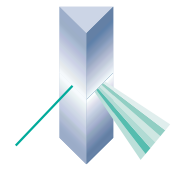


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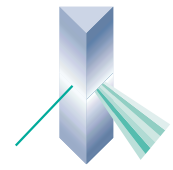
# **Guide to the Required Experience for Licensing as a Professional Engineer in Ontario**



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## 1. INTRODUCTION

Professional Engineers Ontario (PEO) is empowered under the *Professional Engineers Act* to establish the standards for admission and to regulate the practice of engineering in the province. The association is mandated to ensure public safety and welfare where engineering is concerned. In addition, PEO provides leadership to the profession and promotes professional engineers' contribution to, and facility in, the application of science and technology to benefit humankind. The establishment of similar standards for entry into the profession, in each jurisdiction across the country, permits mobility of Ontario professional engineers from one province (or territory) to the other. Furthermore, Ontario professional engineers have gained greater recognition within a world of technology without boundaries and with instant communications.

This Experience Requirements Guide aims to assist engineering graduates, their supervisors, referees, and employers gain an understanding of the quality-based requirements for licensing associated with these standards. The profession relies on individuals and firms that provide the experience opportunities to engineering graduates and act as referees in the licensure process.

Indeed, this Experience Requirements Guide has as much significance for the sponsors of licence applicants, their employers and the applicants themselves. The suitability of an applicant's experience for licensure is assessed against five quality-based experience criteria that specifically define acceptable engineering experience and are described in Section 2.2 of this Experience Requirements Guide.

They are:

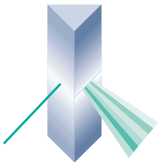
- ◆ Application of Theory
- ◆ Practical Experience
- ◆ Management of Engineering
- ◆ Communication Skills
- ◆ Social Implications of Engineering

It is the responsibility of the applicant to demonstrate that the engineering experience requirements have been met to the satisfaction of the association.

This Experience Requirements Guide refers only to the engineering experience requirements for the professional engineer licence. For information concerning satisfying other requirements, such as those for a Certificate of Authorization for those offering engineering services to the public, please contact PEO.

### **Applicants for a professional engineer licence:**

- ◆ are required to demonstrate 48 months of verifiable acceptable engineering experience gained following graduation;
- ◆ are eligible to receive credit of up to 12 months of pregraduation experience toward the 48 months of required experience;
- ◆ normally receive credit for the successful completion of postgraduate engineering degree(s) from a PEO-recognized university;
- ◆ must acquire at least 12 months of acceptable engineering experience in a Canadian jurisdiction, under a licensed professional engineer (P.Eng.). This experience must be in addition to that obtained at the pregraduation stage and/or toward a postgraduate degree.



## 2. PEO'S ENGINEERING EXPERIENCE REQUIREMENTS

Applicants who satisfy the requirements described in this Experience Requirements Guide will have confirmed that they have the ability to exercise sound engineering judgment, function on multidisciplinary teams, and communicate effectively in the work environment and with society at large. The experience that has been acquired, however, should be considered simply a first step in the lifelong process of continued learning, to ensure continuing competence as a professional engineer is maintained.

### 2.1 Internship

The period of supervised engineering experience serves as an internship for individuals who have the necessary academic qualifications to apply for a professional engineer licence. During this period, such individuals will benefit by being enrolled as Engineering Interns (please refer to section 4 of this Guide) with PEO, and participating in opportunities for their professional development. The profession, as represented by practising professional engineers and their employers, supports prospective professional engineers by providing them with the opportunity to enter full professional practice, all the while maintaining professional responsibility and safeguarding the public interest.

PEO examines the nature, quality, duration and currency of each applicant's experience with one or more employers, and evaluates this experience against prescribed criteria. Individuals and firms are expected to provide experience opportunities, act as referees in the licensing process, or serve as mentors where required.

Engineering experience should be compatible with the applicant's particular area of academic qualification. If there is incompatibility between the academic and experience qualifications (for example, a mechanical engineering graduate whose experience has been acquired working mainly in a civil engineering domain), additional experience, perhaps complemented by relevant studies, will be required.

### 2.2. Criteria for Acceptable Engineering Experience

Experience is a major component in forming the engineering graduate on his or her way to achieving

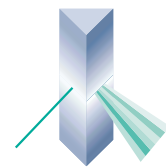
licensing as a professional engineer. The responsibility of providing the appropriate environment, opportunity, range and progression of activities to meet the experience criteria rests with the firms that provide the working environment and the individuals who provide supervision during the internship period.

