Causal Analysis based on Systems Theory (CAST) of the Algo Centre Mall Collapse

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Executive Summary

1 Introduction

The Algo Centre Mall, located in Elliot Lake, Ontario, was constructed between 1979 and 1980 by Algocen Realty Holdings Ltd. Housing a public library, a government service center, a hotel and retirement residence, and various retail stores, the mall served not only as a commercial hub but also as a community gathering space. The three-story structure was composed of concrete and steel-reinforced concrete slabs supported by a steel frame, sitting on a sloped terrain facing northeast. A parking deck was built on the roof, which was accessible via ramps along the hillside. The parking deck was supported by a steel frame held together by bolted and welded connections, with a layer of hollow core concrete slabs on top. In 2012, a section of the roof deck collapsed after a long history of water leaks, structural deterioration, and, most importantly, neglect, resulting in the deaths of two people and over twenty injuries. This report aims to analyze the Algo Centre Mall collapse using the CAST (Causal Analysis based on System Theory) methodology, which focuses on understanding the systemic factors that contributed to the incident. The following section first provides a relatively brief history of the Algo Centre Mall and its deteriorating conditions leading up to the collapse, then gives an overview of the CAST methodology, and finally outlines the structure of this report.

1.1 History of the Algo Centre Mall

1.1.1 Algocen built a defective mall amid a mining rush, sold its problems away at the sight of an economic downturn

Throughout the years that immediately followed its construction, the mall was plagued by significant structural issues, particularly with water leaks from the rooftop parking deck, owing to failed waterproofing measures. Such water leaks, along with cracks that developed in the concrete slabs, were reported as early as 1981, and the building's condition continued to deteriorate over the years. Ten years later, a report prepared by Trow Consulting Engineers Ltd. found that although the rooftop parking deck was generally in good condition, various components of the building had visible signs of deterioration, including the aftermath

of failed repairs, sections of broken concrete, and surface rust on exposed steel. In the Report of the Elliot Lake Commission of Inquiry (henceforth referred to as the Elliot Lake Report) [1], it was noted that the proposed waterproofing for the rooftop parking deck only met the requirements of the Ontario Building Code at that time on a technicality, for the 1975 code never specified what the waterproof membrane should be made of. Although a waterproof sealant was relied upon to act as a waterproofing membrane, it clearly failed to do so, as water leaks continued to be reported throughout the years.

The aforementioned 1991 Trow report also indicated an abnormal amount of chloride content in the slabs, presumably from the de-icing salts used on the parking deck or brought in by vehicles, which proved to have exacerbated the corrosion of the steel components. Trow recommended the installation of a new waterproof membrane and a layer of asphalt to replace the existing concrete topping, but this recommendation was rejected by Algocen due to the high cost of repairs and the disruption of income from the mall's hotel. Testimonies from the Elliot Lake Report indicated that Algocen Realty Holdings was financially capable of performing the renovations, but they never changed the way they dealt with the leakage and eventually sold the mall to Elliot Lake Retirement Living as-is. During this transaction, Algocen did not provide Retirement Living with any of the engineering reports describing the structural issues and leaks. Algocen constructed the mall as they foresaw Elliot Lake's expansion in the 1980s, but quickly sought to offload its responsibilities to the mall as soon as the mining boom died.

1.1.2 Retirement Living helped change the town, but not the mall maintenance practices

The Elliot Lake Retirement Living (ELRL, or "Retirement Living") is a non-profit organization established in 1991 to promote Elliot Lake as a retirement community. Formerly a uranium mining town, Elliot Lake's population reached its peak in the 1980s due to the mining boom, but the closure of the mines in the early 1990s dealt a huge blow to the local economy, and the city's population has been in steady decline ever since [2]. With Retirement Living taking the center stage in the city's transformation into a retirement community, the organization bought many properties in Elliot Lake, including the Algo Centre Mall in 1999 from Algocen Realty Holdings, to convert them into retirement getaways [3]. Retirement Living incorporated NorDev, a for-profit subsidiary, to manage the properties, including the mall and the hotel. Despite the close ties between Retirement Living and

the City Council, the organization was not obligated to share with the city any information that may harm the organization, including the reports on the state of the Algo Centre Mall.

