of liberal education in the total educational process acquires substantive significance in spite of time constraints. This calls for a proper blend of curricular, co-curricular and extra-curricular programmes and cannot be left only to traditional methods of pedagogy.

3.042. The national character of these institutions calls for the introduction of a common compulsory programme and fairly in depth programme, on Indian civilisation which aims to correct distortions arising out of regional, communal, linguistic and casteist parochialism and chauvinism and presents the image of the composite national culture of India.

3.043. Any substantial input for Social programmes in the educational sphere, in order to achieve optimal results, should, in addition to the training of the engineer, also lead to the development of Social Sciences themselves in directions possible only in technological institutions.

3.044. This is important for the following reasons :

(i) The interface of Social Sciences with technology is in an underdeveloped stage in India and can properly develop in the climate of technological institutes of higher learning on the basis of interaction between social scientists and technologists. The following such areas may be tentatively identified :

(a) Industrial Management.
(b) Industrial Economics.
(c) Industrial Psychology.
(d) Industrial Geography.
(e) Industrial Law.
(f) Industrial Sociology.
(g) History of Science and Technology.
(h) Systems analysis of social phenomena.
(i) Natural Resource Management.
(j) Regional Development.

(ii) These programmes act as a pull factor for faculty members of high competence and give them job satisfaction.

(iii) These in-depth programmes create the academic infra-structure for the programmes in Social Sciences for the training of engineers, in selected sub-disciplines to be of a high order, because imparting of knowledge would get linked up with its generation and would also lead to the integrated development of Social Sciences in the country.

3.045. It is suggested that every Central Engineering College should concentrate its faculty and other inputs in a suitable area taking into account regional needs.

3.046. The core faculty in Humanities and Social Sciences should consist of experts in communication skills and those in the selected area of specialisation. The rest of the programmes may be handled by part-time teachers selected by the colleges from educational institutions in the neigh-

bourhood, as far as possible. Funds should be earmarked for this purpose.

3.047. Reading material, relevant to Indian conditions, for these courses at present is not adequate. It is, therefore, suggested that the Central Academic Board should take steps to get such material prepared expeditiously.

Post-graduate courses and research

3.048. There is a great demand for starting post-graduate courses in most of the Central Engineering Colleges. Even in those institutions where some post-graduate courses are already established, there are requests for additional courses to be instituted. This is also the case with other Engineering Institutions in the country.

3.049. The experience of institutions including the Indian Institutes of Technology, is that it has not been possible to fully utilise the post-graduate facilities already established. 50% or more of these places are lying vacant and many students who join do not complete the course.

3.050. It is also our experience that the quality of students attracted to these courses is not always very high. The main reason for this is that the acquisition of a post-graduate qualification by a student does not place him in any advantageous position in the current employment market in the country. After completing his course, he will have to compete for the same type of jobs as first-degree holders do and he has to be content with the same salary scale, without even additional increments. It is also our experience that after taking the post-graduate course in a particular field, the type of job a candidate gets may not necessarily be in the same field.

3.051. One of the arguments for starting post-graduate courses is that it will not be possible to attract highly qualified staff and retain them unless the routine under-graduate teaching is broken by high level and challenging work involved in post-graduate courses and research activities. Staff members also argue that their academic advancement can be ensured only if they are also engaged in the teaching of post-graduate courses.

3.052. We believe that these are not sound arguments for starting post-graduate courses. They can be established only if they can serve a specific purpose and the trained graduates are appropriately employed. There are several other means available which staff members should avail of, if they look for challenging work and academic advancement.

3.053. There are a number of developmental projects in the five-year plans and the teaching staff from each college should be fully conversant with such projects around their institutions. They should establish close

contacts with projects and take on problems arising out of them for investigation in their colleges. We are also recommending some financial provision for the Central Engineering Colleges as a group, to support individuals engaged in such work.

3.054. There are also individual grants for research projects made available by the University Grants Commission, the Council of Scientific and Industrial Research, Department of Atomic Energy, Department of Electronics and the Ministry of Defence. We also understand that agencies such as the Research and Development Organisation for Electrical Industries offer consultation work and financial assistance for the solution of some live problems facing Electrical Industry. Interested and competent staff members should avail themselves of these opportunities.

3.055. Colleges could also offer short courses in specialised topics of interest to working engineers in industrial establishments, developmental projects and government departments in the vicinity of their location. Through the experience of these short courses and individual research efforts, areas of excellence and utility will emerge in each college. Post-graduate courses offered only in such areas of excellence already generated and which will be of interest to industries, government departments and other employing agencies which may be evident from their readiness to sponsor their employees for such courses, are likely to succeed.

3.056. It is relevant to mention, in this context, the progress made by some of the Central Engineering Colleges on the industrially-oriented M. Tech. programmes with UNDP assistance. Since these programmes were all specific to the needs of industry, it has been possible to achieve a measure of success in the proper utilisation of the candidates trained. We are convinced that post-graduate courses should be offered only if at least 50% of the places are filled by sponsored candidates. We also recommend that admission to existing courses which have not been able to attract students to fill at least 30% of the available facilities should be stopped or postponed for the time being.

3.057. The guidelines we enunciated for the establishment of post-graduate courses above, hold good equally to Science and Engineering Departments. We had earlier stated that there is no justification for the Science Departments to run 2 year usual type M. Sc. courses after B. Sc. These Departments should only organise 2 year inter-disciplinary programmes leading to M. Tech. (in applied areas) which should be open to graduates in engineering and Masters in Science. We also recommend that existing M. Sc. courses may be reorganised into M. Tech. courses of the type envisaged.

3.058. In those colleges where competent staff members exist, we

recommend special financial support for research activities including provision for fellowships, for Ph. D. students. We, however, suggest that the research activities in science departments should largely be in the applied fields, preferably in collaboration with engineering departments.

3.059. Teachers from various colleges represented to us that each college should have a certain research fund, from out of which, assessed proposals from Departments and individual staff members should be supported. This is because the C. S. I. R. and other schemes cannot support several staff members and even in those cases where assistance is made available, it is only for recurring expenses, on the understanding that infra-structure is already available with the colleges. There is no justification for providing funds for large scale equipment and other needs for individual research projects. We, however, recommend that there should be a provision of Rs. 20 lakhs annually for all the Central Engineering Colleges, to support individual projects on merits, if they cannot get support from other agencies. This amount should be with the proposed Central Council.

3.060. We also suggest that the colleges should undertake consultancy work and build a research fund. Every year the Central Authority may make matching grants to the research funds of the colleges for credits made by the colleges to the research funds from their consultancy earnings.

RELATIONS WITH THE INSTITUTES OF TECHNOLOGY AND THE STATE ENGINEERING COLLEGES

3.031. We stongly support the view that the Institutes of Technology and the Central Engineering Colleges, both having been established with huge investments by the Central Government, should work in close co-operation and complement each other in the national effort of higher technical education and research.

3.062. An important role assigned to the Institutes of Technology is vitalising technical education in other institutions. In a way, it was envisaged that the Central Engineering Colleges will also be able to help in raising standards of technical institutions within the region. There is little evidence to show that either institutes of Technology or the Central Engineering Colleges made any impact on other institutions in this direction.

3.063. Immediate steps should be taken to set up academic links between the Institutes of Technology in a region and the Central Engineering College in that region on the one hand and between the Central Engineering College and the State Technical Institutions on the other. The

Central Engineering Colleges should draw on the experience of staff and highly sophisticated equipment available at the Institutes of Technology thus avoiding unnecessary duplication of expensive equipment needed at this level of work.

3.064. An interaction between the staff of the Institutes of Technology and the Central Engineering Colleges will be highly beneficial. The Central Engineering Colleges made some progress with industrially oriented post-graduate courses. Further development of these courses and the satisfactory functioning of the problem-oriented research laboratories envisaged at some of the Central Engineering Colleges will greatly be benefited by a joint effort of the high-level teaching staff in both the categories of institutions.

3.065. Excellent short courses for the benefit of practising engineers and technologists in specialised areas by the combined expertise of high level staff in both the institution and also that available in industrial establishments and government departments should be organised.

3.066. Programmes of staff exchange between the Institutes of Technology and the Central Engineering Colleges on the one hand and between the Central Engineering Colleges and other State Institutions, on the other, at the level of Assistant Professors and above, for stated periods will be highly beneficial. It should thus be possible to strengthen the departments by transfer of experience from one institution to another. The staff exchange programmes will cost some additional money and sufficient provision should be made in the college budgets to make it possible. The possibility of a programme of staff exchange between different institutions as stated above, being included in an expanded quality. Improvement Programme under the Ministry of Education, should also be examined.

3.067. The Colleges have fairly good libraries. They also subscribe to a number of Indian and Foreign journals. We understand that each college spends from 50 to 80 thousand rupees annually on foreign journals. With ever increasing prices of books and journals, the library budgets are becoming inadequate. Several colleges are subscribing to the same foreign journals. With a view to making more effective use of the library recurring budgets and also saving a considerable amount of foreign exchange on journals, we suggest that :

(a) Subscription to foreign journals should be restricted to actual use or work going on in the college.

(b) Something like 5 journals to a Department or 50 to a college should be reasonable and

(c) Provision made for off-prints from a Regional Library. These regional libraries may be the existing libraries in the Institutes

of Technology which are subscribing to a large number of foreign journals. The Regional Libraries will circulate to the colleges, a table of contents in the various journals and colleges may obtain copies of articles in which they are interested, from the Regional Libraries. The Regional Libraries should have good reproduction facilities, such as Xerox and should be provided with necessary additional staff and other expenses.

3.068. The measures enumerated above for establishing academic links between the Indian Institutes of Technology and Central Engineering Colleges should also be taken for corresponding links between Central Engineering Colleges and the State Engineering Colleges. It should thus be possible to realise the objectives of the Institutes of Technology vitalising technical education in the country through the medium of the Central Engineering Colleges.

It will, however, be appreciated that the Central Engineering Colleges will not be able to effectively transmit their experience to the other Institutions, unless they are autonomous and entirely independent of the Universities.

3.069. An important need of industrial liaison has not been adequately provided for. With the growth of industrial collaboration, industrially-oriented courses at both under-graduate and post-graduate levels and the proposal for establishing problem oriented research laboratories, there is urgent need to have in the colleges a good organisation for industrial liaison.

3.070. The present arrangement is that, somehow, contacts are established between individual Professors/the Principal and industry. It will be necessary for the Institute to publicise its capabilities and maintain excellent contacts with industry on an institutional basis, and not on an individual basis.

3.071. There is also a need for proper set up to look after student welfare and discipline. Student welfare may include guidance and assistance in employment and scholarships.

3.072. We recommend that all these functions should be brought under a new department—Department of Industrial Liaison and Student Welfare—with a Senior Professor incharge. The existing post of Professor of Placement and Training may be upgraded to the post of senior professor—Industrial Liaison, Placement and Student Welfare. The Department shall have two units—one for Industrial Liaison and Placement and the other for student welfare, with adequate office staff for each unit

3.073. The work of industrial liaison will involve arrangements for final year student projects in industry, arranging staff and student training programmes, from industry as well as the college, making institute capa-

bilities in handling problems known to industry, establishing contacts between experts from industry and teachers of the college and formulation of agreements and contracts on consultancy and projects. The professor incharge may obtain part-time assistance in this work from the appropriate teaching staff member for which suitable honorarium may be paid.

For the work of the student welfare unit, the Professor incharge may have the assistance of a part-time Proctor, Wardens and others looking after the activities appointed from the teaching staff.

The Professor incharge should work as the top executive officer for both the units, each unit having a properly constituted council of advisers. The Council for Industrial Liaison Unit will include Ithe college legal adviser and the Council for student welfare unit will have the student representatives in it.

3.074. in our discussions with staff members. a suggestion has been made that the Headship of a Department should be by rotation from amongst staff of the Department including Lecturers. In support of this, it was stated that this is the accepted practice in institutions of higher learning abroad and also in India. Where this arrangement is prevailing, institutions have progressed substantially. Insofar the institutes of Technology or Departments of Universities are concerned, our view is that there is not much to choose between a permanent head of the department or head of the department appointed by rotation of the Professors in Department. Good management of the Department is the only criterion to establish one or the other system for Headship. Even in these institutions, the practice is to rotate only between Professors of a Department.

3.075. In any case, as we have already mentioned, despite autonomous status that we are recommending to the Regional Engineering Colleges, it is necessary for these institutions to establish their stability and academic discipline over a sufficiently long period before they can be made into degree awarding institutions or deemed universities. Similar considerations compel us to recommend that academic practices available in universities or Institutes of Technology, cannot be applied for the present, to these colleges. Experience tells us that without rotation of headship, success was achieved only with appropriate local situations and conditions. If rotation is to be introduced, it should be confined to staff having over 15 years of total professional standing.

3.076. Members of teaching staff have also represented to us that the policy of confidential reports should be given up, as it is based on doubt rather than on faith and does not contribute to developing free and healthy academic atmosphere. It was also alleged that the system is used to threaten subordinates in private or even in public. We are in full

sympathy with the desire of teachers that the system of confidential reports could sometimes be misused.

3.077. We, however, cannot agree that there should be no method of assessing the performance of teachers. A satisfactory arrangement would be that each teacher is required to give what he has done during the year in teaching, research publications and student activities, mentioning his contribution to the development of the Institute in these directions. The Officer writing the confidential report can support or disagree, with reasons, giving his own observations on the individual. As to the teaching qualities and performance of a teacher, a system of confidential feedback from the students may be worked out and teachers' capacities assessed partly on that basis. This method is used in some foreign Institutions, e.g., Stanford University, U.S.A. It is ofcourse very essential that the students' remarks on the teacher are kept strictly confidential at the highest level.

B. Administrative Set Up

3.078. Each of the colleges is registered under the Societies Registration Act XXI of 1860 and has a Board of Governors with full powers for the administration and management of its affairs and finances. The Articles of Association of the Society provide that in case the college is not functioning properly, the State Government will have the power to take over the administration and assets of the college with prior approval of the Central Government.

3.079. The composition of the Board of Governors and its powers and functions may be seen in Annexure I. The Chairman is appointed by the State Government with the approval of the Central Government. There are three Government representatives—two from the state and one from the Centre. There is also a non-official representative from each State in the region to be appointed by the concerned State Government in consultation with the Central Government. The other members are two nominees of the All India Council of Technical Education and a representative of the university to which the college is affiliated. The Principal of the college is ex-officio Member Secretary and the Board as a whole may co-opt not more than two persons.

3.080. In our discussions with the Associations of Teaching and Non-Teaching staff, during our visits to the colleges, representations were made on the working of the Boards of Governors. The Board consists of busy people drawn from all over; hardly meets three or four times a year and considers important issues as presented to it by the Member-Secretary and takes decisions. The Board very often meets at places outside the institution and it is generally so, that the members do not find any occasion

or time to personally acquaint themselves with the general conditions and state of development and requirements of the institution. It was mentioned that there are several members of the Board who have not seen the college even once.

3.081. It was alleged that since the Board meets at long intervals, many vital matters are kept pending and only those in which the Principal has great interest get on to the agenda and the Member-Secretary may put off for the consideration of the Board irksome problems. Several matters concerning the welfare of the teaching and non-teaching staff and students, thus do not find adequate place in the agenda for the Board meetings.

3.082. We have called for information to study the participation of the members of the Governing Body during the three years—1970-71, 1971-72 and 1972-73. The information collected is presented in Annexure VI. It will be particularly noticed that the Regional Institute of Technology, Jamshedpur furnished incomplete information and were asked to send the information urgently, but the Institute has failed to do so. It will be observed that only 2 out of the 14 colleges have been able to hold four meetings in a year, consistently, for this period. About 9 or 10 colleges were able to hold three or more meetings in a year. 4 or 5 colleges, in each year, have held only two meetings. One college, that at Srinagar, held, consistently in the three years, only one meeting in a year.

3.083. An analysis of the different categories of members' participation in the meetings that were held, shows that generally only the Chairman and Secretary attended all the meetings; the next best participation was that from the State Government representatives who had 75-90% participation. The participation of the Central Government representative is only to the extent of 35-50%. If we consider Central Government representatives participation region-wise, it is about 80% in the Southern region, about 35% in the Western region, and about 50% in the Northern and Eastern regions. Participation by non-official members has only been of the order of 40%. The participation of other members, i.e., nominees of the AICTE and university to which the college is affiliated, is also not very satisfactory, being only 50%.

3.084. What emerges from the above analysis is that most of the decisions are taken between the Chairman, Member-Secretary and State Government representatives. The participation of State Government representatives is good because they make it a point to see that no decision is taken by the Board, which, in their view unduly increases the financial liability of the State Government. It is unfortunate that the representative of the Central Government has not been able to attend these meetings as frequently. This is because the Central Government is represen-

ted by the Regional Officer who has to attend several meetings not only of the Central Engineering Colleges, but also of other institutions.

3.085. There was also a feeling that generally, Boards' decisions, particularly concerning financial issues, mostly reflect the State Government view. The representative of the Central Government either did not attend the meetings or when he attended was not effective enough, being rather junior. Except in the case of a few States, the State Government representatives found it difficult to support higher allocations to the Central Engineering Colleges in comparison with other State engineering institutions due to their resource constraints. The Central Government has been trying to fill the gaps to make them first-rate institutions capable of acting as pace-setters in the region.

3.083. There have been a numebr of representations and complaints on the question of salary scales and allowances to teaching and non-teaching staff of the colleges. Although salary scales attached to teaching posts are uniform in all the institutions, they have a slight variation from salary scales applicable to corresponding teaching posts in the Institutes of Technology. For non-teaching staff, the salary scales are in accordance with the corresponding state government salary scales. For all categories of staff, other allowances admissible are in accordance with the State Government rules.

3.087. Each Board of Governors, being fully autonomous, formulates service conditions and benefits in respect of its employees. They have sometimes adopted a number of State rules and sometimes Central rules. They have also sometimes adopted qualifications for each teaching post, differing from those laid down for the same posts by the All India Council of Technical Education. There was freedom for the Boards in the matter of fixing numbers and cadres in respect of non-teaching staff resulting in a large number of variations in the colleges for similar posts and also possible excess staff in class III and class IV levels. Employees of all categories of the Central Engineering Colleges tend to compare their salary scales, qualifications, other emoluments, service conditions and benefits not only with other Central Engineering Colleges, but also with the Institutes of Technology. This has resulted in unnecessary irritations, frustrations and insufficient attention to academic progress.

3.088. It was provided in the scheme for Central Engineering Colleges that periodical meetings or conferences will be convened by the Central Government for the purpose of coordinating work and development of the institutions so far as major issues are concerned (1.23). In pursuance of this, we would have expected that at least once a year, such a meeting would have been convened by the Central Government. But, we find

that this has not been done except on one occasion, when some general directions and operational instructions were conveyed to the Principals on the implementation of UNDP Project in some of the colleges. This opportunity was taken to convene a meeting of not only the Principals of the Project colleges, but Principals of all the Central Engineering Colleges as well.

3.089. Inability of the Central Government to convene these meetings periodically, has resulted in a multiple approach by various colleges even to problems of common interest. The Regional Officers of the Ministry of Education attended some of the Board meetings of the colleges in their own region, but there was not sufficient central coordination of the stand they have to take, on problems of general interest. This at least could have brought some measure of common outlook in the region, and also to a great extent in various regions.

3.090. It is not clear why only part of the staff (teaching) should have been placed on common salary scales (A.I.C.T.E. scales) all over the country, but even in their case their allowances varying from state to state; while other staff (non-teaching) should be on state scales and state rates of allowances. However, both these categories of staff are covered by the same set of service conditions, rules and benefits. This has naturally resulted in frustrations and unrest affecting the quality of academic work.

3.091. As in the case of Institutes of Technology, the cadres, qualifications and salary scales for all categories of staff should have been laid down in the scheme itself. We, therefore, strongly recommend that in the future set up of these institutions, the salary scales, other allowances, service conditions and benefits for teaching as well as non-teaching staff should be identical with those fixed for corresponding posts in the case of the Institutes of Technology. In this it is not our intention that all categories and designations of posts in the Institutes of Technology should necessarily be provided in the Central Engineering Colleges also. With this arrangement, we are sure that the present confusion will be resolved and a stable staff situation will prevail in the colleges.

3.092. The amount spent on the Central Engineering Colleges by the Central Government on non-recurring items such as buildings, equipment, etc., and 50% of the contributions of the yearly recurring expenditure is shown in Annexure VII. From this and Loans and Grants for Hostels and Staff Quarters Statement in Annexure VIII and IX, it will be seen that so far the Central Government has spent on the 14 colleges now functioning the following amounts (in lakhs of rupees) :—

A. Undergraduate Courses:

Non-Recurring

	(Rs. in lakhs)
Building	985.70
Enquipment	602.04
Loans	942.60
Total N.R.	2530.34

Recurring

50% annual cost from 1960 to 1972-73	1,300.04
Undergraduate Courses Total (Non-Recurring & Recurring)	Rs. 3,830.38 lakhs

B. Post-graduate Courses:

Non-Recurring	Rs. 66.98 lakhs
Recurring upto 1972-73	Rs. 109.47 ,,
Postgraduate Courses Total	Rs. 176.45 lakhs

In addition, 8 Regional Engineering Colleges received assistance under the UNDP Projects as follows :—

Equipment	$ 28.70 lakhs	i.e. Rs. 215.25 lakhs
Expert Services	$ 25.84 lakhs	i.e. Rs. 193.80 lakhs
Training of Faculty	$ 5.42 lakhs	i.e. Rs. 40.65 lakhs
Total UNDP assistance	$ 59.96 lakhs	i.e. Rs. 449.70 lakhs

The contribution of the State Government of the 14 colleges is as follows :—

Non-Recurring

Cost of land acquired by State Government and its development (Cost of land provided by State Government direct is not included in this)	Rs. 437.47 lakhs
50% recurring expenditure	Rs. 1300.04 ,,
Total	Rs. 1737.51 ,,

3.093. Thus so far, the Central Government including the UNDP Project have spent a total of Rs. 44.6 crores on the 14 colleges and the State Governments Rs. 17.4 crores. These figures will speak for themselves on the large inputs the Central Government made in comparison to the State

Governments as a group. It has been represented to us that the State Governments have tended to keep the recurring expenditure low, in view of their tight revenue resources and it has naturally slowed progress to that extent.

3.094. In our discussions with the Boards of the colleges, we were given to understand that in several cases, the contributions of the State Governments to the recurring expenditure are not promptly received. In one of the institutions, these contributions are in great arrears. The flow of funds due from the Central Government, however, are smooth and satisfactory, despite the fact that in a large number of cases, utilisation certificates for non-recurring items do not come forth even long after they were due. Where the State contributions were in arrears, the colleges were obliged to irregularly divert funds for paying staff salaries.

3.095. The recurring expenditure on account of under-graduate courses in the original estimate is Rs. 10 lakhs per year. For some of the colleges, this has now reached over Rs. 30 lakhs. We understand that in a few cases, the State Governments are working on an arbitrary fixed ceiling for the recurring expenditure, thus enforcing cuts even on essential academic items for satisfactory functioning of the colleges. The cost of running the post-graduate courses both recurring and non-recurring is at present borne 100% by the Central Government. There is, however, no decision yet on how it is going to be met in future. Some of the Central Engineering Colleges have already reached a level of Rs. 10 lakhs on recurring expenditure on account of post-graduate courses.

3.096. There is bound to be progress at both under-graduate and post-graduate levels in these colleges. The cost of materials and services are also increasing. This will naturally result in an increase in the recurring expenditure in future years. The reluctance of the State Governments to accept increase in recurring expenditure and their comparison of these colleges with non-government institutions in the State is bound to restrict the development of the Central Engineering Colleges on which such large sums of money have already been invested.

3.097. The financing of the institutions from two sources is thus not very satisfactory and they should function deriving their finances only from one source, viz., the State Government or the Central Government.

3.098. Our discussions, with the representatives of the State Governments and the Boards of Governors, have made it clear that except in one or two cases, the State Governments will not be in a position to take over the entire financial responsibility for running these colleges. If they are compelled to do so, they will be obliged to reduce the functioning of these colleges to the level of State institutions including salary scales. Many

State Governments, however, appear to be willing to continue on the present sharing basis, but this is not satisfactory as already explained above.

3.099. Therefore, it appears to us inevitable that the entire financial burden of these colleges will have to be taken by the Central Government, if the investments already made, are to yield desired results and the institutions function as all-India institutions, complementing the work of the Institutes of Technology and helping in the general raising of standards of technical education throughout the country.

3.100. We understand that on the recommendations of the 5th Finance Commission, some of the State Governments have already received the benefit of increased Central assistance for taking over the entire recurring responsibility of the Central Engineering Colleges, as provided for in the original scheme. The 6th Finance Commission has also recommended a large scale devolution of resources to the States. Very likely, this covers full liability of the State Governments on account of the Central Engineering Colleges. However, in view of what has already been stated, we consider it very essential that despite this, future financial responsibility for the colleges should be entirely from the Central source. We have no doubt that it should be possible for the Central Government, to offset the assistance already made available or indicated to the State Governments, on the recommendation of the Finance Commission for the Central Engineering Colleges against other items due to them.