A mandatory component of acceptable engineering experience, application of theory, must be demonstrated over a substantial part (but not necessarily all) of the internship period. It must be supplemented by exposure to, or experience in, the broad areas of practical experience, management, communication, and the social implications of engineering. Without at least some appropriate exposure to each of these other components, an applicant will be ineligible for licensing.

#### 2.2.1 Application of Theory

Skilful application of theory is the hallmark of quality engineering work. Experience must therefore include meaningful participation in at least one aspect of the following applications of theory:

- ◆ *analysis*, including scope and operating conditions, performance assessment, safety and environmental issues, technology assessment, economic assessment, reliability analysis;
- ◆ *design and synthesis*, including functionality or product specification, component selection, integration of components and sub-systems into larger systems, reliability and maintenance factors, environmental and societal implications of the product or process, quality improvements;
- ◆ *testing methods*, including devising testing methodology and techniques, verifying functional specifications, new product or technology commissioning and assessment;
- ◆ *implementation methods*, including applying technology, engineering cost studies, optimization techniques, process flow and time studies, implementing quality control and assurance, cost/benefit analysis, safety and environmental issues and recommendations, maintenance and replacement evaluation.



### 2.2.2 Practical Experience

Practical experience provides applicants with an appreciation of the fundamental roles of function, time, cost, reliability, reparability, safety and environmental impact in their work. Practical experience should include such components as:

- ◆ *the function of components as part of the larger system*, including, for example, opportunities to experience the merits of reliability, the role of computer software, or the relationship of the end product to the equipment and to the equipment control systems;
- ◆ opportunities to experience and understand *the limitations of practical engineering and related human systems in achieving desired goals*, including, for example, limitations of production methods, manufacturing tolerances, operating and maintenance philosophies, ergonomics;
- ◆ opportunities to experience *the significance of time in the engineering process*, including difficulties of work flow, scheduling, equipment wear out, corrosion rates and replacement scheduling;
- ◆ opportunities to acquire *knowledge and understanding of codes, standards, regulations and laws that govern applicable engineering activities*.

### 2.2.3 Management of Engineering

Management of engineering projects includes supervising staff, managing projects, being exposed generally to an engineering business environment, and managing technology from a societal perspective. Acceptable management components involve:

- ◆ *planning*, from identifying requirements, developing concepts, evaluating alternative methods and assessing required resources, to planning for the social ramifications;
- ◆ *scheduling*, from establishing interactions and constraints, developing activity or task schedules, allocating resources, and assessing the impact of delays, to determining and assessing projects' interactions with other projects and the marketplace;
- ◆ *budgeting*, from developing conceptual and detailed budgets identifying labour, materials and overhead, to assessing risk of cost escalation, and reviewing budgets in light of change;
- ◆ *supervision*, including leadership and professional

conduct, organizing human resources, motivating teams, and managing technology;

- ◆ *project control*, requiring understanding of the elements of a greater whole, coordinating phases of project work, and monitoring expenditures and schedules and taking corrective action;
- ◆ *risk assessment*, relating to operating equipment and system performance, technological risk, product performance, and social and environmental impacts.

### 2.2.4 Communication Skills

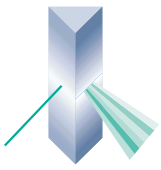
An opportunity to develop communication skills is an important experience requirement. This applies to all areas of the work environment, including communication with supervisors, co-workers, government regulators, clients and the general public. For an applicant's experience in this area to be acceptable, the applicant should have regular opportunities to participate in:

- ◆ *preparing written work*, including day-to-day correspondence, design briefs, and participating in preparing major reports;
- ◆ *making oral reports or presentations* to co-workers, supervisors and senior management, and to clients or regulatory authorities;
- ◆ *making presentations to the general public* as such opportunities arise.

### 2.2.5 Social Implications of Engineering

As emphasized in many of the experience components associated with the four quality-based criteria described above, the social implications of engineering are an important aspect of engineering practice. A professional engineering work environment is one that heightens an applicant's awareness of any social consequences, both positive and negative, of an engineering activity undertaken. While not every project or activity will have direct or immediate social consequences, an applicant's work experience should, nevertheless, instill an awareness of:

- ◆ the value or benefits of engineering works to the public;
- ◆ the safeguards in place to protect the employees and the public and mitigate adverse impacts;
- ◆ the relationship between engineering activity and the public at large;
- ◆ the significant role of regulatory agencies on the practice of engineering.