The Elliot Lake Report also indicated that Retirement Living had no plans to fully address the roof deck issue. The mall's property manager, Mr. Richard Quinn, testified in front of the Commission counsel to further confirm that the organization simply continued the same practices as before it acquired the property, except the maintenance team simply became more adept at patching the leaks, but never at preventing those leaks from happening in the first place. Further, he testified that he interpreted the 1999 Halsall report, which was acquired by Retirement Living as it purchased the mall, as an endorsement of the ongoing maintenance practices. The Halsall report suggested two options for the roof deck: either find and seal all the cracks, or install a waterproof membrane. However, Halsall presented the second option with the requirement that all the cracks must be thoroughly found and sealed, though this point was not sufficiently emphasized. Having mistaken Halsall's suggestion as an endorsement for continuous maintenance, the mall continued to utilize its own maintenance team instead of hiring qualified contractors, and its deterioration proceeded along its course through Retirement Living's ownership of the Algo Centre Mall. During this time, Retirement Living was in a good enough financial standing to perform a permanent fix to the roof deck, which was quoted by Halsall to cost $776,000, but Retirement Living and NorDev instead spent $1.3 million to attract Zellers, a major Canadian retailer, to the mall, as well as at least $1.4 million in the golf course. Given the comparatively little amount that was really spent on the parking deck, as indicated in the Elliot Lake Report, it becomes clear that the 2012 collapse could have been avoided if Retirement Living and NorDev prioritized the safety of the building over the mall's business opportunities.

1.1.3 Duplicitous businessman purchased the mall without a thorough inspection, unwilling to fix but unable to sell

Eastwood Mall Inc. (henceforth referred to as "Eastwood"), wholly owned by Mr. Bob Nazarian, would later purchase the mall in 2005 at a discount. It was later revealed in the Elliot Lake Report that Retirement Living was attempting to sell off the mall to Eastwood without disclosing the full extent of the mall's crumbling conditions, which was remarkably reminiscent of the deal between it and Algocen Realty Holdings. In his interview with the Commission, Mr. Nazarian

commented as such about his other property purchases in August 2009: "The Algo Mall was a black hole that no matter how much money you put in, [...] that mall was doomed."[1]. Indeed, neither maintaining nor renovating the mall was going to be cheap long-term, and they would not have directly contributed to any financial returns, but the mall was still quite a profitable business, as indicated by the financial statements of Retirement Living, also shown in the Elliot Lake Report. This quote more goes to show how little Nazarian was interested in investing in the mall at that time. Instead of hiring outside engineering firms to conduct a thorough inspection of the mall, Nazarian relied on the Royal Bank of Canada's (RBC) engineers to assess it, as part of the loan application process before Nazarian could purchase the mall. The RBC engineers only conducted a visual inspection of the mall's structure and the equipment in the mechanical room. No structural components were inspected by a structural engineer, and no invasive tests were performed. As pointed out in the Elliot Lake Report, not conferring with outside consultation is not at all uncommon in Mr. Nazarian's business practices. This ignorance was further exacerbated by Retirement Living's refusal to disclose the structural issues from Eastwood, RBC, and the firm retained by RBC to survey the mall's condition, Construction Control.

The fact that Eastwood's purchase turned out to be as problem-laden as the Algo Centre Mall may somewhat be attributed to sheer bad luck; one may also consider it amateurish or superficial in its efforts, as it failed to thoroughly inspect the mall before spending millions of dollars to purchase it. However, the sheer multitude of deliberate neglect and indifference that ensued after the purchase, which led to the eventual loss of two lives and injuries to many others, is simply inexcusable. In his testimony to the Commissioner, Mr. Nazarian indicated that he became aware of the building's structural damages since as early as October 2006, from yet another water leakage incident in the public library that led to a Notice of Violation issued by the City Council. On the other hand, Mr. Nazarian displayed a pattern of avoiding large expenditures from his company, especially on the matters pertaining to the roof repairs. Commissioner Bélanger noted in his report that Mr. Nazarian had a rich history of manipulating his firm's financial records to obtain loans, evade taxes, and to hide significant assets. With clearly self-serving motives, Mr. Nazarian repeatedly provided evasive or false testimonies to the Commission or to anyone involved in a business deal with him and Eastwood. One example is the creation of Empire Roofing, a shell company, to provide the facade of a legitimate roofing contractor. Through Empire Roofing, Eastwood was able to appear as if it had entered a contract to fix the roof, which