3.101. The functioning of the Colleges as All-India institutions, and their academic progress in building up of standards high enough to complement the work of the Institutes of Technology, can be ensured only if their financial position is made absolutely secure, academic autonomy is guaranteed and their day-to-day working is not fettered with tedious rules, regulations and official red-tape.

3.102. Administrative autonomy given to the institutions under the present set up has been quite satisfactory. In fact it has been exercised by the Boards liberally. If any comment can be offered on this, it can only be said that in the case of one or two Boards, it could have exercised more carefully. At the same time, in several cases the representatives of the State Governments, have tried to fetter the decisions of the Board by rigid application of rules applicable to state institutions.

3.103. However, there has been a lack of coordination in approach to general problems and problems of common interest to all the colleges. It was not possible for the Central Government to effect the necessary degree of coordination directly. There have also been delays and inadequacies, in the technical examination of the needs of these institutions, in respect of equipment and staff. In some cases, though not many, institu-

tions have over-stepped their authority and propriety in staff selections.

3.104. On the academic side, with all the facilities that have been provided to the colleges, they would have made some significant progress, but for the restrictive influences of the procedures of some universities to which they have been affiliated. Nevertheless, we are not prepared to accept each college as a university or a degree awarding institution by itself, as this would mean a number of statutory procedures in all the states. Such a status can be considered in due course only for institutions which have established their discipline and their stability continuously and consistently over a period of years.

3.105. There is, however, the urgent need for a Central Authority to coordinate—(a) the functions of the Central Engineering Colleges amongst themselves and with other institutions of the region in Engineering, Science and Humanities, in academic work, (b) ensure a more or less uniform curriculum of high standard, (c) allocate grants for maintenance and development, including personnel—a function similar to that of University Grants Commission, (d) arrange for a common admission examination and regulate the number of students admitted to each college and arrange for a periodic review of the working of the colleges and their needs for future development.

3.106. The Central Authority referred to above may be called the Council of Central Engineering Colleges and should be established by an Act of Parliament to give it the necessary powers to confer degrees and to disburse grants to the Central Engineering Colleges from out of the funds placed at its disposal by the Central Government for proper running and development of the colleges. The composition of the Council should be as follows :

(1) Union Minister of Education—Incharge of Technical Education —Chairman

(2) An eminent educationist/engineer/technologist/scientist/industrialist —Vice-Chairman

(3) A representation of the Ministry of Education

(4) A representation of the Ministry of Finance

(5) A representation of the University Grants Commission

(6 & 7) Two nominees of AICTE

(8) One of the Directors of the Institute of Technology nominated by IIT Council

(9) A nominee of the CSIR

(10) A nominee of the Institution of Engineers

(11 & 12) Two Principals of the Central Engineering Colleges by seniority and by rotation every year

(13) Two Chairmen of the Central Engineering

(14) College Boards nominated by the Central Government for one year

(15 & 16) Two teachers of the Central Engineering Colleges nominated by the Central Academic Board for one year

(17) Member Secretary

3.107. The Vice Chairman and Member Secretary should be full time staff of the Council. The Council should have a permanent office to discharge its functions. The Council shall meet at least twice a year and the quorum shall be 9 members. The term of the members of the Council shall be three years unless otherwise mentioned above. No member, except the ex-officio members, shall continue for more than two successive terms.

3.108. Since it is proposed that the degrees should be awarded under the common seal of the Central Council, the maintenance of academic standards by each institution should be looked after by this authority. Therefore, a Central Academic Board should be created for (1) reviewing the academic programmes of the various colleges, (2) maintenance of academic standards, and (3) approving new courses of study.

3.109. The Central Academic Board shall consist of:

(1) Vice-Chairman of the Council —Chairman

(2 to 16) One Professor from each College

(17 to 31) Principal of each college

(32) One nominee of the CSIR

(33) One Professor from the IITs nominated by the IIT Council

(34) One nominee of the Defence R & D

(35) One nominee of UGC from among teaching staff of the universities having engineering faculty

(36 to 39) Professors from Central Engineering Colleges to be nominated if necessary, from disciplines which may not be represented by members in 2-16

(40) Member Secretary of the Council —Secretary

3.110. The term of the Central Academic Board shall be three years except that it is one year in the case of professors from the Central Engineering Colleges. No member, except the ex-officio members, should continue for more than two successive terms. The Central Academic Board shall meet twice a year. The quorum is 50 per cent. It is suggested that the meetings are held at different colleges in order to gain personal knowledge of the academic working of these colleges.

3.111. The management of the individual institutions may continue to be carried out by autonomous Boards of Governors as at present. These Boards should be set up by the Council of the Central Engineering Colleges with the following compositions :

(1) An eminent educationist/engineer/technologist/scientist/industrialist (To be appointed by the Council of Central Engineering Colleges in consultation with the State Governments) —Chairman

(2 & 3) Two industrialists/technologists from the region, as far as possible, to be nominated by the Council of Central Engineering Colleges

(4) A nominee of the Central Government

(5) A nominee of the State Government

(6) A nominee of the AICTE

(7) A nominee of the IIT in the region

(8) A nominee of the UGC

(9, 10, 11) One professor and two other members of the teaching staff other than a professor nominated by the College Academic Committee by yearly rotation

(12) Principal —Member-Secretary

3.112. The Board shall meet at least four times a year and six members should form a quorum. Boards of Governors should be reconstituted every three years and no member, except ex-officio, shall continue for more than two successive terms.

3.113. The academic set up for each college has been discussed in paragraph 3.028.

CHAPTER IV

PRESENT POSITION AND PLANS OF COLLEGES FOR FURTHER DEVELOPMENT

4.001. In this chapter we shall deal with the present state of development of the colleges, their plans for further development and our general recommendations. We are also adding a note on the UNDP/UNESCO project—Post-graduate Education of Engineers—which has been operating in selected Regional Engineering Colleges over the last 9 years.

4.002. In part A of this chapter we are recommending our general approach to the facilities to be provided in the Central Engineering Colleges. In part B, we are reporting on the present state of development of individual colleges and their plans for future and in part C, we are presenting a note on the Post-Graduate Education of Engineers under the UNDP project.

A. GENERAL APPROACH

4.003. Annexures VII, VIII and IX show the grants and loans paid to the colleges by the Central Government as follows :—

Annexure VII :

Part A—Non-Recurring Grants

Part B—Recurring Grants

Annexure VIII :

Loans for Hostels and Repayments

Annexure IX :

Loans and Grants for Staff quarters and repayment of Loans.

4.004. The various colleges, in their reports submitted to the Reviewing Committee, furnished particulars of the facilities to be made good in accordance with the scheme and their estimated costs along with future plans for development and their estimated costs.

4.005. Making specific financial recommendations in respect of each of the institutions for making good the present deficiencies or to meet their future plans of development is not included in the terms of reference given

to us. Moreover, in the very short time that was available to us at each college, a detailed estimate of such requirements was also not possible. In the present position of each college, we had shown the proposals made by the colleges. We are, however, required to recommend the future set up of the colleges including pattern of financing from Central and State resources, to ensure their functioning as all-India institutions of high quality and standard. It is in the context of this reference that we are making certain general observations in the light of our visits and discussions with the staff and students.

4.006. In this, our approach is, principally ensuring fulfilment of the initial scheme as originally envisaged, in respect of each college. We are also listing minimum general facilities and amenities to be made available in each campus, although many of them are already included in the original scheme. As regards the future development, almost all institutions have made ambitious plans involving considerable financial inputs for their achievement. Thus the sum total of the requirements of all the colleges may well exceed Rs. 10.00 crores recurring and Rs. 15.00 crores non-recurring over the next five year period whereas the provision for the colleges in the 5th Plan, as we understand, is only Rs. 10.5 crores.

4.007 We are also aware that the development proposals can be approved only by the All-India Council for Technical Education and the Post-Graduate Board. It will also be necessary to consider manpower requirements in specific fields and the existing facilities before specific recommendations are made. Therefore, we have not attempted any such recommendations in respect of the proposals made by each college.

4.008. The main reason, for additional finances required for making good the deficiencies, is that the costs have gone up since the original estimates were made. For instance, equipment which could have been procured in 1956 at an estimated cost of Rs. 29 lakhs has reached about Rs. 50 lakhs in 1973. Similarly, building costs have gone up very high. Obviously, institutions which have come in later will have to be provided additional funds to build their facilities to the level envisaged in the scheme.

4.009. As far as buildings are concerned, approvals are given on the basis of area to be constructed and usual specifications. Additional costs on account of buildings will, therefore, have to be given, on the basis of prevalent costs of construction when they are put up. This has also been spelt out clearly in the initial scheme.

4.010. Institutions have advanced the following reasons for additional funds on account of equipment to make good the deficiencies :

(a) The cost of equipment has gone up considerably since the original estimates were made.

(b) In the case of earlier Institutions, some equipment needs replacement and modernization.

(c) Additional equipment has to be provided to meet the requirements of university to which they are affiliated, and

(d) Provision of elective subjects requires additional specialised equipment.

4.011. Almost all these institutions are comparatively of recent origin —even the earliest one is only 14 years old. It would, therefore, appear, that it is too early to think of replacement of equipment. Nevertheless, there is some justification for a small additional allocation for replacement and modernisation in respect of the older institutions. We suggest that institutions which have completed their equipment programme for undergraduate courses and with longer than 10 years' standing should be provided a sum of Rs. 5.00 lakhs each and those between 5—10 years' standing should be provided a sum of Rs. 2 lakhs for this purpose.

4.012. For compensating higher costs of equipment incurred by the institutions started in later years, we suggest that the overall cost differential should be provided on a straight-line variation basis as indicated below.

An institution which has completed its equipment programme in 1956 could have done so at a cost of Rs. 29 lakhs and an Institution which has completed its programme in 1973 could do so only at a cost of Rs. 50 lakhs. Thus approximately over 16 years, the cost differential is Rs. 21 lakhs. We, therefore, suggest that from 1956 onwards for every year delay in completing the equipment programme, an amount equal to 5% of the cost of remaining equipment may be added to cover rise in prices.

4.013. We are listing below facilities which, in our view, each Regional Engineering College should provide. Some of them are already included in the initial scheme. We strongly recommend that financial provision for others which do not find a place in the scheme should now be made.

(i) The computer has become a very valuable tool in Engineering Analysis and Design. It is, therefore, necessary that every engineering graduate should be trained in the use of computer and that he should learn not only basic programming but the use of advanced special purpose programmes. Each college should be provided with a small computer like the TDC 12 or equivalent manufactured by ECIL Hyderabad along with some provision for its maintenance. We suggest that a provision of Rs. 5 lakhs for the computer and Rs. 100,000 per year for software and Rs. 20,000 per year for staff and maintenance would be adequate.

(ii) In our visits we have seen some un-utilised equipment lying in some colleges and we were told in many cases that this is because of non-availability of spare parts. It is necessary that adequate arrangements should be made for the provision of spares and upkeep of such equipment both at the college level and also at the regional level. At the regional level, the work, we believe, can be undertaken by the Central Instruments Organisation and the Institutes of Technology.

(iii) The library grant at present provided for the college is inadequate and we suggest that a college with a good number of post-graduate courses and activity should be given an allocation of Rs. 1.5 lakhs per year and others an allocation of Rs. 1 lakh per year for library books and journals. We also recommend a book bank to be established in each college for the use of students.

(iv) Every college should have a language laboratory provided in the Department of Humanities. We estimate that this would cost about Rs. 20,000/-.

(v) The following recreational facilities should be provided in each college :—

(a) Developed playground : 150×200 yds. or approximately 6 acres.

(b) A club facility for indoor games.

(c) A community Hall—15,000 sft. for 1500 people and another covered one of 10,000 sft. for multi-purpose use. The total area provided should thus be 25.000 sft. Total provision for this should be about Rs. 10 lakhs.

(d) There should also be an open air auditorium in each college. A provision of Rs. 1 lakh should be adequate for this purpose.

(e) There should be a cafeteria on each campus.

(vi) Other Amenities :

(a) Health facilities provided on the campus should have a first aid dispensary and a six-bed hospital with a resident Medical Officer.

(b) For the education of children of staff members each campus should have a primary school and in addition a bus for school children attending higher classes in local schools.

(c) There should be Bank and Post Office facilities on each campus.

(d) The colleges should provide accommodation for 100 per cent of the student population, 75 to 100 percent of teaching staff,

50-75 per cent for class III and 25-50 per cent for class IV staff.

The provision of residential accommodation for class III and class IV should depend upon the local availability of living accommodation for them. In particular we recommend that colleges located in steel towns of Durgapur, Jamshedpur and Rourkela should provide more houses for class III and class IV employees than in other areas.

For the construction of staff quarters, we suggest that the number of types at present used, should be reduced. The floor areas provided should also be reduced so that even with the increased costs, more units of accommodation are made available.

(vii) New Course

(a) We recommend that as a rule wherever new courses at the under-graduate level are approved in the colleges, they should be adjusted within the existing approved intake of 250 per year, since this is a good manageable size for a good institution.

(b) New Under-graduate courses, we believe, will be recommended by the AICTE only if required by assessed manpower needs.

(c) Whenever a subject of electrical engineering is changed into Electronics or the subject of Electronics is Introduced, changes in the syllabus and contents alongwith some adjustments in the equipment requirements only should be provided. There would be no justification for increased staff on account of this.

(viii) There should be a provision of Rs. 10,000/- per college per year for expenses of staff members visiting industries in connection with industry oriented post-graduate and other courses.

4.014. The Institutions have been finding it very difficult to repay the loan instalments for loans given for hostels and staff quarters. It will be seen from Annexure VIII that about Rs. 6.5 crores was given as loan for the construction of hostel from 1960-61 till 1970-71. The colleges have been able to refund only an amount of Rs. 1.9 crores leaving a balance of about Rs. 4.5 crores loan to be repaid. Again, from Annexure IX, it will be seen that upto 1971-72, an amount of Rs. 2.32 crores was given as loan for the construction of staff quarters and the colleges have been able to refund an amount of only Rs. 0.68 crores, leaving a balance of Rs. 2.25 crores of loan to be repaid.

4.015. When the scheme was formulated in 1959-60, it was visualised that income from seat rent will be adequate to return the interest free

loans for hostels, over a period of 25 years. On account of increase in the cost of construction and student intake having also been reduced from 1968-69, it was not possible for the college to make repayments of loan instalments. It is also not possible to increase the seat rent to any value higher than what is prevalent in other central institutions like the Institutes of Technology. Similarly, in the case of loans for staff quarters it will not be possible to increase the rent, to more than 10 percent of the salary of the employees. Moreover, a fair amount of money has to be spent, on the maintenance and upkeep of these buildings.

4.016. In the circumstances mentioned above, it appears that it will not be possible for the colleges to repay the loan amounts for a very long time. The Central Government having spent large sums of money in their establishment, we have made the recommendation that the liability of maintaining these institutions should be taken over by the Central Government. We, therefore, further recommend that the loans paid for the construction of hostels and staff quarters should be treated as grants, as in the case of other Central Institutions, viz., Institutes of Technology. Seat rents in the case of hostels and rents recovered from staff members occupying quarters, should be credited to the income of the colleges and central grants may be paid only on the basis of net oeficit.

4.017. The total recurring expenditure of the 14 Regional Engineering Colleges in the last year of the current plan period is of the order of Rs. 4 crores. This amount is shared equally between the Central and the State Governments. The colleges will have to complete the provisions in the original scheme and in addition, the 15th college, namely, the one at Silchar, has to be fully financed in the 5th Plan period. The carry over of the unfulfilled part of the original scheme and the implementation of the general recommendations we made above, will require a provision of approximately Rs. 18.5 crores in the 5th Plan period in addition to the continuation of the expenditure by the Central and State Governments together of Rs. 4 crores per year. An estimate of this requirement is given below :

1. **Completion of the original scheme.**

(i) Instructional buildings	Rs. 150 lakhs
(ii) Equipment with provision for increased costs	Rs. 200 lakhs
(iii) Staff quarters and Amenities	Rs. 150 lakhs
(iv) Silchar College	Rs. 150 lakhs
(v) Carry over of expenditure on post-graduate courses	Rs. 100 lakhs
	Rs. 750 lakhs

2. **Provision for implementing recommendations made in this report.**

(i) Computers and their running costs	Rs. 100 lakhs
(ii) Additional library grants and language laboratories	Rs. 100 lakhs
(iii) Impact of revision of salary scales	Rs. 250 lakhs
(iv) Industrial liaison units and provision for staff contacts with industry	Rs. 50 lakhs
(v) Support to individual staff research programmes	Rs. 90 lakhs
(vi) Establishment of the Council of Central Engineering Colleges	Rs. 10 lakhs
Total	Rs. 600 lakhs

3. **Provision for courses and schemes** that may be approved by the AICTE or the Post-Graduate Board.

(i) New under-graduate courses	Rs. 200 lakhs
(ii) Post-graduate courses	Rs. 200 lakhs
(iii) Problem-oriented research laboratories	Rs. 100 lakhs
Total	Rs. 500 lakhs

Grand total (Rs. 750 + Rs. 600 + Rs. 500) = Rs. 1850 lakhs

B. PROGRESS OF THE COLLEGES AND THEIR DEVELOPMENT PLANS

1. Regional Engineering College, Warangal

4.018. The college was started in 1959 in the Government Polytechnic and other buildings in Warangal, with an admission of 250 students. The college was shifted to the new buildings in its own campus of 240.76 acres in 1962. The annual intake was reduced to 200 from 1968-69 on account of industrial recession and reduced employment of engineers. From 1973-74, the annual admission has been increased to 220.

4.019. The college offers degree courses in Civil, Electrical, Mechanical and Chemical Engineering, Metallurgy, Electronics and Communication Engineering with overall admissions restricted to 220 per year. The

college is also approved for the following post-graduate courses :—

1. M. E. in Soil Mechanics and Foundation Engineering.
2. M. E. in Hydraulics Engineering.
3. M. E. in Structural Engineering.
4. M. E. in Power Systems Engineering.
5. M. E. in Electrical Machines.
6. M. E. in Heat Power Engineering.
7. M. Tech. Design and Production Engineering (Machine Tools).
8. M. Tech. Electronics Instrumentation.
9. M. Tech. Transportation Engineering.
10. M. Tech. Hydraulics and Water Resources Engineering.
11. M. Tech. Chemical Plant Engineering.
12. M. Sc. (Tech.) Engineering Physics.
13. M. Sc. Applied Mathematics.

4.020. Post-graduate courses at S.Nos. 6-13 were introduced as industry-oriented M.Tech. courses with assistance from UNDP. With encouraging experience gained from the industry-oriented courses, post-graduate courses at S.No. 1-6 which were initially of the conventional type were also converted to the industry-oriented type. The post-graduate course at S.No. 2 was, however, dropped in view of the course at S.No. 10, with UNDP assistance. The approved enrolment for the 12 post-graduate courses now functioning is 240 in both years of the M.Tech courses.

4.021. Land Development and Buildings : The State Government acquired a site of 240.76 acres for locating the institution and spent Rs. 16.17 lakhs towards the cost of this site and its development. In the year 1972-73, the State Government also spent additional sum of Rs. 1.4 lakhs for further development. The instructional buildings covering an area of 2,72,215 sft. were approved at a cost of Rs. 59.57 lakhs and the college constructed the same at a cost of Rs. 50.55 lakhs.

4.022. There are 10 halls of residence which can accommodate 1280 students (864 in three-seated rooms and 416 in single-seated rooms). An amount of Rs. 48.56 lakhs was spent on these halls of residence.

4.023. An amount of Rs. 56.91 lakhs was spent on staff quarters providing residential accommodation for 139 members of teaching and equivalent staff and 154 members of ministerial and supporting staff.

4.024. Instructional buildings are completed for all under-graduate courses except for the course in Electronics and Communication Engineering. For the post-graduate courses, a norm of 5000 sft. building for each course was indicated, but no actual sanctions of building for any of the post-graduate courses has so far been issued. The college is, therefore, obliged to accommodate the post-graduate courses also in the building constructed for under-graduate courses and consequently, there is some amount of congestion.

4.025. **Equipment and Library** : For the under-graduate courses against a sanction of Rs. 46.25 lakhs, the college provided Rs. 9.69 lakhs worth of equipment. In addition, through the UNDP/UNESCO project operating in this college, specialised equipment essentially of foreign manufacture and valued at Rs. 47.25 lakhs has been provided. When the balance of the equipment already approved for post-graduate courses is also acquired, the college will be having good facilities for its existing activities.

4.026. The Library having about 24,000 books costing Rs. 8.45 lakhs, is housed in a building of 17,064 sft. plinth. The college subscribes to 409 periodicals and journals at an annuanl cost of Rs. 56,392.

4.027. The staff sanctioned and in position as on 1-1-1973 is as follows :—

	Sanctioned	In position
(a) Teaching staff (including Associate Lecturers and Workshop Foreman).	143	142
(b) Administrative and other staff	11	9
(c) Technical Supporting staff	169	137
(d) Ministerial and class IV	281	254

4.28. **Industrial Collaboration and Research Activities.** The college claims to have collaborative arrangements with 47 industries as an integral part of the training programme of industry-oriented post-graduate courses and sandwich courses at the under-graduate level. The laboratories of the college in Physics, Chemistry, Chemical, Electrical and Civil Engineering Departments have been recognised by the Osmania University for research work leading to the Ph. D. Degree. The Department of Mathematics has produced 5 doctorates and the Department of Chemistry one doctorate. Some staff members have also been registered for the doctorate degrees in the engineering departments. At present 8 research scholarships have been sanctioned by the Government of India for students of the college. Also the CSIR has sanctioned junior and senior fellowships for Chemistry

under some schemes approved for the college. The University Grants Commission has also granted assistance to the teachers of the college engaged in research work.

4.029. The UNDP programme has given sufficient encouragement to the institutions for building close relations with industry and oriented its programmes to meet the specific requirements of industry and employing agencies. The college has an active group of young qualified staff quite enthusiastic in research and development work. However, adequate financial support for these activities is not at present available and the meagre resources are distributed on the various programmes through a Research Council of the Institution. Some funds made available for this activity will, in our view, yield results, but there should be a proper organisation for assessment of projects which can really and effectively be supported.

4.030. Student and Staff Amenities : On the college campus there is a post and telegraph office and a branch of the State Bank of Hyderabad. Cooperative store for student stationery and provisions for staff are also provided. These amenities are located in one of the Associate Lecturer's quarters, lobbies of triple-seated hostel and motor garages. There is also a dispensary and a hospital on the campus with its own building. Extensive play fields for hockey, cricket and football and separate courts for tennis, volleyball, badminton and basketball are provided. A club for the staff is located in one of the Associate Lecturer's quarters and for the recreation of class III and class IV employees, an administrative staff quarter is used. One of the Lecturer's quarters is used as primary school for the children of staff and there are separate play fields for them.

4.013. Recurring expenditure : For the year 1972-73, an amount of Rs. 33.55 lakhs was spent on under-graduate courses and Rs. 9.80 lakhs on post-graduate courses. The break-up of Recurring Expenditure is given **below :—**

		Under-graduate	Post-graduate	Total
1.	Teaching staff	11,21,995	3,87,900	15,09,895
2.	Scholarships and Fellowships	1,62,753	3,58,800	5,22,553
3.	Supporting staff	5,37,343	57,100	5,94,443
4.	Administrative including class III and class IV	7,86,975	—	7,86,975
5.	Other charges	7,45,585	1,75,472	9,21,057

4.032. The following assistance was received by the college from UNDP in the first and second phases of the programme :

	$	Rs.	
Equipment	6.61 lakhs	49.58 lakhs	
International experts	Nos. 29	man-months	434.5
	(Cost $ 9.20 lakhs = Rs. 69.00 lakhs)		
Fellowships	Nos. 17	man-months	280
	(Cost $ 1.34 lakhs = Rs. 10.05)		

Of the **17** fellowships awarded to the college under UNDP programme, **5** doctoral awards from foreign universities and **6** masters degrees were obtained besides other specialised training programmes (6, including 4 for short-term studies).

4.033. The proposals made by the college for further development are as follows :—

1. **Department of Civil Engineering** : The Department has established good collaboration with various field organisations and proposed to utilise its well-developed laboratories and qualified staff for working on problems that will assist in the development of the region. In pursuance of this, the Department has proposed establishment of the following four problem-oriented research laboratories at a total non-recurring expenditure of Rs. 8 lakhs and an ultimate recurring expenditure of Rs. 1 lakh per year. The entire expenditure will be spread over the next 5 years.

1. Instrumentation for and analysis of performance of earthen structures and machine foundations.
2. Investigation and exploitation of ground water potential.
3. Application of Prefabrication techniques to engineering structures.
4. Traffic management and transportation planning in urban areas.

2. **Department of Electrical Engineering** : The Department of Electrical Engineering proposed a non-recurring expenditure of Rs 1.5 lakhs for equipment to the under-graduate course in Electronics and Communication Engineering. The Department also proposed the development of Research Laboratory in Electronics whose activities will be industrial and developmental in nature covering broadly Radar Research, Television Systems, including Satellite TV Receivers, Digital Electronics, including PCM Technique and Material Processing for small-scale industries at an estimated cost of non-recurring Rs. 9,37,000 for equipment Rs. 6.5 lakhs for buildings and furni-

ture and an ultimate recurring expenditure of approximately Rs. 2 lakhs per year.

