



CANADIAN COUNCIL OF PROFESSIONAL ENGINEERS
CONSEIL CANADIEN DES INGÉNIEURS

**NATIONAL GUIDELINE
FOR
ENGINEER-IN-TRAINING PROGRAM**

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PREAMBLE

Provincial and territorial Associations/Ordre of professional engineers are responsible for the regulation of the practice of engineering in Canada. Each Association/Ordre has been established under provincial/territorial legislation and serves as the licensing authority for engineers practising within its jurisdiction. The Canadian Council of Professional Engineers (CCPE) is the national federation of these Associations/Ordre. CCPE provides a co-ordinating function among the provincial and territorial Associations/Ordre, fostering mutual recognition and encouraging the greatest possible commonality of operation in their licensing functions.

CCPE issues guidelines on various subjects to achieve co-ordination among its constituent member Associations/Ordre. These guidelines are an expression of general principles, which have a broad basis of consensus, while recognizing and supporting the autonomy of each constituent Association/Ordre to administer its engineering act. CCPE guidelines enunciate the principles of an issue but leave the detailed applications, policies, practices, and exceptions to the constituent Associations/Ordre.

This guideline has been prepared by the Canadian Engineering Qualifications Board (CEQB) in consultation with the Constituent Associations/Ordre, and adopted by the Canadian Council of Professional Engineers. Its underlying objective is to provide the forum for standardizing an approach to Engineer-in-Training (EIT) programs. They must all be aware of, and understand the requirements for licensing as a professional engineer as well as understand what the practice of professional engineering means with respect to the application of engineering principles and with respect to the safeguarding of life, health, property, economic interests, the public welfare or the environment.

1 INTRODUCTION

Provincial/territorial legislation requires individuals who practice engineering in each jurisdiction to be licensed by the appropriate engineering Association/Ordre. To be licensed, applicants must:

- Be academically qualified;
- Have obtained sufficient acceptable engineering work experience in their areas of qualification;
- Have an understanding of local practices and conditions;
- Be competent in the language of their jurisdiction of practice;
- Be of good character; and
- Demonstrate an understanding of professional practice and ethics issues.

Once the academic qualifications have been obtained, the remaining requirements (with the possible exception of language competency) are met during a period of time (four years as per the *Guideline on Admission to the Practice of Engineering in Canada, 2001*) in which the applicant should be an EIT. It is during this time period that the EIT would develop from being a candidate for licensure into being a professional.