would not only appease tenants such as Zellers but also allow Eastwood to make a dubious grant application. The said application was made possible by routing the payment through Empire Roofing to a legitimate contractor, Peak Restoration, who was hired to perform the work. Mr. Nazarian further reduced and delayed the payment to Peak Restoration, who had already started work with neither a contract signed by Eastwood nor a valid building permit.

The above is not in any way an exhaustive list of Mr. Nazarian's questionable business practices in his evasion of accountability and his unethical pursuit of profit, but it is more than sufficient to demonstrate how little he invested in the already dire conditions of the Algo Centre Mall, both in terms of money and of corporate responsibility. Building on Commissioner Bélanger's conclusion to this segment of the Elliot Lake Report, Eastwood's failure to either sell off the mall or to prevent its collapse was a direct result of its own actions - its deceitful business maneuvers wore thin the trust of the tenants and lenders, its failure to deal honestly with its contractors ran the roof renovation project aground, and most importantly, it putting short-term profits above all else left the Algo Centre Mall to crumble.

1.1.4 Regulatory agencies are also to blame

Although it is easy to blame the past owners for the 2012 collapse of Algo Centre Mall, a necessary component of this tragedy came from the regulatory bodies' failure to enforce the safety standards. The City Council of Elliot Lake had been officially made aware of the mall's ongoing water leakage issues since as early as 1991, when the public library made a complaint to the city. However, with the mall being a significant local hub of commerce and a community gathering space that had the same issue since its construction, it is inconceivable that the City Council had not been aware of the issues from the very beginning. Granted, the City of Elliot Lake may have been busy grappling with an existential crisis that occurred between the mall's construction and the turn of the century, but it had plenty of capacity to act after that. As a non-profit organization working closely with the City Council, Retirement Living was detrimental to revitalizing the city's economy as it transformed a former mining town into a successful retirement destination. However, this close relationship also meant a conflict of interest that ultimately impeded the City Council's ability to enforce safety standards. The City of Elliot Lake's Property Standards By-law includes a term that has remained valid since 1975, which mandates that the roof of a building and its drainage systems must be

watertight, and that the maintenance of which is the responsibility of the owner. The Algo Centre Mall had already been leaking for decades, and no order for compliance was issued until after Retirement Living had already absolved itself of the responsibility to the mall. Even when it did issue orders against Eastwood, the City Council did not follow through with any enforcement actions, such as fines or closure of the mall, until the roof collapsed. The Elliot Lake Report pointed out that the enforcement were carried out in a complaint-driven manner, but given the time frame and what little was done about the mounting complaints, it clearly would have taken a lot more for the city to take any substantial action.

The role of the Ministry of Labour (MoL) in the Algo Centre Mall collapse is also worth noting. The MoL had a field office in the mall in the early years of its operation and visited at least 25 times between 2007 and 2012, but the leaks still somehow went unnoticed or were taken unseriously until a few years before the collapse. The Elliot Lake Report attributes this to the MoL inspector at that time being "incurious" and his actions "perfunctory and inadequate", but mentions relatively little about the MoL's involvement in the Algo Centre Mall's history otherwise, at least not beyond inspections in response to complaints. As far as documented in the Elliot Lake Report, the MoL did not issue any orders directly related to the roof deck or the structural integrity of the mall, and the orders that were issued only superficially addressed the issues at hand, such as mold infestation and water leaks. Few signs, if any, ever indicated that the MoL had any knowledge about the mall's crumbling structure, nor did they take the effort to investigate the matter further.