3. **Department of Chemistry**: The Department has proposed for its development a non-recurring expenditure of Rs. 1.5 lakhs for buildings and Rs. 2 lakhs for equipment and library and ultimate additional expenditure of Rs. 88,000 for the introduction of M.Sc. courses in—

(a) Drugs & Pharmaceuticals, and

(b) Fertilizers including inorganic fertilizers as electives.

2. REGIONAL ENGINEERING COLLEGE, SURATHKAL

4.034. The college was established in 1960 with an annual admission of 250 students. The State Government provided 362.5 acres of land for the college campus, 12 miles north of Bangalore. The annual intake was reduced to 180 from 1969 on account of reduced employment of engineers, but was restored to 250 from 1973.

The college offers degree courses in Civil, Electrical, Mechanical and Chemical Engineering with overall admission restricted to 250 students per year. The college is also approved for the following 7 post-graduate courses and admissions.

B. E

1.	Heat power	5
2.	Chemical Plant design	5
3.	Process Metallurgy	5
4.	Hydraulics and Water Resources Engg.	5

M. Tech.

5.	Industrial Structurers	10
6.	Marine Structurers	10
7.	Industrial Electronics	10

Post-graduate courses at S.Nos. 5, 6 and 7 were introduced as Industry-oriented M. Tech. courses with assistance from UNDP. The other courses are run as conventional post-graduate courses. The approved enrolment for the 7 post-graduate courses is 100 in both the years of M.E. and M. Tech.

4.035. Land Development and Buildings : Of the 362 acres land provided by the State Government, 121 acres is Government land and the rest was private land purchased by the State Government for about Rs. 7 lakhs. The State Government spent Rs. 11.72 lakhs on the development of the land.

4.036. For the instructional buildings of the college, 2,41,000 sft. plinth area at a cost of Rs. 45.25 lakhs was approved and the college constructed these buildings at a cost of Rs. 44.04 lakhs.

4.037. There are 5 halls of residence—one single-seated, 2 double-seated and 2 triple-seated providing accommodation for 1250 students. This hostel accommodation was constructed at a cost of Rs. 53.87 lakhs. Accommodation for staff has been provided as follows at a cost of Rs. 34.1 lakhs.

105 quarters for teaching and equivalent staff and 86 for ministerial and supporting staff.

4.038. Equipment and Library : The college has good equipment for both under-graduate and post-graduate courses. For the Under-graduate courses, an amount of Rs. 45.44 lakhs was sanctioned for equipment and furniture, against which the college acquired equipment and furniture worth Rs. 43.5 lakhs. For the post-graduate courses, an amount of Rs. 11.8 lakhs was sanctioned against which the college so far acquired equipment worth Rs. 5.73 lakhs. In addition, the college also received specialised equipment essentially of foreign manufacture under UNDP project valued at Rs. 23.14 lakhs.

4.039. The library is housed in a building with an 11.025 sft. plinth and has 23,250 books valued at Rs. 7.53 lakhs. The college contributes to 282 journals and periodicals at an annual cost of Rs. 42,000. There is also a book bank with 4,000 volumes valued at Rs. 76,000 for providing text-books to students. The recurring expenditure on the library at present is Rs. 62,000 per year.

4.040. Staff sanctioned and in position as on 1-1-1973 is as follows :—

	Sanctioned	In position
(a) Teaching staff (including Associate Lecturers and Workshop Foreman).	135	119
(b) Administrative and other staff	44	33
(c) Technical Supporting Staff	127	117
(d) Ministerial and Class IV	122	110

4.041. Industrial Collaboration and Research Activities : The college has begun some research work in different Departments. The College is undertaking some services such as testing of materials, chemical analysis and consultation. The charges collected are distributed : 40 per cent to the college receipts, 40 per cent to staff members participating and 20 per cent to student aid fund. A modest amount of research work—guiding research projects of post-graduate students and individual research by the staff members has begun. The first publication of a Research Bulletin of the college has come out. The UNDP Programme gave an opportunity to the college to build active collaboration with industry/employing agencies. This has, however, to be built up more in respect of other courses not under the UNDP Programme.

4.042. Student and staff amenities : There is a Post & Telegraph Office located in the building meant for canteen and a branch of the State Bank of India and student co-operative store are located in the main college building. There is a Consumer Co-operative Society for staff located in one of the staff quarters. There is a dispensary and a hospital which will soon be shifted to its own building. There is a Staff Club at present located in one of the Professors' quarters which will soon be shifted to the Staff Recreation Centre nearing completion. A Sports and Recreation Club for the subordinate staff is also functioning. The college canteen and Printing Press run by the Consumers' Co-operative Society and the Recreation Centre for subordinate staff are located in temporary sheds. There are good facilities for cricket, hockey, tennis and other sports. A Gymkhana building at a cost of Rs. 1.37 lakhs built out of the sports funds provides facilities for indoor games. There is also a Gymnasium located in one of the temporary sheds. There is a primary school upto 7th Standard on the campus managed by the college with grant-in-aid by the State Education Department. There is also an English Medium Primary School at present upto 5th Standard entirely financed by voluntary efforts.

4.043. Recurring Expenditure : For the year 1972-73, an amount of Rs. 27.03 lakhs was spent on under-graduate courses and an amount of Rs. 4.17 lakhs was spent on post-graduate courses. The break-up of the recurring expenditure is as follows :—

	Under-graduate	Post-graduate
(i) Teaching Staff	11,55,277.75	1,54,009.22
(ii) Scholarships and Fellowships	1,91,500.00	1,52,585.14
(iii) Supporting Staff	5,77,157.76	47,632.75
(iv) Administrative including Class III and Class IV.	1,54,079.06	—
(v) Other expenses	6,26,000.00	63,000.00

4.044. The following assistance was received by the college from UNDP in the first and second phases of the Programme.

Equipment	$ 3.16 lakhs	Rs. 23.70 lakhs
International Experts	Nos. 3	Man-months 83
	(Cost $ 1.68 lakhs = Rs. 12.60 lakhs)	
Fellowships	Nos. 9	Man-months 165
	(Cost $ 0.98 lakhs Rs. 7.035 lakhs)	

Of the 9 Fellowships awarded to the college under UNDP Programme, 2 doctoral awards from foreign Universities, 3 Masters degrees were obtained, besides 4 other specialised training programmes, including 2 for short-term studies.

4.045. The College has proposed to make good all deficiencies on account of inadequate provisions in the original scheme, rise in prices, additional facilities required on account of the modifications in the university syllabus and other needs which asserted themselves during the development of the Institution. The estimated cost of this is :

Buildings including staff quarters	Rs. 62 lakhs
Equipment, furniture and library	Rs. 31.25 lakhs
and additional recurring about	Rs. 1.8 lakhs

per year on account of staff. The college, however, Implemented the original scheme in full.

4.046. The proposals of the college for further development are as under :

(a) Introduction of post-graduate courses in

(1) Industrial Instrumentation
(2) Applied Soil Engineering
(3) Environmental Engineering
(4) Construction Planning and Management
(5) Industrial and Production Engineering
(6) Machine Design
(7) Electrical Power System Control
(8) Project Engineering in Chemical Industry.
(9) Materials Engineering

(10) Master of Applied Science in Mathematics
(11) Master of Science in Applied Physics
(12) Master of Science in Applied and Industrial Chemistry

(b) A recurring provision of Rs. 5,000 per annum per course for library, a provision for staff members to visit collaborating industries and projects for short periods, a minimum maintenance provision of Rs. 5,000 per course for post-graduate courses and an equipment grant of Rs. 2.5 lakhs for post-graduate courses in Science Departments, should be made.

(c) A Research Centre for Coastal Engineering, as a follow up of the industry oriented post-graduate course in Marine Structurers to be established under the UNDP Project.

(d) Other proposals are, a request for 20,000 sft. to accommodate research activities of all departments, 20 research fellowships at Rs. 400 per month tenable at the college, establishment of a computer centre to support the post-graduate courses and research activity, an additional building at a cost of Rs. 75,000/- for the library, a recurring provision of Rs. 1.25 lakhs for the purchase of books and subscription to journals and periodicals, and a Central Workshop with a building of 10,000 sft. and equipment costing Rs. 4 lakhs.

(e) Additional facilities for staff and students were proposed as follows :

(i) fans in hostel rooms at a cost of Rs. 1.7 lakhs, (ii) additional play grounds, swimming pool and student recreation centre, (iii) auditorium for 1500 people, (iv) guest house, (v) recreation centre for subordinate staff, (vi) play ground for campus children, (vii) marketing centre, and (viii) school building.

3. REGIONAL ENGINEERING COLLEGE, CALICUT

4.047. The college was started in the year 1961 with an annual admission of 125 students for the under-graduate courses, in a campus of 120 acres about 22 km. to the East of Calicut city. The intake was increased to 250 from the year 1966-67—150 for the first year and 100 for the preparatory course. The annual intake was reduced from 250 to 200 from the year 1968-69 on account of industrial recession and reduced employment of engineers.

4.048. The college is affiliated to the Calicut University and offers degree courses, on the semester system, in Civil Mechanical and Electrical

Engineering. From the year 1972, the college started the following post-graduate courses with a sanctioned intake of 6 students to each :

1. Refrigeration and airconditioning (Mech. Engg.)
2. Control Systems (Electrical Engg.)
3. Structural Engineering (Engg.)

The number of students for the three post-graduate courses in the year 1972, however, is only 12. The college has also research activities in the Department of Civil, Mechanical, Electrical Engineering and Mathematics.

4.049. Land, Development and Buildings : The State Government acquired an area of 290 acres for the college, of which the present campus comprises of 120 acres. The State Government spent Rs. 8.33 lakhs on the cost of land and Rs. 17.12 lakhs on its development.

4.050. Against a sanctioned plinth area of 1,78,000 sft. at a cost of Rs. 52.4 lakhs, the college constructed instructional buildings at a cost of Rs. 38.8 lakhs. The college also constructed 5 hostels—2 single-seated and 3 triple-seated at a cost of Rs. 37.62 lakhs providing accommodation for 1116 students. The college spent Rs. 25.1 lakhs on staff members providing accommodation for 193 teaching and equivalent staff members and 114 ministerial and supporting staff members.

4.051. Equipment and Library : The sanctioned amount for equipment is Rs. 44 lakhs for under-graduate courses and Rs. 4 lakhs for post-graduate courses. Against this, the college procured equipment worth Rs. 42.46 lakhs for under-graduate courses and Rs. 2.39 lakhs for post-graduate courses. The Library has an area of 12,600 sft. with 17,800 books at a cost of Rs. 2.65 lakhs. The college subscribes to 271 journals and periodicals at an annual cost of Rs. 50,000/-.

4.052. The staff sanctioned and in position as on 1-1-1973 is as follows :

		Sanctioned	In position
1.	Teaching staff including Associate Lecturers and Workshop Foreman.	128	120
2.	Administrative and other staff	27	25
3.	Technical Supporting staff	123	89
4.	Ministerial and Class IV	139	128

In the teaching staff, there is a post of German Lecturer which is filled. We are unable to understand the need for a full-time German Lecturer at this college.

4.053. Industrial Collaboration and Research Activities : The college is endeavouring to establish co-operation with industries for the training of students and staff members and also for the deputation of experts from industry to teaching assignments in the college. Some progress has been made in this direction with Fertilizers and Chemicals Ltd., Travancore and the Cochin Shipyard.

4.054. Student and Staff Amenities : The amenities provided by the college on the campus comprise of a Branch of the State Bank and pay office, post office, a hospital and dispensary, auditorium, cycle shed and garage co-operative stores and a guest house, and facilities for the following games on the campus for the students : Volleyball, Basketball, Football, Hockey, Tennis and Badminton.

4.055. Recurring Expenditure : For the year 1972-73, an amount of Rs. 31.33 lakhs on under-graduate courses and Rs. 1.1 lakh on post-graduate courses has been spent. The break-up of recurring expenditure is as follows :—

	Under-Graduate Rs.	Post-Graduate Rs.
Teaching Staff	11.07	0.63
Scholarships and Fellowships	0.01	0.42
Supporting Staff	10.32	—
Administrative including class III and Class IV.	0.14	—
Maintenance	Nil	0.05
Contingencies	8.84	Nil

4.056. The college has proposed new under-graduate and post-graduate courses as under :

Under-graduate courses in—

Electrical Engineering, Chemical Engineering, Geo Prospecting, Paper Technology and Production Systems at an estimated cost of Rs. 38 lakhs and an ultimate recurring expenditure of Rs. 7.5 lakhs.

Post-graduate courses in—

Electrical Drives, Energetics, Design and Production of Agricultural Machinery, Production and Industrial Engineering, Inland Water Pollution, Soil Mechanics and Foundation Engineering, Applied Mathematics, Industrial Physics and Industrial Chemistry. The estimated cost of this is non-recurring Rs. 43 lakhs and ultimate recurring expenditure of Rs. 8.5 lakhs.

4.057. The college also requested additional Rs. 20 lakhs to improve the equipment position for under-graduate courses on account of increased costs when the institution started acquiring equipment as compared to the time when the estimates were made. Besides the above, the college requested for additional Rs. 52 lakhs of non-recurring grant for library, hostels, staff quarters, play grounds, recreational facilities and hospital expansion, auditorium, furniture and fans for the hostels.

4. REGIONAL ENGINEERING COLLEGE, TIRUCHIRAPALLI

4.058. The college was started in the year 1964 with an annual admission of 120. The first normal admission of 250 was made in the year 1966-67. The admission was again reduced from 250 to 180 from the year 1968 on account of industrial recession and reduced employment of engineers.

4.059. The college is affiliated to the University of Madras and offers first-degree five-year integrated courses, part-time courses, post-graduate degree and diploma courses and Refresher Courses as detailed below :—

A. Under-Graduate Courses

1. B. E. (Five-Year Course)

(a) Civil Engineering.
(b) Mechanical Engineering.
(c) Electrical Engineering.
(d) Electronics and Communication Engineering.
(e) Metallurgical Engineering.

2. B. Tech. (Five-Year Course)

(a) Chemical Engineering.

3. B. E. (Three and half year Part-time course)

(a) Civil Engineering.
(b) Mechanical Engineering.
(c) Electrical Engineering.

B. Post-Graduate Courses

(a) M. Sc. in Engineering two years course in :—

(i) Design and Production of Thermal Power Equipment.
(ii) Transportation Engineering.
(iii) Heat Power Engineering ; and
(iv) Power system.

(b) Post-graduate diploma (one year) course in :—

(i) Hydrology and Irrigation ; and
(ii) Welding Technology.

(c) Refresher Courses in :—

(i) Welding Technology ; and
(ii) Current Topics in Communication Engineering.

Of the degree and diploma courses only post-graduate degree courses at (a) (i), (b) (iv) and one specialisation in Civil Engineering are approved.

The M. Sc. course in Design and Production of Thermal Power Equipment is industry-oriented, with assistance from UNDP under the UNESCO Project. The Refresher Courses are organised by the college on their own.

4.059. Land Development and Buildings : The State Government acquired 850 acres of land at a cost of Rs. 5.15 lakhs for location of this Institute and have spent Rs. 45.67 lakhs on the development of the site. An administrative block covering 9,000 sq. meter or approximately 82,000 sft. and other instructional buildings covering an area of 1,36,850 sft. at a cost of Rs. 58 lakhs were approved, and the college constructed these buildings at a cost of Rs. 58,10,250.

4.060. For accommodating 1250 students of the college there are 3 single-seated hostels and 6 triple-seated hostels constructed at a cost of Rs. 61.1 lakhs. An amount of Rs. 53.66 lakhs has been spent on staff quarters providing accommodation for 105 members of teaching and equivalent staff and 200 members of ministerial and supporting staff.

4.061. Equipment and Library : For the Under-graduate courses, the amount sanctioned for equipment is Rs. 52.3 lakhs and the value of equipment procured is Rs. 45.8 lakhs. For the post-graduate courses, the amount sanctioned is Rs. 4.5 lakhs and the value of equipment purchased

is Rs. 2.3 lakhs. In addition the college also received equipment from UNDP under the UNESCO project valued at $ 138,724 or approximately Rs. 10.4 lakhs.

4.062. The Library is included in the administrative building and has books valued at Rs. 3.95 lakhs. The Institute subscribes to periodicals and journals at an annual cost of Rs. 1.98 lakhs.

4.063. The staff sanctioned and in position as on 1-1-1973 is as follows :—

	Sanctioned	In position
(a) Teaching Staff (including Associate Lecturers and Workshop Foreman).	118	94
(b) Administrative and other staff	91	60
(c) Technical supporting staff	60	42
(d) Ministerial and Class IV	101	90

4.064. Industrial Collaboration and Research Activities : In the second phase of the UNDP Project, the college was approved for assistance for starting the M. Sc. industry-oriented course in Design and Production of Thermal Power Equipment. The college has established excellent relations with Bharat Heavy Electricals Ltd. A Refresher course in Welding Technology is also being conducted in collaboration with the Bharat Heavy Electricals Ltd. The college is making efforts for starting sandwich courses leading to B. Tech. degree in Chemical Engineering and B. E. degree in Production Engineering in collaboration with leading industries in the Southern region. A modest beginning has been made by the staff of some of the Departments in undertaking research work on industrial problems. The UNDP programme has given sufficient encouragement to the Institute for building close relations with industry, particularly, the Bharat Heavy Electricals Ltd.

4.065. Student and Staff Amenities : There is a Post and Telegraph Office including a public call office, a Branch of the State Bank of India and a dispensary and hospital with 8 beds on the college campus. Extensive playgrounds are provided for various games and sports for the students. There is an elementary school on the campus and transport facilities are provided for students going to high schools in the neighbouring township of Bharat Heavy Electricals Ltd. Other facilities include, a shopping centre with a provision store, vegetable shop, laundry, saloon and a tailor shop. There is also a canteen with modern facilities.

4.066. Recurring Expenditure : For the year 1972-73, the college incurred a recurring expenditure of Rs. 25.23 lakhs on under-graduate courses

and Rs. 1.45 lakhs on post-graduate courses. The break-up of this recurring expenditure is as follows :—

	Under-graduate	Post-graduate
	Rs.	Rs.
(i) Teaching staff	8,82,959.64	79,868.50
(ii) Scholarship and Fellowship	1,29,355.50	43,209.19
(iii) Supporting staff	1,42,397.18	14,796.00
(iv) Administrative including Class III and Class IV.	4,34,777.97	3,864.00
(v) Other expenses	9,36,000.00	4,000.00

4.067. The following assistance has been received by the college from UNDP/UNESCO :

Equipment $ 1.59 lakhs = Rs. 11.90 lakhs
International Experts **Nos. 5** man months 51.5
(cost $ 1.28 lakhs = Rs. 9.60 lakhs)
Fellowships **Nos. 4** man months 43.5
(cost $ 0.26 lakhs = Rs. 1.95 lakhs)

The college was allotted four fellowships including one short-term all of which were utilised for specialised training and studies abroad.

4.068. For further development, the college has proposed the following additional courses at under-graduate and post-graduate level including refresher courses :

Under-Graduate Courses :

1. Production Technology Sandwich course.
2. Electronics and Communication Engineering Sandwich Course.
3. Chemical Engineering Sandwich Course.
4. Pharmaceutical Engineering.

Post-Graduate Courses :

(a) **Two year M. Sc. degree courses :**

1. Electrical Machines
2. Communication System
3. Applied Electronics
4. Miscowave Engineering
5. Extraction Metallurgy
6. Chemical Engineering
7. Process Development and Plant Design

8. Applied Mathematics with specialisation in—
   (i) Elasticity and Plasticity
   (ii) Numerical Analysis
9. Applied Nuclear Science
10. Nuclear Engineering
11. Analytical Chemistry
12. Electro Chemistry

(b) **Post-graduate Diploma Courses (1 year duration)**

1. Industrial Structurers.
2. Hydro-Geological Engineering.
3. Industrial Engineering.
4. Welding Technology.
5. Manufacture of Boilers.
6. Operation and Maintenance of High Pressure Boilers Plants.
7. Diesel and Electrical Traction.
8. Frequency and medium horse power motors.
9. Electronics and Communication Engineering.
10. Iron and Steel Production.

Certificate and Refresher Courses :

1. Welding Technology.
2. Combustion and Control in Boilers.
3. Defectoscopy in Boilers.
4. Instrumentation.
5. Materials Management.
6. Instrumentation.
7. Design and Development of Electronic Equipment.

There are also proposals for the establishment of research units, a research and data Cell in the Department of Mechanical Engineering, a Research Unit in the Department of Chemical Engineering and a Computer Centre in the Department of Mathematics.

4.076. The total estimated cost for the above proposals Department-wise is given below :—

Department	Non-recurring Bldg.	Equipment	Ultimate recurring
1. Civil Engg.	1200 sft. Rs. 0.4 lakhs	3.05 lakhs $ 2.4 lakhs	1.85 lakhs
2. Mechanical Engg..	Bldg. nil	12.00 lakhs	0.67 lakhs
3. Elec. Engg.	Bldg. nil	2.50 lakhs	1.10 lakhs
4. Electronics & Communication Engg.	Rs. 8 lakhs	10.00 lakhs	Rs. 2.80 lakhs
5. Metallurgical Engg.	5000 sft. Rs. 1.50 lakhs	3.00 lakhs	Rs. 0.73 lakhs
6. Chemical Engg.	nil	6.00 lakhs	Rs. 1.60 lakhs
7. Department of English.	Rs. 0.5 lakhs	0.1 lakhs	Rs. 0.31 lakhs
8. Department of Maths.	2800 sft. Rs. 0.88 lakn	1.5 lakhs	Rs. 0.15 lakhs
9. Deptt. of Physics.	4000 sft. 1 25 lakhs	3.5 lakhs	Rs. 1.35 lakhs
10. Deptt. of Chemistry	nil	Rs. 2.00 lakhs	Rs. 0.99 lakhs
Total	12.53 lakhs	Rs. 43.65 lakhs $ 2.4 lakhs	Rs. 11.60 lakhs

Total—Non-recurring

Bldg. Rs. 12.33

Equipment. Rs. 43.65

Rs. 56.18 lakhs

Total ultimate recurring Rs. 11.60 lakhs

5. REGIONAL ENGINEERING COLLEGE, SRINAGAR

4.069. The college was started in the year 1960 with an admission of 132 students. Although the original approved intake was 60, it was soon raised to 250 and this admission continued till 1968 when the admissions were reduced from 250 to 90 on account of industrial recession and reduced employment of engineers. From 1971-72, the admissions have been increased from 90 to 150.

4.070. The college is affiliated to the J. & K. University and offers first-degree five-year integrated courses in Civil, Mechanical, Electrical, Chemical and Metallurgical Engineering.

4.071. Land Development and Buildings : The State Government acquired about 85 acres of land for the college, but actual possession given to the college is only 62 acres. The State Government also spent Rs. 9.45 lakhs on the development of this land. Instructional buildings covering an area of 1,81,507 sft. plinth have been approved at a cost of Rs. 104 lakhs. The college constructed 97,741 sft. of instructional buildings at a cost of Rs. 41.01 lakhs.

4.072. There are 2 hostel blocks each having 228 rooms accommodating about 1350 students. These hostel blocks were constructed at a cost of Rs. 41.22 lakhs. An amount of Rs. 5.10 lakhs was spent on staff quarters providing accommodation for 12 teaching and equivalent staff members. No other accommodation for staff has yet been provided.

4.073. Equipment and Library : The college is conducting only undergraduate courses. An amount of Rs. 47.26 lakhs was sanctioned for equipment. The college so far procured equipment worth Rs. 45.13 lakhs.

4.074. The Library has an accommodation of 9,940 sft. plinth. It has 13,800 books procured at a cost of Rs. 3.53 lakhs. The college subscribes to 143 journals and periodicals at an annual cost of Rs. 21,000.

4.075. The staff sanctioned and in position as on 1-1-1973 is as follows :—

		Sanctioned	In position
1.	Teaching staff (including Associate Lecturers and Workshop Foreman).	119	97
2.	Administrative and other staff	16	12
3.	Technical Supporting staff	162	145
4.	Ministerial staff and class IV	197	190

4.076. Research Activities : The college is tackling some problems, having a bearing on the industrial development of the State and those faced by the State Public Works and Electrical Departments. The college has recently created the post of a Dean of Research, for co-ordinating the work of research referred to the college by various State Departments.

4.077. Student and staff Amenities : The only facilities for games

so far provided by the college consist of a Cricket field, a Hockey field and Football field. A Post and Telegraph Office, a Bank and a dispensary are temporarily housed in some buildings provided by the State Government. But permanent buildings for them have yet to be constructed.

