

## REGISTRATION AND PROFESSIONALISM

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### SIGNIFICANCE OF REGISTRATION

#### *Increasing Recognition*

The obtaining of registration as a professional engineer has become a magic touchstone by which a technician becomes a professional. This rather startling statement is becoming true in industry and in government as well as in the private practice of engineering. If the public does not always recognize the certificate of engineering registration as a mark of the professional, usually it is the fault of the engineers and of the laxity of their engineering registration laws rather than the intelligence of the layman.

Many of the industrial and electronic firms in Massachusetts, some of which expressed strong opposition to mandatory registration of engineers, are now encouraging their qualified employees to secure their licenses. This is in spite of the fact that in many cases their activities are exempt from the provision of the registration laws. One of the few items where registration actually is involved in industrial work, is the requirement that engineers' professional stamps be placed on certain test certificates.

Heads of departments in plants which employ engineers, holders of engineering titles, and engineers employed in research are now told that engineering registration is becoming necessary for a promotion to engineering positions and is being taken into consideration in awarding salary increases.

The values to industry are manifold. Registration has become a clear demarkation between professional and nonprofessional personnel. This is an important factor in labor relations problems. Surprisingly, the unions also welcome registration as making a clear identification of certain employees. Needless to say, the unions would like to bring the professional employees in under their tent. The special qualification of registration also makes it more difficult to replace such an

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employee during labor strife. The most important effect, however, is that the professional engineering license encourages an assumption of greater responsibility on the part of the employee.

Government, including the military, is one of the largest employers of civil engineers. Federal agencies are exempt from mandatory registration laws of the states. Therefore, the advantages of professional engineering registration were slow to be realized by federally employed engineers. However, it is in this group that great strides are now being taken in encouraging engineers to become registered.

Many state, county and municipal governments require that the responsible, higher level, top-paying positions be filled by registered engineers. Some states require registration for all persons with "engineer" titles. For example, in Texas all highway employees with engineering titles must be registered as professional engineers.

The attitude of the military services can be expressed best by the following quotation from Lieutenant General W. K. Wilson, Jr., Chief of Engineers, U.S. Army, and himself a registered professional engineer:

"As Chief of the Army Engineers, I am emphasizing a policy, which I have always supported, to encourage all civilian employees and officers engaged in engineering within the Corps of Engineers to become registered members of their profession.

"There are a great many advantages in registration, some of which I consider to be particularly rewarding. One of these is the increased self-confidence it gives any man in the Government to know he can measure up fully to the requirements for the practice of his profession which those in private life must meet.

"Another is the added prestige that registration gives him in dealing day to day with the registered private engineers of the firms which design and build so much of the construction he is called upon to administer and supervise.

"Perhaps most important of all is the fact that every engineer, whether in private or government practice, has an obligation actively to contribute to the preservation and enhancement of the public stature of his profession. Such contributions are essential to ensure that the profession is responsive to the growing demands society is placing on the engineer."

Similar statements have been made by Major General A. M. Minton, P. E., Director of Civil Engineering for the Air Force, and by Rear Admiral P. Corradi, Chief of Navy Civil Engineers.

There are now more than 17,000 professional engineers registered in Massachusetts and more than 280,000 registered in all states. Regis-

tration is mandatory in all of the 50 states as well as in many foreign countries. These figures indicate the extent of recognition being afforded engineering registration.

#### *Reasons for Registration and Licensing*

Over 100 occupations, both professional and nonprofessional, are licensed in one or more states. Job titles run from architects, doctors, opticians, and professional engineers; to barbers, beauticians, and plumbers.

A license has been defined as "authority to do some act or carry on some trade, profession or business, in its nature lawful but prohibited by statute except with the permission of the civil authority."

The advantages to the engineer have been very well stated in the foregoing quotation from General Wilson. These apply to the civilian engineer as well as the military engineer.

Public acceptance and recognition of the professional caliber of engineering are based upon a feeling of confidence. This confidence can be assured by the engineer having demonstrated his competence and character through passing examinations for registration. If we consider, for a moment, the public attitude towards a certified public accountant as compared to a bookkeeper or accountant without this distinction, we are bound to agree to this premise.

