



***SATISFACTORY
ENGINEERING/GEOSCIENCE
WORK EXPERIENCE***

JULY 2004

SATISFACTORY WORK EXPERIENCE

A period of supervised engineering or geoscience experience serves as an internship for individuals who are academically qualified and may subsequently apply for professional registration. During that period, such individuals are expected to be enrolled with PEG or with one of the other provincial/territorial associations and participate in the appropriate structured Internship Program. The profession, as represented by practicing Professional Engineers and Geoscientists and their employers, has the obligation to ensure that prospective Professional Engineers and Professional Geoscientists are provided with the opportunity to enter full professional practice, all the while maintaining professional responsibility and safeguarding the public interests.

The Board of Examiners or its designate examines the nature, quality, duration and currency of the candidate's experience and evaluates these against the criteria presented below. The profession relies heavily on the individuals and firms that provide the experience opportunities, serve as supervisors and mentors, and act as referees in the registration process.

Engineering and Geoscience Experience Qualification Requirements

Work experience is an essential element in determining whether or not an individual is acceptable for professional licensure. The responsibility for providing the proper environment, opportunities, range and progression of activities necessary to meet the work experience requirements rests with the applicant and the employer, as well as the individuals who provide supervision during the internship period.

Acceptable engineering/geoscience work experience must include:

- a. Application of theory.
- b. Practical experience.
- c. Management skills.
- d. Communication skills.
- e. Social implications of engineering/geoscience.
- f. Continuing professional development.

The professions under PEG's jurisdiction are technical. To demonstrate technical proficiency, one must show evidence of having spent a significant amount of time on the application of technical theory and on practical experience. If there is evidence of applying the scientific principles learned, then the Board will find the technical elements of experience to be acceptable. Of course, technical experience must meet Canadian standards.

Management skills, oral and written communication skills, and an understanding of the societal implications of a person's work are also integral to the learning experience. These last three components will take on a much greater significance as a career develops.

Each of the above six components has sub-components as detailed below. Some sub-components must be evident in your experience, while others are desirable but not mandatory.

Application of Theory

I ENGINEERING

The skillful application of theory is the hallmark of quality engineering work, and an applicant's experience shall include meaningful participation in one or more of the following:

i. Analysis

For example: scope and operating conditions, feasibility assessment, safety and environmental issues, technology assessment, and economic assessment, etc.;

ii. Design and synthesis

For example: functionality or product specification, component selection, integration of components and sub-systems into larger systems, reliability and maintenance factors, human and environmental aspects, and the societal implications of the product or process, etc.;

iii. Testing methods

For example: devising testing methodology and techniques, functional specification verification, and new product or technology commissioning and assessment, etc.; and,

iv. Implementation methods

For example: technology application, engineering cost studies, optimization techniques, process flow and time studies, quality assurance implementation, cost/benefit analysis, safety and environmental issues and recommendations, and maintenance and replacement evaluation, etc.

The application of theory MUST include:

- selecting solutions and solving problems;
- preparing and checking designs or interpretations;
- showing evidence of sound technical judgment and practices; and,
- showing familiarity with the use and application of pertinent technologies, procedures, systems and programs.

It MAY also include the collection and analysis of information and data. However, data collection and analysis should not be the major component of assigned tasks for a significant period of time.

II GEOSCIENCE

The integration of geoscientific facts and principles into a comprehensive analysis of the situation is the objective of all geoscientific investigations. A candidate must be able to demonstrate, through experience, involvement in several aspects of the following:

- i. design and implementation of geoscientific programs in which the objectives are enunciated in terms of clear instructions and procedures;

- ii. compilation and processing of data acquired both under the candidate's supervision and by others;
- iii. assessment and interpretation of geoscientific data in accordance with geoscientific principles and with due regard for the inherent uncertainties and ambiguities in the data. The candidate must recognize the possibility of alternate interpretations; and,
- iv. writing of technical reports presenting the conclusions in clear, concise form.

Practical Experience

I ENGINEERING:

Practical experience allows applicants to understand the practical limitations of real systems. Practical experience should include:

- i. Site visits to existing engineering works, with opportunities to see equipment and systems in both operational and maintenance circumstances;
- ii. Application of equipment as part of the larger system, including, for example, the merits of reliability, the role of components in the system, and understanding the end product or engineering work in relationship to the equipment;
- iii. Opportunities to experience and understand the limitations of practical engineering and related human systems in achieving desired goals, including limitations of production methods, manufacturing tolerances, performance minima, maintenance philosophies, etc.; and,
- iv. Opportunities to experience the significance of time in the engineering process, including workflow, scheduling, equipment wear-out and replacement scheduling, etc.