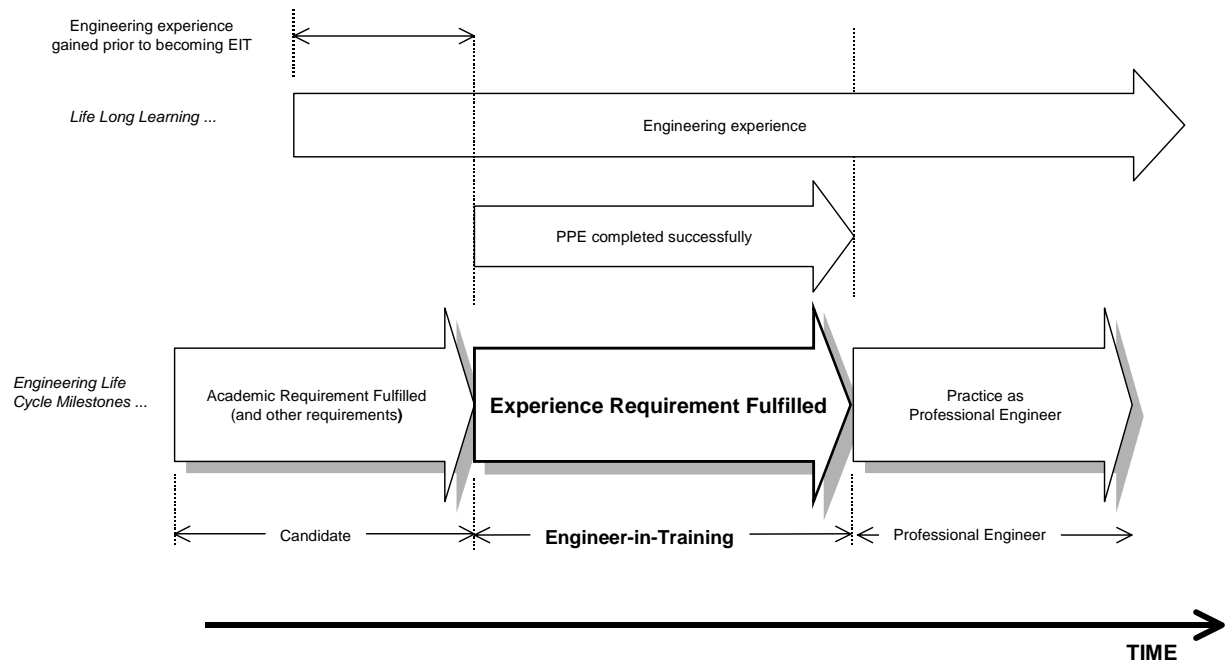


Figure 1: EIT Program - How It Fits In

1.1 Purpose of the Engineer-in-Training Program

The purpose of the EIT Program is to help ensure the development of the EIT from an engineering graduate to a fully qualified professional engineer who is technically and professionally capable of assuming responsibility for the practice of professional engineering as defined in the *Guideline on the Definition of the Practice of Professional Engineering, 2001*. The EIT program provides the link between being a candidate for licensure (as a Student or as an International Engineering Graduate (IEG)) and any programs for continuing competence or professional development, as illustrated in Figure 1. It is structured to help graduates of both CEAB-accredited programs and non-accredited programs meet the engineering work experience requirements and develop and demonstrate knowledge of professionalism and ethics. It will help the individual EIT understand his or her relationship with the employer/client, the Association/Ordre, and society, as illustrated in Figure 2. The EIT can contribute to all three of these in different ways and, by so doing, the EIT becomes the driving force behind his or her own success.

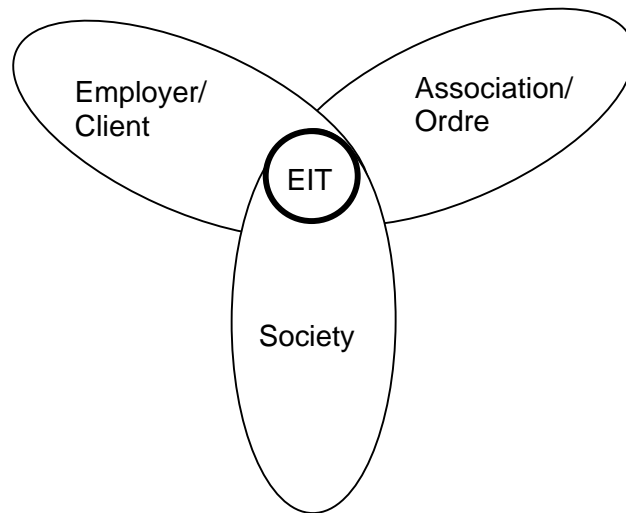


Figure 2: EIT Interaction

1.2 Value of the Engineer-in-Training Program

The value of the EIT Program to the employer/client is that the end product of the Program is a Professional Engineer who has qualifications, experience and skills in addition to academic education. The employers gain insight into the engineering profession, gain understanding of the professional needs of their engineering staff and benefit from building a cadre of professionals in-house.

The value of the EIT Program to the EIT is the guidance provided to help ensure that quality experience is obtained, professionalism and ethics are developed, and licensure is achieved as seamlessly as possible. An EIT program also introduces the concept of lifelong learning and emphasizes the importance of self-regulation.

The value of the EIT Program to society is that the EIT will have gained a thorough understanding of the paramount impact of his or her undertakings on the safeguarding of life, health, property, economic interests, the public welfare and the environment. The EIT will also have learned to contribute to society in a meaningful way through volunteer participation and other means.

