MODULE 1: Communication and Terminology for Professional Licensing

TOPIC 3: Experience Record

LEARNING OUTCOMES:

At the end of this lesson, participants will be able to:

- identify all aspects of PEO engineering experience requirements
- explain one or two aspects of engineering experience according to PEO criteria
- describe a personal employment situation and relate to PEO requirements for experience

TOPIC	SKILLS	CLB COMPETENCIES AREA	COMPETENCIES	PRE-TASKS	TASKS	POST-TASKS
▪ Experience Record	▪ Reading ▪ Listening/ Speaking ▪ Writing of experience records	▪ unformatted text ▪ exchanging information ▪ suasion	▪ read a PEO informational text, understand its purpose and locate specific information ▪ explain in detail one or two specific requirements of engineering experience as required by the PEO ▪ understand general aspects of PEO engineering experience requirements ▪ gain knowledge of terminology related to PEO engineering experience practice	▪ read a PEO informational text ▪ match definitions with terms in the text ▪ explain requirements of an aspect of PEO engineering experience	▪ describe a personal employment situation and explain how that experience reflects one or more aspects of PEO experience criteria	▪ apply PEO experience categories to engineering functions ▪ write own experience record to practice recording own employment experiences

Facilitator's Preparation for Module 1
Topic 3: Experience Record
FACILITATOR PREPARATION

Content

In order to deliver this lesson on licensing procedures effectively, the facilitator should be familiar with the following:

- the PEO's Experience Record requirement as explained in the PEO Licensing Guide Pages 9 & 10 (also see the section entitled How to Complete the Application for Licence reviewed in Topic 2)
- the PEO's work experience requirement as outlined in the guide
- the PEO's booklet *Guide to the Required Experience for Licensing as a Professional Engineer in Ontario*.

These documents are downloadable in PDF form from the PEO's Web site: www.peo.on.ca.

Delivery

This is a complicated lesson in terms of distribution of handouts, so preparation is important. Make copies of the following handouts for all the participants, noting the exceptions:

1. A copy of the PEO's booklet *Guide to the Required Experience for Licensing as a Professional Engineer in Ontario* for each participant, to be distributed at the end of the class.
2. Handouts 1A, B, C, D, E. Make sufficient copies so that members of each group get one of these handouts (each handout is two pages.) If the class is not large enough to create five groups of at least three participants each, then some groups might be given two handouts instead of one.
3. Handout 2 Jigsaw Grid
4. Handout 3 Engineering Activities and PEO Experience Criteria

Terminology List (optional)

Materials needed: access to an overhead projector and OHT 1 and 2.

METHODOLOGY

Introduction

(20 minutes) 1. Elicit from the class what they already know about the PEO licensing process based on the previous two lessons. Note that engineering experience is a requirement and that the PEO has very specific criteria for determining acceptable engineering experience. Elicit from the class the five required areas of engineering experience by having them reflect on their previous experience. Write down the five quality-based criteria for evaluation of experience:

a) application of theory
b) practical experience
c) management of engineering
d) communication skills
e) awareness of the social implications of engineering

(Optional activity: write the five kinds of experience in columns and have participants, in pairs or as a whole class, brainstorm terms or functions associated with each category).

Pre-Tasks

(30 minutes) 1. Show the class a copy of *the Guide to the Required Experience for Licensing as a Professional Engineer in Ontario.* Explain that they will be reading excerpts from this guide and later sharing what they have learned with their colleagues in the class. Divide participants into groups of three or four. Each group receives one of Handout 1A, B, C, D, or E. (If there are fewer than fifteen participants in the class, then some groups should receive two handouts instead of one). Each group should have different information. Have the participants read the first page of their handout. Short discussions may follow.

(30 minutes) 2. Explain to the participants that the next activity will focus on terminology. Show OHT 1 and read the instructions together. Have participants match the underlined terms on the first page of their handout with the definitions on the

second page. They can do this activity with members of their group; alternatively, they can do the activity individually and then compare answers with their group.

(15 minutes) 3. Distribute Handout 2. Show OHT 2. Review instructions with participants to be sure they understand the task. First, participants will complete the grid on Handout 2 with information from their handout, discussing terms with their group members as required. When they are completing the grid, they should summarize, paraphrase and use key words; they should not copy sentences from the handout onto the grid. Explain that groups will be allowed sufficient time to prepare so that each participant is ready to explain their area of engineering experience to other participants who have not read the information. Make clear to participants that they should not read excerpts when they form their new groups, nor should they focus on terminology. Instead, participants should be prepared to paraphrase and focus on helping others understand the information.

