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Public guideline: Direct supervision

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Notice

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About this Engineers Canada paper
This national Engineers Canada paper was prepared by the Canadian Engineering Qualifications Board (CEQB) and provides guidance to regulators in consultation with them. Readers are encouraged to consult their regulators' related engineering acts, regulations, and bylaws in conjunction with this Engineers Canada paper.

About Engineers Canada
Engineers Canada is the national organization of the provincial and territorial associations that regulate the practice of engineering in Canada and license the country's 295,000 members of the engineering profession.

About the Canadian Engineering Qualifications Board
CEQB is a committee of the Engineers Canada Board and is a volunteer-based organization that provides national leadership and recommendations to regulators on the practice of engineering in Canada. CEQB develops guidelines and Engineers Canada papers for regulators and the public that enable the assessment of engineering qualifications, facilitate the mobility of engineers, and foster excellence in engineering practice and regulation.

About Equity, Diversity, and Inclusion
By its nature, engineering is a collaborative profession. Engineers collaborate with individuals from diverse backgrounds to fulfil their duties, tasks, and professional responsibilities. Although we collectively hold the responsibility of culture change, engineers are not expected to tackle these issues independently. Engineers can, and are encouraged to, seek out the expertise of Equity, Diversity, and Inclusion (EDI) professionals, as well as individuals who have expertise in culture change and justice.

Background

Provincial or territorial legislation requires all persons practising engineering to be licensed by the provincial or territorial regulator. However, legislations usually include an exemption that allows unlicensed individuals to perform engineering, provided that an engineer directly supervises their work and assumes full responsibility for their work. Therefore, in practice, in many jurisdictions, a portion of engineering work can be carried out by unlicensed individuals, then sealed by supervising engineers who take full responsibility for the service or work.

By sealing a document, a supervising engineer certifies that he or she prepared the work, or that it was done under his or her direct supervision. A reasonable level of supervision should be provided, which does not require the supervising engineer to do everything in the way of monitoring the direction of works under charge.

By assuming responsibility for an unlicensed person's engineering work, the supervising engineer is subject to the same standards of professional conduct and competence as if this supervisor completed the services personally. As sealing indicates that the engineer takes full professional responsibility for the contents of the engineering work or document, it would be unethical for an engineer to seal documents that he or she has not adequately supervised or reviewed or is not adequately knowledgeable or competent to review.

Industry practice has evolved in such a way that engineering tasks are sometimes carried out by an engineer's unlicensed subordinates (hereinafter referred to as subordinates), and then given a final review by the supervising engineer prior to the supervising engineer sealing the work. This level of supervision is not sufficient to fulfill the supervisory requirements of provincial or territorial legislation. Supervising engineers are expected to conduct a thorough review of all engineering documents before affixing their seals if they have not directly supervised the work.

In instances where an engineer is requested to seal a document prepared outside of their regulator's

jurisdiction, or by individuals who were supervised by another engineer, a full review of the work is expected by the supervising engineer at a level comparable to that required to prepare the original document.

The purpose of this model guide is to provide guidance on:

1. Adequate supervision of subordinates by engineers in the provision of engineering services;
2. Ethical and legal use of the seal by engineers when sealing work and or documents prepared by subordinates.

This model guide is intended to support regulators in developing their own guidelines on direct supervision for their members. It is not intended to establish the amount of review required by an engineer in cases where the document was not prepared under their supervision. While this model guide does not directly address the use of the seal, regulators are encouraged to provide guidance to their members on their use of the seal while supervising unlicensed subordinates.

Guiding Principles

A sealed document indicates that the document meets a certain professional standard and that an engineer has accepted responsibility for the work. When supervising the work of unlicensed subordinates, engineers are expected only to supervise work that they are competent to perform by virtue of their training and experience. They are also expected to adequately understand and monitor the work of subordinates before accepting professional responsibility for their work.