1.2 CAST Methodology

Causal Analysis based on System Theory (CAST) is a methodology that focuses on understanding the systemic factors that contribute to incidents, rather than distributing blame to individual actors or components. Through analyzing the interactions between various components of a system, including the human, technical, and organizational elements, the CAST methodology is able to detach itself from the chronology of events and treat safety as an emergent property of the system. CAST is especially useful for complex indicents like the Algo Centre Mall collapse, where a faulty design was magnified by the cumulative effect of multiple factors and stakeholders over a period of three decades.

The first step towards applying the CAST methodology is to build a com-

prehensive understanding of the system, including its goals, losses, hazards, safety parameters, and proximate events that led to the incident. This helps to construct a Safety Control Structure (SCS) that identifies the interaction pathways between the various components of the system, both at the time of the incident and as originally intended by design. Most accidents start at the operations level, where human controllers interact with a physical process, perhaps through an automated control system. Therefore, the analysis segment of CAST would start from there, examining the flaws in human and automated controllers, in conjunction with the context of the accident. Since the SCS at the operations level is always determined by managerial and regulatory decisions, the analysis would then proceed in a top-down manner, evaluating the positive or negative contributions of those decisions, as well as environmetnal factors such as economic pressures, political climates, and organizational safety culture, to the accident. Finally, CAST concludes its analysis segment by identifying the dynamics of the system from a safety perspective. Specifically, it identifies the manners in which the system's components exacerbated or diminished the risk factors, through establishing a system dynamics model and exposing the it to simulated scenarios. From there, CAST can help format the findings into an accident report, which can then be used to inform future safety measures and regulations.

2 Safety Control Structure

System Goals

G1. Provide a safe, functional, and accessible commercial environment for the residents and visitors of Elliot Lake

G2. Ensure the structural integrity of the building throughout its lifecycle

Losses

L1. Human losses: loss of life, physical injuries and psychological harm

L2. Material and structural losses: destruction of property and economic losses

L3. Institutional and professional failures: loss of public trust, damage to the image of the engineering profession, and less trust in governmental accountability

L4. Disruption to society: loss of a commercial space, and breakdown of

emergency responses

Hazards

H1. Corrosion of the structure due to leaking from the rooftop parking deck [L1, L2, L3, L4]

H2. Ineffective inspection and maintenance routine [L1, L2, L3, L4]

H3. Inadequate engineering assessments [L1, L2, L3, L4]

H4. Regulatory and oversight gaps [L1, L2, L3, L4]

H5. Unclear responsibility allocation and poor communication [L1, L2, L3, L4]

H6. Economic and political pressures [L4]

H7, Unpreparedness when an emergency emerges [L1, L3, L4]

System Safety Requirements and Constraints

SR1: The building must be designed and maintained to ensure long-term structural integrity under expected environmental and usage conditions. [H1]

SC1: Structural components must not be allowed to degrade to the point of losing load-bearing capacity. [H1]

SR2: Regular, thorough inspections of critical infrastructure (e.g., roof, support beams) must be conducted by qualified professionals. [H2]

SC2: Identified structural deficiencies must be documented transparently and acted upon within a reasonable time frame. [H2]

SR3: Engineering assessments must be objective, evidence-based, and prioritize public safety over client interests. [H3]

SC3: Engineers must communicate risk levels clearly and explicitly, including in cases where conditions are unsafe or immediate action is needed. [H3]

SR4: Municipal and provincial authorities must have mechanisms to enforce that the building safety standards are followed. [H4]

SC4: Regulatory bodies must step in when reports indicate serious structural risks, including through orders, fines, or building closure. [H4]

SR5: Property owners must allocate resources for ongoing maintenance and be held accountable for not doing repairs that pose safety risks. [H5]

SC5: Cost-saving measures must not go above the minimum safety standards required for public occupancy. [H5]

SR6: Emergency response plans must account for building collapse scenarios and provide for safe, timely rescue efforts. [H6]

SC6: Emergency response should not be suspended without an effective alternative strategy when lives may be at risk. [H6]

SR7: The public and tenants must be informed about any significant structural safety risks affecting the buildings they use. [H7]

SC7: Safety-related information must not be kept away from the public due to commercial, political, or reputational concerns. [H7]

3 Analysis of the Safety Control Structure Components

In this section, each component of the safety control structure of the Algo Mall is analyzed to see the role it played in its collapse.