(20 minutes) 4. Form new groups consisting of one representative from each of the previous groupings. Group members should all have read different excerpts from the PEO guide. Participants take turns to explain their particular aspect of engineering experience to their group members. Everybody completes the grid on Handout 2.

Alternatively, a short presentation can be made by a speaker from each group, while others fill out the chart.

Task

(35 minutes) 1. Ask participants to choose one specific situation from their previous employment and describe how their experience in that job reflects all or some of the PEO required engineering experience. Ask participants to prepare alone and then share their information with their group. Participants can be grouped according to discipline.

Post-Task

(15 minutes) Now that each participant is familiar with all the areas of required engineering experience, distribute Handout 3 and ask participants to decide which activities within each group belong to what PEO-defined area of experience. Note that their decisions should be based on the text. If time is limited, distribute Handout 3 as an out-of-class post-task. Note that the letter designation in the Facilitator's Guide corresponds to the letters in Handout 1.

Post-Task It is important that the participants get practice writing their own experience records for the PEO application process. This practice can at least partially be provided as part of the training program, depending on the availability and expertise of staff. However, as the task can be overwhelming to most second language learners, it is advisable to consult the PEO for further guidance and information about their requirements and criteria.

OHT 1

The following passages are excerpts from the PEO's Guide to the Required Experience for Licensing as a Professional Engineer in Ontario. In your group, you have been assigned the responsibility of reading and clarifying a particular section.

Read the passage(s) assigned to you. Words and phrases have been underlined. With your group members, use context clues to suggest what the words might mean as they are used in the passage. Then choose a synonym for each word from the words and phrases on the second page of your handout.

Handout 1A

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 environment 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 an 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.

(Source: PEO Guide to the Required Experience for Licensing as a Professional Engineer in Ontario)

Handout 1A (cont'd)

Application of Theory

Definitions

1. combination of various parts into a whole
2. detailed description of a product use or design
3. ways of maximizing efficiency
4. possible effects on society
5. testing dependability
6. creating ways of testing
7. putting quality control methods into action
8. evaluation of performance
9. put technology into use
10. examination of a product or process by looking at all the various parts
11. putting together all the parts of a whole
12. check the correctness of information about product use

Handout 1B

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***.

(Source: PEO Guide to the Required Experience for Licensing as a Professional Engineer in Ontario)

Handout 1B (cont'd)

Practical Experience

Definitions

1. parts of a whole
2. the relationship between people and their surroundings
3. how quickly equipment is destroyed
4. value of dependability
5. allowable differences of manufacturing components

Handout 1C

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 market place;

- ***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 environment impacts.

(Source: PEO Guide to the Required Experience for Licensing as a Professional Engineer in Ontario)

Handout 1C (cont'd)

Management of Engineering

Definitions

1. effect that delays have on a project
2. checking and controlling money that is spent
3. professional behaviour
4. different methods to choose from
5. limits (on schedules)
6. different aspects of management
7. ideas
8. negative consequences for society
9. evaluating what resources are needed
10. the way society sees a situation (the opinion of society)
11. distributing resources
12. evaluating the danger of failure and problems
13. increase in cost
14. deciding how people will work together

Handout 1D

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 superiors, 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.

(Source: PEO Guide to the Required Experience for Licensing as a Professional Engineer in Ontario)

Handout 1D (cont'd)

Communication Skills

Definitions

1. communication in writing
2. group of authorized people who make regulations to control engineering practices
3. design plans

Handout 1E

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 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 direst or immediate social consequences, an applicant's work experience should, nevertheless, instil 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.

(Source: PEO Guide to the Required Experience for Licensing as a Professional Engineer in Ontario)

Handout 1E (cont'd)

Social Implications of Engineering

Definitions

1. increases
2. possible effects on society
3. characteristics
4. results on society
5. minimize negative effects
6. agencies that make regulations to control engineering practices

FACILITATOR'S NOTES

Answer Key to Handouts 1A, B, C, D, E

1A Application of Theory

1. *combination of various parts into a whole – synthesis*
2. *detailed description of a product use or design – specification*
3. *ways of maximizing efficiency – optimization techniques*
4. *possible effects on society – societal implications*
5. *testing dependability – verifying functional specifications*
6. *creating ways of testing – devising testing methodology*
7. *putting quality control methods into action – implementing quality control*
8. *evaluation of performance – performance assessment*
9. *put technology into use – technology commissioning*
10. *examination of a product or process by looking at all various parts – analysis*
11. *putting together all parts of a whole – integration of components*
12. *check the correctness of information about product use – reliability analysis*