Experience in this area should foster an awareness of an engineer's professional responsibility to guard against conditions dangerous or threatening to life, limb, property, or the environment, and to call such conditions to the attention of those responsible.

### 2.3. Length of Experience

All applicants for licensure will be required to demonstrate at least four years of verifiable acceptable engineering experience before licensing can be obtained. *At least one year of all applicants' experience must be acquired in a Canadian jurisdiction, under the direction of a professional engineer.*

### 2.4. Credits for Pregraduation Experience and Postgraduate Studies

Applicants may be granted up to 12 months' credit for experience acquired prior to the completion of their undergraduate degree. The quality of the pre-graduation experience (co-op, sandwich year, summer engineering employment) will be measured against the five quality-based criteria. Only pregraduation experience acquired after the midpoint of an undergraduate program is eligible for credit. **Pregraduation experience is only eligible for credit towards the experience requirements for candidates who applied after July 1, 1998.**

If an applicant successfully completes a "Confirmatory Examination Program," all engineering experience acquired from the date the applicant's engineering degree was awarded is eligible for credit toward PEO's experience requirement. If an applicant has satisfied PEO's academic requirements by completing specific (non-confirmatory) examinations, some of the experience acquired during the undertaking of the examinations may also be eligible for credit toward the experience requirement.

In addition, applicants normally receive a one-year experience credit for successful completion of a postgraduate degree in engineering in the same discipline as their undergraduate degree. They may receive additional work experience credits for postgraduate studies, following an assessment against the five quality-based experience criteria. Total experience credits awarded for postgraduate studies cannot exceed the time spent achieving the postgraduate degrees.

*All applicants, including those whose experience has been gained in other countries, must acquire at least 12 months' experience in a Canadian jurisdiction, under the direction of a professional engineer licensed in Canada.*

### 2.5. Roles of Referees and Supervisors

Individuals who serve as supervisors or provide references in support of an applicant's application are a vital component of the licensing process. Three references, of which two must come from licensed professional engineers who are familiar with details of the applicant's work for the experience claimed, are normally required. The third should at least be a person in authority at the applicant's place of employment or at a client firm. The applicant's present and past direct supervisors are the most suitable referees. If an applicant is claiming experience from multiple work situations, additional referees may be required.

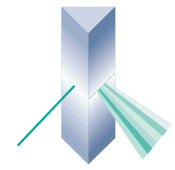
Referees should provide information regarding the applicant's technical ability in the application of theoretical engineering principles, facility to communicate orally and in writing, ability to work on a team and to exercise professional judgment. Referees should also attest whether the applicant is of good character, as demonstrated through such personal attributes as honesty and integrity.

Professional engineers who serve as supervisors or referees are obligated to:

- ◆ provide guidance, encouragement and support to the applicant during the internship period;
- ◆ be sufficiently familiar with the details of the applicant's work, either through direct supervision or ongoing direct contact, to be able to attest that each portion of the work experience qualifies within the context of this Experience Requirements Guide.

### 2.6. Role of the Employer

Providing a working environment that will enable engineering graduates to enter full professional practice is in the best interests of an employer. Employees seeking licensure are demonstrating to their employers that they embrace the concept of professionalism, and are willing to be bound by the profession's Code of Ethics requiring fairness and loyalty to employers, colleagues and clients.



Professional engineering licensure is recognized by licensing bodies in all jurisdictions in Canada. Internationally, a Mutual Recognition Agreement that includes Australia, Ireland, the United Kingdom, New Zealand, South Africa, Hong Kong, and Canada as signatories has further served to raise the profile of the academic preparation of Canada's professional engineers throughout the world. Mobility provisions are also being negotiated between Canada, Mexico and the United States to accommodate professional engineers with extensive experience.

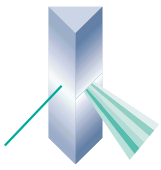
As part of providing a working environment that is conducive to licensure, employers are encouraged to instill an appreciation of the need for prospective professional engineers to commit to lifelong learning, to join technical societies, and to enroll as Engineering Interns (Section 4). PEO provides them with periodic experience assessments aimed to help ensure they achieve licensure within the prescribed period.

Employers of prospective professional engineers should be aware of PEO's licensing requirements, particularly the five quality-based criteria against which the experience of their employees will be

evaluated (Section 2.2). Where an applicant is involved in sales or marketing activities, construction management, supervision, or maintenance, particular attention should be paid to Section 3 for an interpretation of the experience requirements relative to these activities.

