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The Engineering Profession in Pakistan

By
S. S. KIRMANI*

Introduction

The engineering profession in Pakistan is acquiring new dimensions. From its long time confinement in the Government Departments, it is expanding rapidly in public corporations, industry and private consulting practice. There never was a period in history when the opportunities for the profession were so large and challenging. The expanding opportunities, and consequent responsibilities, of an enlarged profession are appearing at a time when competence to meet them is endangered by lack of professional unity, discipline and cooperative effort in the common interest. Today the profession is in danger of disintegration into a large number of separate and isolated groups working independently in their own way to safeguard their own interests. The profession is at the crossroads and there is a great danger of its drifting away from its noble objectives of "the pursuit of a learned art in a spirit of service of the people", the two indispensable qualities that must be manifest in a truly professional career. Many of the problems confronting the Pakistani engineer today can be attributed, not so much to his insufficient technical knowledge and experience but to the lack of professionalism in the application and use of that knowledge and experience. Professionalism is a way of thinking and living rather than an accumulation of knowledge and power. Knowledge and power are exceedingly important but professionalism has to do with their use and should not be identified with them. There is an urgent need for the development of professionalism in engineers through establishment and maintenance of education, ethics and professional practice.

The object of this paper is to seek immediate attention of all engineering organisations in the country for cooperative effort in the common interest of developing the engineering profession, to suggest measures for its development and growth; and to invite attention of the Government that unless such measures to develop the engineering profession are taken it will not be possible to effectively pursue its plans for economic development of the country.

The Forces and the Strains

Through the ages all public works in the Indo-Pakistan sub-continent were engineered by Government Departments specialising in various branches

*Chief Engineer, I. B. P. Division, Wapda, Lahore.

of engineering. The extensive net-work of irrigation canals and barrages, rail and road communications, power stations, transmission lines, distribution net-works, buildings and the innumerable other public facilities in Pakistan today owe their existence to the magnificent work, ingenuity and skill of Government engineers. There were great pioneers amongst them who made outstanding contribution to the advancement of engineering science. Each department had its own design offices, research laboratories, technical libraries, workshops, stores and other facilities required for effective planning, design and construction of works in which it specialised. The engineering profession in the country was all concentrated in the specialized Government Departments. Private consulting practice was unknown and engineering talent outside Government Department was almost non-existent.

In its early stages of development the opportunities to the profession were challenging. The construction of one great work was followed by another. The departments were compact and the challenge of the new problems provided strong motivation for developing new design techniques and improved construction methods and promoted advancement in research for developing more durable, safe and economic engineering structure. Communications for dissemination of knowledge and experience were effective, motivation for achievement was strong and the spirit of team work and comradeship was high. It was a golden era of the engineering profession during which outstanding contributions were made towards advancement of engineering science. Even today the Pakistani engineer looks on the past achievement of his profession with great pride.

As more and more works were constructed the problems of maintenance and operation of the completed works increased in size. The departments were beset by a vast and complex governmental administration; a constantly growing system of rules, regulations and procedures; and a mass of routine work and repetitive operations. Administration became impersonal. The need for uniformity of treatment of problems restricted discretion and individual judgement and the motivation for doing something new became low. Security in service became important and the mass of rules and regulations, codes and practices, circulars and manuals inevitably led to the practice of playing safe. Construction of new works continued but maintenance and operation became the dominant occupation.

This practice continued in Pakistan after independence and even today Government Public Works Departments are the largest engineering organizations in the country.

Three powerful and related forces have swept over Pakistan in recent years and made a tremendous impact on the engineering services and profession.

The first of these forces is the great drive for economic advance which is evident in the progressively increasing sizes of the successive Five-Year Plans. The first Five-Year Plan (1955-60) involved a total capital outlay of 990 crores of rupees which increased to 2300 crores in the Second Plan (1960-65). The Third Plan (1965-70) envisages an investment of 5200 crores of rupees which is more than twice the size of the Second Plan. In the water and power sector the investments in the three Plans are 177, 439 and 893 crores of rupees respectively. The expansion in industry is even more phenomenal. Investment in private sector increased from 100 crores of rupees in the First Plan to 830 crores in the Third Plan.

The second great force is the establishment of public corporations like WPIDC, WAPDA, ADC, CDA etc. as organizational devices for implementing development projects. They represent "an attempt to apply to public administration, when extended to commercial enterprise, the type of organization evolved for large scale private commercial administration by the Joint Stock Companies." The public corporations partake in varying degrees the character both of Government and private enterprise and as President Roosevelt said in respect of TVA, they can be "clothed with the power of Government but yet retain the flexibility and initiative of a private enterprise". The number and size of such organizations has increased enormously during recent years.

