

GEOTECHNICAL ENGINEERS

Here is your competency profile!

Geotechnical engineers now have their own competency profile, a tool that can become invaluable. How? Here are a few answers.

For any given construction project, geotechnical engineers must examine the nature and parameters of soils affected by the project and foresee the construction's impact on those soils. Every geotechnical engineering mandate is critical because, as the Canadian Foundation Engineering Manual stipulates, «*la combinaison d'un projet et d'un site est sans doute unique*»¹.

Known worldwide for the quality of its university research in geotechnical engineering, Québec surprisingly experiences certain difficulties "in the field" when it comes to applying trade practices. In fact, the practice of geotechnical engineering is sometimes subject to certain limitations, namely in terms of examinations, analysis and calculations. These shortcomings can lead to added costs during the execution and post-execution stages, and basically constitute an economic nuisance, all the while tarnishing the reputation of the practice. This situation cannot go on and the Ordre des ingénieurs du Québec wants to help in finding a solution.

THE COMPETENCY PROFILE, A WELL KNOWN TOOL

Over the past several years, the Ordre has produced competency profiles for various fields of practice in engineering; the geotechnics profile is the eighth in a series of nine profiles to date. You can find all profiles in the Ordre's Guidelines to Professional Practice (www.gpp.oiq.qc.ca, "Professional Development" section).

Competency profiles are published as a preventative measure, specifically to help engineers pinpoint and correct shortcomings themselves. For example, an engineer who refers to the competency profile for his or her field of practice can realize that he or she does not follow all the necessary steps to carry out a task or is unaware of a given method.

In short, engineers who refer to competency profiles can detect their limitations and follow appropriate training courses. This introspective exercise can be demanding on a personal level, but it can also be very beneficial for engineers who lend themselves to it. In fact, every engineer can refer to competency profiles:

- young engineers or junior engineers who want to see a list of what they need to do and learn to develop their knowledge and acquire more experience;

THE GEOTECHNICS COMPETENCY PROFILE WAS ESTABLISHED BY A WORKING GROUP WHOSE MEMBERS HAVE EXTENSIVE EXPERIENCE IN THE FIELD.

- seasoned engineers who wish to examine their practice in order to make sure that they have not forgotten or neglected certain aspects over time.

GEOTECHNICS IN ALL ITS ASPECTS

The geotechnics competency profile was established by a working group whose members have extensive experience in the field. The group strived to illustrate the diversity in this field of practice as well as the importance of each task to be carried out, in light of current knowledge. Thus, the finished product presents every step included in the practice of geotechnical engineering, from determining the geotechnical needs to following up on geotechnical activities executed during the completion of a given work. In all, 4 sections – "Examination", "Design", "Execution" and "Post-execution" – cover 16 fields of application.

This source of information goes even further and spells out several required skills. For example, in order to prepare an investigation program, seven steps are formulated, the first two of which are clearly detailed. Here is an excerpt:

«Step B1 – Determine the required geotechnical parameters. Engineers practising in geotechnics must be able to:

- anticipate the nature of the soil based on existing information, namely:
 - visiting the site and its environment;
 - soil maps;
 - existing reports;
 - geographical maps;
 - topographical maps;
 - aerial photos.» (Unofficial translation.)

It should be noted that by putting the emphasis on the capacity to determine geotechnical parameters based on facts, the competency profile follows the Canadian Engineering Foundation Manual's recommendations in every respect, namely where it is stated that: «*La reconnaissance du site est la première étape, dans le temps et en importance, de toute conception de fondation.*»

Another essential skill at the examination stage is validating the drilling and boring reports, including laboratory analyses (step C5), which reminds geotechnical engineers of the various verifications they need to carry out in order to validate the information obtained during drilling and boring.

At every major step, engineers must also determine whether the conditions analyzed at the previous step have changed and if so, which ones and how have they changed. Since calculations alone cannot provide adequate answers to these questions, the competency profile provides for in situ and laboratory soil tests (section C, "Examination").

Furthermore, whether they are specialized in design, execution or post-execution, geotechnical engineers will surely benefit from consulting the "Design" section since all of the skills mentioned therein are required in all three steps.

Finally, the competency profile takes into account the public's safety and the protection of the environment, two priorities that are paramount in geotechnical engineering. At field I8 of the Execution section, engineers can read a detailed description of the skills required to analyze the impact of their work on the environment and on the life, health and property of every person, and to take into account the consequences of their work.

For all these reasons and many others, the new geotechnics competency profile will benefit engineers since it gives them a great opportunity to assess their professional practice and ensure that they comply with all trade practices. Take advantage of it, it's important!

1. Canadian Geotechnical Society, Canadian Foundation Engineering Manual, Second Edition, 1994, p. 38.

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