4.078. Recurring Expenditure : For the year 1972-73, the entire recurring expenditure of Rs. 30.75 lakhs was spent only on the under-graduate courses, since the college does not have any approved post-graduate course. The break-up of the recurring expenditure is as follows :—

1.	Teaching staff (salaries)	Rs. 11,04,658.97
2.	Scholarships and Fellowships	———
3.	Supporting staff (salaries)	Rs. 5,65,988.24
4.	Administrative, including class III and class IV (salaries).	Rs. 5,97,078.36
	(other expenses including House rent relief).	Rs. 8,06,783.77
	Total	Rs. 30,74,509.34

6. REGIONAL ENGINEERING COLLEGE, KURUKSHETRA

4.079. The college was started in the year 1963 and functioned for two years in the Punjab Engineering College, Chandigarh and Thapar Institute of Technology, Patiala, 60 students being admitted to each of these institutions on behalf of the college. The college shifted to Kurukshetra in 1965. From 1966-67, the admission had been increased to 250 students per year. In 1969-70, 1970-71, the admissions were reduced to 190 per year.

4.080. The college is affiliated to the Kurukshetra University and offers 5-year integrated first degree courses in Civil, Mechanical, Electrical, Communication Engineering and Electronics. Admissions to these courses are within the approved annual admission of 250 students. The college also offers post-graduate courses in the following subjects :—

1. **Civil Engineering : M. Sc. (Engg.) 2 year**

   (a) Soil Mechanics and Foundation Engineering with emphasis on Geotechnology.

   (b) Structural Engineering with emphasis on construction technology.

2. **Mechanical Engineering : M. Sc. (Engg.) 2 year**

(a) Design of Machines with emphasis on Production Engineering.

3. **Electrical Engineering : M. Sc. (Engg.) 2 year**

(a) Advanced Electronics and Control System.

(b) Electrical Power System.

4. **Physics P. G. Diploma, 1 year**

(a) Scientific Instrumentation.

Of these only courses at 1, 2 and 3 are approved by the Post-Graduate Board of the AICTE.

4.081. Land Development and Buildings : The State Government provided an area of 300 acres for locating the college and incurred an expenditure of Rs. 29.39 lakhs on its development. Instructional buildings covering an area of 1,83,700 sft. plinth at a cost of Rs. 37.44 lakhs were approved and the college constructed 1,86,214 sft. plinth at a cost of Rs. 39.37 lakhs. In addition, there is also a dispensary constructed at a cost of approximately Rs. 51,000.

4.082. There are two single-seated hostels and three triple-seated hostels together accommodating **1250** students and were built at a cost of Rs. **49.175** lakhs.

An amount of Rs. 46.914 lakhs was spent on staff quarters providing accommodation for 112 members of teaching and equivalent staff and 163 members of ministerial and supporting staff.

4.083. Equipment and Library : For the under-graduate courses, against an amount sanctioned for equipment of Rs. 44.23 lakhs, the college procured equipment worth Rs. 36.56 lakhs. For the post-graduate courses, although Rs. 3 lakhs were sanctioned for equipment, the college could acquire equipment, only for a negligible sum of Rs. 810.00. The library has no special accommodation set apart for it and is at present housed in the Electrical Engineering block. It has 13,582 volumes acquired at a cost of Rs. 3.43 lakhs. The college subscribes to 175 technical and non-technical journals at an annual cost of Rs. 33,000.

4.084. The staff sanctioned and in position as on 1-1-1973 is as follows :—

		Sanctioned	In position
1.	Teaching staff (including Associate Lecturers and Workshop Foreman).	114	96
2.	Administrative and other staff	11	9
3.	Technical supporting staff	77	72
4.	Ministerial and class IV	263	245

4.085. Student and Staff Amenities : The college has a dispensary with 5 beds and a guest house to accommodate 12 persons at a time. There are adequate play grounds and necessary facilities for various games for the students. There is a Post and Telegraph Office housed in one of the rooms of the hostel—a very unsatisfactory arrangement. The college proposed to utilise Government of India grants of Rs. 4 lakhs to provide the following amenities for the staff and students :

Student canteen, Co-operative Stores, Staff Club, Shopping Centre and Post Office. The Haryana Child Welfare Centre has started a Bal Bhavan—a nursery school houses in one of the Professors residences.

4.086. Recurring Expenditure : For the year 1972-73, amounts of Rs. 29.34 lakhs, on under-graduate courses and Rs. 1.647 on post-graduate courses were spent. The break-up of the recurring expenditure is given below :

		Under-graduate	Post-graduate
1.	Teaching staff	Rs. 8,53,354.65	Rs. 67,677.80
2.	Scholarships and Fellowships	Rs. 1,67,413.84	Rs. 72,217.28
3	Supporting staff	Rs. 3,70,922.60	—
4.	Administrative, including class III and class IV.	Rs. 9,03,996.95	—
5.	Contingencies	Rs. 6,38,017.87	Rs. 24,759.77
	Total	Rs. 29,33,795.91	Rs. 1,64,654.85

4.087. The college has estimated a requirement of Rs. 112.3 lakhs non-recurring and Rs. 6.4 lakhs additional recurring expenditure for the consolidation of existing programmes as follows :—

Item	Non-recurring	Recurring
	Rs. lakhs	Rs. lakhs
Departments	64.82	4.82
Buildings	30.00	—
General amenities	11.50	—
Staff research	6.00	1.00
Expert services	—	0.30
Collaboration with industry	—	0.25
	112.32	6.37

4.088. The college also estimated a requirement of Rs. 91.20 lakhs non-recurring and Rs. 14.7 lakhs recurring expenditure for introduction of new programmes. The new programmes envisaged are :

Under-graduate degree courses :

(1) Chemical Engineering.
(2) Agricultural Engineering.

Post-graduate courses

A. 2-year M. Sc. Engineering degree courses in—

(1) Dams and Hydraulics.
(2) Measurements, Power and Control Instrumentation.
(3) Production Science and Technology.
(4) Thermal Science and Technology.
(5) Communication Systems.

B. 2-year M. Tech. Degree course in Scientific Instrumentation

C. 2-Year M. Sc. courses in—

(1) Solid State Electronics.
(2) Industrial Physics.
(3) Applied Mathematics.
(4) Applied Geology.

D. 1-year post-graduate diploma courses in—

(1) Materials Technology.

(2) Constructional Techniques.
(3) Systems and Reliability Engineering.
(4) Industrial Drives and their control.
(5) Mechanical handling of Machines.
(6) High Polymers and Rubber Technology.
(7) Business and Labour Management.

The college also proposed the establishment of a Production Centre at a cost of Rs. 20 lakhs non-recurring expenditure. The intention is that students can spend a year after their graduation in the Centre and trained to tackle industrial problems at production and managerial levels.

4.089. The detailed break-up of the proposed expenditure on new programmes is as follows :—

Under-graduate	**Non-recurring**	**Recurring**
	Rs. in lakhs	
1. Chemical Engineering	12.00	2.25
2. Agricultural Engg.	12.00	2.25
Total	24.00	4.50

Post-graduate	**Non-Recurring**	**Recurring**
	Rs. in lakhs	
1. Civil Engineering	8.00	1.00
2. Electrical Engineering	6.10	1.75
3. Mechanical Engineering	9.50	1.54
4. Electronics Communication Engg.	6.00	0.87
5. Applied Physics	6.15	1.08
6. Chemistry	1.25	0.33
7. Mathematics	2.70	0.80
8. Humanities	0.25	0.54
9. Geology	2.25	0.75
10. Library	5.00	1.50
	47.20	10.16
Total of Under Graduate	24.00	4.50

Total of Post-graduate	27.20	10.16
Production Centre	20.00	—
Total	91.20	14.56

7. MALAVIYA REGIONAL ENGINEERING COLLEGE, JAIPUR

4.090. The college was started in the year 1963 with an annual intake of 60 which was raised to 120 in 1965-66 and 180 in 1966-67. Admissions were again reduced from 180 to 120 from the year 1968-69 on account of industrial recession and reduced employment for engineers.

4.091. The college is affiliated to the University of Rajasthan and offers 5-year integrated first degree courses in Civil, Mechanical, Electrical and Metallurgical Engineering. The college is also offering a post-graduate course leading to the Master of Engineering Degree exclusively for the teachers of the college in Mechanical, Electrical, Civil and Metallurgical Engineering. There is also an industry-oriented post-graduate diploma course in Irrigation Engineering and Hydrology for regular students.

4.092. Land Development and Buildings : The State Government provided an area of 267 acres for locating the college and developed the site at a cost of Rs. 29.9 lakhs. Instructional buildings covering an area of 2,00,656 sft. plinth at a cost of Rs. 58.18 lakhs were approved, against which the college constructed so far 1,83,866 sft. plinth at a cost of Rs. 55.12 lakhs. The construction work is still in progress.

4.093. There is hostel accommodation for 720 students in 4 hostels—324 students being accommodated in triple-seated rooms and 216 in single-seated rooms. In addition there is also a dormitory to accommodate 180 students. All this hostel accommodation was constructed at a cost of Rs. 32.35 lakhs.

An amount of Rs. 31.48 lakhs has been spent on staff quarters providing accommodation for 76 members of teaching and equivalent staff and 73 members of ministerial and supporting staff. The work on staff quarters is still in progress.

4.094. Equipment and Library : For the under-graduate courses, the amount sanctioned for equipment was Rs. 43.93 lakhs and the Institute has acquired equipment valued at Rs. 78.35 lakhs. For the post-graduate courses, the amount sanctioned for equipment was Rs. 0.60 lakhs and the Institute has spent Rs. 0.25 lakhs.

The library has 22,934 books acquired at a cost of Rs. 7.16 lakhs and is housed in a building with 14,259 sft. plinth area. The college also subscribes to 297 journals and periodicals at an annual cost of Rs. 38,860. The staff sanctioned and in position as on 1-1-1973 is as follows :—

		Sanctioned	In position
1.	Teaching staff (including Associate Lecturers and Workshop Foreman).	85	85
2.	Administrative and other staff	24	24
3.	Technical Supporting staff	78	78
4.	Ministerial and Class IV	250	250

4.095. Industrial Collaboration and Research Activities : Through the post-graduate courses, conducted exclusively for the teachers of the college, 6 teachers in Mechanical Engineering, 2 in Electrical Engineering and 3 in Civil Engineering have obtained Master of Engineering degrees of the Rajasthan University. At present there are 12 teachers doing their part-time Master of Engineering Courses in various branches of engineering. The members of the college staff, as well as, some research scholars are engaged in research activities and their publications have been accepted at some international conferences. The departments of Mathematics, Physics, Chemistry and Humanities have guided students for the award of Ph. D degree of the Rajasthan University and so far 15 candidates from these Departments have obtained the Ph. D award. Three scholars in Electrical Engineering, 2 in Structural Engineering and 3 in Metallurgical Engineering are working for their Ph. D degrees at the college at present. Senior staff members of the college are also undertaking consultancy work from industrial establishments in Rajasthan. The college runs a testing and repair house for conducting tests for Government Departments, Railways and private industries.

4.096. Student and Staff amenities: There is a post office with a public call office and a Branch of the Bank of Rajasthan on the college campus. There is a college dispensary manned by a full-time doctor and a compounder. A cooperative store functions on the campus and a canteen is run on contract basis. For the recreation of staff and their families there is a Cine Club and a children park fully developed on the campus. The college provides transport on payment for children of the staff going to the school in the city. The college has provided facilities for games and sports to the students. A gymnasium and a badminton hall have been approved, but construction has been deferred, on account of current economy instructions. There is a staff club ,at present open to the members of the teaching and administrative staff, but will soon admit members of other categories also.

4.097. Recurring Expenditure: For the year 1972-73, an amount of Rs. 30.83 lakhs was spent on under-graduate and Rs. 0.84 lakh on post-graduate courses.

4.098. The college has submitted proposals, Department-wise, for consolidation and further development as follows:—

1. **Department of Civil Engineering:**

The ratio of senior to junior staff should be 1: 1. Subordinate staff position requires a complete review. For some sophisticated equipment, a sum of Rs. 2.5 lakhs is required and for renewal of some existing equipment, a sum of Rs. 25,000 may be provided. For books and journals and back volumes, a capital grant of Rs. 50,000 and an annual budget for the department for library should be raised to Rs. 12,000/-. A small computer is necessary to train the students on running computer programmes and using numerical methods more effectively.

The Department proposed establishment of three post-graduate courses. M.E. in Hydraulics at present offered only to teachers of the college on a regular basis, M.E. in Environmental Engineering/Sanitary Engineering and M.E. in Transportation Engineering. Each course will need Rs. 1 lakh for equipment, Rs. 50,000 for library, some additional building and two senior staff members. A sum of Rs. 20,000 is required for water Resources Research Laboratory which will be complementary to Hydraulics and Sanitary Engineering Laboratory. A new Department of Architecture, Agricultural Engineering and Systems Engineering should be established.

2. **Department of Electrical Engineering**

For consolidation of the existing laboratories, a sum of Rs. 4.15 lakhs is essential, but Rs. 7.3 lakhs is desirable. New under-graduate course in Applied Electronics is proposed at a non-recurring expenditure of Rs. 2.25 lakhs and recurring expenditure approximately of Rs. 80,000 a year. New post-graduate M.E. courses in Computer Electronics and industry-oriented courses in Electrical Drives and Instrumentation are also proposed. To augment the test facilities in the servicing of the industries in the area, it is proposed to establish a Laboratory in the Department of Electrical Engineering at an additional expenditure of about Rs. 20,000 a year. The workshop facilities may be augmented at a cost of Rs. 75,000 non-recurring, about Rs. 20,000 for recurring expenditure for training in the design and fabrication of electronics and electrical equipment.

3. Department of Metallurgical Engineering

About Rs. 5 lakhs for buildings, Rs. 14 lakhs equipment, Rs. 60,000 for back volumes and journals, Rs. 25,000 for annual grant of books and with additional staff costing approximately Rs. 20,000 a year are required for consolidation of the existing courses. Also material grant should be Rs. 30,000 per annum, and for replacement of equipment Rs. 20,000/— per annum is required. The Department proposed regular post-graduate M.E. courses in Metallurgy in Alloy Metals and Alloys, Material Science, and Mineral Dressing, in addition to the existing M.E. course in non-ferrous metallurgy.

For establishing facilities for greater industrial collaboration, consolidation and testing, the Department proposed an equipment grant of Rs. 1 lakh and additional staff, costing Rs. 20,000 per year. The Department also proposed that research facilities should be built for post-graduate research work, to assist the State in the utilisation of rich resources in non-ferrous metals. Approximate cost indicated by the Department for such facilities is—building 3,000 sft. (i.e. Rs. 1.2 lakhs), equipment Rs. 2 lakhs, recurring about Rs. 60,000 per year.

4. Department of Mechanical Engineering

The Department has proposed an additional amount of Rs. 14.25 lakhs for consolidating the under-graduate courses (Laboratories and Library), additional staff at an aproximate expenditure of Rs. 20,000 a year, and a new under-graduate course in Production Engineering at a cost of Rs. 2 lakhs for equipment and about a lakh of rupees per year on recurring expenditure. On the post-graduate side, the college proposed M.E. course in Thermal Engineering and Manufacturing Engineering and Post-graduate diploma course in Industrial Engineering and Entrepreneurship and Heat Exchangers.

5 Department of Structural Engineering

For the Department of Structural Engineering, a sum of Rs. 5 lakhs is required to equip the laboratories in materials testing, structural soil mechanics soil mechanics and concrete engineering. An additional sum of Rs. 1 lakh is also required for increase in the laboratory facilities for this Department. The Department proposed a post-graduate diploma course in Stressed-Concrete at an expenditure of non-recurring Rs. 1 lakh and recurring Rs. 50,000. For collaboration and liaison with industry, further strengthening of all the laboratories is necessary for which a sum of Rs. 3 lakhs is proposed.

6. Department of Chemistry

The Department has proposed the starting of M.Sc. course at an additional recurring cost of Rs. 17,000 per year. No other expenditure is involved.

7. **Department of Physics**

The Department of Physics has proposed post-graduate diploma course in Plasma Electronics, M.Sc. in Applied Physics, and consolidation of Ph. D. course already started for which it has estimated the following financial support:—

Building	18,000 sft.	Rs. 75,000
Equipment, Library and Furniture		Rs. 7,30,000
Recurring Expenditure		Rs. 66,000
Additional staff		Rs. 2,00,000

8. **Department of Mathematics**

The Department has proposed a full fledged post-graduate course in Applied Mathematics for which a non-recurring expenditure of Rs. 25,000 and a recurring expenditure of Rs. 5,000 is required. In addition, two additional Readers costing approximately Rs. 12,000 per year should be approved.

9. **Department of Humanities**

The Department has proposed a language laboratory at a cost of Rs. 40,000 and the services of a technician.

10. The Department of Training and Placement requires a separate budget provision of Rs. 15,000 per annum for its staff to visit industries.

11. The library has estimated the cost of additional books, back volumes etc. at a cost of Rs. 6 lakhs non-recurring and Rs. 2.35 lakhs recurring The library has also proposed additional staff at a cost of Rs. 50,000 to perform its functions efficiently.

8. MOTILAL NEHRU REGIONAL ENGINEERING COLLEGE, ALLAHABAD

4.099. The college was started in 1961-62 with an under-graduate admission of 100 students annually in the first two years. In 1963-64, the intake was increased to 250 per year but was again reduced to 180 per year from 1968-69 on account of industrial recession and reduced employment of engineers.

4.100. The college offers first-degree regular courses of 4 year duration and industry-oriented courses of $4\frac{1}{2}$ years' duration in Civil, Electrical and

Mechanical Engineering within the overall approved admissions. The minimum admission qualification is intermediate in science. The college is also approved for three industry-oriented M. Tech courses of 2 years' duration with assistance from UNDP—Analysis and Design of Process Equipment, Design and Process Machines, and Production and Process Machines and Equipment.

The college also offers two-year Master of Engineering degree courses in Civil Engineering and Electrical Engineering and Doctoral Programmes in Applied Mathematics, Civil Engineering, Electrical Engineering and Mechanical Engineering. The college is an approved Centre for Industrial Entrepreneurship Programme assisted by the Ministry of Industrial Development and Internal Trade of the Government of India.

4.101. Land Development and Building: The State Government so far acquired 215 acres of land at a cost of Rs. 19.4 lakhs and spent an amount of Rs. 37.3 lakhs on its development. The State Government is acquiring an additional area of 17.8 acres at a cost of Rs. 2.4 lakhs.

4.102. Sanctions were issued to the college for the construction of 1.82 lakh sft. plinth area of instructional buildings at a cost of Rs. 40.27 lakhs. The college actually constructed 1,98,650 sft. plinth area of instructional buildings consisting of main college building, workshop and N.C.C. at a total cost of approximately Rs. 42 lakhs. Instructional buildings are complete for all under-graduate courses. Although a norm of 5000 sft. per post-graduate course was approved, no actual sanctions of buildings have so far been issued.

4.103. There are four single-seated hostels having 1044 rooms which the college constructed at a cost of Rs. 50-08 lakhs. An amount of Rs. 43.52 lakhs was spent on the construction of staff quarters providing accommodation for 119 members of teaching and equivalent staff and 144 members of ministerial and supporting staff.

4.104. Equipment and Library: For the under-graduate courses, a total amount of Rs. 38 lakhs was approved for equipment and so far the college has acquired equipment worth Rs. 35.27 lakhs. For the post-graduate courses, the amount sanctioned for equipment was Rs. 7 lakhs and the equipment actually procured was valued at Rs. 7.4 lakhs. In addition, through the UNDP/UNESCO project operating in this college, specialised equipment essentially of foreign manufacture and valued at $2,23,800 or Rs. 16.8 lakhs approximately has been provided.

4.105. The Library has an accommodation of 8000 sft. and has a stock of 24,600 books at a cost of Rs. 1.29 lakhs. In addition, the college also received UNESCO grant for back volumes of journals costing approx. Rs. 1.25 lakhs. The college subscribes for 370 journals and periodicals annually at a cost of Rs. 75,000. The Library furniture is valued at 1.8 lakhs approx:

4.106. The staff sanctioned and in position as on 1.1.1973 is as follows:—

		Sanctioned	In position
1	Teaching staff (including Associate Lecturers and Workshop Foreman).	106	103
2.	Administrative staff	13	10
3.	Technical Supporting staff	98	90
4.	Ministerial & Class IV	235	235

4.107. Industrial Collaboration and Research Activities. The college has built excellent relations with industry and in this, the UNDP assisted programme gave considerable encouragement to the Institute. The college is now aware of the problems of collaborating industry and has taken challenging tasks from industry which provided meaning and purpose to the educational programmes in the Institution. Effective collaboration has been obtained in industry-oriented programmes at M.E. and B.E. level. Part-time Masters Degree courses are being conducted for serving engineers in local establishments.

4.108. The college has established an Industrial Research Centre with a grant from the State Government and after an initial testing of the assistance available there, industry is now referring problems for solution on a payment basis and the institution expects that the Centre will become self-sufficient very soon. The college is actively engaged in research programmes and at present there are 6 candidates enrolled for doctoral work in engineering and 12 for doctoral work in applied sciences, of whom 11 candidates have already obtained their doctoral awards mostly in applied sciences.

4.109. The college has been conducting short-term courses for employed personnel from industry and Government Departments. The Ministry of Industrial Development is supporting industrial entrepreneurship programmes organised by this institution.

4.110. Student and Staff Amenities: The college has provided the following amenities for students and staff from out of the sanctioned funds from the Government of India.

A guest house, a dispensary with a full-time medical officer and 2 beds, a post office, a cooperative store, canteen, shopping centre, cycle stand, water coolers and play grounds for various types of games.

From out of the funds sanctioned by the State Government, the college has established a school for children upto the 8th standard.

4.111. Recurring Expenditure: For the year 1972-73, an amount of Rs. 24.8 lakhs on under-graduate courses and Rs. 3. 55 lakhs on post-graduate courses has been spent. The break-up of the recurring expenditure is as follows:—

	Under-graduate	Post-graduate	Total
1. Teaching staff	Rs. 8,19,643	Rs. 1,09,337	Rs. 9,28,980
2. Scholarships and Fellowships	Rs. 1,40,550	Rs. 1,47,770	Rs. 2,88,320
3. Supporting staff	Rs. 8,98,246	Rs. 11,486	Rs. 2,09,732
4. Administrative, including class III and class IV	Rs. 6,22,000	Rs. 87,000	Rs. 7,09,000

4.112. The following assistance was received by the college from UNDP in the first and second phases of the programme:

Equipment $ 2.99 lakhs=Rs. 22.42 lakhs
International Experts Nos. 7, man-months 145
(cost : $ 31.14 lakhs=Rs. 23.55 lakhs)
Fellowships Nos. 6, Man-months 84
(cost : $ 0.40 lakhs=Rs. 3.00 lakhs)

Of the 6 fellowships awarded to the college under UNDP programme, 2 doctoral awards from foreign universities and 1 master degree was obtained, besides other specialised training programme (3, including one short-term).

4.113. All instructional buildings have been completed according to the original scheme. For its Civil Engineering Department laboratories, the scheme has provided 7100 sft. which the college has complained is too meagre and our visual observation also confirmed the same.

4.114. Laboratories are housed in workshop type buildings with asbestos cement roofing. For many months in the year, the inside temperatures are very high—100-188° F and for about three months 100-110° F. We, therefore, recommend that fans be provided for cooling these laboratories and to make them effectively usable by providing false ceiling.

4.115. The college has developmental plans for the decade 1974-1984 (5th and 6th plans) involving a total expenditure of Rs. 2431 lakhs of which Rs. 1228 lakhs is on non-recurring and Rs. 1203 lakhs on recurring expenditure. The break-up on various accounts of this amount is as follows:—

	Non-recurring Rs. lakhs	Recurring Rs. lakhs	Total Rs. lakhs
1. Proposal for Technical University	18.00		
2. Consolidation of existing under-graduates courses	57.2	84.6	141.8
3. Development of six new undergraduate courses	110.8	128.9	239.7
4. Consolidation of existing post-graduate courses.	80.5	52.3	132.8
5. Development of 29 new post-graduate courses	466.6	449.0	915.6
6. Development of Ph. D programme in 6 fields	16.40	20.3	36.7
7. Consolidation of Central Academic Facilities	38.8	84.1	122.9
8. Development of 13 Academic Centres	345.3	205.0	550.3
9. Miscellaneous Academic Programmes	12.2	63.6	75.8
10. Consolidation and Development of other central facilities	82.1	96.1	178.2
Total	1227.9	1203.1	2431.0

9. VISVESVARAYA REGIONAL ENGINEERING COLLEGE, NAGPUR

4.116. The Government of Maharashtra established a State Engineering College in Nagpur in 1956 with an annual admission of 120 students. This was converted into the Regional Engineering College in the year 1960 and the admissions were raised to 150 students in 1964, to 225 in 1965 and 250 in 1967. Admissions were again reduced from 250 to 180 in 1968-69 on account of industrial recession and reduced employment of engineers.

4.117. The college is affiliated to the University of Nagpur and offers first degree five-year integrated courses in Civil, Mechanical, Electrical and Metallurgical Engineering and Architecture with overall admissions restricted to the approved intake. The college is also offering the following post-graduate courses:—

A. Two-year M. Tech degree courses in—

(1) Public Health Engineering, and
(2) Integrated power systems.