The working environment that provides, to the greatest extent possible, opportunities for licence applicants to obtain appropriate and acceptable experience is one in which the employer provides that:

- ◆ the applicant has sufficient exposure to a significant majority of the components described in Section 2.2 of this Guide;
- ◆ progression of these activities and experiences will lead to the applicant's increased involvement and responsibility with time;
- ◆ the applicant is directly supervised by, or at least has on-going contact with, a professional engineer during the various components of the experience.



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### **3. INTERPRETATION OF ENGINEERING EXPERIENCE REQUIREMENTS IN SPECIFIC AREAS OF PRACTICE**

#### **3.1 University Teaching**

Applicants whose engineering experience consists of, either in whole or in part, university teaching will be evaluated to ascertain if the teaching experience complies with the criteria for acceptable engineering experience. Such activities as providing specialized advice to industry, conducting or supervising applied research and development work, or the teaching of upper-year engineering science courses, analysis and design, will normally constitute acceptable experience. However, the teaching of basic courses to students in the early years of their degrees may not constitute acceptable engineering experience. Also, teaching outside of an engineering faculty does not fall within the definition of the practice of engineering. PEO will assess the actual tasks performed by these applicants to delineate those portions of their tasks that are acceptable engineering experience for licensing purposes.

#### **3.2 Community College and Technical Institute Teaching**

Under normal circumstances, community college and technical institute teaching falls outside the definition of acceptable engineering experience. However, industry consultations and employment undertaken during sabbaticals or of a part-time nature may be considered, and will be evaluated against the experience criteria.

#### **3.3 Sales and Marketing Activities**

Sales and marketing activities can vary immensely from position to position and can similarly vary from tasks that have little or no requirement for engineering expertise, and thus little engineering experience gained, to positions where a high level of engineering competence is necessary. Applicants whose experience has been entirely or partially in the areas of sales and marketing will be evaluated carefully, having due regard to the actual tasks that have been performed, the degree to which the mandatory experience component of “application of theory” has been achieved, and whether the applicant’s work has required the supervision of a professional engineer. In most circumstances, an applicant whose sole employment has been in the area of sales and marketing will require

employment for more than the minimum experience requirement of four years, to obtain suitable engineering experience.

Consideration will be given to the following types of experience:

- ◆ providing professional advice and guidance in the selection of equipment, a product or service;
- ◆ providing technical assistance during the application of a process or installation of equipment;
- ◆ conducting technical seminars for engineers as part of the marketing of specialized materials, equipment or processes;
- ◆ design work associated with the marketing and sale of materials, equipment or processes.

Suitable experience will not be gained from doing clerical tasks, routine administration, or the simple act of persuading a customer to purchase a product or service.

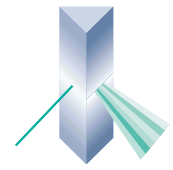
#### **3.4 Military Experience**

Graduates in the armed forces sometimes find themselves in line positions that may provide command experience of great value to personal development, but may sometimes also provide limited acceptable engineering experience. The experience of these applicants will be treated the same as that of those working in civilian occupations.

It is important that applicants provide a complete description of activities in order that they can be evaluated against the criteria for acceptable engineering experience.

#### **3.5 Project Management and Supervision**

Applicants whose sole experience has been in the field of project management or supervision will be evaluated carefully to ascertain if the requirements for “application of theory” have been adequately met. Under normal circumstances, if an applicant’s sole engineering experience has been in construction management, it is unlikely that this experience criterion will have been satisfied. The applicant may be advised to take a position for a period of time in a



role that involves application of theory, in order to supplement the experience gained in a construction management or supervisory role.

Well-documented evidence of field experience in “problem solving” and development of sound engineering judgment may satisfy the “application of theory” criterion.

Consideration will be given to the following types of experience:

- ◆ scheduling and cost control of large, highly-technical projects, utilizing sophisticated scheduling and control techniques;
- ◆ technical supervision of the construction and installation of materials and equipment;
- ◆ problem solving and component design.

It is unlikely that suitable experience will be gained from duties involving preparing bids not requiring engineering evaluation, or from ordering materials.

### **3.6 Operations and Maintenance**

With the increasing complexity of industrial processes, it is possible that there will be applicants whose entire employment, after graduation, has been in the area of operations and maintenance. Again, as in many of the classifications above, the applicant will be carefully evaluated for “application of theory.”