II GEOSCIENCE

Practical experience should provide the candidate with the opportunities to become aware of the practical limitations of real systems. Practical experience should include components such as:

- i. participation in field data collection to understand the techniques and field setting;
- ii. application of data and sample compilation and processing techniques;
- iii. opportunities to experience and understand the limitations and uncertainty associated with geoscientific data and its application to the understanding of the physical environment;
- iv. understanding of the socio-economic uses of the data and its interpretations; and,
- v. opportunity to experience the impact of time on geoscientific processes, the evaluation of data with time, the importance of scheduling, and the impact of the natural environment on schedules.

Management

Management of engineering and geoscience works includes the supervision of staff, project management, general exposure to an engineering and geoscience business environment, and the management of technology.

Management includes:

- i. Planning, from conception through to implementation. This includes: needs assessment, concept development, assessment of resources required, and assessment of impacts, including societal and project implementation;
- ii. 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 marketplace;
- iii. Budgeting, including the development of preliminary and detailed budgets, identifying labour, materials and overhead, risk analysis, life-cycle analysis, and tracking;
- iv. Supervision, including leadership, professional conduct, organization of human resources, team building, and management of technology;
- v. Project control, including co-ordination of work phases, tracking and monitoring costs and progress, and implementing changes to reflect actual progress and needs; and,
- vi. Risk-analysis related to operating equipment and system performance, product performance evaluation, and evaluation of societal and environmental impacts.

The development of management skills MUST include involvement in:

- managing personnel and project resources;
- planning, scheduling, budgeting, and cost control;
- developing team skills, understanding, professional and business ethics; and,
- keeping appropriate records.

Experience MAY also include developing an understanding of corporate structure, legal aspects of contracts, quality assurance programs, and cost impact studies.

Communication Skills

Developing and practicing communication skills is an essential experience requirement. This applies to all areas of the work environment including communication with superiors, colleagues, regulators, clients, and the public. Applicants should have regular and progressive opportunities to participate in:

- i. preparation of written work, including day-to-day correspondence, record-keeping, and report writing;
- ii. making oral reports or presentations to colleagues, supervisors, senior management, and an exposure to, or

participation in, reports to clients and regulators; and,

iii. making public presentations.

The development of good oral and written communication skills is essential for all professionals.

Experience MUST show evidence of the preparation of written technical reports and of making oral presentations to management, peers, or the public.

Social Implications

The overriding objective of the "social implications of engineering/geoscience" requirement is to provide experiences which increase awareness of the professional's responsibility to guard against conditions which are dangerous or threatening to life, limb, property, or the environment, and to call any such conditions to the attention of those responsible.

The social implications of engineering/geoscience are an important aspect of the professional practice. The work environment should provide opportunities for applicants to heighten their awareness of the potential consequences of their work. This should include:

- i. a recognition of the value and benefits of the engineering/geoscience work to the public;
- ii. an understanding of the safeguards required to protect the public and methods of mitigating adverse impacts;
- iii. an understanding of the relationship between the activity and the public;
- iv. a demonstrated interest and involvement in the broader social implications of engineering and geoscience;
- v. an appreciation of the role of regulatory bodies on the practice of engineering and geoscience;
- vi. an understanding of the provincial health and safety of the workplace legislation; and,
- vii. an understanding of the work's implications.

Interaction between the professions and society is of significant importance. Experience MUST show evidence that an applicant is acquainted with such matters as safeguards and benefits to the public, and the roles and responsibilities of regulators in the specific field of professional practice.

Continuing Professional Development

Members-in-Training are required to comply with PEG's Guideline for Professional Development. This Guideline and the reporting forms are accessible in electronic format through the website at www.pegnl.ca. Paper copies will be provided upon request. It is the responsibility of the MIT to become familiar with the guideline and to submit his/her Member Profile Forms upon enrollment as a Member-in-Training.

The PD Plan and report forms are required to be submitted annually prior to the end of January of each calendar year.

The requirements for "Practicing Members" under this Guideline on Professional Development are different from the requirements for Non-Practicing Members. MIT's are expected to meet the same requirements as Practicing Members.