1B Practical Experience

1. *parts of a whole – components*
2. *the relationship between people and their surroundings - ergonomics*
3. *how quickly equipment rusts – corrosion rates*
4. *value of dependability – merits of reliability*
5. *allowable differences of manufacturing – manufacturing tolerances*

1C Management of Engineering

1. *effect that delays have on a project – impact of delays*
2. *checking and controlling money that is spent – monitoring expenditures*
3. *professional behaviour – professional conduct*
4. *different methods to choose from – alternative methods*
5. *limits (on schedules) – constraints*
6. *different aspects of management – management components*
7. *ideas – concepts*
8. *negative consequences on society – social ramifications*
9. *evaluating what resources are needed – assessing required resources*
10. *the way society sees a situation – societal perspective*
11. *distributing resources – allocating resources*
12. *evaluating the danger of failure and problems – risk assessment*
13. *increase in cost – cost escalation*
14. *deciding how people will work together – establishing interactions*

1D Communication Skills

1. *communication in writing – correspondence*
2. *group of authorized people who make regulations to control engineering practices – regulatory authorities*
3. *design plans – design briefs*

1E Social Implications of Engineering

1. *increases – heightens*
2. *possible effects on society – social implications*
3. *characteristics – criteria*
4. *results on society – social consequences*
5. *minimize negative effects – mitigate adverse impacts*
6. *agencies that make regulations to control engineering practices – regulatory agencies*

OHT 2

Read the passage(s) again. Discuss the information with your group to be sure everyone understands it well enough to explain it to someone else. On the grid on Handout 2, fill in the information from your group's handout.

Use key words and paraphrases. Don't copy sentences from the handout onto the grid.

Join a group with participants who have read other excerpts from the *PEO Experience Guide*. Ask questions to complete the grid with information about other aspects of engineering experience required.

Handout 2

	A Application of Theory	**B** Practical Experience	**C** Management of Engineering	**D** Communication Skills	**E** Social Implications of Engineering
1. What is the passage about?					
2. What are the main ideas included in it?					
3. What are some of the concerns or activities mentioned? (I) (II)					

Handout 3

The following phrases describe engineering activities. Decide which areas (as defined by the PEO Experience Guide) each activity belongs to. Beside each activity, write AT for Application of Theory, PE for Practical Experience, ME for Management of Engineering, CS for Communication Skills, or SIE for Social Implications of Engineering.

1. assessed new technology
2. wrote daily reports
3. supervised technicians
4. applied codes and standards
5. made presentations to clients
6. assessed negative social consequences
7. developed budgets
8. assessed project costs and devised budgets
9. produced monthly reports for a vice president
10. conducted reliability analysis
11. assessed social impact of project site work
12. prepared design briefs
13. coordinated and monitored phases of project
14. devised testing procedures
15. maintained equipment replacement schedule

FACILITATOR'S NOTES

Answer Key to Handout 4

The following phrases describe engineering activities. Decide which areas as defined by the PEO Experience Guide each activity belongs to. Beside each activity, write AT for Application of Theory, PE for Practical Experience, ME for Management of Engineering, CS for Communication Skills, or SIE for Social Implications of Engineering.

1.	*assessed new technology*	*AT*
2.	*wrote daily reports*	*CS*
3.	*supervised technicians*	*ME*
4.	*applied codes and standards*	*PE*
5.	*made presentations to clients*	*CS*
6.	*assessed negative social consequences*	*SIE*
7.	*developed budgets*	*ME*
8.	*assessed project costs and devised budgets*	*ME*
9.	*produced monthly reports for a vice president*	*CS*
10.	*conducted reliability analysis*	*AT*
11.	*assessed social impact of project site work*	*SIE*
12.	*prepared design briefs*	*CS*
13.	*coordinated and monitored phases of project*	*ME*
14.	*devised testing procedures*	*AT*
15.	*maintained equipment replacement schedule*	*PE*

Terminology List

Application of Theory

- synthesis
- specifications
- optimization techniques
- societal implications
- to verify functional specification
- to devise testing methodology
- implement quality control
- performance assessment
- technology commissioning
- analysis
- integration of components
- reliability analysis

Practical Experience

- components
- ergonomics
- corrosion rates
- merits of reliability
- manufacturing tolerances

Management of Engineering

- impact of delays
- to monitor expenditures
- professional conduct
- alternative methods
- constraints
- management components
- concepts
- social ramifications
- assessing required resources
- societal perspectives
- to allocate resources
- risk assessment
- cost escalation
- to establish interactions

Communication Skills

- correspondence
- regulatory authorities
- design briefs

Social Implications of Engineering

- to heighten
- social implications
- criteria
- social consequences
- to mitigate adverse impacts
- regulatory agencies