The third great force is the gigantic Indus Basin Programme involving an investment of more than 900 crores of rupees comprising some of the largest engineering structures in the world. More important than its size is the speed with which it must be implemented in order to meet the rigid time schedule specified in the Indus Waters Treaty. The consequences of failure are dreadful—payment of over 13 crores of rupees to India and after a three-year extension, complete cut-off of irrigation supplies which will ruin the economy of Pakistan.

The combined effect of the three powerful forces described above created a very large and constantly increasing demand for all types of engineering services. Shortage of qualified engineers severely restricted the activities of the newly created public corporations. The nucleus engineering forces borrowed from Government Departments were too inadequate to implement concurrently the large engineering programmes assigned to them. If the programmes must proceed and the planned targets were to be met, there was no alternative but to import engineering talent from outside. A number of consulting engineering firms, foreign as well as Pakistani, were engaged. The number and size of such firms increased enormously in recent years and considering the sizes of the successive Five-Year Plans, the outlook is for continued

expansion. A new system of engineering of public works hitherto unknown in the country was established providing expanding opportunities in the consulting engineering field, both for those seeking employment as engineers and those wishing to establish new firms and become their own bosses.

While the new system proved effective in implementing the programmes and in meeting the planned targets, it created controversies which not only affected the progress of the programmes in some measure, but placed the engineering progression in adverse light before the Government and the public. Recurrent criticism and discussion of competency, engineering costs and practices of departmental engineering *versus* engineering through private consulting firms, foreign consultants *versus* Pakistani consultants and foreign engineers *versus* Pakistani engineers clouded the basic issue of how the engineering needs of the development plans could be effectively satisfied. It was not appreciated that these needs must be met by the effective use of the total available engineering man-power in the country, whether in Government departments, public corporations or in private enterprise, augmented by foreign engineering talent to the extent necessary. It was not realized that such controversies would seriously damage the engineering profession, retard its growth and development, provide the basis for non-engineers to claim that engineers cannot be entrusted with management and administrative responsibilities of large engineering undertakings, place the engineering profession in adverse light before the Government and the public, and discredit the great contributions the engineering profession has made and is making towards the economic development of the country.

One must appreciate, however, that changes in the engineering practices in Pakistan brought about by the powerful forces described above were so rapid and sudden that the resulting strains in the engineering profession were inevitable. For every action there will be a reaction. This is the law of nature. This will be true if rapid changes are introduced in any profession, practice or service under similar circumstances and the engineering profession is no exception. The changes require a period for adjustment. The great task before the engineering profession is to remove the strains affecting the growth and development of the profession by promoting the qualities to think clearly and accurately, to understand and investigate the conditions which surround the problem, to determine the principles upon which its successful solution depends, to understand and respect the other man's point of view and to keep the main objective of the engineering profession always in the forefront—"the pursuit of a learned art in the spirit of service of the people". It is the development of these faculties in the engineering profession that this paper is mainly concerned with and not the nature or merits of the present controversies.

Development of Engineering Competence

Engineering competence of an organization depends on effective management of the five essential Ms in engineering practice: men, methods, materials, machines and money. The first of these—men—is the key factor because it is the talent and skill in men that determines the efficient use of the rest. No amount of money, the best of methods and techniques, the best materials and the most powerful machines and tools can produce the best results unless there are men who have the competence to use them effectively. Unfortunately while great emphasis is laid, and very correctly, on the management of the rest of the Ms, little attention is paid to the development of competence in men who control them all. The competence of an engineer depends on two qualities, his "inherent ability" and his "attitude" towards his profession. Inherent ability is a natural gift and not all engineers are endowed with this gift to the same degree. But inherent ability can be developed in a climate of proper mental attitude. The key factor in the development of competence is the development of professional attitude.

The four essential requisites for development of attitude are, Motivation, Enthusiasm, Discipline and Participation. Motivation for work depends on :

(*a*) the financial return that makes possible the comfort and security of family ;

(*b*) the personal satisfaction that comes with the knowledge that one is contributing significantly to his service and profession ;

(*c*) and the recognition by one's associates and others that he is competent in his profession and is making a significant contribution.