3.1 Federal Government of Canada

The federal government's role in this case reveals how a broken governance system can allow serious safety issues to fall through the cracks. While federal agencies occupy space in buildings like the Algo Mall, they often do so without corresponding responsibility for ensuring the structural integrity of those buildings. This disconnect between public presence and regulatory accountability contributed to a situation where federal facilities gave the appearance of legitimacy and safety to a building that was, in fact, deeply unsafe. Additionally, the slow mobilization of federal resources following the collapse undermined public trust and raised questions about the responsiveness of federal institutions to crises in smaller or more remote communities. The case highlights the need for more integrated oversight and better-defined roles for federal actors in ensuring the safety of the public

facilities they use, regardless of ownership.

Safety Requirements and Responsibilities

The federal government is expected to support public safety by enforcing and maintaining national legislation such as the Criminal Code, funding and overseeing federal agencies like Public Safety Canada, and setting national standards through model codes such as the National Building Code of Canada (NBC). While enforcement of building safety rests with provincial and municipal authorities, the federal government influences safety practices by publishing national codes and funding research through institutions like the National Research Council. In the context of the Algo Mall, it also bears a duty to ensure that spaces leased by federal departments, such as Service Canada and Members of Parliament's offices, are reasonably safe for the public and for federal employees. Additionally, the federal government is responsible for providing coordinated emergency response support, particularly when provincial or municipal capabilities are overwhelmed.

Context in Which Decisions Were Made

The federal government's actions must be understood in light of the law boundaries of Canada's federal system. Construction safety is largely a provincial responsibility, and while the federal government produces the NBC, it lacks the constitutional authority to enforce its conditions or arrangements. The Algo Centre Mall, a privately owned and municipally regulated structure, was under the authority of the City of Elliot Lake and the Province of Ontario. Federal agencies that leased office space within the Mall had limited mechanisms, or perhaps little perceived obligation, to investigate or respond to ongoing deterioration in the building's structure. This resulted from a wider political context characterized by limited financial resources and federal intervention in local infrastructure matters during the early 2010s. When the collapse occurred, the federal government did not immediately intervene in rescue efforts. Only after significant public pressure and the direct involvement of Ontario Premier Dalton McGuinty did federal resources, such as a specialized crane from Toronto, become available to assist in search and rescue operations.

Mental Model

Within the federal system, policymakers likely operated on the assumption that provincial and municipal authorities were managing the structural safety of the Algo Centre Mall. There appears to have been a widespread belief that once a building was approved and certified under local building codes, it did not require further intervention from federal tenants or agencies. This reflects a mental model in which liability and responsibility were seen to reside with the property owner and municipal inspectors, rather than with federal leaseholders. Additionally, it is likely that federal departments viewed their facilities management obligations in commercial leases narrowly, focusing on lease terms and tenant services rather than structural safety. There may also have been an implicit trust in the municipal permitting and inspection routine, which masked the serious long-term structural risks the Mall posed to federal employees and citizens alike.

Inadequate Control Actions

The federal government failed to take a number of actions that could have mitigated the risk or severity of the disaster. Most notably, it did not institute any independent inspections of leased commercial properties despite the clear public-facing function of federal offices located in structurally deteriorating buildings. This constitutes a failure to provide a required safety control action. Furthermore, following the collapse, federal intervention in the emergency response was delayed and occurred only after significant provincial and public pressure. This represents a correct control action applied too late to affect the outcome. There is no evidence that the federal government attempted to proactively assess safety oversight mechanisms for leased properties even after the collapse, which suggests a lack of follow-through or revision of internal models for building safety. No unsafe or actively harmful actions were taken, but the federal government's inaction, especially in the face of known structural degradation, can be seen as a form of failure within the safety control structure.

