FORESEEABILITY AND NEGLIGENCE IN EQUIPMENT AND STRUCTURE FAILURES

By José Vera, P.Eng., MEPP

It's important for practising engineers to understand the relationship between foreseeable risks and allegations of professional negligence in equipment and structure failures. Below, we share three examples of court cases to expand on these concepts.

EXAMPLE 1: A CASE OF MACHINE FAILURE

In the early 1990s, Canadian National Railway (CNR) had a project to drill a tunnel under the St. Clair River to connect Sarnia, Ontario, and Port Huron, Michigan. The project required a custom tunnel boring machine (TBM) to do the drilling. CNR insured this project under a builder's risk policy with the following exclusionary provision: "This policy does not insure the cost of making good faulty or improper design."

CNR engaged a TBM manufacturing company and set up a committee of experts to oversee the design of the TBM. Contamination problems were detected after 14 per cent completion of the tunnel. Modifications were made, and the main bearings were cleaned, resulting in a delay of 229 days and greatly increased costs. An inspection revealed that some seals had worn out due to excessive deflection of the cuttinghead. The insurers denied coverage and claimed that the delay and costs fell under the "faulty or improper design" exclusionary clause. However, the Ontario Superior Court of Justice determined that the insurers were liable for the damages, since the design of the TBM considered foreseeable risks and that decision specifically noted that:

> Cuttinghead differential deflection and the potential effect on the sealing elements had not been a previous problem and was not identified at the time by anyone as a potential problem. The assembled expertise had no reason to anticipate this new failure process. (*Canadian National Railway Company v. Royal and Sun Alliance Insurance Company of Canada, 2004 CanLII 33029 (ON SC)*, www.canlii.org/en/on/onsc/doc/2004/2004canlii33029/2004canlii33029.pdf)

This case eventually went to the Supreme Court of Canada (SCC), which cites expert Leslie G. Hampson:

> There are undoubtedly failures due to incompetence, ignorance, complacency, blind faith, mistakes and incorrect information. But there are also failures of components that could not have been foreseen and would not be focused on from the basis of information that was available at the time—it is my contention that the St. Clair TBM is in this category. The value of hindsight after a problem cannot be over-emphasized—but this is far removed from foreseeability in the real world. (Hampson's Third Report, p. 5)

The report further concludes:

> The policy did not exclude all loss attributable to "the design" but only loss attributable to a "faulty or improper design." The design exhausted the state of the art but left a residual risk. Failure is not the same thing as fault or impropriety. In my view, the insurers did not meet the onus of bringing the loss within the exclusion. (*Canadian National Railway Co. v. Royal and Sun Alliance Insurance Co. of Canada, [2008] 3 S.C.R. 453, 2008 SCC 66*, https://scc-csc.lexum.com/scc-csc/scc-csc/en/item/6236/index.do)

In this case, we can't simply blame the engineers, especially when all foreseeable risks available at the time of design were considered. Consequently, the key lesson is "Failure is not the same thing as fault or impropriety."

EXAMPLE 2: A CASE LINKING DUTY OF CARE TO FORESEEABILITY

Below is a key passage from a recent SCC decision which notes the link between duty of care and foreseeability:

> To establish a duty of care, there must be a relationship of proximity in which the failure to take reasonable care might foreseeably cause loss or harm to the plaintiff. Once foreseeability and proximity are made out, a prima facie duty of care is established. Whether or not something is "reasonably foreseeable" is an objective test. The question is properly focused on whether foreseeability was present prior to the incident occurring and not with the aid of 20/20 hindsight. (*Rankin (Rankin's Garage & Sales) v. J.J., 2018 SCC 19, [2018] 1 S.C.R. 587*, https://scc-csc.lexum.com/scc-csc/scc-csc/en/item/17085/index.do)

This decision teaches us that a key question to ask when establishing a duty of care in cases involving alleged negligence, such as equipment or structural failure, is: Was the risk foreseeable prior to the incident occurring?

EXAMPLE 3: A CASE ALLEGING NEGLIGENCE

In 1989, the Hilton hospitality company was looking into purchasing a hotel in Halifax. Hilton engaged engineering firm LGL (later acquired by SNC-Lavalin) to conduct a condition assessment of the building and to provide a report. Two engineers from LGL performed a visual assessment of the premises in 36 hours and then prepared a report. The report did not find any major defects with the hotel. Consequently, Hilton went ahead with the purchase. The scope of services as per the report was "…to determine if major defects were to be found and to assess the general condition of the building." Furthermore, the report did note a specific problem with the facade:

> The front facade which is made of stone and bricks has been extensively repaired and is generally in good shape, but some bricks are deteriorating due to infiltration of humidity or water. This could create major problems if proper care is not taken in the very near future.