### PRINCIPLES OF ENGINEERING REGISTRATION LAWS

#### *Purpose of Laws*

Registration as stipulated in the various state statutes is intended to provide two services:

- (1) Protect the public from a possibility of being duped unknowingly by an incompetent into practices which are unsafe, unhealthy, or not in the interest of the public's welfare.
- (2) Provide a means of legal recourse in the cases of malpractice or misrepresentation.

#### *History*

Registration was made mandatory for the practice of engineering in Wyoming in 1907. This was followed by all the states, with Massachusetts being the last to adopt the mandatory provisions in 1958. In several of the states failure of structures caused by inadequate design accelerated the acceptance of their licensing statutes.

The present Massachusetts engineering registration law is a compilation of amendments to Chapters 13 and 112 of the General Laws as effected by Chapters 643 and 722 of the Acts of 1941, and Chapter 584 of the Acts of 1958. Copies of this compilation are available at the office of the Registration Board in Room 34 at the State House.

The requirements for registration in Massachusetts have been briefed by Mr. Harrison I. Dixon, a member of the Board of Registration, in the November, 1964 issue of the "Massachusetts Professional Engineer." The following is based on his article:

As a professional engineer,

- A. Graduate with B.S. degree in engineering from an accredited ECPD college. He must also have had at least four years of recognized professional engineering practice.
- B. A non-graduate who has had eight years' professional experience and who is permitted to take the examination held by the Board twice yearly.
- C. "Eminence" or 12 years of professional engineering practice if NOT less than 35 years of age.
- D. "Reciprocity" by registration in another state under methods equal to those of Massachusetts. The Board also recognizes a "National" certificate of registration available to those properly qualified who may be practicing in more than one state.

As an Engineer-in-training,

- A. Graduation in accredited engineering curriculum of four scholastic years or more from an accredited ECPD college, and who is permitted to take a written examination in the basic engineering subjects.
- B. A specific record of four years of experience satisfactory to the Board and who is permitted to take written examination in the basic engineering subjects.

As a land surveyor,

- A. Graduate with B.S. degree in civil engineering, including a course in surveying, from an accredited ECPD college plus two years of professional experience.

- B. A non-graduate with 6 years' professional experience, if he passes the land surveyor's examination.
- C. Ten years' professional experience, if not less than 30 years of age.

#### *Engineer-in-Training Program*

There are few in the profession of engineering who consider a man is qualified to practice immediately upon graduation. This is truer today than previously. Our science oriented colleges fit the student with a good basis for adapting readily to our changing technology. However, the virtual abandonment of design courses leaves a gap for the how and why of design.

Most state laws require him to spend 4 years under the guidance of a professional engineer before being admitted to responsible charge of engineering work. This is similar to the internship required of medical doctors and is for the same reason.

The student is encouraged in his last year of college to take the Engineer-in-Training examination (E.I.T.). The questions are intended to test his competency in basic engineering fundamentals. It is the first part of the professional engineers' examination. The second part is given 4 years later when he is questioned in regard to actual practice.

The importance in taking the E.I.T. examination as early as possible instead of at the end of the 4-year period is readily apparent. Those who have waited have had much greater difficulty recollecting fundamental details.

Massachusetts does not require an examination at the present time. It is hoped the law will be changed soon to bring us up to the many other states in this regard. Civil engineering has never been a profession for the stay-at-homes. The young engineer should by all means aim at qualifying in any state.

The E.I.T. status also makes the young engineer aware of his professional responsibilities. It tends to keep him out of the ranks of the technicians and away from joining a union.

#### *American Society of Certified Engineering Technicians*

N.S.P.E. in 1961 established an "Institute for Certification of Engineering Technicians." It authorized the Institute to "concern itself entirely with technicians who work for and under the direction of engineers."

Certificates are issued in 3 grades:

- A. Senior Engineering Technician-35 years old, 7 years' experience and endorsement of 3 professional engineers.
- B. Engineering Technician-25 years old, 7 years experience, endorsement of two professional engineers and a written examination for those who are not graduates of accredited engineering curriculum.
- C. Junior Engineering Technicians, no age limit, 2 years experience or graduation from ECPD accredited program, and endorsement of one professional engineer.

A national society, American Society of Certified Engineering Technicians, was formed in April, 1964. It is expected that it will have a rapid growth.

