

By Daniel Jolin, CRHA

The Competency profile: completely new and very useful

Following last year's publication of the Engineer's Guide to Competency Development, the Ordre des ingénieurs du Québec has gone even further and produced a new tool which is bound to be very informative for many engineers: the competency profile.

A PREVENTATIVE APPROACH

"In order to assume its role as public protector, the Order relies on control mechanisms. Professional inspection is one of these mechanisms that has allowed us to uncover serious gaps in specific fields of engineering", explains Daniel Jolin, CHRP, training instructor with the Order's Professional Affairs Directorate and the person responsible for the project. "We felt that in these fields, it was necessary to go beyond individual cases and deal with the source of the problem".

The Order decided to adopt a preventive approach and develop a tool that allows engineers to pinpoint their shortcomings themselves. "If an engineer does not have all the required technical skills, he or she will be able to figure that out by referring to the competency profile associated to his or her field of practice." In doing so, the Order has provided engineers with the first series of four competency profiles, which deal with:

- building electricity;
- building structure;
- design of automatic water sprinkler systems; and
- design of decentralized sewage systems for domestic wastewater.

It should be noted that there are many different reasons as to why certain engineers display shortcomings: a new field that is not well known, training relating to another sector is partly deficient, etc. The Ordre will eventually provide members with profiles relating to building mechanics, agricultural engineering, municipal engineering and machine safety.

DOING THE RIGHT THING, CORRECTLY

What will engineers find when referring to a competency profile? Essentially, two main sections: the first one is an inventory of competencies which lists the technical and general skills required to practise in a given field, while the second is a detailed description of the technical skills deemed essential with respect to the public's safety and the client's investment.

For instance, looking at the example taken from the competency profile relating to building electricity set out below, one can see that in order to calculate fault currents, one must be able to carry out four duties (namely those that are preceded by a black bullet). For each of those duties, one must be able to perform key actions (namely the white bullets). Consequently, in order to carry out fault current calculations, one must "establish the impedance values relating to the single-line diagram components". To do so, one must:

"The engineer who wishes to assess his or her competence can then answer two crucial questions: am I doing the right things? Am I doing them correctly?"

1) determine the affected components in the electrical distribution; 2) identify the capacities and/or the characteristics of these components; 3) establish impedance values using the appropriate reference charts.

Daniel Jolin goes on to say: "In other words, the inventory lists the competencies required to practise in a given field. Then, the detailed description sets out the duties that engineers must be able to carry out as well as key actions associated with those duties in order to fulfill the competency in question. By reading this list, the engineer who wishes to assess his or her competence can then answer two crucial questions: am I doing the right things? Am I doing them correctly?" Engineers who already use the *Engineer's Guide to Competency Development* know that this tool ties in perfectly with the second competency mentioned in the index of competencies: "Solve problems using applied sciences and trade practices."

STARTING FROM SCRATCH

"These indicators constitute a model for each field for which there is a competency profile. Engineers are not required to master each and every competency, only those that are associated with their field of practice," points out Pierre Jean, Eng., Vice-President, Electricity Division at Bouthillette, Parizeau and Associates, and member of the Order's Professional Inspection Committee.

Pierre Jean was asked to participate in drafting the competency profile relating to building electricity. His working group was composed of experts practising in several leading sectors and it is thanks to their combined know-how that the profile came to be. "We had to break new ground given that such a profile had never been produced. We needed to establish basic notions and answer questions that appeared simple enough. What does being competent mean? What are the required competencies?", said Jean.

Daniel Jolin agrees. “We had to start from scratch but who better than an engineer to describe how to practise the profession? With the help of Pierre Morin, CHRP, a consultant specialized in developing competency profiles, this is how we were able to call upon well known experts in their fields to pool their knowledge together. Engineers are very lucky to have such a source of information at their disposal.”

FOR ENGINEERS, EMPLOYERS AND INSPECTORS

All engineers who practise in the fields described in competency profiles will be able to use this tool to self-assess and, where appropriate, uncover their shortcomings. Pierre Jean specifies that: “Competency profiles will benefit particularly to self-employed engineers who haven’t yet had much experience and who are often forced to learn alone as they go. The competency profile will be of invaluable help.”

Engineers will also be able to refer to the competency profile when explaining to employers and clients the various steps that need to be performed to carry out work and, in particular, to justify the time and cost associated with such work.

For employers, the competency profile will provide a practical guide when helping engineers direct their efforts with respect to their professional development. At the Ordre, inspectors may use competency profiles as an evaluation grid which they can combine to a questionnaire during their monitoring visits.

In short, competency profiles will have many uses and will support engineers in their endeavours to grow professionally. You may refer to the first four competency profiles in the “Professional Development” section of the new *Guidelines to Professional Practice*.

EXAMPLE OF A DETAILED DESCRIPTION OF A COMPETENCY

Carry out fault current calculations

Engineers who practise in building electricity must be able to:

- ◆ Establish the maximum fault current level at one point ahead of places where we wish to calculate fault currents
 - ◆ Obtain fault current data corresponding to the electrical input from the electricity provider
 - ◆ Where an electrical distribution network exists, obtain maximum fault current level at a particular point in the electrical distribution
- ◆ Establish the impedance values relating to the single-line diagram components
 - ◆ Determine the affected components in the electrical distribution
 - ◆ Identify the capacities and/or the characteristics of these components
 - ◆ Establish impedance values using the appropriate reference charts
- ◆ Calculate engine loads that contribute to fault currents
 - ◆ Determine engine loads present in the electrical distribution network that contribute to fault currents
 - ◆ Choose an appropriate method of calculation
 - ◆ Carry out the calculations using proper multiplication factors
 - ◆ Set out a procedure to verify the calculations
 - ◆ Apply the verification procedure to the calculations
- ◆ Calculate fault current for the purposes of choosing electrical distribution equipment
 - ◆ Choose an appropriate method of calculation
 - ◆ Set out a procedure to verify the calculations
 - ◆ Determine points in the electrical distribution where we wish to evaluate fault current levels
 - ◆ Apply the calculation method to each of those points using the data obtained during the previous steps
 - ◆ Apply the verification procedure to the calculations