

Considerations in the Establishment of a Pakistan Association of Consulting Engineers

By

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A year ago I had the pleasure of addressing your Golden Jubilee Session on "The Private Practice of Consulting Engineering". I am very happy to see that you have decided to hold a symposium on "Consulting Practice in Pakistan" during your 51st Annual Session. In response to your invitation to contribute a paper to the symposium, I have thought it might be helpful if I were to discuss the desirable features of organization if you should decide to establish a Pakistan Association of Consulting Engineers.

NEED FOR AN ASSOCIATION

It has been the experience in many developed countries that the advancement of the private practice of engineering has been due largely to the efforts of a national association in identifying its members with high professional standards and ethics, in carrying out activities related to the self-policing of its membership to maintain these standards, and in acquainting the public with the advantages of retaining association members for engineering services. Accordingly, it is reasonable to expect that similar objectives could and would be fully realized in Pakistan.

In order to succeed, any organization must fulfil a basic need. In so doing, it is important that it should not duplicate or encroach upon the functions of others. Thus the Association should avoid conflict with existing engineering organizations whose aims are principally to further professional technology, such as the societies of the basic branches of engineering and the national technical committees in specific fields such as dams, irrigation, drainage and flood control, navigation and so forth.

BASIC TYPE OF ASSOCIATION

From the standpoint of positive identity and for legal protection it is usually desirable to give it legal status, that is to incorporate an "Association". This will identify the Association with the specific objectives stated in the articles of incorporation, will establish legal responsibility for its acts, and will provide

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protection against the unauthorized use of its name by non-members, either individually or in groups.

A professional or quasi-professional association may be formed of individual members or of engineering firms, either partnerships or corporations. There are precedents for both. The advantages of individual membership are that a greater number of engineers will have individual identification with the objectives of the Association, and the status of individual membership is consonant with the fact that engineering is a profession that should require the pre-qualification of each individual. On the other hand, an engineering firm with several principals may attain a status of association membership if all of its principals are members of the Association. However, if the Association is comprised entirely of engineering firms, the identification of the several principals is much less positive and to a large degree less significant. Accordingly, I believe the purposes of an Association can be more successfully carried out if the Association consists of individual members.

MEMBERSHIP

For individual membership there should be established positive standards of education, experience, and demonstrated ability in a recognized branch of engineering as well as high personal character and reputation as a citizen and engineer. In some associations, these qualifications are fulfilled in part by the prerequisite that the candidate be a full member in good standing of one of the founder national or international engineering societies, which in turn have high prequalifications for full membership. There should be a minimum age limit as one of the prequalifications of experience, which might be of the order of 30 to 35 years of age. The candidate should also be the proprietor of his own engineering business, a member of a partnership, or an officer or director of an engineering corporation. In many countries staff members of educational or research institutions who practice consulting engineering on a part-time basis would also be qualified for membership.

One of the most important decisions to make on qualification is whether to admit engineers who are owners or principals or are employed by construction contracting or manufacturing concerns. Because there is an inherent conflict of interest in the activities of a member representing a client as a consulting engineer and at the same time performing functions related to his construction, contracting or manufacturing affiliation, it is strongly recommended that engineers with an interest in construction, contracting or manufacturing be not eligible for Association membership.

Definite provisions should also be made for the cancellation of membership in the Association of any member who, because of change of status, ceases to fulfil all of the limiting qualifications.

GOVERNING ORGANIZATION OF THE ASSOCIATION

In order to take advantage of the accumulated professional experience of its members in carrying out the management of Association affairs, it is desirable to have an executive committee or council consisting of members elected by the Association. The executive council or committee should consist of two or three counsellors elected each year to serve for a period of two or three years, thereby providing at all times a balance of senior and junior counsellors. The President of the Association may be elected by and from the Council, normally for a term of only one year, or he may be elected by the membership at large. It has been the experience of most national associations that the major part of the work of the Association is performed by the Council with the assistance of committees, who in turn report to it. Normally, one of the experienced members of Council is best qualified to serve the Association as its president. The counsellors, from their acquaintance with the performance of their own members, are in the best position to select the one best qualified to serve as president. Some associations also elect first and second vice-presidents, who in succeeding years become presidents. The disadvantage of this system is that it does not permit an updated evaluation of individual performance which may be affected by the individuals' health, or time available from personal responsibilities to serve the Association.