The supervising engineer ethically cannot seal a document that has been brought to them by subordinates for final approval if they have had no prior involvement with the document. In cases where prior or early involvement is minimal, the supervising engineer should conduct a full thorough review of the document, including any design issues and relevant calculations. Supervising engineers are encouraged to adopt clear and formal approval processes between themselves and their subordinates to ensure appropriate level of supervision.

The following elements should be considered when determining whether a supervising engineer has met this standard and has satisfied their duty to directly supervise subordinates.

1. The supervising engineer must have knowledge of all stages of the project.

The exemption clause contained in provincial or territorial legislation is intended for unlicensed individuals who assist an engineer in the performance of engineering. This exemption does not allow them to engage in engineering at a professional level unsupervised (i.e. are not able to act independently or take professional responsibility for the work).

Supervising engineers have an obligation to both direct and monitor the activities of their subordinates. While direction may be satisfied by involvement in the initial stages or concept development, monitoring implies an awareness of activities and work throughout the process. Therefore, supervising engineers who conduct only a final review of documents, and who are unaware of the work prior to those documents arriving on their desk, have not fulfilled their supervisory role.

Active involvement may be demonstrated through knowledge of the project, development/history of the project, input on earlier drafts, review of particular elements at earlier stages, or evidence of regular consultation throughout the project.

Indicators of appropriately supervised subordinates may include:

- Physical presence of both the supervising engineer and the subordinate at the same workplace (where this is not possible, regular and continuous communication between the two is necessary);
- Periodic documented reviews of the work, and/or consultation of the supervising engineer throughout the project, as opposed to only at the final stage; and
- Adequate documentation of the supervisory activities of the supervising engineer.

2. The supervising engineer must carefully instruct subordinates who carry out field reviews.

When a supervising engineer is directing a subordinate with respect to undertaking field review tasks, the supervising engineer must ensure that such work is carried out in a fashion which meets the definition of direct supervision. Direct supervision of a task that occurs outside the office is, by definition, difficult, and care must be taken to ensure that field reviews meet the standard expected of an engineer.

Direct supervision of a field review would typically take the form of specific instructions on what to observe, check, confirm, test, record and report back to the supervising engineer. Where circumstances go beyond this, or where engineering decisions or judgments are required, contact must be made with the supervising engineer so that the engineering decisions and judgments are made by him or her and, further direction and/or instruction can, at that point, be provided to the subordinate.

When relevant, adequately supervised field reviews will require the supervising engineer to:

- Consider all circumstances surrounding the project and determine whether or not it is appropriate to delegate one or more of the field reviews to a subordinate;
- Consider the level of complexity, or critical nature of the field review to determine whether the quality and accuracy of observations made by a subordinate may be relied upon;
- Consider whether the subordinate carrying out the field review has the appropriate level of training and experience (with consideration for the complexity of the project at hand);
- Discuss with the subordinate the level of effort to be exercised, the level of detail required when reporting, and specific aspects of the construction activities which are to be included in the field review; and
- Review the field reports and do follow ups as required.

When information is not based on the supervising engineer's own observations and investigations, the source of the information shall be clearly stated and cited. This should include exact reference to reports or records, the author and the degree of reliance placed on them. If possible, when the information is derived from unpublished reports or records, an authenticated copy of the source and certificate of the author's professional qualification should be appended.

3. The supervising engineer must have involvement in all engineering decisions made.

Supervising engineers are required to assist their subordinates. The supervised individual, therefore, should not make independent engineering decisions without consultation and approval of the supervisor. Instead, they should be working to carry out or implement the decisions made by their supervising engineer.

Responsibility for engineering decisions does not require that the supervising engineer actively makes each and every decision relevant to a project. Codes and standards of practice that are accepted by the supervisor can guide much of the detailed work. However, he or she must have turned their mind to the relevant issues, monitored the subordinate who carried out the work, given directions where applicable, reviewed and documented each decision and the reasons for making it.