Recognition of the engineering technicians should not dilute or lower the status of the professional engineer. It will, however, provide him with competent assistants who will have a pride in their work. The technician will now know that he is an important member of the engineering team.

#### *Model Law*

In any discussion of engineering registration laws we hear a great deal about conformity with the Model Law. The first Model Law was drafted in 1911 by the American Society of Civil Engineers. It soon gained the support of other so-called "founder societies." It was intended "to serve as a model to be followed in the filing of all new registration laws and in the amending of existing laws, with a view to attaining a uniform, high standard throughout the United States."

The Model Law has been revised in 1925, 1927, 1929, 1937, 1943, 1946, and 1960. The present Massachusetts statute is in general conformity with the 1946 revision.

The 1960 revision has not been approved as yet by the American Society of Civil Engineers or by the Consulting Engineers' Council. The major objection is the provision for practice by corporations.

#### *Corporate Practice*

Section 81R (f) of the Massachusetts Statute provides as follows:

"Practices or performance of work not prevented or affected. Nothing in said sections shall be construed to prevent or to affect:—(f) The practice of engineering or land surveying in the Commonwealth by a firm, co-partnership, corporation or joint stock association; provided that the person in

charge of such practice by such firm, co-partnership, corporation or joint stock association is a professional engineer or land surveyor holding a certificate of registration under said section."

The 1960 version of the Model Law contains this exemption clause:

"This act shall not be construed to prevent or to affect:—(d) Corporate and Partnership Obligations. The practice or offer to practice engineering, as defined by this Act, by individual registered professional engineers through a partnership, joint stock company, or corporation, as agents, employees, officers or partners, provided they shall be individually liable for their professional acts, and further provided that all personnel of such partnership, joint stock company or corporation, who act in its behalf as engineers in the State are registered under this Act or are persons practicing lawfully or are exempt under paragraph (b) or (c) of this section. Each such partnership, joint stock company, or corporation providing engineering services shall be jointly and severally liable with such individual registered professional engineers. And all final plans, designs, drawings, specifications and reports involving engineering judgment and discretion, when issued, shall be dated and bear the seals and signatures of the engineers who prepare them."

The point of issue seems to be the key word "through" instead of "by."

The states of Rhode Island and Washington have recently made sweeping revisions of their registration laws and have adopted most of the 1960 Model Law provisions. Both of these states provide, as Massachusetts does, for the practice of engineering by corporations rather than by individuals through the business medium of a corporation. The State of Washington even goes so far as to license the corporation to practice engineering. This latter question brings up the point as to whether only natural persons may be admitted to the practice of a profession. The writer believes that our Massachusetts version is satisfactory to corporations and to most engineers.

#### *Registration Required of Employees and Subordinates*

There is a great deal of confusion about who is legally required to be registered. Many uninformed persons consider that it is only those engineers who offer their services to the public, in other words, the owners of an engineering firm or the heads of other engineering organizations.

In this regard, attention is directed to the following wording of the Model Law, Section 22 (c), and of the Massachusetts statute, Section 81R (d):

"This act shall not be construed to prevent or to affect: 'The work of an employee or a subordinate of a person holding a certificate of registration under this Act,' . . . *'provided such work does not include final engineering designs or decisions and is done under the direct responsibility, supervision, and checking of a person holding a certificate of registration under this act.'*"  
(Italics added by the writer.)

It seems clear that this does not exempt any engineers doing responsible work either in the office or in the field. This general ignoring of the clause is causing one of the major violations of the principles of the engineering registration law both in Massachusetts and in several other states.

The new Model Law calls for registration of *all* engineers whether in private practice or in other forms of engineering endeavor. The Consulting Engineers Council in an open letter to all consulting engineers dated October 10, 1962, questions whether the engineering profession as a whole is ready for this step.

There is considerable opposition on the part of some consulting engineers to the concept that all engineers should be required to be registered. There is no question that it will result in higher salary levels and so raise the cost of engineering. Many also question the public benefit as the consultant now bears all of the financial and contract responsibility for the engineering work. They state that it is merely up to the head of the firm to employ persons in whom he has confidence.

The writer agrees with the framers of the new Model Law. This is the nub of the problem:—An engineer is only a technician if he is not registered. There is no middle ground if we are to have a profession.