The secretary and treasurer are generally appointed by, and hold office at the pleasure of the Council. These two offices may be held by the same person. Also, because of the nature of their duties it is usually permitted that these two positions may be held by non-members of the Association.

The Council should hold periodic meetings to transact the business of the Association at intervals which will depend upon the degree of activity and the business at hand. It would seem initially that meetings might not be held oftener than every two or three months.

Initially the Council may be able to handle the activity of the Association without supporting committees. However, as the activity grows the committee system should be established. In addition to distributing the workload, the committee system will bring many more members into an active participation in the business of the Association.

HEADQUARTERS AND FUNDS

It is desirable that an Association representing consulting engineers in private practice be operated entirely independently of any branch of government and of any government subsidy. It has been found feasible for such an Association to maintain its autonomy and still take advantage of secretariat services of another national technical society. When such an arrangement is

made, the secretariat services are generally limited to operating as a headquarters address, mailing address for sending and receipt of communications, and treasurer's office for billing and collection of dues and payment of expenses of the Association as authorized by Council. The seeking of a secretariat arrangement is suggested only where there might be practical difficulties in financing an entirely independent office for the Association.

It is desirable to keep the dues as low as practicable in order to encourage all qualified engineers to become members. This is accomplished in many associations by the performance of the great bulk of the work of the Association by its members without compensation. Most associations of individual consulting engineers have annual dues at a basic fixed rate with an additional surcharge for those members in the vicinity of headquarters of the Association, if there are additional activities and benefits that accrue to these members because of their favourable location. Most associations of firms of consulting engineers have a sliding scale of annual dues that is a function of the volume of engineering work performed by the firm or of the number of its employees. In each case there is usually an entrance fee in addition to annual dues. Provisions are made for limited assessments over and above the annual dues if voted by a 2/3 or 3/4 vote of Council members. For other assessments beyond a minor percentage of the annual dues, a referendum of the full membership is usually required.

For extraordinary and generally non-recurring or seldom-recurring costs, such as the furnishing of a headquarters office or the periodic publishing of directories, funds are frequently raised by voluntary contributions.

INTERNAL ACTIVITIES OF THE ASSOCIATION

It is suggested that as the Association grows, the Council delegate certain internal operating functions to committees as follows:—

- Membership
- Admissions
- Finance
- Constitution and By-Laws
- Charges for Consulting Engineering Services
- Professional Practices and Ethics

Following are described briefly the normal functions of each of these committees :

Membership and Admissions

The Membership Committee should encourage and stimulate the application of qualified candidates for membership. It should disseminate information on the membership requirements and use caution and judgment to avoid

the difficulties and embarrassment of receiving applications from candidates who are not properly qualified. Normally, a candidate should be sponsored by a member of the Association and endorsed by at least two other members. Once the Membership Committee has satisfied itself that an applicant's papers are in order, they should be transmitted to the Admission Committee, which carries on the review and screening process to check upon the candidate's qualifications.

The Admissions Committee checks the professional references of the candidate, verifies the educational and career data contained in the application, and then circularizes the applicant's record to the entire membership. After allowing sufficient time for the comments of any member, the Admissions Committee then makes its recommendations to Council. If Council is satisfied that the applicant is fully qualified, a secret ballot of Council is usually taken with a requirement generally greater than the majority and preferably in the area of three-quarters of the votes of Council required in the affirmative for election. The suggested procedure is time consuming and meticulous. However, experience has shown that no association of consulting engineers is any better than the caliber of its members, and the steps taken to safeguard this standard are well worth the effort.

Finance

This Committee should prepare budgets, review treasurer's and auditor's reports and recommend to Council whatever steps are necessary to maintain the financial soundness of the Association.

Constitution and By-laws

Normally, the Organizing Committee of the Association would draft its Constitution and By-Laws. However, it may be expected that questions will arise periodically with respect to interpretation, clarification, and possible amendments, which can be studied better by a small committee with legal counsel, where necessary, and reported to the governing Council for action. It is generally desirable that Constitutional Amendments be acted upon by vote of the membership as a whole, whereas By-Laws may be amended either by Council, or by a majority vote of members attending a special meeting for such purpose.

