comment

THE ROLE OF THE ENGINEER

Much has been spoken about the Role of the Engineer in a country's efforts towards development. The present comment is an attempt to discuss this role in the context of the various stages in an Engineer's professional development. The recent concessions given by the Government towards Engineers in the State Sector is a recognition of the value of their services and the necessity to retain as many of them as possible, so as not to hamper the attempts towards national growth and development. It is now all the more imperative that the Engineer understands his role both in the context of the structural and organisational framework and his own stage of professional development.

The Engineer begins his career after acquiring adequate theoretical knowledge in his selected discipline. Hitherto, he has developed his ability in the treatment of problems in abstraction as in theoretical exercises or under controlled conditions as in laboratory experiments. He has now to apply this knowledge in the real world full of various constraints, limitations and procedures of a different nature. The many facets to the issues and problems he now faces—financial constraints, economic viability, personal relationships, organisational aspects etc. are all intermingled with the technological aspects. They are inseparable parts of a composite problem and the Engineer has to learn to apply his theoretical knowledge in this context.

What may be called the second stage in the Engineer's professional development is the specialisation in a field of competence within his chosen discipline. Having acquired the ability to apply his theoretical knowledge in the overall context of the socio-economic and organisational framework he now develops into an expert or specialist in a certain field. Apart from any additional theoretical knowledge he may have gained, his experience in handling a particular field of work over a number of years would have developed deeper insights and the ability to use his theoretical knowledge in the correct perspective.

The third stage is the development into the higher echelons of management. The specialist function he has acquired in the second stage must at some time be taken over by his juniors who would become more proficient in theoretical aspects, in particular the latest developments in the field. This is not to say that the senior engineer loses his importance or that the contribution that he can make is diminished. In fact the contribution that is possible and required from him acquires different dimensions and becomes even more important. Having had the benefit of a number of years experience in handling technological problems and managing projects etc. he becomes ideally qualified for areas of higher management and overall decision-making. Although he may have to give up his specialist function, he still remains in control and is able to give adequate guidance and direction to his juniors. His understanding of the wider perspectives and the overall goals is a necessary complement to the specialist knowledge of his juniors and the proper understanding of these functions by all concerned would yield the optimum benefits.

Thus at the third stage the Engineer must evolve from the specialist to the top management or overall decision-making and guiding role. Decisions he now makes will have an added bias towards the overall framework of financial, economic, legal and organisational parameters. These should not be new or unfamiliar factors as from the beginning of his engineering career he has worked within this framework. It has been a gradual shift of emphasis or weightage, and if his career has progressed correctly he would be fully competent in the multi-disciplinary nature of his new position. What is not often recognised is that it is only an engineer who has gone through the previous stages who will ideally fit into the highest echelons of management in technological spheres. This is because of the fact that although there are many non-technical areas mentioned above in which he must have adequate competence these aspects have their relevance only in the context

of the main field of action or province, which is essentially technological in nature. Thus it is only an engineer competent in the relevant field who is capable of acquiring the other attributes or facets of the multi-disciplinary role of top management in technological matters.

This concept of the areas of competence of the higher echelons of management is closely linked to the principle of 'parity of authority and responsibility'. The person who is held responsible for a given job or function must be given adequate authority to get the job done and conversely those who are given the authority to make decisions should be held responsible for the consequences. Such responsibility must, if it is to have any meaning, be founded on knowledge and recognised competence. In fact the knowledge, training and experience one has acquired have a direct relationship to the responsibility one bears for one's actions or advice given in relevant matters.

The Engineer is not expected to be a specialist in all the fields of Total Technology, which is obviously not a self-contained discipline. But he must acquire sufficient knowledge and develop the necessary skill to know when to consult other specialists and then to evaluate their advice in fields such as the social sciences, industrial psychology, Law of Contracts and arbitration, patent and copyright laws, economics, agriculture, medicine, ergonomics etc. Though he cannot be an expert even in all the technological fields such as Research, Design, Planning, Development, Scientific Management, Organisation, Production, Marketing etc., yet he must possess a fairly deep knowledge and know the latest developments in these fields to direct his junior specialists with confidence.

It is thus the duty of all engineers to understand their role and establish competence in the many areas of knowledge which interplay with the technological aspects. These are adequate opportunities to develop their competence as from the beginning of their careers engineers work within the framework of socio-economic, financial, legal and organisational parameters. This opportunity must be enhanced and developed with a specially directed effort. By reading and study one must acquire sufficient knowledge on the basic principles of economic analysis and project evaluation, the various financial procedures and control methods, information theory and quantitative techniques, the latest concepts of management theory etc. The Institution is making an attempt to develop these aspects among our members. It is hoped that the recent Questionnaire will produce an adequate response and that a programme of activities would be organised to help the members acquire adequate ability and competence to produce a well-balanced synthesis of all these functions.

C.R.