Motivation is prime requisite in the development of professional attitude. Every organization must recognize it. It must be given high order of value in the early years of professional career in order to inspire the dedication of purpose that is always manifest in those who have achieved real success in their profession.

Enthusiasm is a quality without which nothing worthwhile can be achieved. It is a driving power and a miraculous stimulant which accelerates the process of development when once the requisites for Motivation are satisfied.

Discipline is the application of one's time and energy to maintain his learned art and to pursue it with diligence and determination. It is the development of faculty for sustained concentration and clear thinking which will serve to delve into the depth of subjects and to reach the height of learning that is

so essential in the complex systems of to-day's engineering. Clear thinking embraces reasoning, weighing, considering and inquiring into everything that is not obvious. Sustained concentration leads rapidly to the conquering of problems and seeing new vistas and horizons. The most important contributions to engineering science have come from intuition through the process of sustained concentration and clear thinking. Discipline is the control of self to evaluate his weaknesses and shortcomings and to do something about their correction. It is a realization that no matter how extensive one's knowledge, and experience may be, there are great gaps in his fund of knowledge, that technology is not static and unless he gets continuing education, new developments will pass him by. It is the development of the ability to understand the other's point of view and to control his impulse to shoot it down before he fully understands and studies it. It is the observance of the ethics of his profession in his dealings with his associates and those who are above and below him in service.

Participation is essential to establish one's identity in his profession and contribute to it where possible. Through such contributions one will make known his abilities, make valuable contacts and apprise those who might use his services of his willingness and capacity to handle greater responsibilities. There is nothing like the challenge of responsibility. Even those who appear ordinary and average, have great potentialities for growth and will perform far better if they are given the opportunities to participate and are trusted with important responsibilities. The ability of one to achieve some personal fulfilment of his own potentialities can be demonstrated only if he is given the chance to participate and the opportunity for personal growth in responsibility. In many situations it may be difficult to bestow real responsibility upon an employee. But there are always ways to challenge him more fully, ways that will produce benefits for both him and the organization.

Competence should count most in an engineering organization and it must be progressively superior competence. The engineering organizations in the country and the Government must recognize this important fact and must take measures to promote its development. Of all the professions and services in the country, the engineering profession is entrusted with the responsibility of using the largest part of the country's natural resources, money, materials and machines for the benefit of the people. It is essential that competence of its members must be developed so that these resources are used most effectively and produce maximum benefits with minimum of waste. Every effort in this direction will bring rich dividends and every rupee spent in the promotion of this cause will save thousands of rupees in return.

Factors affecting Development of Engineering Competence

Some of the important factors affecting development of engineering competence are :—

(*a*) The Class system in service.
(*b*) Service Rules.
(*c*) Lack of opportunities.
(*d*) Inadequate communications.

Class System in Service

The class system of Temporary Engineers, Class II and Class I service prevalent in some engineering organizations is one of the important factors affecting promotion of engineering competence. In many respects it is similar to the caste system in the Hindu religion with all its evils. The future of a young engineer should not depend on his status at birth in the organization. Competence should count most and promotion in service should be directly related to competence.

Service Rules

Service rules which in practice guarantee promotion on the basis of seniority provide low motivation for development of competence. They tend to promote the theory that if one tries something new and it fails he will be in trouble whereas if he just "plays safe" he will have a record without either blemishes or brilliancy and in the long run he will prevail over his more venturesome contemporaries. This philosophy provides a haven for an average man and must be demolished and it can be done only by recognizing and rewarding competence. Many of the great advances in engineering on all fronts have come out of the efforts of engineers who ventured something new and worthwhile and not played safe by blindly following established methods and practices.

Indeed there have been instances where competence has been recognized and people have been selected to hold high responsibilities in the interest of work without regard to their "seniority" but even in such cases motivation for work was partially nullified by the service rules which did not permit full remuneration commensurate with their work and responsibilities. Unless such serious defects in service rules are corrected all sermons on development of competence become idle talk.

Opportunities

A large number of engineers in Pakistan are engaged on jobs which demand little initiative and live for years in a world of routine and repetitive work. In course of time, because of lack of opportunities and challenge, their

technical knowledge becomes obsolete. Since competence is based on knowledge, and it must be a progressively increasing knowledge, their professional growth is retarded. There are many amongst them who would have risen to great heights in competence and proficiency and opportunities been afforded for their professional growth. Many of them get hardened by years of living in bureaucratic controls into expecting little responsibility, even into avoiding it, putting emphasis not on ambition but on security. Thus a great reservoir of talent remains only partially utilized and the nation is deprived of the full benefits of its resources.