#### *Policing of the Profession*

As in the medical and legal professions, it is necessary to set up some means within the profession to police the members. Until recently we had no counterpart of the regional medical society or bar association. Committees have now been formed to investigate reported infractions of the registration laws. Reports of unethical practices are being handled by separate committees.

A Massachusetts corporation was formed in February, 1963, entitled "Committee to Uphold the Principles of Engineering Registration Laws" (CUPERL, Inc.). The stated purposes of this corporation are:

"To safeguard and advance the interests of the general public by improving the practice of professional engineering and of land surveying through advocating measures for increasing the efficiency and effectiveness of engineering registration laws; to receive and investigate complaints of illegal practice of engineering, of negligence, incompetency and misconduct of registered and unregistered engineers and land surveyors and report on same to the proper authorities, including the presentation of complaints to the Board of Registration of Professional Engineers and of Land Surveyors, District Attorneys, or Attorney General, as well as the making of recommendations toward expulsion from professional and technical societies, and to this end to provide liaison with the many engineering societies and the appropriate governmental agencies."

This type of activity is supplemented by local chapters of the Massachusetts Society of Professional Engineers. This work is co-ordinated by CUPERL, Inc. In several other states, similar activities are carried on entirely by the State Society of Professional Engineers. However, in Massachusetts, many engineering societies wished to have a broader base of operation than that afforded by MSPE.

In order to separate the responsibility from any particular society, a corporation was formed. This has obvious legal advantages both as to tax status and as to the incurring of any possible liabilities for slander and libel.

The corporation, CUPERL, Inc. provides little or no protection to its members if sued for damaging the reputation or destroying the livelihood of the parties under investigation. Great care must be used in the handling of the cases. Fortunately, the disclosure of data relating to alleged transgressors can be confined to the members of the corporation who have no obligation to report to the various societies or to anyone outside of their group.

The various engineering societies in the state may nominate one of their members for consideration for membership in the Corporation. The trustees of CUPERL usually follow these recommendations but there is no obligation to do so. The Corporation may select any registered professional engineer as a member. This serves to keep the corporation independent in fact from the engineering societies. There are nine members presently and another nine may be elected bringing the total to a maximum of 18.

The type of case which has arisen most frequently is a non-registered person offering engineering services to the public. In the recent state election several persons included a statement in their

political advertisements that they were engineers although they were not registered. In fact, some of them were a "far cry" from being engineers. Action was taken by CUPERL to bring about the satisfactory corrections in the above cases.

An alleged fraud in presenting surveying data to a public agency was brought to the attention of the Corporation. This has been discussed with the Attorney General's office and is presently being investigated.

A program is now underway by the various chapters of MSPE and by CUPERL to make sure that the various county, city and town engineers are registered. We have been informed that because of rulings on "Home Rule" the state cannot prevent towns and cities from assigning any title to their employees. We can, however, make sure that they do not practice or profess to practice professional engineering or land surveying without being registered. We have been successful in inducing some Boards of Selectmen to make registration a requirement in appointing Town Engineers.

In some States, the Board of Registration of Professional Engineers passes upon questions of ethical behavior. This provision is not included in the Massachusetts statutes nor has it been recommended as yet. These cases are brought to the attention of the Joint Committee on Professional Conduct. This Committee is sponsored by the American Society of Civil Engineers, Massachusetts Section; Boston Society of Civil Engineers; and the Massachusetts Society of Professional Engineers.

We have the basic machinery to keep a guiding hand on the profession. It is being utilized to a limited extent. Any person who is not satisfied with the efforts being made by the engineering societies should bring his complaints on violation of the engineering registration law or on a breach of ethics to the aforementioned committees.

#### CORRECTIVE ACTION NECESSARY

##### *Lack of Professionalism in Engineers' Behavior*

Many young engineering graduates ask why they should bother to take examinations for registration. The time, effort and expense involved is considerable. They observe that many more mature engineers working near them who, although registered, never are permitted to sign their name to the work, never have occasion to use their professional seals and seldom, if ever, are referred to in their places of

work as "engineers." This is a situation peculiar to the engineering profession and is almost never observed in the medical or legal professions.