Charges for Consulting Engineering Services

As a service to prospective clients and to foster better engineer-client relationships, it is desirable to consolidate the experience on engineering services in the country into a guide which classifies engineering services into various phases such as preliminary, design, and construction engineering, and recommends procedure for selection of the consulting engineer, forms of contracts for

engineering services, and charges for consulting engineering services. There are many precedents for such guides prepared by various other national engineering associations which could be studied. However, it is essential that the manual be prepared to fit conditions in Pakistan, in addition to taking advantage of experience elsewhere. If it is desired to express the range of cost of various phases of engineering service as a percentage of the cost of construction of various types of projects, this should be done from an extensive collection and analysis of such data from current experience in Pakistan. Generally, only the professional engineering costs are related in such manner and attendant services such as for topographic surveys, foundation investigations, special tests, and shop inspections and so forth, are considered as additional costs. These percentage or curve relations should be considered only as guides, because for specific cases the costs may be somewhat more or less than shown by the guide. In determining proper compensation for engineering services, there is no real substitute for a detailed estimate of direct and indirect costs, plus a reasonable margin for contingencies, interest on invested capital, readiness to serve, and profit that is prepared by the engineer and reviewed and concurred in by the client.

As time passes, guide curves should be adjusted for variations in relative costs of engineering and construction. Experience in recent years has shown that for some types of heavy construction, such as highways and hydraulic works, the unit costs of construction have not risen appreciably, while costs of engineering has risen substantially. Accordingly, in these cases, guide curves prepared several years ago would indicate inadequate compensation for engineering services.

Formulas for compensation for engineering services on a reimbursement basis should define precisely the items covered in direct charges and those covered by multipliers.

It is anticipated that a period of one to two years would be required to gather and interpret data and to draft an adequate manual of this type. At least every ten years it should be rewritten to meet current conditions and requirements.

Professional Practices and Ethics

The first function of this Committee is to draft a Code of Ethics and Standards of Professional Conduct by which the members of the Association will be pledged to abide. There are many similar codes of professional societies in other countries that may be used as a guide. They are all based on the Golden Rule and they form the cornerstone of honest and faithful professional practice.

The Committee should recommend to Council upon the interpretation and application of the Code of Ethics and should follow actively and report upon current ethical questions of general interest to the profession. The Committee usually assists Council in the investigation and criticisms or charges of improper conduct against any member of the Association. Such charges should be specified in writing and supported by the evidence upon which they are based, a copy of which should be sent to the member affected and opportunity should be given him to reply in writing, with supporting evidence. Council should be the final judge and should take any necessary action relating thereto, which may vary all the way from exoneration to reprimand, or expulsion.

There are many areas of professional conduct in which remain conflicting opinions as to what is or is not ethical. As in moral conduct, everyone is against sin, but there are many differences of opinion as to what constitutes sin. Advertising is one of these areas. Generally approved professional practices include professional brochures, factual and informative articles in magazines, both technical and non-technical, unsolicited personal calls to obtain information or to express interest, and professional cards of limited size inserted in magazines and newspapers. Practices that are generally disapproved are commercial-type advertising, displays at public events, or in advertisements by equipment suppliers, direct mail letters sent indiscriminately and the employment of non-professional business getters.

Competition for professional assignments is another area involving interpretation of ethics. Approved practices include full submittal of qualifications and of proposed procedure for carrying out an assignment with an indication of the manpower required, but without naming a fee. Occasionally, a client will invite a selected and limited number of engineering firms to submit detailed proposals, including the proposed compensation, but with the statement that in the selection, price will not be the prime consideration. Most consulting engineers will not respond to such an invitation because there can be no assurance that the client will do otherwise than make his selection primarily on the basis of the price. It is firmly believed that the best interest of the client and the profession will be served by selection of consulting engineers on the basis of their qualifications and the subsequent negotiation of equitable contracts by mutual accord.

Another area of ethical interpretation is in giving and receiving entertainment and in making political contributions. This becomes a matter of magnitude and of good taste. It is generally considered that hospitality exercised modestly and at a cost so small that it could not possibly exert any influence or have any bearing on a client's decisions, is entirely proper. How-

ever, the financing of expensive trips and elaborate costs of entertainment are disapproved practices. It is generally considered that a consulting engineer has the same right as any other citizen to support the political party of his choice, including modest contributions to political campaigns. However, contributions above relatively nominal amounts are disapproved as well as any contribution, regardless of size, that is made with the primary purpose of influencing official responsible for the selection of engineering firms.