Today the growth of private consulting practice in Pakistan is seriously affected for lack of qualified and experienced engineers. The construction industry is suffering for the same reason. Does not the profession owe a duty to promote their growth? Could not the under-employed engineering talent be put to more productive work—work which will benefit the engineering organizations, the profession and the country. Indeed there are always ways to challenge the potentialities of engineers more fully, at least of the more promising amongst them, on creative work—work of a kind which their present assignments do not provide opportunities, by permitting them to take part-time short assignments with private consulting firms and contractors in a manner which will not prejudice their normal work and responsibilities. But here again, the service rules come in the way and block all opportunities for development of competence.

The world is always made of three groups of people, "the first group who make things happen; the second who watch things happen and the third group who do not know what happens." In many situations it may not be possible to provide opportunities of the first group to some engineers whose assignments, however unchallenging and unfavourable to growth of superior competence, require their full time attention. In such cases they should at least be provided opportunities of the second group to "watch things happen"; to visit the completed works and those under construction; to participate in technical conferences and conventions; to meet and communicate with their associates in the first group; to establish their identity in their profession and to contribute to it where possible; and in short to receive "continuing education" which will increase their competence in their present assignments and prepare them to accept higher responsibilities in the future. It is unwise to allow such opportunities to pass them by; it is short-sightedness to say "he cannot be spared", and it is false economy to save such expense. Curiosity—that magic quality without which nothing worthwhile can be achieved—the catalyst for the growth of enthusiasm and the formulation of professional attitude, can only be aroused by "watching things happen". It will be unfortunate if, for

lack of opportunities, engineers fall in the third group of those "who do not know what happens". Their reservoir of talent will soon become a "dead storage" and a great resource will be lost to the nation.

Communication

With the phenomenal progress in research and new developments advancing at a rapid pace, knowledge is becoming obsolete today faster than ever before in history. Continued competence to assimulate and use this knowledge can be maintained by a professional man only through pursuit of continuing education. Communication is the most important facet for continuing education. The Engineering Societies, through their usual periodic publications, meetings and convention programmes can satisfy the engineers' continuing educational needs most conveniently. They should periodically develop and make available graded bibliographies of technical books, papers and articles covering significant developments. The engineering departments and organizations should encourage the publication of new and significant developments in design and construction techniques accomplished by them. In this developing era of huge projects competence must relate to a vastly widened perspective. The present facilities available to the Pakistani engineers in communicating with their associates and benefiting through their books, reports, technical papers and to assimulate and use new knowledge are hopelessly inadequate. The Engineering Societies in Pakistan owe it to the profession to take effective steps in this direction. The American Society of Civil Engineers is doing valuable work for continuing the education of engineers and the Societies in Pakistan can reprint, in affiliation with the ASCE, material of particular interest and application in Pakistan and provide it to its members.

Professional Behaviour

Too often one hears the following views expressed by engineers and of engineers :

"His technical knowledge is sound but in practice he is an utter failure—
He is a 'mistry' and not an 'engineer'—
The technical standards of engineers today are low—
In our time it was different—
I know my subject. You need not try to teach me—
You are wrong and I can bet anything on it—
I would have done this job at half the cost—
It is I who gave him this idea—
I did all the work but being the boss he got all the credit—
I had to do all the calculations myself as my assistants are just incompetent—

No two engineers agree—
Engineers are poor administrators—
Engineers have limited perspective—
If engineers are given high responsibilities there will be chaos—"

Too often one engineer tries to gain personal recognition by failing the other. Too often prestige takes precedent over the force of conscience. Too often authority is exercised to cow-down others point of view.

Many of the problems confronting the Pakistan engineer today can be attributed, not so much to his insufficient technical knowledge and experience but to the lack of professional behaviour in the application and use of that knowledge and experience, to the lack of those larger qualities which affect him to live with others and to conduct himself in the community in which he and the soundness operates. The engineer is judged not only by the quality of his engineering work of his technical decisions but also by his conduct and professional behaviour with many people with whom he deals. The secret of good conduct is the rational control of impulse; the ability to listen and understand the other man's point of view undisturbed by passions, prejudice or superstition; the manifestation of integrity, fairness and courtesy in one's relations with others, the ability to abstain from mutual harm and to combine to protect each other from injury and the ability to place service to mankind above personal gain and recognition. It is the calm, resolute and skilful achievement of professional attitude and the development of the qualities of "Goodness" which is the highest manifestation of human wisdom. The pursuit of a learned art in a spirit of service of the people, to abstain from mutual harm and to combine to protect each other from injury are the fundamentals of professional behaviour. The importance of ethical conduct was defined by the Chief Justice of the United States as follows :—