The Association/Ordre will benefit from having an EIT Program that brings engineering graduates into the profession, enables it to monitor their work experience and provide them with meaningful feedback. The engineering profession gains better-prepared and professionally motivated members at the time of registration, fewer difficult borderline cases for determination at admission, higher quality assurance with respect to admitted candidates and an increased relevance and interaction with employers.

This guideline provides the framework for the development and implementation of an EIT Program. It is provided to the constituent Associations/Ordre in order to promote a common basis for such programs. By adopting this Guideline, the Associations/Ordre will be helping to ensure sufficient commonality of EIT Programs to allow for the relatively seamless mobility of EITs across Canada.

2 ROUTE TO LICENSURE THROUGH ENGINEER-IN-TRAINING PROGRAM

Candidates seeking licensure in Canada have varied backgrounds and as a result there may be alternative paths through the EIT Program. All candidates for licensure should be encouraged to proceed through the EIT program to take advantage of the structured guidance offered by the supervisor and/or mentor in ensuring that they are gaining relevant engineering work experience to satisfy the work experience requirements. This guidance includes what types of engineering work meets the requirements as well as how to present the necessary information to the licensing body. All recent graduates, whether from CEAB-accredited programs or non-CEAB accredited programs, should be encouraged to proceed through the full EIT Program. Also, CEAB and non-CEAB accredited program graduates with many years of experience should be encouraged to enrol in the EIT program for the time required for them to demonstrate their experience (or gain experience in a Canadian environment), demonstrate their continued professional development and participation-related development where applicable, and write the Professional Practice Examination. It is recognized that not all applicants for licensure will be enrolled in an EIT program; nonetheless, employers, supervisors, mentors and associations/ordre are reminded that the required elements of the EIT program apply to all applicants.

3 ENGINEERING WORK EXPERIENCE

A minimum of four years of acceptable engineering work experience, including at least one year in a Canadian environment¹, is required. The Canadian environment requirement is to ensure that the EIT has a good knowledge of local Canadian practices.

The *Guideline on Admission to the Practice of Engineering in Canada* defines acceptable engineering work experience as:

- comprising the practice of professional engineering (see *CCPE guideline "Definition of the Practice of Professional Engineering"*);
- being normally consistent with the field of academic qualification;
- being current;
- including the application of theory (see *Interpretive Guide IV - (Admission) "Components of Acceptable Engineering Work Experience"*);
- including exposure to the broad areas of practical experience, management, communication, and the social implications of engineering (see *Interpretive Guide IV - (Admission) "Components of Acceptable Engineering Work Experience"*);
- demonstrating progression and growth;
- being normally obtained following academic qualification (with exceptional pre-graduation experience limited to one year); and
- being normally obtained under the guidance and supervision of a professional engineer.

¹ Canadian Environment is defined as work experience obtained in Canada supervised by a professional engineer licensed in the applicable Canadian jurisdiction, or work experience acquired outside Canada where applicants demonstrate a good knowledge of local Canadian engineering laws, practices, standards, customs, codes, conditions and climates. Source: *Guideline on Admission to the Practice of Engineering in Canada, (G01-2001)*

- being normally recorded and/or reported to the respective Association/Ordre.

All engineering work experience will be evaluated against these criteria. No experience will be automatically credited or discounted.

The *Guideline on Admission to the Practice of Engineering in Canada* recommends that engineering work experience normally be obtained while applicants are enrolled as EITs, to help ensure that they obtain the guidance and supervision necessary to prepare them technically and professionally for licensing.

Under the EIT Program, every EIT should ideally have a supervisor who is a professional engineer. The supervisor should provide technical and professional guidance to the EIT, and assume responsibility for the engineering work done by the EIT. In situations where the EIT's supervisor is not a professional engineer, the employer should ensure, where appropriate, that a professional engineer is taking responsibility for the EIT's work. Ideally the supervisor's discipline should be the same as, or closely related to, that of the EIT. The EIT's supervisor as well as the professional engineer who is taking responsibility for the EIT's work if the supervisor is not a professional engineer must carry out the assessment of the EIT's engineering experience.