3.2 Ontario Provincial Government

The role of the Ontario provincial government in this case reflects the dangers of distributed power without adequate accountability or support. By assigning mu-

nicipalities the legal duty to enforce building safety while retaining little oversight of how those duties were performed, the province created conditions where enforcement gaps could grow unchecked. In Elliot Lake, that dynamic allowed a structurally unsound building to remain in operation for decades despite widespread awareness of its problems. The province's failure to provide periodic structural inspections, combined with weak coordination in emergency response, exposed both regulatory and operational vulnerabilities.

Moreover, the case highlights how fragmented responsibilities and isolated ministries undermine systemic safety. Engineers, inspectors, labour officers, and emergency managers operated in parallel with insufficient mechanisms to synthesize their observations into collective action. Without structural changes to execute inspections, resource local enforcement, and unify safety oversight, the same conditions that enabled the Algo Mall collapse could easily reemerge elsewhere in Ontario. The tragedy thus revealed the inadequacy of relying on self-correcting systems in contexts where power, expertise, and incentives are not aligned.

Safety Requirements and Responsibilities

The Ontario provincial government holds primary responsibility for regulating and enforcing building safety within the province. Through legislation such as the Building Code Act and the accompanying Ontario Building Code, the province sets minimum design and construction standards for all buildings under its power. It also has oversight of professions such as engineers and building officials through special authorities like Professional Engineers Ontario (PEO) and the Ontario Building Officials Association (OBOA). The Ministry of Municipal Affairs and Housing is tasked with maintaining and updating the Building Code, while the Ministry of Labour, Immigration, Training and Skills Development (formerly the Ministry of Labour) ensures workplace safety and may intervene in matters involving hazardous conditions. Additionally, the province is responsible for empowering municipalities to enforce building codes and property standards, and is expected to ensure that those local governments have the capacity and guidance needed to fulfill those obligations.

In the case of emergency response, Ontario's Ministry of the Solicitor General and its Emergency Management Ontario branch have the power for oversight and coordination of provincial-level emergency preparedness. In contexts like the Algo Mall collapse, the province is expected to provide expertise, specialized equip-

ment, and decision-making support in rescue operations that exceed municipal capabilities. Furthermore, the province is responsible for establishing clear lines of authority and communication between engineering professionals, municipalities, and provincial ministries during both routine safety enforcement and crisis events.

Context in Which Decisions Were Made

The Ontario provincial government's actions must be understood in the context of a system that transfers primary responsibility for enforcing the Building Code to municipalities, while retaining authority over the standards themselves. Since the 1990s, there had been a political trend toward "downloading" responsibilities onto municipalities in Ontario, particularly under governments that have limited resources. This left smaller municipalities like Elliot Lake under-resourced, even as they remained legally accountable for enforcing complex safety standards. At the same time, the province retained the authority to intervene in matters of non-compliance with the Code, particularly when municipalities failed to act. However, this authority was not exercised in the case of Algo Mall.

Additionally, at the time of the collapse in 2012, there was no mandatory requirement in Ontario for periodic inspections of structural elements in existing buildings. Provincial oversight of engineering practice existed but relied heavily on self-regulation by PEO. The Ministry of Labour, though notified at times of hazardous working conditions at the Mall, did not act on the escalating structural risk as a workplace safety issue. In terms of emergency response, the province did not immediately provide direct support after the collapse. When municipal rescuers declared the structure too unsafe to enter, the absence of a provincial-level command mechanism left the situation paralyzed for over 48 hours, until political intervention from the Premier's Office jump-started further rescue efforts.

Mental Model

The provincial government appeared to operate under the assumption that municipalities were adequately equipped and motivated to enforce structural safety standards on their own. This mental model underestimated the capacity gaps in smaller municipalities and failed to account for the complex political and economic incentives facing local officials, such as avoiding enforcement actions that could destabilize a community's economic hub. Additionally, the province seemed

to assume that periodic structural inspection of buildings was unnecessary unless complaints or renovations were involved, despite the known aging infrastructure across many Ontario communities.

