

## **NATURE OF ACCEPTABLE ENGINEERING WORK EXPERIENCE**

(NOTE: Pages 2 – 5 of this document also applies to Specified Scope of Practice Licensee applicants.)

Council has defined acceptable engineering work experience as:

- comprising the practice of professional engineering as defined in the Engineering and Geoscientific Professions Act;
- including the application of theory;
- providing exposure to or experience under the general headings of practical experience, management, communication, professionalism and ethical responsibilities, and the social implications of engineering;
- being obtained under the guidance and direct supervision of a professional engineer who assumes all responsibility for the technical quality of the work; and
- being obtained while the applicant is enrolled in the Association's examination program or as an Engineering Intern (for all work experience obtained in Manitoba).

**At least 48 months' experience is required.**

**At least twelve months of the required work experience must have been obtained in Canada or in a Canadian environment.**

Up to six months' engineering-related work (e.g. training, technologist-level work, etc.) may be included in the 48 months. In exceptional circumstances, up to 12 months' pre-graduation work experience may also be included in the 48 months, if it satisfies the criteria.

**To claim pre-grad experience or experience gained in another province or country, you must complete a progress report form for every position held. This experience must be validated by your supervisor (and professional member taking responsibility, if applicable). In these instances, the time period may be greater or less than six months.**

For all applicants, the nature and quality of the engineering work experience are the primary requirements. The time required to obtain the necessary experience may exceed the four-year minimum.

At an absolute minimum, the applicant's work experience must include the application of theory (and the applicant will be asked to list the subject areas of his or her academic background in which the experience was obtained), as well as some exposure to the areas of practical experience, engineering management, communication skills, professionalism and ethical responsibilities, and the social implications of engineering.

A complete lack of exposure to any one of these areas may render the applicant unsuitable for registration.

Exposure to these five areas may be obtained by on-the-job training, volunteer work, courses, participation in the activities of technical societies, etc. The applicant must show progression in technical capability, responsibility, maturity of judgment and communication proficiency. Evidence of both professional and personal development and improvement will be sought.

### **Application of Theory**

Acceptable engineering work experience **must** include the skillful application of theory. The application of theory is the backbone of engineering work experience, and it is mandatory- .

The application of theory should include active and responsible participation in several of the following:

- (1) **Analysis;** including scope and operating conditions, feasibility assessments, safety and environmental issues, technology assessment, and economic assessment.
- (2) **Design and synthesis;** including functionality or product specification, component selection, integration of components and sub-systems into larger systems, reliability and maintenance factors, compliance with codes and standards, human and environmental aspects, and societal implications.
- (3) **Testing;** including methodology and techniques, functional specification verification, and new product or technology commissioning and assessment.
- (4) **Implementation;** including technology application, engineering cost studies, optimization techniques, process flow and time studies, quality assurance implementation, cost/benefit analyses, safety considerations, environmental assessments, and maintenance and replacement evaluations.

### **Practical Experience**

Practical experience should provide the applicant with opportunities to implement engineering designs and experience the practical limitations of real systems. Practical experience should include:

- (1) **Visits to existing engineering works;** to experience the assembly, installation, testing, commissioning, assembly, operation and maintenance of equipment and systems.
- (2) **Application of equipment as part of the larger system;** including the merits of reliability, the role of computer software, and the relationship of the engineering work to the equipment.

- (3) **Opportunities to observe the limitations of practical engineering and related human systems;** including, for example, limitations of production methods, manufacturing tolerances, performance minima, and maintenance philosophies.
- (4) **Opportunities to experience the significance of time in the engineering process;** including difficulties of work-flow, scheduling, equipment wear-out and replacement scheduling.

### **Engineering Management**

While it is recognized that most engineers-in-training will have limited opportunity to become involved in the management of engineering projects, the assumption of increased responsibility is an important aspect of qualifying experience, as is the general exposure to the engineering business environment.

Management of engineering works includes the supervision of staff, project management, and the management of technology from a societal perspective. Representative management components include:

- (1) **Planning;** from identification of requirements, concept development and assessment of resources required, through to social ramifications of project implementation.
- (2) **Scheduling;** from establishing interactions and constraints, developing activity or task schedules, and allocation of resources, through to the assessment of delay impacts and beyond to broader aspects such as interactions with other projects and the market-place.
- (3) **Budgeting;** from the development of both a conceptual budget and its detailed counterpart identifying labour, materials and overhead, through to risk assessment of cost escalation potential and an ongoing review of budgetary considerations in light of change.
- (4) **Supervision;** which includes leadership and professional conduct, organization of manpower, team building, and management of technology.
- (5) **Project control;** which requires understanding the elements of a greater whole, coordination of phases of the project work, and monitoring of expenditures and schedules and taking appropriate action.
- (6) **Risk assessment;** related to operating equipment and system performance, product performance, and social and environmental impacts.

### **Communication Skills**

The development of communication skills is an important experience requirement. Effective communication with superiors, co-workers, government regulators, clients, and the general public is essential. The candidate should demonstrate increasing proficiency in the written and oral presentation of engineering work, including correspondence and record-keeping and through to major reports. The candidate

should also demonstrate increasing proficiency in the ability to read technical drawings and to present ideas in the form of sketches or drawings.

## **Professional and Ethical Responsibilities**

By working under the direct supervision of a registered professional engineer, the applicant should be exposed to professional conduct in the workplace, should demonstrate integrity, the ability to assume responsibility and a commitment to life-long learning, and should gain an appreciation of such ethical considerations as:

- (1) The responsibility of the engineer to the public.
- (2) The responsibility of the engineer to the profession.
- (3) The responsibility of the engineer to the client and/or employer.
- (4) The responsibility of the engineer to the employee.
- (5) The responsibility of the engineer to perform work tasks with full regard for the environment and the policy and guidelines for Sustainable Development.

## **Social Implications of Engineering**

The social implications of engineering are becoming an increasingly important aspect of the practice of engineering. The work environment should provide opportunities for the applicants to heighten their awareness of the potential consequences, both positive and negative, of their engineering projects, including:

- (1) Recognition of the value or benefits of the engineering works to the public.
- (2) Recognition of safeguards in place to protect the public and mitigate adverse impacts.
- (3) Understanding of the relationship between the engineering activity and the public-at-large.
- (4) Recognition of, and involvement with, the broader social implications of engineering.
- (5) Recognition of the significant role of regulatory agencies on the practice of engineering.

The overriding objective is to provide experiences which will foster an awareness of the engineer's professional responsibility to guard against conditions dangerous or threatening to life, limb, property, or the environment, and to call any such conditions to the attention of the authority having jurisdiction over the matter and/or the person having professional responsibility.

## **Quality of Engineering Work Experience**

The minimum requirement of four years of engineering work experience is based on the presumption that it takes at least four years for an engineering graduate to reach a level of competency to be considered fully qualified to accept professional responsibility. Applicants may require more than the minimum four years because of the nature of their engineering work experience.

Some quality aspects to be assessed include increasing work complexity; increasing responsibility; the effect of employment interruptions or changing assignments on the applicant's retention of, and ability to build upon, the experience gained; employment responsibilities that are not of an engineering nature; whether the engineering work performed was in the discipline of graduation; and the degree of supervision by, and guidance of, professional engineers.

All of these factors are taken into account. The simple passage of time is not sufficient.

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