One of the principal reasons for this lack of appreciation is in the use of titles. Many persons with full professional capabilities and often registered professional engineers are referred to in their places of work "designer," "chief draftsman," "stress analyst", "clerk-of-the-works," "inspector," and other designations which make no reference to engineer. On the other hand the titles "resident engineer," "project engineer," "safety engineer" and "right-of-way engineer" are applied to persons who many times are not registered and do not possess the qualifications for registration. We do not find architects making this mistake. They do not give a field inspector an architectural title, they refer to him as a "clerk-of-the-works."

It is enlightening to read the definition of "practice of architecture" as stated in the architects' registration law and this is as follows:

"Performing or agreeing to perform or holding one's self out as able to perform professional services in connection with the design, construction, enlargement or alteration of a building including consultations, investigations, evaluations, preliminary studies, aesthetic design, preparation of plans, specifications and contract documents, the coordination of structural and mechanical design, and site development, supervision of construction and other similar service or combination of service in connection with the design and construction of buildings regardless of whether one or all of these services are being performed regardless of whether these services are performed in person or as the directing head of an office or organization performing them, provided that the practice of architecture shall not include the practice of engineering as defined in this chapter but a registered architect may perform such engineering work as is incidental to the practice of architecture."

It is evident from the preceding that the architects intend to protect their profession and to become the leader in any grouping of professionals in the construction industry.

One of the most serious and damaging conditions is one where professional engineers work in a department or firm headed by a non-professional. The architects have discouraged this practice by refusing membership in the American Institute of Architects to persons employed by engineering firms or other non-architectural firms.

A bill was filed in the Massachusetts legislature, last year, to require that persons placed in charge of departments in state, county,

and municipal governments where professional engineers or land surveyors are employed, be, themselves, registered in the field which is practiced in that department. This bill was supported by many engineers including the writer. Unfortunately it failed to pass. Non-qualified men making final engineering determinations, in many cases, can be the cause of inferior or defective work as well as damage to the professional status of engineering. We can find many examples of major engineering works in and about Boston where this sort of decision making has raised havoc with our transportation system.

#### *Recognition of Other Professionals*

The very limited use of the stamp or seal of the professional engineer in Massachusetts is a major factor in the evaluating the importance of professional standing to engineers. It is not uncommon in thumbing through a set of possibly fifty construction drawings to find them all stamped and signed by the same engineer on the same day. Many of the drawings may be of a specialty with which he may be almost totally uninformed and may freely admit to having little or no competence. The engineer may give the reason that he has confidence in the man who prepared the drawings or that he bears the contract and financial responsibility for the work involved.

Certain parts of the Model Law state that drawings shall be stamped by the engineers who prepare them. The wording of the statutes is not sufficiently clear. The references to responsible charge of preparation of engineering work needs to be clarified in the law. A similar statement to that previously described for the work of employees and subordinates would be satisfactory in this respect. The writer believes it to be a gross violation of the principles of engineering registration. It also results in shoddy work when qualified professionals are not engaged and held responsible for the heating, ventilating, structural, electrical or other specialties involved.

This work of other professionals has been a sore point with many building inspectors and other regulatory officials reviewing plans. They have in many cases made it a point to call on the person whose seal appeared on the drawing for explanation and defense of the designs appearing over their signature and seal. In addition, they have refused to talk to any others whose names and seals did not appear on the documents.

These regulatory officials have also sought to obtain legislation by

which it would be necessary to state the field of specialty alongside the professional stamp. This is a misinterpretation of the present law. Engineers, of course, are not registered in their specialty. They are registered as professional engineers to practice within the profession to the limit of their capabilities. This is the same in the medical profession and in the legal profession. Specialties are listed in the roster only to signify the fields of practice under which the engineers listed their experience for consideration in their registration application.

There is no question that the engineer has the moral obligation of employing co-professionals in fields in which he himself does not profess competence. How much better it would be if this were evidenced by the engineers in the various specialties in electrical, mechanical, structural and the like being recognized by having their seal appear on the drawings for which they are responsible.

Fortunately, the practice is growing among engineering offices to have two seals on engineering drawings and documents involving specialties other than the field of the person in responsible charge of the entire project. In other words, the section of the drawings dealing with electrical work would bear the seal of the engineer specializing in this field as well as the seal of the engineer in responsible charge of the entire project.