Ideally a professional engineer should also be assigned to the EIT to serve as a mentor for the duration of the EIT Program. The mentor should provide the guidance that the EIT requires to help ensure that he or she is aware of the components of acceptable engineering work experience as detailed in the Interpretive Guide IV to the Admission Guideline and is engaged in work having suitable and sufficient engineering content to address these components. The mentor should help ensure that the experience as reported in the EIT's diaries/logbooks is presented in a logical format, including summaries, to address the published components of acceptable engineering work experience.

All EITs should be asked to keep detailed records of their work experience, and all EITs and supervisors or mentors should be required to report regularly on the EIT's experience and growth to the Association/Ordre.

The Association/Ordre should evaluate the information received to determine whether the EIT's experience is acceptable, within the framework described in the *CCPE Guideline on the Admission to the Practice of Engineering in Canada*, and provide timely guidance and feedback to the EIT on the work experience accumulated to date. The reporting and feedback process may include written or on-line reports, journals, diaries, "log books", and/or interviews, etc., and should provide the EIT with an indication of his or her progress to date. This progress should be transferable, should the EIT relocate to another jurisdiction.

3.1 Professional Development

3.1.1 Non-Technical Skills

While enrolled in an EIT Program, EITs should engage in the continuing professional development of their non-technical skills as well as their technical skills.

Non-technical skills have become increasingly more valuable to industry due to, among other things, the widespread adoption of new organizational models. They are becoming critical considerations in recruitment and career advancement decisions. The key non-technical skills that have taken on increased importance are the skills required to ensure the effectiveness of a team. It is vital that EITs acquire these important skills to maximize their value to the employer. EITs should, in consultation with their supervisors/mentors, ensure that they develop the skills needed for licensure as well as for the enhancement of their careers, in the following areas:

- Communication
- Interpersonal skills
- Project management
- Problem solving
- Management
- Business

These skills will be acquired through a combination of experience and formal training. While many non-technical skills will be generic to most work environments, some of the skills may be valued differently by the employer and may have a different focus depending on such characteristics as industry, work structure, and discipline of engineering.

An EIT's involvement in the development of non-technical skills should follow the recommendations found in the appropriate Association/Ordre's guideline on continuing competency. Appendix A includes a few examples of the types of skills that should be acquired.

3.1.2 Technical Skills

The responsibility for the acquisition of technical skills and related career development rests with the EIT. The primary advantage of technical training to an EIT is the furtherance of his or her career. A mentor could be advantageous to the EIT in determining the most appropriate training for his or her career aspirations.

EITs may require some supplementary technical training, particularly in specialized areas. Ongoing technical training will be required in most areas. In addition, technical training may be required to bridge the gap for EITs who practise outside their disciplines of study, or across disciplines. It is expected that, in most instances, the employer will provide any specialized training required by the EIT to perform his or her duties.

Employers should be encouraged to provide technical training for EITs. An EIT's involvement in the development of technical skills should follow the recommendations found in the appropriate Association/Ordre's guideline on continuing competency. Appendix A provides examples of technical training.

3.2 Participation-Related Development

The EIT should be encouraged to include participation-related activities in their development. The overall purpose of participation-related development is to help ensure that the EIT develops into a professional engineer who is a well-rounded member of the Community (where Community can include geographic location, Association, profession, etc.) who understands and appreciates the importance of volunteer work for the profession. More specifically, the EIT's participation-related development should allow for:

- An appreciation of the importance of volunteer service to, and on behalf of, the engineering profession and contribution to the engineering profession by the EIT.
- The development of interpersonal and other personal (non-employment-related) skills, such as organizational, teamwork, and delegation skills.
- An improved awareness of contributions of professional engineers to society as well as contributions to society by the EIT.

A description of activities that allow for participation-related development is provided in Appendix B.

3.3 Reporting And Evaluating

A significant component of the EIT Program is the reporting on and evaluation of engineering work experience. EITs should record their work experience and professional development activities on an ongoing basis and report these activities as required. Provincial/Territorial Associations/Ordre should provide timely feedback in terms of credit for experience and guidance to the EITs on their progression towards satisfying the requirements for registration as a professional engineer.