Indicators of appropriately supervised subordinates may include the:

- Availability of the supervising engineer to answer questions regarding engineering decisions made during work on the project; and/or
- Supervising engineer's awareness of relevant design criteria, methods of analysis, selection of materials and systems, field conditions, design constraints, economics of alternate solutions, and environmental considerations.

4. The level of supervision may be adapted to reflect the nature of specific supervisor and subordinate relationships.

In engineering, the working relationship between a supervising engineer and subordinate (e.g. a technologist or engineer-in-training) may span a number of years, or the length of a career. It is likely that under these circumstances, the level of supervision required will evolve to reflect the relative experience of both parties. This is not to say that engineers may substantively waive their supervisory duties for a senior technologist or experienced engineer-in-training, it is intended simply to recognize the realities of the relationship.

As an engineer-in-training works his or her way through the competency building and training process, it is expected that he or she will enjoy increasing autonomy, independence and responsibility. While the level of supervision he or she receives may decrease, it should not disappear.

Indicators of appropriately supervised experienced subordinates may include:

- Assignment of broader or multi-stepped tasks with reviews at intervals of decreasing frequency, as subordinate experience increases; and/or
- Continued availability should the subordinate have questions or require further direction.

Checklist for Supervising Engineers

Supervising engineers should ensure the following pre-requisites have been satisfied before the work is started by their subordinates:

1. Assessment of the requirements of the work that is being considered for delegation with respect to the knowledge, experience and capabilities required of the subordinate who will perform the work and identify the tools and other resources required to successfully complete the work.
2. Assessment of the subordinate who is being considered to perform the work to determine whether there is a gap in knowledge, experience and capabilities of the individual compared to the requirements of the work.
3. Arrangements to make available the required tools and other resources identified in (1) or identification of the gaps between the required and available tools and other resources. This includes reasonable access to subject matter experts that must be consulted during the course of the work.
4. Identification of the means by which the gaps identified in (2) and (3) above will be mitigated either directly by the supervisor or by other individuals who have agreed to assist. For engineers-in-training, the supervisor should ensure that they are allowed the opportunity to expand on their existing skills, knowledge, experience and capabilities. The supervisor should delegate work that is identified as a gap to another individual; the process should involve letting the engineer-in-training perform unfamiliar work and have that work reviewed in detail with an engineer as a learning opportunity.
5. Establishment of a scope of work, duties, responsibilities and authorities of the subordinates and the limitations with respect to acting alone.
6. Creation of a plan for the review of the engineering work output of the subordinates, including the timing and method. A subordinate who is delegated engineering work should ensure that an engineer has been identified to assume the professional responsibility for the work and should regularly submit their work to that supervising engineer for guidance and approval.

Potential Problems

1. Supervising multiple subordinates

In some firms, senior engineers may find themselves supervising many subordinates; potentially making it very difficult to maintain an active level of supervision or involvement in each project. This is not a defence for inadequate supervision.

However, since subordinates with different levels of experience may require different levels of supervision and attention, a defined maximum number of subordinates per supervising engineer may be inappropriate. Nevertheless, supervising engineers should be careful not to take on responsibility for more subordinates than they can realistically supervise at one time. They should also be cognizant of how their supervisory activities compare to the indicators discussed above.

2. Supervising multi-disciplinary projects

In multi-disciplinary projects, one engineer may find themselves nominally “in charge” of the entire endeavour – they are the designated coordinating engineer. The supervising engineer should not seal documents outside of his or her area of competence and other supervising engineers should be clearly identified. The decision as to who will take responsibility for each section, and direct the work in each area should be made prior to work starting. A record should be kept of each professional member's contribution and responsibility.

3. Conflict with industry practices

Industry practices may have developed in conflict with the guiding principles set out above and could lead to serious, and perhaps valid, opposition.