> "Society would come to grief without Ethics, which is unenforceable in the Courts, and cannot be made part of Law....Not only does Law in a civilized society presuppose ethical commitment; it presupposes the existence of a broad area of human conduct controlled only by ethical norms and not subject to Law at all....
>
> The individual citizen may engage in practices which, on the advice of counsel, he believes strictly within the letter of the Law, but which he also knows from his own conscience are outside the bounds of propriety and the right. Thus, when he engages in such practices he does so not at his own peril—as when he violates the Law—but at peril to the structure of civilization, involving greater stakes than any possible peril to himself....

> This Law beyond the Law, as distinct from Law, is the criterion of civilization and is indispensable to it.....

The professional discipline of the engineer applied with moral courage, intellectual honesty and social responsibility in complete professional freedom is the only action society has to use the products of science and technology for the maximum benefit of mankind. The engineering profession in Pakistan requires today, not only knowledge and competence but those larger qualities of professional behaviour which affect an engineer in living with others and in conducting himself in the community in which he operates. Professional attitude is a characteristic which must grow and develop in the individual. It takes cautious instructions, reading, training and illustrations to develop this attitude.

No Two Engineers Agree?

Non-engineers often say this of engineers. It is true that engineers often express different views for the solution of the same problem. This does not necessarily mean that they hold conflicting views. It is not always realized that there are basic differences between the engineering profession and the other professions and services. In engineering there are always many ways of doing the same thing. This is not generally true of other professions. The following example will illustrate the point.

Consider a bridge, a very common structure. There are many types of bridges. The spans could be varied. For each of its components such as foundations, piers and decking, there is a choice of several variants. There is a wide range of construction materials available for selection. Further there is a large choice of design techniques and construction methods to accomplish the same job. All the alternatives have been tried and tested elsewhere and examples of various types of bridges with all combinations of different types of component parts, materials and finishes do exist. The engineer responsible for the construction of a bridge at a given site has to select one type of bridge—the one which meets the requirements of the particular situation in best way. The requirements are—safety, durability, economy, ease in construction, speed and minimum maintenance cost. There may be several other limiting factors in particular situations. Architectural value may be more important than strict economy. Time of completion may be a critical factor. Safety during construction may be important enough to rule out certain types of construction irrespective of their other merits. The engineer has to consider all the available alternatives and the several factors associated with them. His judgement in selection will naturally be influenced to a very large extent by his own knowledge and experience of the various alternatives.

The available data and the confidence that can be placed on it will have an important effect on his choice. Further his judgement may also depend upon the relative importance he attaches to the different requirements. Another engineer in the same situation but with a different background and experience may weigh the factors differently and may advocate with equal emphasis a different type of bridge to achieve the same objectives. Does this mean that "no two engineers agree"?

For accomplishing every engineering structure, engineering science has provided several alternative methods. In the case of a project which comprises several structures of different kinds, the available alternatives multiply manifold. This is not generally true in other professions where there is often only one way for doing the right thing and all other ways of doing it are not considered right. This will be apparent from the examples of alternatives available to the legal, medical and other professions in any given situation. In the case of services the choice is even more limited as in almost all cases the rules and regulations prescribe what is right and wrong and any action that violates the rules is wrong, however right it may appear to one in his own judgement.

In engineering science, there is no such thing as right or wrong in the absolute sense of these words, as every proposal, scheme or project is invariably based on previous experience elsewhere. The words right and wrong are used only in the relative sense. Therefore, when A calls an action right and B calls the same action wrong, they may not necessarily be contradicting each other but advocating different policies and experiences. A very large proportion of disputes as to what is right or wrong are indeed due merely to differences of opinion as to fact, specially regarding the consequences of the proposed actions. This may be explained by differences in the experiences and psychology of different people so that the same external situation does not produce the same inward state. Thus, there is nothing wrong when two engineers advocate different experiences for the solution of the same problem. In engineering, this is in fact necessary. What is wrong, however, is the misapplication of the experiences by one sidedness, that is, by failure to attend adequately to all the relevant aspects of a situation or by sheer unwillingness to seek or admit the truth. All these circumstances can lead to error in judgement as to matters of fact and may result in a solution which may not be wrong in the absolute sense but may not be right in the sense that something better could have been done in the given situation. What is wrong is the lack of professional ethics in the presentation and appreciation of each other's views and experiences. The only remedy the profession can offer to correct such failings in engineers is the development of truly responsible professional attitude which will enable them to think clearly

and accurately, to extend and investigate the conditions which surround the problem, to listen to other man's point of view and to seek a solution on the basis of facts and principles and not by the expediency of the moment. Many of the failings of the Pakistani engineers are attributable not so much to the differences in their technical views but to lack of professional attitude in the resolution of those differences.