B. Evening slab type 3-year M. Tech courses in—

(1) Civil Engineering (a) Structures and (b) hydraulics Engineering.
(2) Mechanical Engineering (a) Heat Power Engg: and (b) Production Engineering.
(3) Electrical Engineering—Communication Engg:
(4) Mechanical Engineering—Process Engineering

C. 1-year Post-graduate diploma courses in—
Ferro Alloy Technology

The post-graduate courses at A (1) and (2) are industry-oriented and are being assisted by UNDP/UNESCO project. The post-graduate courses at B are adopted from September 1971 and admit only serving engineers on a part-time basis. No additional funds are provided for running these courses.

4.118. Land Development and Buildings: The State Government acquired 290 acres of land for this college at a cost of Rs. 8 lakhs and spent Rs. 27 lakhs for its development. Instructional buildings covering an area of 2,16,600 sft. plinth were approved by the Central Government at a cost of Rs. 57.55 lakhs. The college has constructed 2,16,600 sft. plinth of instructional buildings at a cost of Rs. 57.31 lakhs.

4.119. There are 6 hostels—2 single-seated and 4 triple-seated providing accommodation for 708 students and built at a cost of Rs. 38.17 lakhs. An amount of Rs. 45.73 lakhs was spent on staff quarters providing accommodation for 81 members of teaching and equivalent staff and 59 members of ministerial and supporting staff.

4.120. The buildings for all academic facilities including the laboratories and administrative block as laid down under the scheme are complete and substantial part of the students residences and staff quarters are also complete. Adjustments of a temporary nature have been made for conducting post-graduate courses. Although a norm of 5000 sft. per post-graduate course is approved no funds have yet been released for constructing them.

4.121. Equipment and Library : For the under-graduate courses an amount of Rs. 43.17 lakhs was approved for equipment and the college so far acquired equipment worth Rs. 43.7 lakhs. For the post-graduate courses an additional amount of Rs. 5.08 lakhs was approved and the college obtained equipment worth Rs. 4.73 lakhs. In addition, through the UNDP/UNESCO project operating in this college specialised equipment, essentially of foreign manufacture and valued at Rs. 16.32 lakhs has been provided.

4.122. The Library having about 28,500 volumes acquired at a cost of Rs. 5.82 lakhs, is located in a building which has an accommodation of 8,000 sft. plinth area. The college also subscribes to 300 journals and periodicals at an annual cost of Rs. 30,000.

4.123. The staff sanctioned and in position as on 1-1-1973 is as follows :—

		Sanctioned	In position
1.	Teaching staff including Asso-ciate Lecturers and Workshop Foreman)	135	125
2.	Administrative and other staff	65	54
3.	Technical supporting staff	90	78
4.	Ministerial and Class IV	306	295
	Total	596	552

4.124. Industrial Collaboration and Research Activities : The college had an appreciable collaboration with industry in the earlier years and this received considerable boost in the development of post-graduate pro-

grammes. The collaboration extends to government departments such as Public Works, Irrigation, Sanitary, City Corporation of Nagpur, State Electricity Board, the Ferro Alloy Plant of the South Eastern Railway and the Central Public Health Engineering Research Institute. The faculty guides under-graduate and post-graduate projects/research and undertakes consultation with industry. The college organises staff seminars to involve the outside people in the working of the college on such subjects as Power System operation, collaboration with local industries, teaching methods, public water supply and urban development of Nagpur.

4.125. Student and Staff Amenities: There Is a post-office housed in one of the rooms of the college building. A dispensary, an extension counter of the State Bank of India housed in one of the rooms of the college exist on the campus. Facilities also exist for canteen, and co-operative stores. There is a staff club for the teaching staff housed in a temporary shed and a recreation club for class III and class IV staff also housed in a temporary shed. There are extensive play grounds to provide facilities in all games for the students. There is also an NCC building.

4.126. Recurring Expenditure: For the year 1972-73, the college spent Rs. 35.17 lakhs on under-graduate courses and Rs. 2.02 lakhs on post-graduate courses. The break-up of recurring expenditure is as given below :

		Under-graduate Rs. lakhs	Post-graduate Rs. lakhs
1.	Teaching staff	14.19	0.71
2.	Scholarships and Fellowships	1.48	0.68
3.	Supporting staff	13.30	0.39
4.	Administrative including class III and class IV		
5.	Other expenditure	6.20	0.21

4.127. The following assistance was received by the college from UNDP/UNESCO in the first and second phases of the programme :

Equipment $ 3.09 lakhs Rs. 23.17 lakhs

International Experts Nos. 3, man-months 58.5

(Cost $ 1.40 lakhs =Rs. 10.50 lakhs)

Fellowships Nos. 7, man-months 81

(Cost $ 0.66 lakhs =Rs. 4.95 lakhs)

Of the 7 fellowships awarded to the college under UNDP programme, 1 doctoral award from a foreign university and a masters degree was obtained besides 5 other specialised training programmes including one for short-term studies.

4.128. The college has stated that as in many other universities, the syllabus of the Nagpur University for Engineering subjects has been upgraded. Moreover, the college has been running for the last 16 years and therefore needs considerable augmentation of its equipment. The college has estimated that additional equipment valued at approximately Rs. 46 lakhs is required if the Institute is not to be allowed to become an outmoded one. The college has also suggested that the Library in each of the Regional Engineering Colleges should be provided with Rs. 1.5 lakhs for books and Rs. 50,000 for purchase of journals annually. Regarding replacement of old equipment and library recurring grants, we made some general recommendations which should apply in this case.

4.129. The college has suggested that a total provision of Rs. 7.6 lakhs is required for student and staff amenities as follows :—

1.	Auditorium	Rs. 3 lakhs
2.	Closed Badminton Hall	Rs. 1 lakh
3.	Swimming Pool	Rs. 1.5 lakh
4.	Post Office	Rs. 30,000
5.	Bank	Rs. 30,000
6.	Staff Club	Rs. 1.5 lakh

These requests are all covered in our general recommendations.

4.130. The college has suggested the following additional post-graduate programmes to be established :

1. **Electrical Engineering**
   (i) Applied Electronics.
   (ii) Power Electronics.
2. **Metallurgical Engineering**
   (i) Electro-Metallurgical Engineering.
   (ii) Mineral Dressing.
3. **Civil Engineering**
   (i) Advance Building Science and Technology
   (ii) Transportation Engineering.

4. **Applied Mechanics**

(i) Advance Diploma in Structural Design.

(ii) Short-term course in Water Retainment and Conveyance Structure.

(iii) Diploma in Structural Engineering.

5. **Architecture**

City and Regional Planning.

10. MAULANA AZAD COLLEGE OF TECHNOLOGY, BHOPAL

4.131. The college was established in the year 1960 for an annual admission of 250 students. The full intake was, however, realised only in the year 1967 and this was again reduced to 200 from 1968 on account of industrial recession and reduced employment of engineers.

4.132. The college is affiliated to the Bhopal University, Bhopal and offers the following courses :

A. **Under-graduate courses :**

First-degree 5-year integrated courses in—

Civil, Mechanical, Electrical and Electronics Engineering and Architecture. Industry-Oriented B. Tech. courses are offered in Civil, Mechanical and Electrical Engineering. Admission to these under-graduate courses are within the total approved intake.

B. **Post-graduate courses :**

2-year M-Tech Industry-oriented degree courses with assistance from UNESCO in :

(1) Design and Production Engineering (Heavy Electrical Equipment).

(2) Design and Production Engineering (Power Plant Machinery —Thermal).

(3) Design and Production Engineering (Power Plant Machinery —Hydro-Electric).

(4) Engineering Materials for the Design and Production of Heavy Engineering Equipment.

(5) Foundation Engineering (Applied to Vibratory Systems).

C. **Part-time M. Tech courses in :**

(1) Design and Production Engineering (Heavy Electrical Equipment).

(2) Design and Production Engineering (Power Plant Machinery—Thermal).

(3) Design and Production Engineering (Power Plant Machinery—Hydro-Electric).

(4) Engineering Materials (for the Design and Production of Heavy Engineering Equipment).

(5) Foundation Engineering (Applied to Vibratory Systems).

D. **2-Year M. Sc. courses in Sciences :**

(1) Mathematics.

(2) Physics.

(3) Chemistry.

4.133. Land Development and Buildings : The State Government acquired a site measuring 482.3 acres at a cost of Rs. 2.31 lakhs and in addition transferred 127.1 acres of government land to the college, thus making a total of 610 acres for the campus. The State Government also spent Rs. 37.5 lakhs on the development of this land.

4.134. Instructional buildings covering an area of 2,08,000 sft. were approved at a cost of Rs. 48.5 lakhs and the buildings were all completed at the sanctioned cost.

4.135. There are 2 single-seated and 4 triple-seated hostels for students with accommodation for 1328 students built at a cost of Rs. 53.5 lakhs. An amount of Rs. 41.4 lakhs was spent on the construction of staff quarters providing accommodation for 122 teaching and equivalent staff and 82 members of ministerial and supporting staff.

4.136. The original building approved was only for the under-graduate courses and the college is offering several post-graduate courses using the same accommodation available. Although a norm of 5,000 sft. has been approved for each post-graduate course, no sanctions for post-graduate buildings are yet issued. On account of this, there is some congestion and it is hoped that this can be relieved when the post-graduate buildings will be constructed.

4.137. Equipment and Library : An amount of Rs. 47.26 lakhs was sanctioned for equipment and the college procured equipment worth Rs. 32.12 lakhs. For the post-graduate courses, the college acquired equip-

ment worth Rs. 1.75 lakhs. In addition, through the UNDP/UNESCO project operating in this college, specialised equipment specially of foreign manufacture and valued at Rs. 26.32 lakhs has been provided.

4.138. The Library has an accommodation of 11,000 sft. carpet area and has a collection of 23,400 books and 1680 journals acquired at a cost of Rs. 7.85 lakhs. The college subscribes to 120 periodicals at an annual cost of Rs. 32,000.

4.139. The staff sanctioned and in position as on 1-1-1973 is as follows :—

	Sanctioned	In position
1. Teaching staff (including Associate Lecturers & Workshop Foreman),	129	100
2. Administrative and other staff	13	6
3. Technical Supporting staff	108	55
4. Ministerial and Class IV	466	210

4.140. Industrial collaboration and research activities: The college is located very near the Heavy Electrical Plant in Bhopal and was from the very beginning planned to provide an orientation to industrial needs. The research and development organisation of Electrical Industries is also located in Bhopal which has helped in the orientation of its courses and programmes to practical needs. Students engage themselves even at the under-graduate level on projects of interest to industries collaborating with the institution. At the post-graduate level, the collaboration of industries is very extensive and post-graduate problems/theses/dissertations are jointly formulated by the Institute and collaborating industry and industry provides suitable guides for the research work. The college is also engaged in research activities and at present research grants totalling over Rs. 6.8 lakhs and spread over 3-5 years are made available to the Institute through the UGC, CSIR, Indian National Science Academy etc.

4.141. Student and Staff Amenities: A sub-post office, a public call office and a branch of the State Bank of India function on the college campus. Students Co-operative Stores for books and stationery and Employees' Co-operative Store, Consumer Stores and a dispensary are provided on the campus. Adequate facilities for all types of games for students are available. The staff also has provision for games. There are recreation clubs separately for senior staff and class III and class IV staff functioning in some of the staff quarters. There is a primary school on the campus run by the State Government for which the college has provided a type VI quarter.

4.142. Recurring Expenditure: For the year 1972-73, an amount of Rs. 25.9 lakhs was spent on under-graduate courses and an amount of Rs. 4.06 on post-graduate courses. The break-up of recurring expenditure is given below:

	Under-graduate		Post-graduate	
	Pay	Allowances	Pay	Allowances
1. Teaching staff	Rs. 7,24,328	Rs. 1,78,806	Rs.	Rs.
2. Scholarships and Fellowships	1,51,615 1,33,259	6,27,903	1,63,000	59,105
3. Supporting staff	94,683			
4. Administrative including class III and IV	14,803			
5. Other expenditure	5,00,000			

4.143. The following assistance was received by the college from UNDP in the first and second phases of the programme:

Equipment	$ 3.51 lakhs =	Rs. 26.32 lakhs
International Experts	Nos. 6,	man-months 105
	(Cost $ 2.35 lakhs =	Rs. 17.62 lakhs)
Fellowships	Nos. 10,	man-months 176.5
	(Cost $ 0.80 lakhs =	Rs. 6.00 lakhs)

Of the 10 fellowships awarded to the college under UNDP programme, 4 doctoral awards from foreign universities and 2 masters degrees were obtained besides other specialised training programmes (4 including two short-term).

4.144. The college has stated that although the buildings were originally planned only for first-degree courses in Civil, Mechanical and Electrical Engineering in 1962, an under-graduate course in Architecture was introduced in 1963 and five industry-oriented post-graduate courses with UNESCO assistance in 1966-67 utilising the same space. This has resulted in a lot of congestion and there is deficiency in drawing halls, tutorial rooms, laboratory space and class rooms for post-graduate courses. The college has assessed that there would be additional building requirement of 24,000 sft. We understand that for each approved post-graduate course, the building norm of 5,000 sft. plinth is also approved, but no grants for this

have so far been released. The college is entitled to approximately 25,000 sft. on account of approved courses and when this accommodation is provided, it should be possible for the college to readjust its existing buildings and then the deficiencies as pointed out could be adequately met. The requirements for the under-graduate course in Architecture should be separately provided for, although in our view it should be possible for this to be accommodated in the new set up.

4.145. The college has also stated that with the introduction of post-graduate courses and revision in the syllabi for the under-graduate courses, the equipment provided for in the laboratories has become insufficient. The college has assessed that an additional amount of approximately Rs. 17 lakhs is required to make good the equipment shortages at the institute. The Institute has also suggested that there should be an additional recurring grant for raw materials for satisfactory working of the laboratories. An additional recurring amount of Rs. 55,000 has been sanctioned for this.

4.146. The college has stated that non-recurring grants for library were assessed five years back, with the result that at present there are no funds for purchase of books or back volumes of journals. The college has stated that the library should be provided an additional amount of Rs. 5 lakhs for procuring 10,000 additional books, Rs. 1,50,000 for back volumes of journals and Rs. 1 lakh for furniture, Rs. 40,000 for binding section and a recurring expenditure of Rs. 50,000 for current journals.

4.147. To consolidate the progress in industry-oriented post-graduate education and research, the college has proposed the establishment of 4 problem-oriented research laboratories in the following fields with their estimated requirement:

		Building	**Equipment**
		sq. ft.	Rs. lakhs
1.	Fluid Mechanics and Hydraulic Machines.	12,850	6.6
2.	Heavy Electrical Machines	8,000	7.0
3.	Steam and Gas Turbines	8,000	6.9
4.	Developing and testing of Engineering Materials.	1,000	5.8

The approximate recurring cost—teaching and supporting staff is Rs. 1.25 lakhs for each laboratory except for the Research Centre for Developing and Testing Engineering Materials which is Rs. 0.90 lakh.

11. SARDAR VALLABH BHAI REGIONAL ENGINEERING COLLEGE, SURAT

4.148. The college was started in the year 1961 with annual admission of 250 students. The annual admission has not been reduced at any stage.

4.149. The college is affiliated to the South Gujarat University and offers first-degree 5-year integrated courses in Civil, Mechanical and Electrical Engineering. The college is offering post-graduate courses in Public Health Engineering, Transportation Engineering and Soil Mechanics and Foundation Engineering. These courses, however, are not approved by the Board of Post-graduate Studies.

4.150. Land Development and Buildings: The State Government acquired an area of 256 acres for locating the college and spent Rs. 25.56 lakhs on its development. Instructional buildings covering an area of 1,94,189 sft. plinth at an estimated cost of Rs. 52.42 lakhs were approved. The college so far constructed 1,45,458 sft. plinth of instructional buildings, at a cost of Rs. 48.65 lakhs.

4.151. There are 4 hostels—1 single-seated and 3 triple-seated accommodating a total number of 594 students. These were constructed at a cost of Rs. 40.45 lakhs.

An amount of Rs. 26.71 lakhs has been spent on the construction of staff quarters providing accommodation for 30 members of teaching and equivalent staff and 48 members of ministerial and supporting staff.

4.152. Equipment and Library: A total amount of Rs. 34.02 lakhs was sanctioned for equipment, furniture and library out of which the college has so far spent Rs. 33.76 lakns on these items. All this equipment is only for under-graduate courses.

The Library covers an area of 11,161 sft. and has 17,675 books acquired at a cost of Rs. 2,89,000. The college also subscribes to 102 journals and periodicals at an annual cost of Rs. 30,000.

4.153. The staff sanctioned and in position as on 1-1-1973 is as follows :—

	Sanctioned	In position
1. Teaching staff (including Associate Lecturers and workshop Foreman).	114	95
2. Administrative and other staff	13	11
3. Technical supporting staff	110	89
4. Ministerial and class IV	133	109

4.154. Industrial Collaboration and Research Activities: The college is being approached by industries to help them in their problems of quality control, product development and design. The college hopes that if more post-graduate courses are offered with better facilities, more collaboration will take place with industries. The college claims research facilities in ail its departments. The college also claims that its faculty members have enaged themselves in meaningful research publishing as many as 100 research publications. Some of its research projects are supported by the UGC, CSIR and South Gujarat University.

4.155. Student and Staff amenities: Opening of a branch of a Bank and a sub-post office with a public call office is under process. Recently a building for Cooperative Stores has been constructed. A dispensary is functioning on the campus. There are reasonable facilities for different indoor and outdoor games for students. The staff members have no facilities for games. There is a Central School very near the college campus and there are high schools, middle schools and primary schools within a distance of 2-3 kms. from the college.

4.156. Recurring Expenditure: For the year 1972-73 an amount of Rs. 25-066 lakhs has been spent on under-graduate courses. The break-up of the recurring expenditure is as follows:—

1. Teaching and Supporting Staff	Rs. 11,00,484.85
2. Scholarships and Fellowships	Rs. 94,233.10
3. Administrative including class III and class IV	Rs. 6,89,482.97
4. Department/Library Operating Cost and other contingencies	Rs. 6,22,371.88

4.157. The college has stated that it is one of the very few Regional Colleges which has only the basic courses of Mechanical, Electrical and Civil Engineering, while many other colleges have additional branches. To cater to the needs of the State in particular and the country in general, the college has proposed first-degree courses in Chemical Engineering with special emphasis on salt-based industry, synthetic fibres and petroleum products; electronics and instruments and control. The college has also stated that to attract better faculty and students and to meet the technical needs of the zone, industry-oriented post-graduate courses in various technical fields may be approved. It has also proposed the starting of post-graduate courses leading to M.Sc. (Tech) in Applied Mathematics, Physics (with specialisation in applied optics) and Chemistry (with specialisation in industrial chemistry). The college has made an estimate of approximately

Rs. 33.41 lakhs for consolidation and additional requirements for new courses as follows:—

1. Upgrading under-graduate laboratories.	Rs. 7.76 lakhs
2. Diversified courses	Rs. 5.75 lakhs
3. Starting of post-graduate courses.	Rs. 19.90 lakhs
	Rs. 33.41 lakhs

12. REGIONAL ENGINEERING COLLEGE, DURGAPUR

4.158. The college was started in the year 1960 with an annual admission of 250. The annual intake was reduced to 195 from the year 1968-69 an account of industrial recession and reduced employment of engineers. In the year 1970-71, admissions were very low, being 41 and 129 respectively, on account of very disturbed political conditions in West Bengal.

4.159. The college is affiliated to the University of Burdwan and offers the first-degree 5-year integrated courses in Civil, Electrical, Mechanical, Chemical and Metallurgical Engineering restricting the overall admissions to the courses within approved annual admissions. The college also offers the following post-graduate courses:—

1. Production of Fertilisers and Heavy Chemicals (Chemical Engg).
2. Design, Operation and Maintenance of Electrical Systems in Steel Plants (Elec. Engg).
3. Design and Production of Medium Duty Machine (Mechanical Engg).
4. Mechanical shaping of Metals and Heat Treatment with Forging, Rolling and Heat Treatment (Metallurgical Engg).
5. Extractive Metallurgy and Foundry with special reference to Alloy Steel Production (Metallurgical Engg).

Master of Engineering course

Structural Engineering (Civil Engineering). The college has also been recognised by the University of Burdwan as a Centre for Doctoral work in engineering and science. The Industry-Oriented M. Tech. courses are initiated with assistance from UNDP.

4.160. Land Development and Buildings: The State Government acquired an area of 187 acres of land for the location of the college at a cost of Rs. 19.3 lakhs and spent an amount of Rs. 17.9 lakhs on its development.

4.161. Instructional buildings covering a plinth area of 1,96,865 sft., at a cost of Rs. 41.32 lakhs, were approved and the college built the same at a cost of Rs. 38.83 lakhs.

4.162. There are 2 single-seated and 3 triple-seated hostels providing accommodation for 1250 students built at a cost of Rs. 49.3 lakhs including hostel equipment and furniture. An amount of Rs. 54.68 lakhs has so far been spent on the construction of staff quarters providing accommodation for 119 members of teaching and equivalent staff and 193 members of the ministerial and supporting staff.

4.163. Equipment and Library: For the under-graduate courses, the amount of Rs. 42.45 lakhs sanctioned for equipment has been fully spent and so also for the post-graduate courses the amount of Rs. 5 lakhs sanctioned has been fully spent. In addition, through UNDP/UNESCO project operating in this college, specialised equipment essentially of foreign manufacture valued at Rs. 27.75 lakhs has been provided.

The Library has a total collection of 16,500 books at a cost of Rs. 4.14 lakhs. It is housed in a building with a plinth area of 7,000 sft. The college also subscribes to 250 journals at an annual cost of Rs. 80,000/-

4.164. The staff sanctioned and in position as on 1.1.1973 is as follows:—

	Sanctioned	In position
1. Teaching staff (including physical training officer and Workshop Foreman.	135	92
2. Administrative and other staff	9	9
3. Technical supporting staff	92	81
4. Ministerial and class iv staff	306	272

4.165. Industrial collaboration and research activities: The college is in close contact with industries in the region—the collaboration covering students' training, lectures on special topics by experts from industry and M. Tech. Projects from industry under the joint guidance of experts from industry and teachers. The Department of Civil Engineering offers test

facilities and has undertaken survey work on behalf of the Asansol Planning Organization. The Department of Atomic Energy has sponsored a project in the Department of Physics and has so far provided a grant of Rs. 4 lakhs. The staff members have undertaken a good number of research projects. The college proposes that a separate Research and Development Cell with Central Instrumentation Section be provided to facilitate taking up industrial projects and implement design and development of equipment. The estimated cost of this is Rs. 4.5 lakhs non-recurring and Rs. 4.63 lakhs recurring.

4.166. Student and Staff Amenities: A Post and Telegraph Office, a Pay Office of the State Bank of India, and a Cooperative Store run by the college are located on the campus. There is also a six-bed hospital-cum-medical unit on the campus. The hospital staff is provided by the Directorate of Health Services, Government of West Bengal, but all other expenditure is borne by the college. Except the Cooperative Store, the other amenities are housed in staff quarters.

Facilities for various games, including a football ground situated in the Durgapur Steel Plant area, are also available for the students. There is a Faculty Club for teachers, a Staff Club for other employees also housed in staff quarters. There is a Higher Secondary Multipurpose School on the campus sponsored by the Board of Secondary Education, Government of West Bengal.

4.167. Recurring Expenditure: For the year 1972-73, an amount of Rs. 35.9 lakhs was spent on under-graduate courses and Rs. 2.21 lakhs on post-graduate courses. The break-up of recurring expenditure is given below:

	Under-graduate Rs. lakhs	Post-graduate Rs. lakhs
1. **Establishment**		
(i) Teaching staff	11.10	0.28
(ii) Administrative staff	0.92	—
(iii) Supporting staff, Class III & Class IV	12.15	0.23
(iv) Society's contribution to CPF Account	1.95	—
(v) Subsidy to Mess Employees, Muster Roll workers, Leave Salary & Pension contribution, Loans and advances etc.	1.24	—

2. Contingency	2.50	0.49
3. Scholarships	1.24	1.21
4. Estate Maintenance	3.11	—
5. Misc. Expenditure	0.71	—
6. Buildings & Works maintenance	0.98	—

4.168. The following assistance was received by the college from UNDP/UNESCO in the first and second phases of the programme:

Equipment $ 3.70 lakhs = Rs. 27.75 lakhs

International Experts Nos. 5 Man-months 117
(Cost $ 2.31 lakhs = Rs. 17.32 lakhs)

Fellowships Nos. 11 Man-months 134.5
(Cost $ 0.75 lakhs= Rs. 5.62 lakhs)

Of the 11 fellowships awarded to the college under UNDP programme, 2 doctoral awards from foreign universities were obtained besides 9 other specialised training programmes including one for short-term studies.