EITs should use a format that is easy for all parties (EITs, supervisors, and experience reviewers) to understand. The format should be set by the Association/Ordre and contain the following elements:

- Basic Information - Name and contact data, date and name of degree, and period covered by the report
- Employer name, job title and brief description of job duties
- Description of experience including tasks completed and projects worked on (address each of the five value-based criteria as applicable)
- Professional development activities
- Participation-related development activities
- Exposure to professionalism and ethics
- Verification by supervisor

4 PROFESSIONALISM AND ETHICS

The EIT must develop and demonstrate knowledge of professionalism and ethics. This may be assessed through interviews, reports from referees, the EIT reporting on his or her work experience, and the Professional Practice Examination (see *CEQB Guideline on the Professional Practice Examination (G06-2001)*).

The work environment of the EIT should provide an opportunity to develop an understanding and observe the application of the laws and regulations governing the practice of engineering in the jurisdiction of practice, and to gain an appreciation of business and social ethics in a professional engineering work environment. This will enable the EIT to understand:

- A need to develop a social and environmental awareness.
- The role of the Profession in society.
- And apply the concepts of professionalism with respect to protecting the public interest.
- The need to support the association in return for the privilege of practising in a self-regulated profession.
- And observe the importance of working at all times within the limits of personal training and experience.
- Responsibility/accountability and liability.
- The laws and regulations governing the practice of the profession in the jurisdiction.

5 KEY INDIVIDUALS WHO SHARE RESPONSIBILITY UNDER THE EIT PROGRAM

The Employer and Supervisor

Ideally, a professional engineer should supervise the EIT's work. This individual should assess the quality of the EIT's work on a regular basis and certify the EIT's documentation of work experience. Supervisors are responsible for assigning work, and for providing advice and support to EITs. Supervisors should be encouraged to ensure that the engineering work is progressive in complexity and responsibility. Supervisors may be called upon by the Association/Ordre to provide information regarding the engineering work experience and the progress of EITs. Supervisors also play a role in the continuing education and professional development of EITs. The employer should be encouraged to offer the EIT a full range of responsibilities and opportunities in the practice of engineering to the extent that the EIT gains experience in all five of the engineering experience requirement areas (*see Interpretive Guide IV - (Admission) "Components of Acceptable Engineering Work Experience"*). In addition, the employer should be encouraged to provide the EIT with the opportunity for professional development and reasonable progression towards increasing involvement and responsibility over time.

The Mentor

The role of the Mentor is complementary to that of the employer and supervisor. Where the supervisor is not a professional engineer, the Mentor should assess the quality of the EIT's work experience in light of the requirements listed in the Interpretive Guide IV of the Admission Guideline on a regular basis and certify the EIT's documentation of work experience. The Mentor should provide an overall perspective, advise the EIT and provide a balanced viewpoint. He or she should help to sensitize the EIT to the obligations and duties of the professional engineer by promoting a better understanding of the *Engineers' Code of Ethics* and the components of acceptable engineering work experience as detailed in the Interpretive Guide IV of the Admission Guideline. The Mentor should be encouraged to meet with the EIT regularly (possibly once every three

months) to discuss the EIT's progress and provide professional guidance. **It is important to remember that the role of the Mentor is to encourage and guide the EIT. The Mentor must not take responsibility, either technically or professionally for the work of the EIT.**

The Association/Ordre

Because the EIT Program requires the supervisor's support and co-operation, and involves continuing education and professional development, the Association/Ordre should ensure that all employers and supervisors are aware of the requirements of the EIT Program. The Association/Ordre should seek the assistance and support of the employer in ensuring that the EIT has a professional engineer supervisor or mentor who will co-operate fully with the EIT Program. The Association/Ordre should also seek the assistance and support of the employer in ensuring that the EIT is provided with the opportunity to engage in sufficient and appropriate professional development activities. The Association/Ordre should ensure that all supervisors and mentors are aware of their responsibilities within the context of the EIT Program.