The Congress

The West Pakistan Engineering Congress has an interest and responsibility, not only to promote technical competence amongst its members, but also to promote, maintain and protect truly responsible professional discipline and high ethical standards to govern the professional attitude and behaviour of its members. Further it has a responsibility to save the profession from disintegration by promoting engineering unity amongst its members and the various engineering organizations in the country. There is little hope of renaissance of the profession unless a crusade is launched throughout the profession to achieve these objectives and raise the dignity of the profession. The Congress, as the guardian of the profession, must accept responsibility and assume the leadership.

The need for development of professionalism in engineers is urgent. The problems are great and the dangers are real. Nothing worthwhile can be achieved without conviction, organization and cooperative effort on the part of all members of the profession. Unfortunately, the Congress today is weak and ineffective. Senior members of the profession who constitute the strongest and most influential group of people in the society, have ceased to be the professional guardians of the welfare of the society but have become instead a collection of specialized technical employees and expert advisers seeking individual security without professional responsibility. To them belongs the responsibility to reorganize and revitalize the Congress and to effectively develop the profession to meet the challenge of the times. This is a sacred duty and they owe it to themselves, to the profession and to the nation to discharge this responsibility effectively. The problems facing the profession must be attacked vigorously and continuously through the best use and cooperative effort of all agencies and resources available in the country.

The writer believes that the following measures should be taken by the Congress to achieve the objectives discussed in this paper :

1. The Constitution of the Congress should be amended to include the following within the scope of its objectives and activities :

(*a*) to identify and advance the profession through the establishment and maintenance of education, ethics and professional practice;

(*b*) to promote engineering unity among its members and the engineering organizations in the country to satisfy the inherent obligation of the profession to serve the nation effectively.

2. The Constitution should also be amended to increase the effectiveness of the Congress in achieving the above objectives. The Executive Council which is the governing body of the Congress must be strengthened by enlisting effective participation of the senior members of the profession instead of the present composition based on strict equitable representation on the basis of the strength of membership in the various organisations and Zones. It is suggested that articles 8 to 12 of the Constitution should be amended :

(*a*) to include technical heads of engineering organizations stationed in the capital of West Pakistan and in the respective Zones as members of the Executive Council.

(*b*) to elect a specified number of members of the profession, regardless of the zones, who are known for their dedication to the service of the profession to the Executive Council.

(*c*) to ensure continued availability of competent and dedicated members of the profession to the high office of the President, the President of the Congress should be eligible for re-election for another year at the expiry of his one year's term of service. Competence and dedicated service to the profession should count most in his election and not rotational representation of the various engineering organizations.

3. In order to promote engineering unity of the profession for service of the people and to save it from indignity in the public, the Executive Council should accept responsibility to act as a Consulting Board, in a purely advisory capacity, to advise senior members of the profession and the engineering organizations, in matters of major technical disagreements and disputes. The members of the profession should pledge to seek the assistance of the Congress in such matters, to present their views and abide by the advice of the Congress.

4. The Congress should maintain effective liaison with other engineering societies, both inside and outside the country, and work in cooperation with them for the development of the profession.

Government must recognise that it has a direct interest and responsibility in the promotion of engineering competence, professional aptitude and standards of high ethical conduct in the engineering profession in Pakistan

so that the resources of the nation are effectively used for the maximum benefit of the country with minimum of waste. This interest can best be served by assisting and encouraging the Congress in its efforts to achieve the above objectives.

Conclusions

Will the profession wake up in time to recognize its peril and face the realities of today? It must be realized that "all that is necessary for the forces of evil to win in the world is for enough good men to do nothing." Think of the profession, Visualize the dangers, Unite to inspire confidence, Organize to be effective and Act to achieve the noble objectives—"the pursuit of a learned art in the spirit of service of the people", the two indispensable qualities that must be manifest in a truly professional career.

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