Among many other fields of ethics that are susceptible to varying interpretations are the supplanting of another engineer and conflicts of interest. Basic honesty, sound judgment, and good taste, are the foundation of proper interpretation in these as well as all other questions of ethics.

The associations of consulting engineers in several countries have polled their membership with extensive and detailed questionnaires on many of the above questions of ethics in order to determine and establish their prevailing opinion of right and wrong. Their findings have been helpful in crystallizing policy in this important field.

EXTERNAL ACTIVITIES OF THE ASSOCIATION

These activities may similarly be delegated by Council to committees as follows :—

- Public Relations
- Legislation
- Engineering Education
- Relations of Engineers with Architects and Contractors
- Engineering for Government

Following are described briefly some of the suggested functions of each of these committees :—

Public Relations

This Committee should develop a brochure which will describe properly the Association to those who are not familiar with it. After the Association is well established, a committee should prepare a directory of members, which also summarizes and classifies the services that they are qualified to render. This directory should be brought up to date at intervals of two or three years.

The Committee should convey to the public through all media of communication the true image of the consulting engineer and the value of his service to government, industry, and the public in general. The proper identification of the consulting engineer with all projects which he has planned, designed, and supervised, should be made known to the public. Too often the consulting engineer finds himself relegated to anonymity.

The role of the consulting engineer can be disseminated through technical articles, speeches before professional, public and commercial groups, and students, and through publicizing of the Association's activities. Publicity can be given to the admission of new members, the election of officers, and the conferring of awards periodically upon members for their outstanding service to the profession and the country and upon non-members in public or private life for their services in contributing to engineering and scientific advancement.

Legislation

This Committee should suggest desirable legislation on the practice of engineering for the protection of the public. Most countries have professional registration laws, which set rigid educational and professional standards of qualification and require that all engineers in private practice serving the public be registered. The professional engineering should require individual responsibility. Accordingly, in many countries the practice of engineering is restricted to individuals and to partnerships. There should be no objection to the practice of engineering by corporations provided that the following restrictive conditions are met by the corporation.

- (a) The majority of the officers and the executive officer, or officers, should be licensed professional engineers.
- (b) The majority of the directors should be licensed professional engineers.
- (c) The majority of the ownership of the corporation should be in the hands of licensed professional engineers.

Some states or other governmental subdivisions have enacted legislation which limits or prohibits the hiring of consulting engineers for the engineering of public projects. It is highly desirable in the public interest that such legislation be opposed and that public agencies have full right and authority to retain consulting engineers whenever their services can result in savings and in improved engineering.

The Committee should follow actively all legislation with respect to the liability of the engineer and assure that the relative responsibilities of the engineer, construction contractor, and manufacturers and suppliers, are kept in their proper perspective. Another legislative field is that relating to conditions of employment of the consulting engineer's staff covering social benefits, working conditions, and responsibilities of the employer. The Committee should endeavour to obtain just and equitable conditions in this field that are fair, both to the employee and the employer.

Engineering Education

The Association as a whole, and preferably through a working committee, should foster and encourage a greater number of qualified high school graduates

to study engineering and to train for service in the concrete and tangible fields that provide facilities and supplies for a better life on this earth. There is an intense competition today between science and engineering to attract the technically gifted student. Some of the fields of science and especially the exotic ones relating to space and the nuclear age are more glamorous and appealing to the student. They are certainly necessary, and without belittling them, it still must be remembered that the traditional engineering fields serve the backbone of our economy and even make possible many of the successes of science. The Association can be of great service to Pakistan in helping to bring this matter into proper perspective.

The provision of curricula in the technical universities to train an engineer for private practice, including such fields as business administration, office management, engineering law, and basic economics, should be encouraged.

Consulting engineering offices are often able to provide part-time employment in junior capacities, such as draftsmen and computers, for engineering students and in this way to make it possible for greater numbers to obtain an engineering education. This can be fostered by an Association through organized effort.

Relations of Engineers with Architects and Contractors

The Association should establish guiding principles for these relations and the continued study and implementation of these principles lend themselves well to committee service.