And the report concluded:

> This building has generally aged well and is in satisfactory condition. The brick problem is important but relatively inexpensive solutions can be found if the work is done before the surface deteriorates further.

Thanks to previous repairs, there were few, if any, water leaks remaining at the time of the assessment. However, after the assessment was completed significant water leak problems resurfaced. In April 1992, the local architectural and engineering community had learned about the "potential for problems with corrosion of steel elements in steel frame masonry clad buildings" from the repair of a Bank of Nova Scotia building in downtown Halifax. Later that same month, and after ongoing water leakage, Hilton engaged an architect to address several problems including the leakage. The architect submitted a report that stated:

> We are not structural engineers and cannot comment extensively on structural matters. We do have concerns about lack of control/expansion joints, the possibility of a rusting steel frame and the brick quoins to name a few. We would like to have some structural input...

Consequently, engineering firm BMR was engaged to conduct further investigations of the hotel. When BMR engineers made a hole in the brickwork to examine the steel structure, they discovered that the steel structure had corroded to the point that "in many places the steel beams and columns were almost non-existent." Hilton then sued LGL, alleging they had conducted a negligent condition assessment of the hotel, since LGL had not discovered the steel corrosion during their 1989 assessment. The decision quotes *The Canadian Law of Architecture and Engineering* (2nd ed., 1994) authors Justice Beverley McLachlin, Wilfred Wallace and Arthur Grant. Below are some passages of interest:

> …architects or engineers are not obliged to perform to the standards of the most competent and qualified members of the profession, unless they so covenant. Unless they undertake to exercise a higher standard of care, what is required of architects or engineers is reasonable skill, care and diligence as judged generally by the standards of competence in the profession in which they practise…
>
> …the architect or engineer is to be judged by the professional standards prevailing at the time the work was done, not by what may be known or accepted at a later date, or what may be seen only with the benefit of hindsight…
>
> …architects or engineers do not guarantee that their work will be successful. Provided they have exercised reasonable judgment, competence and due diligence in doing their work, the fact that the work proves unsatisfactory in some way will not render them liable to the client for breach of contract or negligence….

The decision concludes that:

> I accept the evidence of Mr. McBride (professional engineer from BMR) that a structural engineer could probably have discovered the corroded steel beams and columns if they had conducted a full investigation. I am not, however, convinced that a reasonably competent structural engineer should have recommended a further investigation to determine the cause of the brick failure in 1989. In saying this I note that Mr. McBride has the benefit of 20/20 hindsight, which he enjoyed at the time that he became involved in the investigation of the hotel structure in 1992. This 20/20 hindsight was gained from his experience at the Bank of Nova Scotia complex, but it was not a knowledge which he had in 1989, nor was it knowledge or experience generally available in the structural engineering community…The defendant was not negligent in the conduct of the assessment or in preparation of the report to Hilton. (*Hilton Canada Inc. v. S.N.C. Lavalin Inc., 1999 CanLII 1352 (NS SC)*, www.canlii.org/en/ns/nssc/doc/1999/1999canlii1352/1999canlii1352.html)

Again, just because a structural failure occurs it does not mean the practitioner who conducted a previous condition assessment with no red flags is to blame. The key lesson from this case study is that the "engineer is to be judged by the professional standards prevailing at the time the work was done, not by what may be known or accepted at a later date, or what may be seen only with the benefit of hindsight."

In Ontario, practice advisory staff can comment only on the *Professional Engineers Act* (the act), its regulations as well as PEO's practice guidelines. The issue of professional liability is outside of the act. To gain a better understanding of professional liability, practitioners should:

- Consider taking courses on business law, construction law and professional liability to gain an understanding of basic principles;
- Read relevant case law that provides legal insights into professional negligence, including various factual scenarios for evolution of the law; and
- Consult with their professional liability insurance providers and their lawyers regarding specific exclusion clauses in their insurance policies.

Finally, PEO's practice advisory team is available by email at practice-standards@peo.on.ca and is glad to hear from practitioners looking for general information on their professional obligations. However, practitioners looking for assistance on resolving legal problems occurring in specific, concrete situations should always contact their lawyer. **e**

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