

Consultancy

a review

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DURING the last two centuries or more human knowledge has been expanding at an ever accelerating rate. Expansion has occurred in pure and abstract fields arts social and physical sciences applied sciences and technology etc. all the facets of human knowledge. Old disciplines have expanded such that once narrow fields have now assumed vast proportions; completely new fields unheard of and undreamt of at the beginning of the century have sprung up and have radically changed ways of life of vast populations.

This proliferation of knowledge has made it impossible for any person to fully master and assimilate any discipline—he can expect to completely master only a portion. Also, he must keep himself abreast with contemporary research and advancement falling which he will soon become out dated.

When some client, an individual or an organization, needs to use specialized knowledge in any field he has to seek the services of a specialist consultant in the field. If such service is required by an organization for a long or indefinite period of time it is usually advantageous for such an organization to create a section within the same organization to take care of such activities by engaging experts in the field together with the logistic support as may be needed. However more often such specialised services are required for limited period only and rather infrequently. In such cases the client/organization would prefer to approach some organization which retains suitable experts and engage them to do the required jobs. Such experts specialising in narrow limited fields have come to be known as consultants and the organizations who normally retain such consultants in one or multiple fields have come to be known as consulting organisations. Such organisations may cover any conceivable field of activity and their services are particularly used in planning designing and quality control of various projects in the development sector.

Industrial and other development work involves design execution operation and quality control of different aspects of development activities. Design and execution is often limited to a relatively short period whereas operation of a system or organization is a continued affair over a long period of time. Quality control is applicable on all the aspects including design and execution. As such engagement of consultants are primarily sought for for the design and execution of projects and the consultants are also required for quality control in the design as well as execution and hence quality control is also a part of a consultant's activity. After the implementation of a project this is normally handled over when clients for their operation and quality control of the products which is therefore a part of the clients activity. As such during operation normally services of consultants are not called for except when the client looks for modification or improvement of previously established facilities procedures and processes.

It is therefore obvious that the duties of a consultant emphasise on preparation of plans and design which call for innovation and application of the latest knowledge and techniques. Except for innovation and application of recent developments it would have been possible for preparation of designs once for all without further reference to another consultant. However this is not so in scientific and technological field. It is accepted that there is no absolutely best for technological processes and there always is a possibility of improvement not only due to later innovation but even on application of old and well-known principles. That is why consultants have always been in demand and will remain in the demand in any dynamic society.

The characteristics discussed

above indicates the goals for training of consultants. Since the emphasis is on innovation and design the individual aspiring to be a specialised consultant must accumulate the available knowledge in this field of activity and be able to use them for new applications.

Under-graduation education as is understood in our country involves about four years of university. This education is sufficient only to impart a background of the field a person chooses for study. The under-graduate study enables one person only to find which branch of science or technology would be most suitable for him so that he can pursue his field of specialisation. During under-graduate study a person is exposed to subjects and facts which are normally taken from granted to be in general true and applicable and it also exposes him to elementary analysis. Such elementary analysis is sufficient background for construction operation and maintenance of most of structures industries and other technological fields. However for innovative work it is necessary to have deeper understanding of the physical and social processes combined with economic appreciations. In under-graduate curriculum usually one does not come in contact with controversial opinions partially understood phenomena or processes that needs deeper understanding of the scientific and technological principles. As a rule a person after graduation has the highest confidence level since he has studied all the accepted facts and principles of his field but has not yet been exposed to the aspects not fully accepted by the scientific and technological society. It follows that a person pursuing post-graduate studies may find himself at a lower level of confidence since he becomes aware of the limits of knowledge and not fully understood phenomena. This part is necessary to make a proper specialist so that he is aware not only of his knowledge but also of his limitation and shortcomings. While research is not essential for the make up of a specialist, this gives him the unique

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It would be wrong to assume that mathematical and technical analysis can give exact solutions to problems encountered by designers whether it is design of a system unit sub-assembly or component. Mathematical analysis can be applied to problems which can be mathematically formulated. In other words only if a model can be devised which is amenable to mathematical analysis. Such model is almost invariably idealised and deviations from ideal always exist which makes it impossible to get exact solution. Too complicated mathematical model will make it extremely difficult if not impossible to find a solution which can be applied in practice.

All analyses are based on certain assumptions which are not necessarily correct in a mathematical sense e.g. materials of construction are often assumed to be homogeneous and/or isotropic in nature which they hardly ever are. The geometries of the components concerned may not be exact. Even if it is possible to produce in exact shape it may not be economical; or for that matter even necessary. These are the reasons which call for application of factors of safety in all design work which really is a measure of ignorance. Quite often involved analysis may offer only very nominal savings in construction or manufacture and at the same time introduce great complexities. In order to avoid such difficulties and also to simplify the design processes various standards have been designed. Materials are standardised so that they may be available within certain ranges of properties. Sizes and shapes are also standardised. Design standards are also recommended by various standards associations. Standards are indeed the results of previous research and experiences codified for easy applicability.

Unfortunately almost all the industrialised nations have their own standards. While standards in different countries may be interchangeable in certain aspects they may be very different in others so that it becomes necessary for the designer to follow certain particular standards in exclusion of others. It is necessary for designer to be aware of the advantages and limitations of standards which are going to be used and their applicability. The basic principle of preparation of such standards is to ensure that the users can be assured that the design is safe. In other words errors if any will only make the designs comparatively safer.

All clients would like to ensure that the services they receive will make the total expenses the minimum which will mean that all the possible alternative solutions should be investigated by the consultant and in order to arrive at a solution which is acceptable safe and least expensive. In other words the work of the consultant should consist of investigation of as many alternatives as possible even if it may need extra effort on his part so long as this effort is to the benefit of the client. The consultant therefore has to cultivate an attitude to offer the best and not to be satisfied with the first solution he may come by. (To continue).

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