4.169. Under the consolidation programmes, the college proposed modernising the existing laboratories and providing them with additional equipment, a few new laboratories, offer a few more electives and organise sandwich and refresher courses. The existing post-graduate courses are all proposed to be made industrially-oriented and reorganised to make them uniform and reduce the field covered. The cost for this is estimated at a non-recurring expenditure of Rs. 90.8 lakhs. Under the development programmes, the college mentioned introduction of a first-degree course in Electronics and at the post-graduate level, the introduction of 12 courses. The estimated requirements are for the under-graduate course Rs. 15.63 lakhs non-recurring and for the post-graduate courses non-recurring Rs. 48.7 lakhs and recurring Rs. 9 lakhs. The college also proposed introduction of new courses in Science and Humanities as follows:—

1. 5-year integrated course leading to B. Sc. (Hons.) and M. Sc. in Physics, Chemistry, Mathematics, English and Economics.
2. 3-year M. Sc. (Tech) course in Applied Geology.
3. 2-year M. Sc. (Tech) course in Operations Research.
4. 1-year Diploma course in Numerical Analysis and Computer Programming.
5. 2-year degree course in Industrial Management, at an estimated cost of—non-recurring Rs. 52 lakhs and recurring of approximately Rs. 8 lakhs.

13. REGIONAL INSTITUTE OF TECHNOLOGY, JAMSHEDPUR

4.170. The college was started in the year 1960-61 with an annual admission of 250 students. Admissions were reduced from 1967-68 to 200 and from 1968-69 to 150 on account of industrial recession and reduced employment of engineers. The college did not make any admissions in the year 1971-72 and from 1972-73, the admissions have been raised again from 150 to 180.

4.171. The college is affiliated to the Ranchi University and offers first-degree 5-year integrated courses in Civil, Electrical, Mechanical and Metallurgical Engineering. The college also offers M. Tech. industry-oriented degree courses in Metallurgy, which was started under UNDP/UNESCO project. From the year 1973-74, the college is offering an M. Tech. degree course in Electrical Engineering.

4.172. Land Development and Buildings: The State Government provided an area of 341.30 acres and spent Rs. 2.38 lakhs on its development. Instructional buildings covering 2,07,935 sft. plinth have been approved at a cost of Rs. 39.6 lakhs and the college constructed the same at a cost of Rs. 38.5 lakhs.

4.173. There are three single-seated hostels and 4 triple-seated hostels providing accommodation for a total number of 1236 students. The hostels were constructed at a total cost of Rs. 46.7 lakhs. The college also has constructed 37 staff quarters for teaching and equivalent staff and 18 for ministerial and supporting staff at a cost of Rs. 13.62 lakhs.

4.174. Equipment and Library: Against an equipment grant for undergraduate courses of Rs. 29.75 lakhs, the college procured equipment worth Rs. 23 lakhs. For post-graduate courses, the amount of grant released was Rs. 50,000 and the college procured equipment worth Rs. 39,000. In addition, the college acquired equipment worth Rs. 17.10 lakhs essentially of foreign origin through UNDP/UNESCO project.

The Library has a collection of 10,253 books acquired at a cost of Rs. 2.55 lakhs and is housed in a building of 4812 sft. plinth area. The college also subscribes to 175 journals and periodicals at an annual cost of Rs. 45,000.

4.175. The staff sanctioned and in position as on 1.1.1973 is as follows:—

	Sanctioned	In position
1. Teaching staff (including Lecturers and Workshop Foreman)	112	90
2. Administrative and other staff	14	10
3. Technical Supporting staff	80	56
4. Ministerial & Class IV	322	292

4.176 Students and Staff Amenities: There is a post office, a public Call Office, a Branch of the State Bank of India on the college campus. Medical facilities are available through a full-time medical officer and a dispensary on the campus. There is arrangement for a few beds for students in the Government hospital and Tata Main Hospital if needed. There is also a Consumer Cooperative Stores on the campus.

For students recreation, there is provision for Hockey, Football, Basket Ball and Tennis. In addition there is also a gymnasium. Facilities for table tennis and other indoor games are provided in all hostels.

The Institute bus is made available for school going children and other staff members at subsidised rates. For class III and class IV staff there is a Technology Social Club and Adarsh Club. These clubs receive aid from the Institute.

4.177. Recurring Expenditure: For the year 1972-73, an amount of Rs. 31.98 lakhs on under-graduate courses and Rs. 78,000 on post-graduate courses has been spent. The break-up of the recurring expenditure is as given below:—

1. Teaching staff	Rs. 9,18,683
2. Scholarships and Fellowships	Rs. 1,44,718
3. Supporting staff	Rs. 5,15,840
4. Administrative, including class III and class IV	Rs. 6,68,234
5. Other expenditure	Rs. 9,50,000

4.178. The following assistance was received by the college from UNDP/UNESCO in the first phase of the programme:

Equipment	$ 2.28 lakhs	=	Rs. 17.10 lakhs
International Experts	Nos. 4		Man-months 46
	(Cost $ 1.27 lakhs	=	Rs. 9.52 lakhs)
Fellowships	Nos. 5		Man-months 70
	(Cost $ 0.32 lakhs	=	Rs. 2.40 lakhs)

Of the 5 fellowships awarded to the college under UNDP programme, 2 doctoral awards from foreign universities and 1 masters degree was obtained besides 2 other specialised training programmes including one for short-term studies.

4.179. The college submitted to the Reviewing Committee building estimates at a cost of Rs. 84.5 lakhs including Rs. 66 lakhs for staff quarters to be constructed to provide adequate accommodation and facilities. It has also estimated additional input of Rs. 31 lakhs for equipment to make good the deficiencies.

4.180. The college was established as early as 1960 in the first set of the Regional Colleges. It has also an excellent location being situated in the heart of the most heavily industrialised area in the country. Nevertheless, the progress made by the Institute has been very slow. Buildings and equipment provided under the normal scheme have not been made available.

4.181. Despite its slow progress, having regard to its excellent location, the college was selected for the introduction of industry-oriented post-graduate courses in the first phase of the UNDP/UNESCO project. Two courses were allotted to it—(i) in extractive metallurgy and (ii) in Foundry Technology.

The college could hardly establish the first course and could not make even a beginning with the other, principally owing to lack of adequate staff, direction and other serious local difficulties. The Evaluation Mission set up by UNDP to report on the progress made by all the Regional Engineering Colleges in the project, recommended that this college should be dropped in the second phase of the project.

14. REGIONAL ENGINEERING COLLEGE, ROURKELA

4.182. Initially the college was started by the Government of Orissa in August 1961 and in February, 1962 it was approved as a Regional Engineering College. Upto the year 1963-64, the annual admission was 120, but this was increased to 250 in that year. The admissions were again reduced to 200 from 1968-69, on account of industrial recession and reduced employment of engineers.

4.183. The college is affiliated to the Sambhalpur University and offers first degree 5-year Integrated courses in Civil, Electrical, Mechanical, Metallurgical and Chemical Engineering, the overall admission to the courses

being restricted to the approved annual admission. The college also offers the following 2-year M. Tech post-graduate degree courses in:—

1. **Mechanical Engineering**—Design and Production of Heavy Machines with emphasis on Mech. equipment for steel plant.
2. **Metallurgical Engineering**—Technological and Metallurgical Furnaces.
3. **Civil Engineering**—Soil Mechanics and Foundation Engineering and Structures.
4. **Electrical Engineering**—Communication Systems.

The post-graduate courses at 1 and 2 above are industry-oriented and are assisted through the UNDP/UNESCO project. From the year 1955, the college has been conducting post-graduate courses in Mathematics, Physics and Chemistry on its own and without approval of the AICTE. Obviously utilising the overall facilities approved for the institution.

4.184. Land Development and Buildings: The State Govt. acquired a site of about 648 acres at a cost of Rs. 4.3 lakhs for locating the institute. The State Government also spent an amount of Rs. 52.7 lakhs on development of the site. Instructional buildings covering an area of 2,60,000 sft. plinth were approved at a cost of Rs. 67.13 lakhs. The college built this entire area at a cost of Rs. 66.4 lakhs.

4.185. There are two single-seated hostels and three triple-seated hostels providing accommodation for 1214 students (including special accommodation for 15 girls). These hostels were built at a cost of Rs. 30.66 lakhs. An amount of Rs. 55.75 lakhs was spent on the construction of staff quarters providing accommodation for 123 members of teaching and equivalent staff and 232 members of ministerial and supporting staff.

4.186. Equipment and Library: For the under-graduate courses, against a sanctioned amount of Rs. 44.5 lakhs, the college procured equipment for Rs. 43.67 lakhs. For the post-graduate course, the amount sanctioned is Rs. 2.70 lakhs and the value of equipment procured is Rs. 2.30 lakhs. In addition, through the UNDP/UNESCO project operating in this college, specialised equipment essentially of foreign manufacture and valued at Rs. 15 lakhs has been provided.

The library having a collection of 18,110 books is housed in a building of 12,400 sft. plinth area. The value of the books so far collected is Rs. 3.27 lakhs. The total amount approved for under-graduate and post-grad-

uate courses for library is Rs. 4.6 lakhs. In addition the college subscribes to 219 journals and periodicals at an annual cost of Rs. 58,000.

4.187. The staff sanctioned and in position as on 1.1.1973 is as follows:—

	Sanctioned	In position
1. Teaching staff (including Associate Lecturers and Workshop Foreman)	124	112
2. Administrative and other staff	9	8
3. Technical Supporting staff	93	87
4. Ministerial and class IV	224	216

4.188. Industrial Collaboration and Research Activities: The college started receiving assistance from UNDP/UNESCO for industry-oriented post-graduate courses in the second phase of the programme. Although some collaboration has been established with industry, it is possible to do much more. There is a lot of interest for research work in the college in all the Departments which need consolidation and channelising. One or two Departments have been doing work of a very good standard and level.

4.189. Students and Staff Amenities : There is a Post and Telegraph Office, a branch of the State Bank of India, Cooperative Stores for students and staff and a dispensary, on the campus. Facilities exist for NCC and several games for students. There is a staff club for the senior staff, a club for administrative and ministerial staff and a club for class IV staff functioning in temporary buildings. Schooling facilities exist upto higher elementary level. There is a building for primary section and other classes are functioning in temporary buildings.

4.190. Recurring expenditure : For the year 1972-73, an amount of Rs. 31.83 lakhs was spent on under-graduate courses and an amount of Rs. 2.24 lakhs on post-graduate courses. The break-up of the recurring expenditure is given below :—

	Under-graduate	Post-graduate
1. Teaching staff	Rs. 12,13,378	Rs. 27,920
2. Scholarships and Fellowships	Rs. 1,34,051	
3. Supporting staff	Rs. 3,59,494	Rs. 6,701
4. Administrative, including class III and class IV	Rs. 4,35,019	Rs. 14,889
5. Other expenditure	Rs. 11,83,000	Rs. 1,13,000

4.191. The following assistance was received by the college from UNDP/UNESCO in the second phase of the programme :

Equipment $ 1.80 lakhs = Rs. 13.5 lakhs
International experts Nos. 1 Man-months 30
(cost $ 0.745 lakhs = Rs. 5.85 lakhs)
Fellowships Nos. 2 man-months 39
(cost $ 0.235 lakhs = Rs. 1.76 lakhs)

The 2 staff members who were awarded fellowships are currently in Masters degree programmes abroad.

4.192. The college proposed consolidation of existing courses, new post-graduate and under-graduate courses, establishment of Advanced Research Centres and a Computer Centre involving a total expenditure of non-recurring Rs. 200.60 lakhs, ultimate recurring Rs. 28.00 lakhs. The particulars are as follows :—

	Non-recurring Rs. lakhs	Recurring Rs. lakhs
A. Consolidation of post-graduate courses.		
1. Basic Sciences	16.6	2.00
2. Industry-oriented	3.00	—
3. M. Sc. Engg.	—	—
B. Consolidation of under-graduate courses.	15.00	0.50
C. Post-graduate hostel for 120 students.	12.00	—
D. New Post-graduate courses	103.00	17.00
E. New under-graduate courses	24.00	7.50
F. Advanced Research Centres	10.00	—
G. M. Sc./M. Tech. in Applied Geology.	7.00	1.00
H. Computer Centre	20.00	—
Total	200.60	28.00

4.193. The proposed courses and Centres are :

A. **Post-Graduate Courses**

(i) **Chemical Engineering**

(a) Fertilizers and Heavy Chemical Technology.

(b) Chemical Reaction Engineering.

(c) Coal and Coal Chemicals Technology.

(ii) **Civil Engineering**

(a) Water Resources.

(b) Public Health.

(iii) **Mechanical Engineering**

(a) Heat Power (Plant/Refrigeration Engineering)

(b) Production Engineering (Heavy Machines)

(c) Industrial Engineering.

(d) Machine Design (Farm Machinery)

(iv) **Electrical Engineering**

(a) Power System Control.

(b) Computer Technology.

(c) Advanced Electrical Machine and their control.

(v) **Metallurgy**

(a) Iron and Steel Production.

(b) Electrometallurgy.

(c) Metal forming.

(d) Non-ferrous metallurgy.

B. **Under-Graduate Courses**

(i) Industrial Instrumentation Engineering.

(ii) Architecture and Regional Planning.

(iii) Agricultural Engineering (Farm Machinery).

C. **Advance Research Centres**

Civil Engineering :

(i) Soil Mechanics and Foundation Engineering.

(ii) Structural Engineering.

(iii) Ground Water resources.

Electrical Engineering

Electrical Drives In Industries and their control.

Mechanical Engineering

(I) Heat Power Engineering. (Power Plant/Refrigeration)

(ii) Production Engineering.

(iii) Mechanical Equipments relating to Steel Plants.

Metallurgical Engineering

Iron and Steel Technology.

Chemical Engineering

Chemical Reaction Engineering.

Physics

Applied Physics with emphasis on X-Ray and Solid State Physics.

Chemistry

Applied chemistry with emphasis on Inorganic Chemistry and Chemistry of refrectories and cement.

Mathematics

Applied Mathematics with emphasis on Operating research, Continuum Mechanics, Mathematical Physics and Applied Analysis.

Geology

Applied Geology with emphasis on Geology as applied to this region.

Humanities

The Department of Humanities is to be expanded in the three specialisations as follows :—

(i) English with emphasis of liquisitics

(ii) Economics with emphasis of industrial econometrics.

(iii) Industrial Psychology.

U. N. D. P. Project

POST-GRADUATE EDUCATION OF ENGINEERS

4.194. The Government decided to improve the quality of training in the Central Engineering Colleges by providing them with modern equipments, highly qualified staff and advanced academic programme to meet the demands of developing industry. They approached the UN Special

Fund to afford necessary technical assistance by providing sophisticated equipment to improve the laboratory base in the colleges, advanced training for faculty in institutions in developed countries and UNESCO experts and consultants in different fields of engineering and technology.

4.195. The proposed technical assistance was to be in two stages; (1) direct assistance for the Central Engineering College at Warangal to develop it into a fullfledged institution and (2) in the light of the experience with the Warangal college, assistance to other Central Engineering Colleges in the country. The two projects were "Teachers Training for Engineering College Warangal" and "Technical assistance to 6 Regional/Central Engineering Colleges."

4.196. The aim of the Warangal project was to establish in the Central Engineering College at warangal a training centre for teachers of eight Central Engineering Colleges and to attain fuller establishment of the college principally through (a) promotion of higher quality of instruction, curricula and research and (b) the development of other specialised fields of study. The original plan envisaged special fund contribution of US $ 1,650,800 out of which US $ 819,200 was for UNESCO experts (468 man-months $ 360,000 for training abroad 75 teachers from all the Central Engineering Colleges and $ 400,000 for equipment.

4.197. The Regional/Central Engineering Colleges project had a special fund allocation of US $ 2,160,588 of which $ 481,488 was for UNESCO experts (12 specialists in different branches of engineering and one library consultant) and $1,500,000 for equipment. The 6 colleges in the programme are those located at Allahabad, Bhopal, Durgapur, Nagpur, Jamshedpur and Surathkal (Mangalore). The objective was to develop an approved programme of instruction in these colleges principally through upgrading existing courses of instruction and adding new courses where necessary to meet the demands of Government service and of industry. Starting of post-graduate courses in these colleges except at Warangal was not initially envisaged. The 6 colleges project was planned to be carefully Integrated with the Warangal Project so that for maximum effectiveness the entire staff of the experts teams under both projects could be utilised to serve the needs of all the colleges.

4.198. As both the projects have been intended from the beginning to achieve the same objectives, the implementation of the two projects was so coordinated as to ensure the maximum purposeful utilisation of the facilities provided by the special fund under these projects. In fact, in actual implementation both the projects have been combined practically into one by integrating the allotments of the various programmes propos-

ed in the projects. Some adjustments were made in the duration of the projects for a simultaneous termination of both in the middle of 1969.

4.199. The main objectives envisaged in the two projects were (1) to establish a centre for training of teachers in different branches of engineering for Central Engineering Colleges, (2) to upgrade the level of under-graduate studies in the colleges by means of improving the quality of instruction, syllabuses and laboratory programme.

4.200. It was felt that the teacher training centre need not be confined to Warangal alone as originally envisaged. The other colleges has also been developed, more or less to the same level as the Warangal College and they were in a position to start their own teacher training courses. Through this, it was possible for each college to develop its own specialists by a greater concentration of efforts in one speciality in one centre instead of dissipating the resources.

4.201. After scrutiny of the problems of technical education and demands of industry for the quality of engineers and review of the situation in all the Central Engineering Colleges, in consultation with the Chief Technical Adviser, and Coordinator of both the projects, the Government accepted a two-year post-graduate industry-oriented course as the main instrument for the teacher training programme. In these courses, emphasis would be laid on post-graduate students acquiring practical experience and essential up-dated knowledge. Industrial orientation of the courses opened up new possibilities for bringing about a close cooperation between the colleges and industry—a necessary pre-condition for upgrading the standard of technical education. The courses chosen were closely related to the type of industry being developed by the region served by each of the colleges. As the success of self-supporting economy needed qualified engineering cadres in the field of design and technology, it was decided to specialise the industry-oriented M.Tech. courses with emphasis on the design and production aspects of different branches of engineering.

4.202. The model curriculum includes two periods of theoretical studies at the college itself and two periods of indusrtial training ranging from 7-10 months duration organised as part of the courses. In the first period of 2 months duration in industry, students get the first acquaintance with their specialisation in industry, lectures by industrial engineers to introduce the students to technological aspects, processes and equipment. This period supplements the knowledge of the students gained during the first semester lectures in the college. The second part of training in industry—5—6 months is followed by 3 months studies at the college for coordinated thesis work leading to masters degree.

4.203. In the second part of their industrial training, the students work as counterparts to engineers in industry, preparing at the same time for their thesis. Special problems confronted by industry concerned are given to students as topics of thesis. The kinds of theses proposed for students of these courses are to be in the main categories of (i) design of machines, devices and instrumentation, (2) analysis of manufacturing processes and (3) research in various fields with a practical and applied bias. The success of thesis work has to be evaluated from the point of view of its utility to industry.

4.204. Each college was to start M.Tech courses in one or two specialisations with the assistance and support of industry and research laboratories available in its surroundings. Thus each college could develop its own teaching centre at the highest level and this centre is to cater for the needs of the remaining colleges to train teachers in related specialisations. Two factors were taken into consideration for the choice of M.Tech courses for each college, (1) suitable industrial environments for providing close collaboration between the college and the industry and (2) a specialised nature of the courses to prevent duplication or dissipation of funds received from UNDP/UNESCO and from Government.

4.205. At present 30 industry-oriented post-graduate courses are being offered by the Central Engineering Colleges. The particulars of the courses and the colleges at which these are offered may be seen in Annexure X.

4.206. The UNDP/UNESCO assistance has been very useful to the college in the project. Some of these colleges have been able to procure excellent equipment of a highly specialised nature. A large number of the staff of the colleges has been trained abroad in specialised subjects and obtained doctoral and other awards. Assistance received from UNDP/UNESCO in the shape of expert services, equipment and fellowships may be seen in Annexure XI. Also awards earned by fellows is shown in Annexure XII.

4.207. The experience with the industry-oriented courses was very encouraging. This is mainly due to the wide contacts established with industry, research institutions etc., by the colleges during the operation of the projects and also through the active participation and interest evinced by industry in evolving the academic process. During the students industrial training, the laboratory and equipment of industry was utilised for routine and dissertation experiments. This strengthened and widened the laboratory base of the M.Tech courses. Experienced and qualified engineers in industry and research institutions took active part

in the academic and the industrial training, giving the benefit of their knowledge through lectures on certain special subjects. This collaboration has proved very effective for colleges located in industrial areas where frequent day-to-day contacts were possible even during the period of theoretical studies. Such readily available industries and research centres are those at Bhopal, Durgapur, Jamshedpur and Nagpur.

4.208. The scheme of post-graduate studies adopted in the colleges in the projects allows not only the training of specialists in theoretical knowledge combined with industrial experience, but also gradually narrows the gap between industry and the educational institutions where these specialists are being prepared. It gives the teaching staff access to industry, thus enriching their knowledge with practical aspects of their specialisations and provides them with material for research. Industry too benefits from such collaboration in that it gains access to theoretical knowledge, can utilise the college facilities and staff and can get help in improving the qualifications of their engineering cadres. The success of this type of courses may be seen from the fact that in 1968, despite a difficult employment situation, nearly all of the post-graduate students have been employed on completion of their courses. From an output of 93 candidates, 39 have found employment as teachers in engineering colleges and 43 joined industry or research institutions. Information about the rest is not readily available.

4.209. As a sequel to the development of a sound laboratory base for the M.Tech courses and the increased awareness and understanding of industrial problems by the teaching staff due to greater collaboration with industry, possibilities have emerged for the maximum utilisation of facilties in organised specialised laboratories for scientific and industrial research to solve industrial problems. These Laboratories would at the same time create excellent conditions for giving the teaching staff opportunities for research work on a permanent basis. This would at the same time promote conditions for constantly improving the qualifications of the teaching personnel of the Central Engineering Colleges and strengthening their ties with industries. These laboratories would not be substitutes for the National Research Institutes but would be good supplements to them.

4.210. As a next logical step to the development of industry-oriented M.Tech courses, problem-oriented research laboratories are also being established at three of the colleges those at Warangal, Nagpur and Bhopal. The Centre to be established at the Warangal College will be oriented towards Electronics in collaboration with the Electronics Corporation of India, a Public Sector enterprise and other similar medium and small scale

industries located in and around Hyderabad. The Centre at the Maulana Azad College of Technology in Bhopal is for heavy electrical machines and hydraulics machines in collaboration with the Heavy Electricals India Ltd., a Public Sector organisation. The Centre at the Visvesvaraya Regional College of Engineering will be organised in the field of stability in electrical power systems in cooperation with the Maharashtra State Electricity Board.

4.211. As we understand each of these research centres will be in the overall charge of a Leading Professor with the laboratory staff consisting of one or two permanent research officers and Research Fellows who are not loaded with academic work. Some of the teachers will participate in the work on a part-time basis. Post-graduate students of the college will utilise some aspects of this work for their dissertation and project.

4.212. We are pleased to note the progress already made in this direction by the colleges at Bhopal and Warangal. We strongly support this activity in other colleges as it will no doubt considerably enhance the quality of training and also the quality of teaching staff, thereby providing highly trained engineers in specialised fields with research and development capabilities to industry.

CHAPTER V

Summary of Recommendations

1. On account of the background, intentions and later developments, the Regional Engineering Colleges should appropriately be renamed as Central Engineering Colleges.

(Para 1.16)

2 We would recommend the closure or postponement of admissions to post-graduate courses where the wastage is higher than 70% of the intake in the corresponding year or where the admission is less than 30% of the sanctioned intake for some years in succession.

(Para 2.15)

3. To achieve the objective of national integration and improve the quality of admissions to the colleges from other states, we suggest—

(a) full rail concessional fares by third class be provided once in a year to students from other states whose homes are more than 500 kms from the colleges—the fare for the first 500 kms will be borne by students,

(b) the existing number of scholarships (merit-cum-means) available in each college should be divided equally between the students from within the state and those from other states, and

(c) colleges should provide opportunities for students from other states to imbibe something of the language and culture of the state.

(Paras 2.21, 2.22, 2.23 and 2.24)

4. Admissions to all the Central Engineering Colleges should be made through an entrance examination for both the State quota of seats and the quota of seats for other States according to accepted

pattern and choice of candidates.

(Para 2.32)

5. There should be properly constituted selection committees for all categories of posts and healthy conventions should be established and maintained In the matter of appointing experts. Posts should be advertised on an all-India basis and selections arranged with enough notice to candidates and experts. Travel expenses for persons called for interview should be paid as in the case of Institutes of Technology.

(Paras 2.45 to 2.48)

6. The emoluments, service conditions and benefits for teachers of Central Engineering Colleges should be the same as for corresponding staff of the Institutes of Technology.

(Para 2.51)

7. There should be a thoroughly prepared approach on the part of the institutions in establishing post-graduate courses.

(Para 2.53)

8. The teaching loads for the staff of the Central Engineering Colleges should be in accordance with the recommendations of the All-India Council for Technical Education.

(Para 2.54)

9. In the recruitment of teaching staff, sufficient care and emphasis should be laid on the professional experience competence of the candidates.

(Para 2.56)

10. The present practice of all teaching posts being filled by advertisements and open selection on a competitive basis is a very healthy practice and should continue

(Para 2.57)

11. The posts of Associate Lecturers should all be converted without further delay into those of Lecturers and further recruitment should take place only at the level of Lecturers.

(Para 2.59)

12. The organisation and programmes of Central Engineering Colleges should be linked up with other engineering colleges in the States.