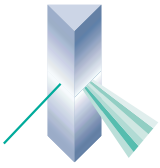
An evaluation of the applicant’s actual work history, responsibilities, and the degree of involvement in

analysis and design will be performed. Work experience exclusively in the area of operations and maintenance will frequently fall short of the requirements for licensing and the applicant will be advised to obtain experience in a position involving the application of theory.

Consideration will be given to the following types of experience:

- ◆ designing, developing, and upgrading product or production systems specifications;
- ◆ providing technical assistance during commissioning of structures, equipment, processes or systems;
- ◆ designing, developing, managing, and upgrading maintenance programs;
- ◆ developing, managing, and upgrading methodologies for production planning and scheduling, inventory management, process, quality and cost control;
- ◆ developing and upgrading production standards and analyzing production problems;
- ◆ analyzing equipment failures and applying non-destructive evaluation methods.

Suitable experience will not be gained from duties involving purchasing materials, equipment and supplies of a non-technical nature, collective bargaining or the administration of collective agreements, or from supervising workers on a day-to-day basis in the performance of routine maintenance.

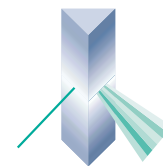


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## 4. THE ENGINEERING INTERN TRAINING (EIT) PROGRAM

If applicants have satisfied PEO's academic requirements and have not yet completed the experience requirement, they should apply for registration in the Engineering Intern Training (EIT) program. It:

- ◆ helps applicants assess the acceptability of their experience. PEO will review an Engineering Intern's experience and advise of any apparent deficiencies;
- ◆ demonstrates to employers that the applicant is serious about being licensed as a professional engineer;
- ◆ allows the applicant to join a chapter and attend chapter meetings;
- ◆ allows the applicant to participate in PEO's insurance programs and the Ontario Society of Professional Engineers' (OSPE) Career Centre program;
- ◆ entitles the applicant to receive PEO's award-winning journal *Engineering Dimensions*, *The Link* and *EngineerMENTOR*, PEO's EIT publication.



## 5. ENGINEERING EXPERIENCE RECORD

The final section of this Experience Requirements Guide covers the format that should be used when submitting your experience record for evaluation by PEO. An applicant should prepare this summary carefully, and complete it only after becoming familiar with the contents of this Experience Requirements Guide. Applicants participating in PEO's EIT program will submit this experience record to PEO annually. PEO will then advise on areas in which the experience may not yet meet the necessary criteria. Applicants who are being offered the opportunity to attend an Experience Requirements Committee interview should follow the specific guideline provided at that time.

You must give a clear summary of your engineering experience in a reverse chronological format by month and year. Include names and addresses of all employers and a technical outline of the nature of the duties and responsibilities associated with each position. Periods of absence from employment (travelling, unemployed) should also be listed with dates.

Satisfactory engineering experience is that which complements your academic engineering training. Activities should involve engineering, design, analysis and synthesis, and should provide for the development of responsibility, judgment, communication skills and self-confidence.

The elements of satisfactory engineering experience for licensing purposes are described in Section 2.2 of this guide. A substantial exposure to the first, "Application of Theory," is mandatory while a reasonable exposure to the remaining four elements is sufficient. A complete lack of exposure to any one of these areas may render the applicant unsuitable for licensure.

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 engineer(s).

All of the above-noted factors are taken into account when assessing the final Experience Record. The simple passage of time is not sufficient.

To assist with PEO's review and help you ensure that your Experience Record provides adequate information, it is suggested that your Record be organized as follows:

- ◆ For each position about which you are reporting give the dates (day, month and year), position title, company name and a paragraph describing your job responsibilities with an emphasis on the engineering duties; and
- ◆ Describe how the work experience obtained in that position meets each of the five criteria (application of theory, practical experience, management of engineering, communication skills and social implications of engineering) paying particular attention to the "application of theory".

Applicants are reminded that this Experience Record is not a résumé for use in applying for employment. It is a record of your engineering experience and as such must inform us as to what specific engineering work you have personally performed. Please avoid the use of the third person. Terms such as "manage", "review" or "direct" are imprecise and should be avoided when discussing your experience under the application of theory.

Questions concerning the engineering experience required for licensing, or the licensing process, should be directed to PEO's Admissions Department at (416) 224-1100 or (800) 339-3716, or write to us at PEO, 25 Sheppard Avenue West, Suite 1000, Toronto ON M2N 6S9. We can also be reached by fax at (416) 224-8168 or (800) 268-0496.

Visit PEO's site on the World Wide Web for updates concerning PEO's experience requirements. The URL is <http://www.peo.on.ca>.