#### *P. E. Designation*

In many states it is common and sometimes required that registered engineers write PE after their signature. This is in the same manner as a medical doctor writes MD after his signature. Engineers, particularly in New England, are reluctant to engage in this practice which touches on a sort of self-aggrandizement. It may well be that overcoming this modesty is a practical means of assuring better recognition as a professional. It is certainly worthy of very serious consideration.

#### *Effect of the Grandfather Clause*

There is no question that one of the most serious obstacles to the advance of professionalism and to recognition of registration as a symbol of professionalism is the great number of engineering registrations obtained by the use of the "grandfather" provision. Although this escape clause was in effect for only six months at the outset of the mandatory registration law of 1958, in Massachusetts, it resulted in

a large number of unqualified persons assuming the title of registered professional engineers.

These persons taking advantage of the "grandfather" clause needed to demonstrate to the Board that they actually practiced engineering at the time the law was passed and also they had to furnish endorsements from at least three registered professional engineers. It is enlightening that about 1,500 of these applications are still pending. The applicants have been unable to obtain any registered professional engineers who are willing to perjure themselves in stating these men were competent. The professional responsibility involved in endorsing others for participation in his profession, should always be kept in mind.

The requirement of the "grandfather" clause was brought about by the constitutional provision that a person cannot be deprived of his property without due process of the law. The right of a person to earn his living through the practice of a profession or to engage in a trade is one of the most valuable of property rights. However this may be justified from a legal standpoint, its practical effects have been harmful to the profession. Fortunately, it is not required to grant reciprocity to persons who obtain their license by this method.

Attempts have been made to have this "grandfather" clause reinstated; it has been and should be fought strenuously each time by the engineering societies. This condition will remove itself from the scene in a single generation. It should not be a "crutch" on which to base our reasons that nothing can be done about improving the registration laws and upgrading the practice of engineering.

#### *Corrections Necessary in Registration Law*

Efforts to have Massachusetts Registration Law brought up to the standards of the 1960 Model Law have been unsuccessful to date. Apparently engineers are not willing to agree on the provisions. This is not unexpected as you seldom find two lawyers who agree on the exact wording of a bill or for that matter any group of engineers in a discussion rarely agree. It has been reported in the National Council of State Boards of Engineering Examiners that there were fifty engineers present at a discussion of the provisions of the model law and there were fifty different expressions of opinion. However, explanations and discussions should bring about sufficient agreement so that an improved measure can be filed in Massachusetts, at least by December,

1965. Other states have upgraded their engineering laws to this 1960 standard. More than half the states have provisions more stringent than Massachusetts.

The writer has been on a BSCE committee charged with recommendations for revisions to the Massachusetts statutes. Even this committee was not in complete agreement. However, a draft of the proposed revisions has been circulated among many interested engineers for discussion purposes. The suggested revisions are as follows:

1. New definitions of land surveyors and engineers-in-training.
2. Provisions of a paid full-time executive secretary for the Board of Registration.
3. Requirement for written examination, without exception, for both professional engineers and land surveyors.
4. Set passing grade of examination at 70 per cent.
5. Provide for work of employee or subordinate for work not done under direction of registrant. This includes Field Engineers and Resident Engineers as well as work in specialties other than that of registrant.
6. Provide that board may employ counsel.

All of these items have been drafted but the committee is not yet in agreement as to Item 5.

The Metropolitan Chapter of the Massachusetts Society of Professional Engineers has filed a bill to provide for only the full-time executive secretary and for an increase in dues to pay for same. No general agreement could be reached on the other revisions.

### *Summary and Conclusions*

There is no question that the problems as usual are national in scope. Referring everything to the National Societies only results in a further stagnation. However, Massachusetts has led the way before and should again.

BSCE should join with ASCE Mass. Section and MSPE to form a formal discussion group with regular meetings to discuss and formulate courses of action on the following:

1. Revision of the Engineering Registration Laws to conform to the 1960 Model Law and to go beyond this if necessary to accomplish the desired goals as established in the areas of discussion.

2. Clarify the relationship which exists between engineering and science in the colleges, between technicians, graduate engineers, engineers-in-training and professional engineers.
3. Establish greater rapport between the practicing professional engineers and the professors and students in the colleges of engineering.