Para. 3.009)

13. For best results out of the investments made, the Central Engineering Colleges should be fully autonomous in academic matters.

(Para 3.018)

14. There should be a Council of the Central Engineering Colleges with overall powers for both academic and administrative purposes.

(Para 3.026)

15. The Council of the Central Engineering Colleges should be established by an Act of Parliament with powers to confer degrees and disburse grants. It should have the constitution, functions and organisation indicated.

(Paras 3.105 to 3.110)

16. The individual colleges should have autonomous Boards of Governors with the suggested composition and should be set up by the Central Council.

(Para. 3.111)

17. Each college should have a College Academic Committee and Departmental Boards of Studies with the composition indicated for each.

(Para 3.028)

18. Senior Teaching staff positions in the Science and Mathematics Departments should, in future, be filled, as far as possible, by persons initially recruited in engineering institutions and who have applied themselves to the specific needs of engineering studies and established their further work and achievement in this direction.

(Para 3.033)

19. There is no justification in Science and Mathematics Departments running 2-year M. Sc. courses after B. Sc.

(Para 3.035)

20. Teaching plans at the under-graduate level should be worked out through joint committees of Science and Engineering Departments.

(Para 3.036)

21. In Central Engineering Colleges, the interface of social sciences with technology should be developed by organising indepth programmes in selected areas, each college concentrating in a suitable area, having regard to the regional needs.

(Paras 3.044 and 3.045)

22. The core faculty in Humanities and Social Sciences should consist of experts in communication skills and those in the selected area of specialisation. The rest of the programmes may be handled by part-time teachers.

(Para 3.046)

23. The Central Academic Board of the Council should take steps to get reading material in specialised areas of social sciences relevant to Indian conditions.

(Para 3.047)

24. Interested and competent staff members of the colleges should avail themselves of opportunities for research grants provided by various establishments.

(Para 3.054)

25. The Central Engineering Colleges should follow the guidelines indicated for the establishment of post-graduate courses.

(Paras 3.053 to 3.057)

26. There should be a provision of Rs. 20 lakhs annually for all the colleges to support individual research projects on merits if they cannot get support from other agencies.

(Para. 3.059)

27. The colleges should undertake consultancy work and build a research fund. The Central authority may make matching grants to the research funds of the Central Engineering Colleges.

(Para 3.060)

28. Links should be established between the Institute of Technology, the Central Engineering Colleges and State Technical Institutions in a region for the best use of facilities, transfer of experience, conduct of valuable short courses with joint expertise and utilisation of library facilities.

(Paras. 3.063 to 3.067)

29. Additional provision of funds for staff exchange programmes should be made, if necessary, and this may be included in an expanded quality improvement programme.

Para. 3.066)

30. Industrial liaison, Student Welfare and Discipline should be brought under a new Department—Department of Industrial Liaison and

Student Welfare with a senior Professor incharge.

(Paras. 3.069 to 3.073)

31. If rotation of headship is to be introduced, it should be confined to staff having over 15 years of total professional standing.

(Para. 3.075)

32. A new procedure for confidential reports on teaching staff may be evolved which should include confidential feed back from the students on the teaching ability of the individual teachers.

(Para. 3.077)

33. Salary scales, allowances, service conditions and benefits for teaching and non-teaching staff should be Identical with those fixed for corresponding posts in the case of the Institutes of Technology.

(Para. 3.091)

34. Financing of the colleges from two sources is not very satisfactory and future financial responsibility for the colleges should be entirely from the Central source. If necessary, adjustments should be made for the recommendations made by the Finance Commission regarding devolution of resources to States in respect of Central Engineering Colleges.

(Paras. 3.097 to 3.100)

35. Colleges which completed their equipment programme for under-graduate courses and which have more than 10 years standing, should be provided Rs. 5 lakhs and those between 5—10 years standing, Rs. 2 lakhs for replacement of equipment.

(Para. 4.011)

36. Colleges which could not complete the equipment programme should be compensated for rise in prices in the manner indicated.

(Para. 4.012)

37. Each Central Engineering College should have facilities indicated. Such of those facilities for which financial provision is not made in the initial scheme should now be provided with funds.

(Para. 4.013)

38. Outstanding amounts of loans paid for the construction of hostels and staff quarters should be treated as grants and the rents realised should be credited to the income of the colleges.

(Para. 4.016)

39. Approximately an amount of Rs. 18.5 crores will be needed during the 5th Plan period for completion of the original scheme, implementing the recommendations made in this report and further development. Of this, the cost of implementing the recommendations made in this report is Rs. 6.00 crores.

(Para 4.017)

ANNEXURE I

COMPOSITION, POWERS AND FUNCTIONS OF THE BOARD OF GOVERNORS OF REGIONAL ENGINEERING COLLEGES

(1) Chairman	To be appointed by the State Government with the approval of the Central Government.
(2) & (3)	Two representatives of the State Government—one from the Finance Department and another from the Department concerned with technical Education.
(4)	One representative of the Central Government.
(5) & (6)	Two nominees of the All-India Council for Technical Education—the nomination being made by the Regional Committee concerned.
(7)	A representative of the University to which the college is affiliated.
(8), (9), (10) & (11)	One non-official from each state in the region, interested in technical education, to be appointed by the State Government concerned in consultation with the Central Government.
(12)	Principal (Ex-Officio and Secretary).

The Board as a whole may co-opt not more than two persons.

Powers and Functions

(i) To prepare and execute detailed plans and programmes for the establishment of the college and to carry out its administration and management.

(ii) To receive, to have custody and expand the funds of the college, and to manage the properties of the College.

(iii) To prepare the budget estimates for each year, and to sanction expenditure within the limits of the budget as approved by the Central Government and the State Government concerned.

(iv) To prescribe and conduct courses of study and training in different branches of engineering and technology.

(v) To prescribe rules and regulations for the admission of students to the various courses, in consultation with the Central Government.

(vi) To prescribe rules and regulations for and to hold examinations and declare the results, for courses other than those for University degrees. In respect of the latter, to make arrangements in accordance with the statutes of the Universities concerned.

(vii) To institute and award Fellowships, scholarships, prizes and medals.

(viii) To supervise the residence, progress, health and discipline of the students.

(ix) To appoint and control such staff as may be required for the efficient management of the affairs of the College, and to regulate their recruitment and conditions of service.

(x) To co-operate with any other organisation in the matter of education and training in Engineering and technology,

(xi) To enter into agreements for and on behalf of the college.

(xii) To sue and defend all legal proceedings on behalf of the College.

(xiii) To appoint committees for disposal of any business of the college or for advice in any matter pertaining to the College.

(xiv) To delegate any or all of its powers to the officers of the Society for the administration of the affairs of the Society.

(xv) To consider and pass resolutions on the annual report, the annual accounts and other finaniial estimates of the College as it thinks fit, the annual report, the annual accounts and the financial estimates along with resolutions passed thereon being submitted to the State Government and the Central Government.

(xvi) To make, adopt and vary from time to time bye-laws for the regulation of and for any purposes connected with the management and administration of the affairs of the College and for

furtherance of its objects, with the prior approval of the Central Government and the State Government.

(xvii) To make, adopt and vary from time to time bye-laws for the conduct of the business of the Board and the Committee to be appointed by it, for delegation of its powers for fixing the quorum and for co-option.

(xviii) To perform such additional functions as may from time to time be assigned to it by the Central Government—State Government

ANNEXURE II

STAFF FOR AN ENGINEERING COLLEGE CONDUCTING 5-YEAR DEGREE COURSES IN CIVIL, MECHANICAL ENGINEERING

Admissions : Civil : 70
Mechanical : 90
Electrical : 90

A. Administration

(i) Principal	(1) Rs. 1800—2250
(ii) Registrar	(1) Rs. 600—1150 plus D. A.
(iii) Dy. Registrar (Accountants, Academic & General Administration including State Management)	(2) Rs. 350— 850 plus D. A.
(iv) Store Officer	(1) Rs. 300— 550 plus D. A.
(v) Assistant Registrar	(1) Rs. 275— 800 plus D. A.
(vi) Oveaseas Estate Maintenance	(2) Rs. 150— 250 plus D. A.
(vii) Medical Officer	(1) Rs. 350— 850 plus D. A.
(viii) Professor of Training & Placement & Students Welfare Officer	(1) Rs. 1000—1500
(ix) Assistant Proctor	(1) Rs. 350— 850
(x) Librarian	(1) Rs. 350— 850 plus D. A.
(xi) Assistant Librarians	(2) Rs. 300— 560 plus D. A.

Stenographers : Typists; Peon; Malis; Staff Car Driver, Watch and Ward; Compounder and other Medical Unit Staff; Number & grades of pay to be determined in each case.

B. **Mathematics, Physics and Chemistry & Humanities Section**

(i) Professor	(1) Rs. 1300—1600
(ii) Professors	(2) Rs. 1000—1500
(iii) Assistant Professors	(6) Rs. 600—1150 plus D. A
(iv) Lecturers	(10) Rs. 350— 850 plus D. A.
(v) Teaching Assistants	(10) Rs. 300— 560 plus D. A.

C. **Applied Mechanics, Hydraulics and Hydraulic Machinery**

(i) Professor	(1) Rs. 1300—1600
(ii) Assistant Professors	(3) Rs. 600—1150 plus D. A.
(iii) Lecturers	(5) Rs. 350— 850 plus D. A.
(iv) Teaching Assistants	(5) Rs. 300— 560 plus D. A.
(v) Draughtsman	(1) Rs. 200— 250 plus D. A.

D. **Mechanical Engineering including workshops**

(i) Professor	(1) Rs. 1300—1600
(ii) Professor	(1) Rs. 1000—1500
(iii) Assistant Professors	(5) Rs. 600—1150 plus D. A.
(iv) Lecturers	(7) Rs. 350— 850 plus D. A.
(v) Teaching Assistants	(8) Rs. 300— 560 plus D. A.
(vi) Draughtsman	(1) Rs. 200— 250 plus D. A.

Workshops

(i) Superintendent	(1) Rs. 600—1150 plus D. A.
(ii) Foreman	(2) Rs. 275— 800 plus D. A.
(iii) Supervisors	(4) Rs. 250— 350 plus D. A.
(iv) Store-keeper	(1) Rs. 150— 250 plus D. A.

E. **Electrical Engineering**

(i) Professor	(1) Rs. 1300—1600
(ii) Professor	(1) Rs. 1000—1500
(iii) Assistant Professors	(4) Rs. 600—1150 plus D. A.
(iv) Lecturers	(6) Rs. 350— 850 plus D. A.
(v) Teaching Assistant	(6) Rs. 300— 560 plus D. A.

(vi) Draughtsman	(1) Rs. 200— 250 plus D. A.

F. **Civil Engineering**

(i) Professor	(1) Rs. 1300—1600
(ii) Professor	(1) Rs. 1000—1500
(iii) Assistant Professors	(2) Rs. 600—1150 plus D. A.
(iv) Lecturers	(5) Rs. 350— 850 plus D. A.
(v) Teaching Assistants	(6) Rs. 300—560 plus D. A.
(vi) Draughtsman	(1) Rs. 200— 250 plus D. A.

G. Each Department should have stenographer. It will also have the necessary clerical staff, peons, attendants etc., whose number and grades of pay should be determined in each case separately.

H. The number and grades of pay of Mistri Instructors for work-shops should be determined separately in each case.

I. For colleges which will conduct degree courses in Metallurgical Engineering, the above staff should be reduced by: Assistant Professor 1; Lecturers 2; and Teaching Assistants 2 and the following additional staff should be sanctioned:

(i) Professor	(1) Rs. 1300—1600
(ii) Assistant Professors	(2) Rs. 600—1150
(iii) Lecturers	(2) Rs. 350— 850
(iv) Teaching Assistants	(2) Rs. 300— 560
(v) Draughtsman	(1) Rs. 200— 250
Manager of Hostels and Estate	Rs. 350— 850

ANNEXURE III

Undergraduate Admissions (Part A—Distribution)

S. No.	Name of the College	1968-69				1969-70				1970-71			
		Total Admissions made	From own State	From own Region	From other Regions	Total Admissions made	From own State	From own Region	From other Regions	Total Admissions made	From own State	Form own Region	From other Regions
1.	Warangal	192	106	14	72	200	108	18	74	No	admissions	made	
2.	Tiruchirapalli	180	102	14	64	179	88	17	74	180	90	33	57
3.	Surathkal	166	112	17	37	177	123	11	43	178	120	9	49
4.	Calicut	158	81	40	37	208	133	39	36	171	99	40	32
5.	Nagpur	150	87	7	56	150	94	5	51	150	98	12	40
6.	Surat	267	134	43	90	267	134	44	89	212	100	46	66
7.	Bhopal	193	91	17	85	171	89	15	67	203	111	16	76
8.	Jaipur	119	91	4	24	119	92	9	18	143	116	9	18
9.	Srinagar	96	76	11	9	84	67	10	7	78	70	..	8
10.	Allahabad	172	88	22	62	171	117	15	39	179	81	24	74
11.	Kurukshetra	178	125	27	26	114	72	30	12	118	68	36	14
12.	Durgapur	164	141	16	7	173	157	8	8	41	41	..	..
13.	Rourkela	207	79	40	88	198	94	33	71	177	96	36	45
14.	Jamshedpur	150	76	18	56	150	100	20	30	185	131	30	24
15.	Silchar												

ANNEXURE III

Undergraduate Admissions (Part A—Distribution)

S. No.	Name of the College	1971-72				1972-73				1973-74			
		Total Admissions made	From own State	From own Region	From other Regions	Total Admissions made	From own State	From own Region	From other Regions	Total Admissions made	From own State	From own Region	From other Regions
1.	Warangal	196	124	13	59	195	104	18	73	Admissions not yet finalised			
2.	Tiruchirapalli	192	108	10	74	184	112	21	51				
3.	Surathkal	200	149	20	31	180	89	32	59	274	174	18	82
4.	Calicut	173	115	38	20	219	150	36	33	Admissions not yet finalised			
5.	Nagpur	150	95	9	46	150	86	9	55	150	82	6	62
6.	Surat	255	129	41	85	286	148	29	109	272	157	21	94
7.	Bhopal	199	113	10	76	203	108	12	83	226	113	20	93
8.	Jaipur	120	92	7	21	116	68	9	32	127	97	8	22
9.	Srinagar	65	47	..	18	151	120	13	18				
10.	Allahabad	171	93	5	73	176	93	15	68				
11.	Kurukshetra	193	125	33	35	187	129	28	30	194	130	25	39
12.	Durgapur	129	123	6	..	179	174	3	2				
13.	Rourkela	202	108	30	64	216	118	29	69	216	118	30	68
14.	Jamshedpur	Admissions not made				180	108	23	49	23			
15.	Silchar												

ANNEXURE III

Under Graduate Admissions (Part B—Quality)

S. No.	Name of the College	1968-69							1969-70						
		Total Admissions made	Admitted students having over 60% marks in the qualifying examination		Admitted students having 50% to 60% marks in the qualifying examination		Admitted students having below 50% marks in the qualifying examination		Total Admissions made	Admitted students having over 60% marks in the qualifying examination		Admitted students having 50% to 60% marks in the qualifying examination		Admitted students having below 50% marks in the qualifying examination	
			From own State	From other States	From own State	From other States	From own State	From other States		From own State	From other States	From own State	From other States	From own State	From other States
1.	Warangal	192	80	29	20	48	6	9	200	83	26	22	46	3	20
2.	Tiruchirapalli	180	102	78	..	..	..	..	179	88	91	..	..	..	..
3.	Surathkal	166	106	38	6	13	..	3	177	97	35	23	13	3	6
4.	Calicut	158	56	35	18	42	7	..	208	78	30	46	45	9	..
5.	Nagpur	150	72	55	11	8	4	..	150	85	37	8	19	1	..
6.	Surat	Information not furnished by the College													
7.	Bhopal	193	85	64	6	38	..	..	171	79	46	10	36	..	..
8.	Jaipur	119	91	28	..	..	..	..	119	92	27	..	..	..	..
9.	Srinagar	94	49	15	22	8	..	..	82	54	12	10	3	3	..
10.	Allahabad	172	77	40	11	44	..	..	171	92	22	25	32	..	..
11.	Kurukshetra	178*	45	14	80	36	..	..	114*	21	15	51	29	..	..
12.	Durgapur	164	79	11	61	9	1	3	173	64	..	81	9	12	7
13.	Rourkela	207	15	89	64	37	..	2	198	21	59	71	45	2	..
14.	Jamshedpur	151*	32	19	44	51	...	..	150	24	8	76	42	..	..
15.	Silchar														

ANNEXURE III

Under Graduate Admissions (Part B—Quality)

S. No.	Name of the College	1970-71							1971-72						
		Total Admissions made	Admitted students having over 60% marks in the qualifying examination		Admitted students having 50% to 60% marks in the qualifying examination		Admitted students having below 50% marks in the qualifying examination		Total admissions made	Admitted students having over 60% marks in the qualifying examination		Admitted students having 50% to 60% marks in the qualifying examination		Admitted students having below 50% marks in the qualifying examination	
			From own State	From other States	From own State	From other States	From own State	From other States		From own State	From other States	From own State	From other States	From own State	From other States
1.	Warangal			Admissions were not made					196	83	32	36	27	5	13
2.	Tiruchirapalli	180	90	90	..	...	..	..	192	108	84	..	..	..	..
3.	Surathkal	178	86	34	33	20	1	4	200	122	31	25	17	2	3
4.	Calicut	171	64	42	29	30	6	..	173	58	24	45	34	12	..
5.	Nagpur	150	88	36	4	16	6	..	150	85	38	10	17	..	..
6.	Surat	212	34	29	59	81	7	2	255	43	48	54	58	32	20
7.	Bhopal	203	92	57	19	35	..	..	199	88	54	25	32	..	..
8.	Jaipur	143	113	27	3	..	..	..	120	91	28	1	..	.	..
9.	Srinagar	78	38	4	32	4	..	..	65	37	11	9	8	..	..
10.	Allahabad	179	60	42	21	56	..	..	171	75	68	18	10	..	..
11.	Kurukshetra	118	17	16	51	34	..	..	194	43	21	82	48	..	..
12.	Durgapur	41	24	..	13	..	4	..	129	72	3	42	3	9	..
	Rourkela	181	33	39	63	45	..	1	202	28	53	79	39	1	2
14.	Jamshedpur	185	37	9	94	45	..	..			Admissions not made				
15.	Silchar														

ANNEXURE III

Under Graduate Admissions (Part B—Quality)

1972-73

S. No.	Name of the College	Total Admissions made	Admitted students having 60% marks in the qualifying examination		Admitted students having 50% to 60% marks in the qualifying examination		Admitted students having below 50% marks in the qualifying examination	
			From own State	From other States	From own State	From other States	From own State	From other States
1.	Warangal	195	43	51	51	29	10	11
2.	Tiruchirapalli	184	112	72	..	..	..	..
3.	Surathkal	180	47	71	37	15	5	5
4.	Calicut	220	121	21	25	49	4	..
5.	Nagpur	150	82	43	4	19	..	2
6.	Surat	286	54	38	79	77	15	23
7.	Bhopal	203	100	78	8	17	..	..
8.	Jaipur	116	65	48	3	..	..	..
9.	Srinagar	151	76	14	44	17	..	..
10.	Allahabad	176	79	26	14	57	..	..
11.	Kurukshetra	187	47	13	82	45	..	..
12.	Durgapur	179	98	3	66	2	10	..
13.	Rourkela	216	38	47	79	47	1	4
14.	Jamshedpur	180	*	21	*	48	*	..
15.	Silchar							

*Candidates from Bihar are admitted through a combined competitive Examination from the Session 1972—73

TOTAL ADMITTED FROM BIHAR—108

ANNEXURE III

Under Graduate Admissions (Part C—Number and Quality of Applications)

S. No.	Name of the College	1968-69								1969-70							
		Percentage of marks obtained by the Applicants in the qualifying examinations								Percentage of marks obtained by the Applicants in the qualifying examination							
		Over 60%				Below 60%				Over 60%				Below 60%			
		Own State		Other States		Own State		Other States		Own State		Other States		Own State		Other States	
		Applications	Admissions	Applications	Admissions	Applications	Admissions	Applications	Admissions	Applications	Admissions	Applications	Admissions	Applications	Admissions	Applications	Admissions
1.	Warangal	**	80	**	29	**	26	**	57	**	83	**	26	**	25	**	66
2.	Tiruchirapalli	102	102	47*	78	..	..	..	..	88	88	49*	91	..	..	..	..
3.	Surathkal	266	106	426	38	102	6	230	16	160	97	177	35	127	26	454	19
4.	Calicut	56	56	34*	35	25	25	33*	42	78	78	29*	31	55	55	43*	45
5.	Nagpur	410	72	266	55	175	15	353	8	311	85	164	37	170	9	437	19
6.	Surat	Information not furnished by the college															
7.	Bhopal	85	85	64	64	6	6	38	38	70	79	46	46	10	10	36	36
8.	Jaipur	407	91	365	28	13	..	220	..	262	92	156	27	43	..	138	..
9.	Srinagar	49	49	15	15	328	22	447	8	54	54	12	12	310	13	194	3
10.	Allahabad	115	77	62	40	369	11	173	44	135	92	43	22	463	25	190	32
11.	Kurukshetra	153	45	205	59	35*	80	118	116	67	21	120	15	87	51	120	29
12.	Durgapur	79	79	9*	11	62	62	10*	12	64	64	..	..	93	93	8*	16
13.	Rourkela	36	15	212	104	183	64	609	39	27	21	142	59	231	73	505	45
14.	Jamshedpur	203	32	29	19	282	44	123	49	170	24	24	8	350	76	115	42
15.	Silchar																

** Information not available with the college.
*Figures were wrongly furnished by the Institutions.
They are being checked from the Institutions.

ANNEXURE III

Under Graduate Admissions (Part C—Number and Quality of Applications)

S. No.	Name of the Colleges	1970-71								1971-72							
		Percentage of marks obtained by the applicants in the qualifying examination								Percentage of marks obtained by the applicants in the qualifying examination							
		Over 60%				Below 60%				Over 60%				Below 60%			
		Own State		Other States		Own State		Other States		Own State		Other States		Own State		Other States	
		Applications	Admissions	Applications	Admissions	Applications	Admissions	Applications	Admissions	Applications	Admissions	Applications	Admissions	Applications	Admissions	Applications	Admissions
1.	Warangal	Admissions		Were		Not		Made		**	83	**	32	**	41	**	40
2.	Tiruchirapalli	90	90	62*	90	..	..	..	..	108	108	21*	84	..	..	..	..
3.	Surathkal	138	86	177	34	..98	34	361	24	207	122	265	31	199	27	401	20
4.	Calicut	64	64	39*	42	35	35	30	30	58	58	23*	24	57	57	32*	34
5.	Nagpur	282	88	170	36	178	10	340	16	327	85	200	38	188	10	372	17
6.	Surat	40	34	58	29	92	66	235	83	33*	43	84	48	129	86	321	78
7.	Bhopal	92	92	57	57	19	19	35	35	88	88	54	54	25	25	32	32
8.	Jaipur	358	113	144	27	29	3	117	..	156	91	89	28	103	1	150	..
9.	Srinagar	38	38	4	4	305	32	150	4	37	37	9*	11	274	9	180	8
10.	Allahabad	220	60	65	42	474	21	171	56	240	75	161	68	400	18	256	10
11.	Kurukshetra	59	17	73	16	104	51	67	34	61	43	143	21	41*	82	121	48
12.	Durgapur	24	24	..	..	17	17	..	..	72	72	3	3	51	51	3	3
13.	Rourkela	41	33	130	39	237	63	407	46	47	28	159	53	328	80	459	41
14.	Jamshedpur	240	37	35	9	483	94	196	45			Admissions		Not		Made	
15.	Silchar																

**The information is not available with the college.

* Figures were wrongly furnished by the Institutions. They are being checked from the Institutions.