The Engineer-in-Training

The EIT is responsible for complying with the EIT program, gaining appropriate experience, advice, and exposure to engineering ethics and professionalism, as well as carrying out professional development and participation-related activities. It is the responsibility of the EIT to properly document the experience, the professional development activities, and the participation-related activities in a format acceptable to the appropriate Association/Ordre. This will enable portability of experience, professional development, and participation-related development from one Association/Ordre to another. Ultimately, the EIT is responsible for the development of his or her own career.

APPENDIX A – SUGGESTED RELATED SKILLS / PROFESSIONAL DEVELOPMENT

NON-TECHNICAL SKILLS

Communication

- a. Written Communication
- b. Oral Communication

Interpersonal Skills

- a. Cultural Sensitivity and business practice differences and their impacts
- b. Conflict Management
- c. Negotiation
- d. Working with subordinates and other professionals
- e. Delegation
- f. Decision-making

Project Management

- a. Project Manager's Role
- b. Document Relationships / Approval
- c. Scheduling Processes
- d. Estimating Methodologies
- e. Budgeting Practices
- f. Risk Management Quality
- g. Quality assurance and control methods
- h. Procurement
- i. Team Structures/Practices
- j. Contract Administration

Problem Solving

- a. Problem Definition
- b. Root Cause Analysis
- c. Factors
- d. Criteria
- e. Evaluation of possible solutions
- f. Selection of preferred solution

Management

- a. Recruiting
- b. Training
- c. Performance Evaluation
- d. Coaching
- e. Motivation
- f. Time Management
- g. Meetings
- h. Workplace Legislation
- i. Harassment Issues
- j. Human Rights

APPENDIX A - CONT'D

- k. Change Management

Life Long Learning

- a. Self-Assessment
- b. Career Planning
- c. Self-Development
- d. Second Language

Business

- a. Business Case
- b. E-business concepts
- c. Contract negotiation
- d. Financial accounting
- e. Risk analysis
- f. Corporate Culture
- g. Law

TECHNICAL SKILLS

Some technical training areas would have a broader appeal and would cover topics that are not specific to an individual technology or industry. They might include:

Dangerous/hazardous materials management
Environmental regulations
Codes and standards
Regulatory compliance

Other technical training areas would be related either to a specific industry that might cover several technologies or to a specific technology that could be used in one or more industries.

APPENDIX B - APPROACHES TO PARTICIPATION RELATED DEVELOPMENT

The following approaches may be taken to provide/obtain participation related training:

- Offer courses in Personal Development (i.e. additional knowledge not directly related to employment but useful for rounding out person's skill set)
- Offer networking opportunities for EITs (e.g. belong to an Association/Ordre chapter, interface with students at university, develop EIT-specific groups to discuss technical items, non-technical items or just socialize)
- Participate in outreach activities in Universities/schools
- Participate in outreach activities in the Association
- Participate in outreach activities in Community

Participation could be divided into:

- Professional Service
- Community Service

The following are examples of activities in these areas:

Professional Service Activities

- Participate in organizing or making a presentation at an Association/Ordre general or chapter meeting or seminar
- Serve on an Association/Ordre committee
- Assist in organizing a technical society function (seminar, meeting, etc.)
- Serve on a technical society committee
- Serve on a Board or Committee in an engineering capacity
- Provide job shadowing for a student
- Mentor a student on a volunteer basis, outside the workplace
- Participate as a judge at a science fair
- Prepare and deliver a presentation on engineering as a career to an elementary, junior or senior high school class, or to a youth organization
- Participate in career days or a careers symposium by staffing a booth and/or preparing and setting up a display on engineering
- Participate as a Production Advisor to a Junior Achievement Company
- Sponsor an engineering student at the annual engineering dinner

Community Service Activities

- Hold a board position and actively participate in the operation of a community club, cultural group, or religious organization
- Coach or manage a team or organize a cultural event
- Participate in a community volunteer organization
- Assist in the organization and production (sound, lights, stage etc) of a community event such as a play or concert
- Organize and co-ordinate a charity event