In the US, the National Society of Professional Engineers (NSPE) operates a Board of Ethical Review (BER) which reviews specific cases from the profession and publishes their findings as judgments. These cases are intended to be a set of guiding principles and educational tools in professional ethics. In a series of cases where the BER explored the level of involvement required for an engineer to ethically attach his seal to a piece of work, industry concern led to the modification and evolution of the initial holding.

Initially in case 86-2, BER considered the terms “direction” and “control” in the NSPE Code of Ethics and the National Council of Examiners for Engineering and Surveying (NCEES) Model Law, and interpreted them to suggest that an engineer “would be required to perform all tasks related to the preparation of the drawings, plans, and specifications for the engineer to ethically affix his seal.” Using this approach, the BER concluded that it was unethical for a chief engineer to seal work they had not conducted themselves or given a detailed review of.

This finding was met with opposition from the engineering community as it was inconsistent with industry practices and left many people in violation of the codes. The issue was revisited in a later case, where the original decision was qualified by allowing that it was ethical to seal documents prepared by someone else, so long as they were checked and reviewed by the signing engineer in some detail. With this decision, the Board stressed the critical importance of the engineer being squarely involved either in the preparation of the work or being responsible for the work they ultimately seal.

Another case, 91-8, further clarified the standard; it concluded that it was ethical for an engineer to seal someone else’s work, provided that in exercising direction and control, they perform a careful and detailed review of the material submitted by their staff.

The provincial/territorial procedures should consider the concerns and issues raised in the BER Cases. These procedures should be sufficiently accommodating to allow for a range of personal and industry practices while remaining clear and strict enough to further the engineering mandate to protect the public safety, health and environment.

Conclusion

The model guide provided guidance on the required supervision of subordinates and the associated ethical and legal use of the seal by supervising engineers. It is hoped that regulators will use the content of this document to develop their own model guides on direct supervision.

Definitions

“assist” means to give usually supplementary support or aid [1], to help, to act as an assistant in a subordinate or supportive function. An assistant contributes to the fulfillment of a need or furtherance of an effort or purpose [2].

“control” means to order, limit, instruct or rule someone’s actions or behaviour [3]. Synonyms include manage, organize, be in charge of, have power over, be in command of, direct, and rule.

“conduct” means the act, manner or process of carrying on [4], controlling, or directing. It is also, skillful guidance or management [5].

“**delegation**” means directing subordinates, or practitioners who do not have sufficient knowledge and experience to work independently, to undertake certain engineering activities or make certain engineering decisions on behalf of an supervising engineer who retains professional responsibility for the work.

"direct supervision" means the responsibility for the control and conduct of the engineering work of a subordinate.

“**subordinate**” means any person, directly supervised by an engineer who assists in the practice of engineering but is not themselves a supervising engineer [6].

“supervising engineer” means a licensee who determines technical questions of design and policy; advises the client; directly supervises the work of subordinates; is the person whose professional skill and judgment are embodied in the plans, designs, surveys, and advice involved in the services; and who supervises the review of material and completed phases of construction. [7]

“supervision” means the action, process, or occupation of supervising; monitoring and directing (as of activities or a course of action) [8]. When supervising a person or activity the supervisor is to make certain that everything is done correctly, safely, etc. [9]

Endnotes

[1] “Assist.” Merriam-Webster Online Dictionary. 2009
[2] “Assist.” Wordnet. 2009
[3] “Control.” Cambridge Dictionaries Online. Cambridge University Press 2009.
[4] "Conduct." Merriam-Webster Online Dictionary. 2009
[5] http://en.wiktionary.org/wiki/conduct
[6] Definition taken from the Nevada Board of Engineers and Architects
[7] Definition taken largely from the definition used by the Michigan Department of Consumer & Industry Services Board of Professional Engineers for “Person in Responsible Charge”)
[8] "Supervision.” Merriam-Webster Online Dictionary. 2009
[9] “Supervision.” Cambridge Dictionaries Online. Cambridge University Press 2009.