ANNEXURE III

Under Graduate Admissions (Part C—Number and Quality of Applications)

1972-73

S. No.	Name of the College	Percentage of marks obtained by the Applicants in the qualifying examinations							
		Over 60%				Below 60%			
		Own State		Other States		Own State		Other States	
		Applications	Admissions	Applications	Admissions	Applications	Admissions	Applications	Admissions
1.	Warangal	296	43	204	51	409	61	419	40
2.	Tiruchirapalli	112	112	**45	72	..	..	..	..
3.	Surathkal	92	47	287	71	123	42	693	20
4.	Calicut	121	121	22	21	29	29	**44	49
5.	Nagpur	366	82	199	43	178	4	362	21
6.	Surat	61	54	86	38	175	94	611	100
7.	Bhopal	100	100	78	78	8	8	17	17
8.	Jaipur	205	65	199	48	40	3	162	..
9.	Srinagar	76	76	**11	14	353	44	265	17
10.	Allahabad	336	79	198	26	522	14	537	57
11.	Kurukshetra	72	47	129	13	242	82	198	45
12.	Durgapur	98	98	**2	3	76	76	**1	2
13.	Rourkela	56	38	287	47	491	80	768	51
14.	Jamshedpur	Figures not available	*	53	21	Figures not available	*	288	48

**Figures were wrongly furnished by the college. They are being checked from the Institutions.

*Candidates from Bihar are admitted through a combined competitive examination from the session 1972-73. Total Admitted from Bihar—108

ANNEXURE III

Under Graduate Admissions (Part D—From each state to all the regional engineering colleges in the country)

S. No.	Name of the State	Name of the College in the State	1968-69		1969-70		1970-71	
			Admissions to the college from the State	Admissions from the State to Regional Engg. Colleges in other States	Admissions to the college from the State	Admissions from the State to Regional Engg. Colleges in other States	Admissions to the college from the State	Admissions from the State to Regional Engg. Colleges in other States
1.	Andhra Pradesh	Warangal	106	90	108	79	No admission made	114
2.	Tamil Nadu	Tiruchirapalli	102	27	88	24	90	12
3.	Mysore	Surathkal	112	25	123	23	120	9
4.	Kerala	Calicut	81	14	133	19	99	13
5.	Maharashtra	Nagpur	87	112	94	119	98	92
6	Gujarat	Surat	134	17	134	14	100	12
7.	Madhya Pradesh	Bhopal	91	24	89	20	111	31
8.	Rajasthan	Jaipur	91	89	92	72	116	55
9.	Jammu & Kashmir	Srinagar	76	29	67	35	70	31
10.	Uttar Pradesh	Allahabad	88	151	117	158	81	91
11.	Harayana	Kurukshetra	125	21	72	12	68	4
12.	West Bengal	Durgapur	141	77	157	58	41	79
13.	Orissa	Rourkela	79	3	94	5	96	1
14.	Bihar	Jamshedpur	76	141	100	116	131	116
15.	Assam	Silchar						

ANNEXURE III

Under Graduate Admissions (Part D—From each state to all the regional engineering colleges in the country)

S. No.	Name of the State	Name of the College	1971-72		1972-73	
			Admission to the college from the State	Admissions from the State to Regional Engineering Colleges in other States	Admission to the College from the State	Admissions from the State to Ragional Engg. Colleges in other States
1.	Andhra Pradesh	Warangal	124	118	104	73
2.	Tamil Nadu	Tiruchirapalli	108	31	112	56
3.	Mysore	Surathkal	149	13	89	14
4.	Kerala	Calicut	115	15	150	17
5.	Maharashtra	Nagpur	95	73	86	93
6.	Gujarat	Surat	129	11	148	16
7.	Madhya Pradesh	Bhopal	113	40	108	38
8.	Rajasthan	Jaipur	92	38	68	74
9.	Jammu & Kashmir	Srinagar	47	27	120	27
10.	Uttar Pradesh	Allahabad	93	86	93	137
11.	Harayana	Kurukshetra	125	7	129	10
12.	West Bengal	Durgapur	123	64	174	121
13.	Orissa	Rourkela	108	5	118	11
14.	Bihar	Jamshedpur	No Admission made	127	108	166

ANNEXURE III

PART E

Post-Graduate Courses

S. No.	Name of the college	1968-69					1969-70				
		Number of courses	Total admissions made	Percentage of marks obtained by applicant in the qualifying examinations		Total passed out	Number of courses	Total admissions made	Percentage of marks obtained by applicant in the qualifying examination		Total passed out
				Over 60%	Below 60%				Over 60%	Below 60%	
1.	Warangal	10	67	65	2	32	5	36	36	..	43
2.	Tiruchirapalli	Information not given by the college									
3.	Surathkal	3	20	12	8	..	3	25	19	6	13
4.	Calicut	Information not given by the college									
5.	Nagpur	3	22	22	..	11	3	25	25	..	13
6.	Surat	Information not given by the college									
7.	Bhopal	5	65	65	..	14	5	44	44	..	30
8.	Jaipur										
9.	Sr nagar										
10.	Allahabad	3	31	28	3	..	5	38	*34	*1	21
11.	Kurukshetra	3	Information not given by the college				3	Information not given by the college			
12.	Durgapur	8	42	42	..	30	5	45	45	..	16
13.	Rourkela	1	14	..	14	10	1	14	..	14	11
14.	Jamshedpur	1	20	20	..	..	1	18	18	..	1
15.	Silchar										

* Figures were wrongly furnished by the college and are being checked from them.

ANNEXURE III

PART E

Post-Graduate Courses

S. No.	Name of the college	1970-71					1971-72			
		Number of courses	Total admissions made	Percentage of marks obtained by applicant in the qualifying examination		Total passed out	Number of courses	Total admissions made	Percentage of marks obtained by applicant in the qualifying examination		Total passed out
				Over 60%	Below 60%				Over 60%	Below 60%	
1.	Warangal	6	34	25	9	24	12	97	73	24	20
2.	Tiruchirapalli	1	8	8	..	..	3	12	12	..	8
3.	Surathkal	3	22	15	7	15	5	25	24	1	27
4.	Calicut						3	18	13	5	NA
5.	Nagpur	3	23	23	..	14	4	25	22	3	17
6.	Surat										
7.	Bhopal	5	31	31	..	23	5	52	52	..	26
8.	Jaipur						1	5	5	..	**
9.	Srinagar										
10.	Allahabad	4	32	32	..	..	5	66	54	12	5
11.	Kurukshetra	3	Information not given				4	Information not given			3
12.	Durgapur	No admissions could be made due to disturbances				27	6	53	53	..	4
13.	Rourkela	2	40	19	21	8	3	56	35	21	13*
14.	Jamshedpur	1	20	20	..	6		Admissions not made.			

* is the number passed out in one course only. Results of other two pending.

** The course is a two year one. Result of II year is awaited.

ANNEXURE III

PART E

Post-Graduate Courses

S. No.	Name of the College	1972-73				
		Number of courses	Total admissions made	Percentage of marks obtained by the applicant in the qualifying examination		Total passed out
				Over 60%	Below 60%	
1.	Warangal	12	96	91	5	NA
2.	Tiruchirapalli	3	17	17	..	9£
3.	Surathkhal	7	45	35	10	29
4.	Calicut	3	13	11	2	NA
5.	Nagpur	3	21	20	1	19
6.	Surat	1	1	1	..	NA
7.	Bhopal	4	36	36	..	25
8.	Jaipur	1	8	4	4	**
9.	Srinagar					
10.	Allahabad	5	55	50	5	Not yet known
11.	Kurukshetra	4	Information not given			11
12.	Durgapur	6	65	65	..	NA
13.	Rourkela	3	50	26	24	17*
14.	Jamshedpur	1	20	20	..	12
15.	Silchar					

£ The other 3 are part time students where course will be completed during 1974-7 5.

* Is the number passed out in one course only. Results of other two pending.

** The course is a two year one. Result of II year is awaited.

ANNEXURE IV

Teaching staff as in July 1973 (Distribution)

S. No.	Name of the College	Total Teaching Staff	Professors		Other Staff	
			From own State	From other States	From own State	From other States
1.	Warangal	134	15	4	103	14
2.	Tiruchirapalli	65	8	4	35	18
3.	Surathkal	117	9	6	84	18
4.	Calicut	**4	6	3	81	24
5.	Nagpur	121	7	7	67	40
6.	Surat	96	5	2	54	35
7.	Bhopal	96	2	11	40	43
8.	Jaipur	80	2	10	29	39
9.	Srinagar	85	1	5	57	22
10.	Allahabad	99	7	6	62	24
11.	Kurukshetra	93	4	9	28	52
12.	Durgapur	93	13	1	70	9
13.	Rourkela	108	8	5	76	19
14.	Jamshedpur	82	4	4	49	25
15.	Silchar					

ANNEXURE V

Regional Engineering Colleges and Non-Government Colleges Affiliated to the same University

S. No.	Name of the College	University to which affiliated	Other institutions affiliated to University
1.	Motilal Nehru Regional Engineering College, Allahabad.	Allahabad University	(a) J. K. Institute of Applied Physics, Allahabad University, Allahabad. (b) Allahabad Agricultural Institute, Allahabad.
2.	Malaviya Regional Engg. College, Jaipur.	Rajasthan University	—
3.	Regional Engineering College, Kurukshetra.	Kurukshetra University	—
4.	Regional Engineering College, Srinagar (J. & K.).	Kashmir University	—
5.	Regional Engineering College, Durgapur.	Burdwan University	—
6.	Regional Institute of Technology, Jamshedpur.	Ranchi University	(a) Indian School of Mines, Dhanbad (b) Bihar Institute of Technology, Sindri (c) B. I. T., Ranchi
7.	Regional Engineering College, Rourkela.	Sambalpur University	University College of Engg., Sambalpur
8.	Regional Engineering College, Silchar	Gauhati University	—
9.	M. A. College of Engg., Bhopal	Vikram University	S. A. Technological Institute, Vidisha
10.	Visvesvarya Regional College of Engg., Nagpur.	Nagpur University	(i) College of Engg., Amravati (ii) Laxmi Narayan Instt. of Tech. Nagpur. (iii) Deptt. of Pharmaceutical Science, Nagpur.

11.	S. V. Regional College of Engg. (Surat).	Gujarat University	(a) L. D. College of Engg., Ahmedabad (b) L. M. College of Pharmacy, Ahmedabad (c) School of Architecture, Ahmedabad
12.	Regional Engineering College, Calicut	Kerala University	(i) Engineering College, Trichi (ii) College of Engineering, Trivandrum (iii) N. S. S. College of Engg., Palghat (iv) T. K. M. College of Engg., Quilon (v) M. A. College of Engg., Kothamangalam.
13.	Regional Engineering College, Tiruchirapalli (Tamil Nadu)	Madras University	(i) College of Engineering, Guindy (ii) Govt. College of Technology, Coimbatore. (iii) Govt. Engg. College, Salem (iv) Deptt. of Pharmacy, Madras University, Madras. (v) A. C. College of Technology, Madras University, Madras. (vi) School of Architecture, Madras University, Madras. (Guindy). (vii) MIT Madras (viii) PSG College of Technology, Coimbatore. (ix) A. C. College of Technology, Karaiknadi. (x) Coimbatore Institute of Technology, Coimbatore. (xi) Thaigarajar College of Engg., Madurai.

14.	Karnataka Regional Engineering College, Surathkal (Mysore)	Mysore University	(i) B. D. T. College of Engg., Davangar (ii) Malnad College of Engineering, Hassan (iii) National Institute of Engg., Mysore (iv) Manipal Engg. College, Manipal (v) P. E. S. College of Engg., Nondya (vi) Sri Jayachama Rajindra College of Engg., Mysore. (vii) Sree Siddaganga College of Engg., Tumkaur.
15.	Regional Engg. College, Warangal (A. P.)	Osmania University	(i) Nagarjunosager Engg. College, Hyderabad. (ii) Govet. College of Fine Arts and Architecture, Hyderabad, (iii) University College of Engg. Hyderabad.
		Jawaharlal Nehru Technological University	(iv) University College of Technology, Hyderabad. (i) Govet. College of Engg. Kakinada. (ii) Govt. of College of Engg. Anantapur. (iii) Govt. College of Engg. Nagar junatanagar. (iv) College of Art & Architecture, Hyderabad.

ANNEXURE VI

Participation of Governing Body Members 1970-71

S. No.	Name of the College	Number of meetings held	Number of Meeting attended by				
			Chairman & Secretary	State Government representative	Central Government Representative	*Non-Official	*Other Members
1.	Warangal	4	4	4,3	3	6/4	12/8
2.	Tiruchirapalli	3	3,3	3,2,3	3	7/4	25/6/4
3.	Surathkal	5	5,5	5,4	3	7/4	14/4
4.	Calicut	2	2,2	2,2	2	2/4	5/3
5.	Nagpur	3	3,3	2,2	1	6/3	6/5
6.	Surat	6	6,6	5,6	3	9/3	9/5
7.	Bhopal	4	4,4	2,3	1	3/3	9/4
8.	Jaipur	4	2,4	3,3	1	5/5	13/3
9.	Srinagar	1	1,1	1,1	..	1/2	2/3
10.	Allahabad	3	3,3	2,3	3	6/5	4/5
11.	Kurukshetra	4	3,4	3,4	1	9/5	10/6
12.	Durgapur	3	2,3	3,1	2	6/4	2/5
13.	Rourkela	2	2,2	1,2	1	6/4	3/5
14.	Jamshedpur	The college has given incomplete informations. It was asked to give complete information which was not received till the end of October, 1973.					
15.	Silchar	2	1,2	1,1	1	1/3	4/6

* Total attendance of members in all meetings / No. of Members

ANNEXURE VI

Participation of Governing Body Members 1971-72

S. No	Name of the College	Number of meetings held	Number of Meetings attended by				
			Chairman & Secretary	State Government Representative	Central Government Representative	*Non-Official Members	* Other Members
1.	Warangal	7	6	6,4	4	11/3	23/5
2.	Tiruchirapalli	2	2,2	2,2,2	2	2,4	4/5
3.	Surathkal	4	4,4	3,1	3	4/4	12/4
4.	Calicut	3	3,3	2,3	2	4/4	5/4
5.	Nagpur	2	2,2	2,1	2	4/3	6/5
6.	Surat	5	5,5	3,4	5	6/3	12/5
7.	Bhopal	3	2,3	2,2	3	4/3	8/5
8.	Jaipur	4	4,4	3,2	1	3,5	19/7
9.	Srinagar	1	1,1	1,1	..	3/4	1/4
10.	Allahabad	4	4,4	4,4	2	4/5	7/5
11.	Kurukshetra	8	8,8	6,8	4	17/5	24/5
12.	Durgapur	2	2,2	2,2	1	3/5	1/5
13.	Rourkela	4	4,4	4,3	2	10/4	6/4
14.	Jamshedpur	The college has given incomplete information. It was asked to give complete information which was not received till the end of October.					
15.	Silchar	2	1,2	1,1	1	1/3	3/5

* Total attendance of the members in all meetings
No. of Members

ANNEXURE VI

Participation of Governing Body Members 1972-73

S. No.	Name of the College	Number of meetings held	Number of Meetings attended by				
			Chairman & Secretary	State Government Representative	Central Government Representative	Non-Official Members	Other Members
1.	Warangal	5	5	5,1	4	12/4	19/7
2.	Tiruchirapalli	2	2,2	2,1	2	1/4	6/6
3.	Surathkal	4	4,4	2	3	3/4	8/4
4.	Calicut	2	2,2	1.2	2	-/4	6/4
5.	Nagpur	2	2,2	2,1	1	5/3	8/3
6.	Surat	3	3,3	2,3	1	5/3	8/5
7.	Bhopal	4	4 4	4,4	2	5/3	7/5
8.	Jaipar					3/5	9/6
9.	Srinagar	1	1,1	1	..	2/6	3/6
10.	Allahabad	6	2.6	6,6	4	13/5	9/4 & 12/7
11.	Kurukshetra	3	3,3	2,2	1	12/5	13/6
12.	Durgapur	2	2,2	2,2	1	4/3	4/5
13.	Rourkela	4	4,3	1,2	2	7/4	10/5
14.	Jamshedpur	The college has given incomplete information. It was asked to give complete information which was not received till the end of October.					
15.	Silchar	1	-,1	1,-	1	2/4	2/4

Total attendance of members in all meetings
No. of Members

ANNEXURE VII (PART A)

Grants and Loans Paid by Central Government (Part A—Non-recurring)

S. No.	Name of the College	Building (Instructional)	Equipment	Staff Quarters	Loans		Post-graduate Non-Recurring
					Hostel	Staff Quarters	
1.	Warangal	50.32	48.57	29.74	49.07	28.69	10.78
2.	Tiruchira-Palli	54.75	55.31	25.15	57.80	25.15	3.70
3.	Surathkal	44.00	45.57	17.75	52.24	16.76	5.30
4.	Calicut	34.38	44.00	15.39	39.04	13.89	4.30
5.	Nagpur	58.35	49.00	22.40	32.00	23.20	6.25
6.	Surat	47.90	34.13	26.46	24.73	25.10	..
7.	Bhopal	43.98	41.91	21.09	54.45	20.90	7.00
8.	Jaipur	60 68	56.25	17.55	32.49	17.83	0.60
9.	Srinagar	56.14	20.99	12.72	41.88	12.54	..
10.	Allahabad	41.10	38.20	20.49	45.58	20.49	13.10
11.	Kurukshetra	41.68	44.23	22.38	55.17	22.38	3.30
12.	Durgapur	40.16	42.13	28.43	58.30	26.25	5.00
13.	Rourkela	68.13	48.00	29.03	63.25	28.93	6.00
14.	Jamshedpur	38.70	31.50	12.35	37.13	12.35	1.65
15.	Silchar	4.50	2.25	..	5.00	..	..

ANNEXURE VII (PART B)

Grants Paid by Central Government (Part B—Recurring)

S. No.	Name of the College	Recurring grants paid upto 1968-69	Recurring grants paid for Under-graduate courses during				Total paid during 69-70 to 1972-73	Grand Total	Total Recurring grants for Post-graduate courses upto 1972-73
			69-70	70-71	71-72	72-73			
1.	Warangal	66.29	12 20	12.00	12.32	17.00	53.52	119.81	29.53
2.	Tiruchirapalli	17.355	8.25	8.50	14.50	14.50	45.75	63.105	3.15
3.	Surathkal	48.50	4.00	7.00	14.00	13.00	38.00	86.50	13.60
4.	Calicut	27.10	7.75	8.50	11.50	14.00	41.75	68.85	2.10
5.	Nagpur	55.67	13.50	13.00	17.00	19.00	62.50	118.17	10.25
6.	Surat	19.615	6.95	7.00	11.00	13.00	37.95	57.565	..
7.	Bhopal	48.60	7.00	10.00	12.50	12.00	41.50	90.10	12.25
8.	Jaipur	34.37	7.50	11.00	15.00	16.47	49.97	84.34	1.18
9.	Srinagar	52.174	13.00	13.00	16.00	14.40	56.40	108.574	..
10.	Allahabad	51.24	13.75	11.00	11.00	5.25	41.00	29.24	15.00
11.	Kurukshetra	21.35	11.40	11.00	14.00	12.50	48.90	70.25	2.10
12.	Durgapur	61.22	11.30	11.00	18.00	19.00	59.30	120.52	10.83
13.	Rourkela	61.691	15.768	14.00	17.15	8.00	54.918	116.609	6.08
14.	Jamshedpur	55.36	15.21	10.00	10.50	13.50	49.21	104.57	3.40
15.	Silchar	0.45	..	2.00	1.00	0.75	3.75	4.20	..

ANNEXURE VIII

Hostels—Loans and Repayments

S. No.	Name of the College	Total Loan Sanctioned	Period	No. of students for whom hostel approved	No. of students for whom hostel constructed	Repayment due	Amount repaid	Balance repayment due	Total amount recoverable
1.	Warangal	49,06,900	60-61 to 72-73	1264	1264	12,71,010	8 86,370	3 84,640	40 20 530
2.	Surathkal	52,24,000	60-61 to 72-73	1248	1248	10,93,384	10,93,384	Nil	38,30,616
3.	Tiruchirapalli	58,40,700	64-65 to 72-73	1280	1251	12,21 486	8,59,282	3,62,203	49,81,418
4.	Bhopal	54,45,000	63-64 to 67 68	1376	1376	11,25.955	11,25,955	Nil	43,19,045
5.	Calicut	39,04,000	61 62 to 67-68	1113 (Built) (U.C.)	933 180	7,80,127	6.55,087	1.25,040	32 48,913
6.	Surat	24,73,000	66-67 to 72-73	594 (Built) (U·C.)	450 144	3;83,040	2,42,360	1,40,680	22 30,640
7.	Jaipur	32,49,000	65-66 to 72-73	72) (Built) (U.C.)	540 180	6,39,200	3.05,100	3,34,100	9,44,260
8.	Srinagar	41,88,000	62-63 to 66-67	1250	702	10,40, 988	9,74,139	66,849	32,13,861
9.	Rourkela	63,25,000	62 63 to 63-64	1278		Information not received			
10.	Kurukshetra	55,17,000	65-66 to 70-71	1250	1250	10,72,423	7 66,707	3,05,716	47,50,293
11.	Allahabad	45,58,000	61-62 to 67-68	1000	1044	10,86,2 0	3,04 250	7,81,950	48,53,750
12.	Nagpur	32,00,000	64-65 to 68-69	708	708	8,40 000	4,64,000	3,76 000	27,36 000
13.	Durgapur	58,30,000	60-61 to 67-68			7,48,146	7,48,146		50 82 000
14.	Jamshedpur	37,13,000	62-63 to 63-64	122)	1095	Information not received			
15.	Silchar	5,00,000	70-71						5,00,000

ANNEXURE IX

Staff Quarters (Loans—Grants—Repayment)

	Name of the College	Total loan sanctioned	Period	No. of quarters approved in each type						No. of quarters approved constructed in each type						Repayment due	Repayment made so far	Balance repayment due	Balance amount of loan repayable
				I	II	III	IV	V	VI	I	II	III	IV	V	VI				
1.	Warangal	28.69	63-64 to 70-71	1	10	8	120	102	52	1	10	8	120	102	52	5,03,796	4 80,112	23 684	23,64,904
2.	Tiruchirapalli	21.15	65-66 to 71-72	1	11	13	80	36	164	1	11	13	80	36	161	4,11,680	2,34,328	1.77,532	22,80,672
											1	4	58	48	52	5,39,070	6,00,000	..	11,74,565
3.	Calicut	13.89	63-64 to 67-68	..	9	14	70	62	52	..	8	10	12	24					
											(UC)	(UC)	(UC)	(UC)					
4.	Surathkal	16.76	60-61 to 67-68	1	7	22	75	60	26	1	7	22	75	60	26	11,21,338	10,43,509	77.739	13,20,894
5.	Bhopal	20.90	62-63 to 67-68	1	5	16	40	92	30	1	5	16	40	92	30	10,44.164	5,53.941	4,90.222	19,50,355
6.	Surat	25.105	66-67 to 71-72	1	6	12	60	43	48	(UC)	6	12	18	..	48	4,25,545	62,293	3,63,252	24.97,940
													24						
													(UC)						
7.	Kurukshetra	20.38	65-66 to 68-69	1	10	17	79	71	81	1	10	17	79	71	81	9,32,515	5.30,820	4,01,695	23,07,385
8.	Allahabad	20.49	66-67 to 69-70	1	22	40	80	80	54	1	16	22	80	80	54	9,33,043	2,04,000	7,29,043	19,05,000
9.	Srinagar	12.547	67-68 to 72-73	1	8	12	30	..	..	(UC)	(UC)	(UC)	12	..	..	1,19,775	97,927	21.848	12,12,643
													18(UC)						
10.	Jaipur	17.83	66-67 to 71-72	1	9	16	50	82	32	1	9	16	50	52	32	6,50,100	3,26,945	5,23,155	15,56,095
11.	Rourkela	28.93	62-63 to 71-72	1	14	28	91	136	95	1	14	28	80	136	96	Information not received.			
12.	Durgapur	26.25	60-61 to 67-68	1	..	..	30	216	68	1	..	..	30	216	68	5.27,558	5,27,558	..	20,97,000
13.	Jamshedpur	12.35	66-67 to 72-73	1	6	11	36	29	44	1	4	14	18	6	12	Information not furnished.			
14.	Nagpur	23.20	64-65 to 71-72	1	11	21	47	27	32	1	11	21	47	27	32	10,30,095	5,54,705	4,75.390	17.65,295

Type
I. Principal's quarters.
II. Professors Quarters.
III. Asstt. Professors Quarters
IV. Lecturers Quarters.
V. Class III Quarters.
VI. Class IV Quarters.
(U. C.) Under Construction.

ANNEXURE X

M. Tech. Industry-oriented Courses in Regional Engineering Colleges

Name of the College	Name of the Course
Warangal	1. Design & Production Engg. Machine Tools. 2. Electronic Instrumentation. 3. Transportation Engg. 4. Chemical Plant Engg. 5. Advanced Physics. 6. Advanced Engg. Mathematics. 7. Hydraulics and Groundwater Resources Engineering.
Bhopal	1. Design & Production—Power Plant Machinery —Hydro-Electric. 2. Design & Production—Power Plant Machinery Thermal. 3. Design & Production—Power Plant Machinery —Heavy Electrical Equipment. 4. Foundation Engineering (Applied to Vibratory System). 5. Engineering Materials.
Durgapur	1. Design & Production Engg. Medium Duty Machines. 2. Mechanical Shaping of Metals (Rolling, Forging and Heat Treatment). 3. Extractive Metallurgy and Foundry with emphasis on Alloy Steel Production. 4. Production of Fertilisers.
Jamshedpur	1. Extractive Metallurgy. 2. Foundry Technology.
Nagpur	1. Public Health Engineering. 2. Integrated Power System. & Diploma course in Metallurgy—Ferro Alloys Production.

Surathkal	1. Marine Structures. 2. Industrial Structures. 3. Industrial Physics.
Allahabad	1. Analysis and Design of Process Equipment. 2. Production of Process Machines and Equipment. 3. Design of Process Machines
Tiruchirapalli	1. Design & Production—High Pressure Boilers and Accessories.
Rourkela	1. Design & Production—Heavy Machines with emphasis on mechanical equipment for steel plants. 2. Technology of Metallurgical Furnaces.