There is substantial overlapping of professional talents, interests, and activities of engineers and architects. The responsibility for the engineering of buildings and other structures can be the concern of either, or of an association of both, depending upon the character and type of the project. Both engineers and architects should be free to take prime responsibility for any type of project for which they are qualified, and, in turn, they should retain the qualified technical assistance of the other as necessary to accomplish the job properly. Restrictive legislation which prevents this freedom of action is against the public interest. Rather than to consider the two professions to be in competition, it is only natural that they should be in close cooperation and thereby bring together their respective experiences and capabilities.

The consulting engineer should be entirely independent of the construction contractor and should act with fairness and justice in all matters of contract relations between his client and the contractor. On projects where an engineer agrees to provide professional engineering services to a contractor, the latter becomes the client of the engineer. Compensation for such engineering services should be on a direct professional basis and not on a contingency

basis. An engineer should not be a party to a joint venture with a contractor, as by so doing, he becomes a contractor himself. He should have no financial interest in any way in the business of any contractor, manufacturer, or material supplier.

Engineering for Government

Since this is one of the broadest fields of activity for consulting engineers in Pakistan as well as in other countries, it deserves the special attention of the Association and could well form a useful committee function. A large portion of the practice of consulting engineers is in the civil engineering field and, in turn, a large portion of civil engineering is in public works.

Most branches of government have developed their own engineering organizations and perform varying percentages of their own engineering work. Consulting engineers working for government are generally serving directly these engineering branches of government and are generally called upon to carry the peak loads of engineering work and in some cases, part of the basic load. The Association can be instrumental in developing an atmosphere of cooperation and understanding between government and private practice and in convincing government of the advantages of allocating a portion of its work to private practice. If a branch of government organize its own staff to carry on peak-load work, it frequently encounters difficulties in later reducing its staff. The consulting engineer has greater flexibility in this respect and also since he is serving the private sector of the country as well as the public sector, the factor of diversification results in some balancing of his work load.

Frequently, branches of government gauge the compensation that they are willing to pay consulting engineers by determining the costs of carrying on the work within the government. There are many indirect costs of operation which are frequently overlooked by government in making this evaluation, such as standby costs of personnel, fringe benefits, costs of facilities and relative efficiency of staff. The Committee should endeavour to work with government in a cooperative effort to evaluate properly all of these factors with the ultimate view of establishing fair and adequate compensation for the consulting engineer.

In some countries, government engineering branches have entered into direct competition with engineers in private practice in performing engineering services for private clients. Wherever this is encountered, it should be strongly resisted by the Association.

Occasionally, branches of government complain, and with good cause, that the engineering service rendered for them by some engineering firms is of poor caliber, either from the lack of experience of the firm and its staff, or from

poor management. The efforts of the Association in uplifting private practice and in maintaining high quality of service is of great value to all clients, both in the government and in the private sectors.

Frequently, government contracts, and all of the conditions contained therein, are offered to a consulting engineer on a take-it or leave-it basis. Sometimes these conditions are one-sided and are unfair to the consulting engineer. The Association, acting for the profession as a whole, is in a much better position to seek rectification of these inequities than anyone of its members, since the individual may always be considered to be a prejudiced party, dealing with a specific case. Among the fields where improvement has been obtained in government contracts in other countries in this respect are the more comprehensive definition of scope of work, the specification of time limits for review and approval of various phases of the work as they are submitted, the provision for equitable progress payments, the adjustment of compensation for changes and revisions when they are the result of decisions or changes desired by the client, compensation for time overrun when beyond the control of the engineer, additional compensation for work required by the client that necessitates overtime of staff, and adjustment of compensation for index changes during the course of the work, such as increased general levels of professional or sub-professional compensation and social law changes that result in additional costs to the consulting engineer.

By periodic informal meetings of government officials and representatives of the Association, criticism of consulting engineering services can be invited, problems of the consulting engineers can be aired and ways and means can be explored of improving consulting engineering services and making more use of these services, all in the public interest.

CONCLUSION

The foregoing general exposition of the possible activities of a Pakistan Association of Consulting Engineers is by no means comprehensive. It should indicate, however, the vast panorama of useful activity that may develop. If the fundamental objectives of the Association are service to your country and to your own profession, and if a sufficient number of your qualified engineers are willing to dedicate a portion of their time to the founding and development of an Association, I am confident that its value would soon come to be recognized widely throughout Pakistan. The direct and indirect benefits to all concerned would be well worth the effort.