

Automatic sprinkler systems: know-how worth knowing!

In the last few years, much has been written at the Ordre des ingénieurs du Québec regarding inadequate behaviours of certain engineers working in the field of fire protection. Nowadays, the Professional Inspection Committee still observes that several members sign and seal engineer plans and specifications pertaining to automatic sprinkler systems without having the required qualifications to do so. Yet, fire prevention is a field which aims to protect lives as well as property, an overriding concern common to all engineers during the course of every professional act. Is this a paradox or carelessness?

Let us note, first and foremost, that the engineer specializing in fire protection has the following responsibilities:

- ensure compliance with the National Fire Code of Canada and the Québec Construction Code standards;
- safeguard the public's protection in that the engineer must see to it that the automatic sprinkler system he or she designed is efficient, should the system ever be triggered or activated.

More specifically, engineers who participate in the design and development of sprinkler systems must fulfil obligations which are clearly defined under section 24 of the Engineers Act. Pursuant to this provision, the plans and specifications relating to automatic sprinkler systems of buildings the cost of which exceeds \$100,000 must be signed and sealed by an engineer.

At present, this is what actually goes on. However, certain engineers are misguided when it comes to the value of their own signature as well as their professional seal, and affix them without being adequately qualified. It goes without saying that such conduct violates the Code of ethics of engineers, and moreover, constitutes a blatantly irresponsible behaviour, disregarding the safety of all of the building's users as well as the employers' and clients' reputation and economic prosperity.

"This is an unfortunate phenomenon, even more so since fire protection is an interesting field. Even though the demand is there, few engineers are truly specialized in automatic sprinkler systems" laments Laurier Nichols, eng., vice-president of special projects at Dessau and the Ordre's outgoing chairman of the Professional Inspection Committee.

Furthermore, there is another aspect to be considered in relation to this situation. For several years now, we have been noticing a new trend among engineering consulting firms, one that allows the production of "performance specifications" ("*devis de performance*") and general plans. These documents merely describe the requirements with which one must comply. In other

words, the detailed design of the automatic sprinkler system, the hydraulic calculations and the preparation of installation plans are left to the engineer employed or retained by the contractor in fire protection.

The Ordre closely monitors this way of doing things since the engineer is at greater risk of being placed in a conflict of interest. The design must ensure that the system will offer adequate

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protection and the person responsible for the design should not be primarily concerned with achieving a solution that is less costly, even if that happens to be the contractor's wish.

A VERY PARTICULAR TECHNOLOGY

Let no one be fooled. Even though it may appear simple to the untrained eye, the automatic sprinkler system design is based on a deeper knowledge in terms of detection and alarm systems, such as fluid mechanics and automatic controls. The design in itself requires measurements, sketches and detailed calculations, and the person responsible for the design must be able to determine optimal solutions in every context. All these activities are part and parcel of the engineer's exclusive field of practice and "are usually within the comfort zone of engineers, people with a penchant for numbers" points out Laurier Nichols.

As the author of *Processus de conception des systèmes de gicleurs automatiques*, Mr. Nichols knows what he is talking about, having scrutinized every step of this process, such as the preliminary analysis, the type of sprinkler to choose, location of the piping system, hydraulic calculations, the preparation of plans and specifications, the production of shop drawings, etc. Mr. Nichols explains that "engineering firms sometimes limit themselves in

simply playing an administrative role, whereas they would do well to embrace their role when it comes to design and act as beacons for their clients in technical matters.”

If designing automatic sprinkler systems is so complex and fascinating, why is it that engineers do not look to acquiring the necessary skills? According to Mr. Nichols, the answer to this question could simply reside in the contextual backdrop of the 1970s. “In those times, the design was planned following a method using tables relating to the piping system. Calculations were already made based on the number of water supply outlets. Consequently, it was relatively simple to design a functioning system.” Things have evolved considerably over the years.

A NEW METHOD, BUT THE RESPONSIBILITY REMAINS THE SAME

Fire protection has greatly evolved thanks to the arrival of hydraulic calculation software, among other things. “With these software programs, one can simulate a fire in a particular building and calculate the flow of water within the system, based on a water

distribution model. For example, it is possible to verify if the diameter of the pipes we plan on using and the water flow will be sufficient to extinguish the area that is most difficult to reach.”

These new electronic tools are quick and easy to use; they represent a valuable asset for designers in that they allow for more flexibility and provide countless possibilities, including the elaboration of system performance models. Mr. Nichols is excited about the efficiency of computer tools relating the hydraulic calculations and maintains that every engineer who desires to do so can learn how to use them. All it takes is a short training session.

That being said, one can never forget that beyond such a practical tool, it is the engineer who remains master of the system’s design, which means that he or she must fully understand the principles governing the design and be able to verify the calculations. This responsibility for the system lies with the engineer and he or she is additionally required to sign and seal all related plans and specifications.

1. Available to members on the extranet at www.members.oiq.qc.ca, under “Publications”.