In the context of the Algo Mall, provincial ministries may have lacked the internal information-sharing structures necessary to connect separated indicators of risk. For example, the Ministry of Labour was aware of ongoing leaks and employee safety concerns within the Mall but did not interpret these as a symptom of structural decay requiring higher-level intervention. Similarly, the Ministry of Municipal Affairs and Housing had no formal mechanisms to monitor municipal enforcement of the Building Code. The overall process model implicitly placed trust in local authorities while offering limited oversight or support, an arrangement that ultimately failed when multiple warning signs went ignored over many years.

Inadequate Control Actions

The province failed to take several critical control actions that could have prevented or mitigated the collapse. Most significantly, it did not require ongoing structural inspections for aging commercial properties, even though other jurisdictions (such as Quebec) had begun implementing such practices following earlier tragedies (Elliot Lake Commission of Inquiry, 2014, pp. 585–586). The provincial government also failed to monitor or assess the enforcement capacity of small municipalities like Elliot Lake, which struggled with both technical knowledge and political pressures in dealing with problem buildings. Furthermore, despite being notified of concerns about the Mall over the years, through both Ministry of Labour interactions and public reports, the province took no steps to independently investigate or intervene in enforcement misses.

Following the collapse, the province's initial failure to take command of the rescue operation led to a dangerous delay in life-saving action. The decision to suspend rescue efforts due to structural instability was reasonable in itself, but the lack of an alternative plan, as well as an apparent vacuum of leadership, represented a breakdown in emergency management coordination. It was only after Premier Dalton McGuinty intervened personally that the necessary equipment and expertise were brought in to resume search efforts. This reveals a significant misalignment between the province's formal responsibilities and its operational readiness to act in a crisis.

3.3 Ministry of Labour (Ontario)

The Ministry of Labour's role in the Algo Centre Mall collapse underscores a critical flaw in Ontario's safety structure: the isolation of responsibilities among institutions that interact with the same infrastructure. Although the Ministry was not responsible for building code enforcement or structural design, its repeated involvement with the Mall and its knowledge of long-term interior damage placed it in a unique position to detect and escalate safety concerns. However, a narrow regulatory lens and a lack of cross-department protocols prevented it from doing so.

The case illustrates how frontline regulators can become numbed to risk when they are trained to view systemic decay as a series of isolated incidents. The Ministry's inability to interpret patterns, share data, or collaborate with other authorities reflects a larger cultural and institutional challenge: workplace safety enforcement must evolve to recognize that persisting infrastructure failure is a form of occupational hazard. Without an integrated system of oversight that encourages proactive risk detection and coordinated responses, regulators like the Ministry of Labour will remain limited in their capacity to prevent tragedies like the Algo Mall collapse (Elliot Lake Commission of Inquiry, 2014, pp. 140–149).

Safety Requirements and Responsibilities

The Ontario Ministry of Labour holds responsibility for workplace health and safety under the Occupational Health and Safety Act (OHSA). Its inspectors are tasked with enforcing workplace safety standards, investigating complaints, and issuing orders where conditions pose a danger to workers. While the Ministry does not oversee the structural soundness of buildings, it is empowered to intervene when conditions in the physical work environment, including ceiling collapses, leaks, or hazardous materials, pose risks to employee safety. In the context of the Algo Centre Mall, the Ministry of Labour was expected to respond effectively to reports of dangerous conditions within workplaces housed in the facility, such as retail shops, offices, and food courts. Its regulatory mandate includes the authority to order repairs, halt work, or close a workplace if workers face imminent danger (Elliot Lake Commission of Inquiry, 2014, pp. 3–4, 140–145).

Context in Which Decisions Were Made

Prior to the Mall's collapse, the Ministry of Labour had been made aware of recurring hazards in the Algo Centre through multiple complaints dating back to at least 2008. These included falling ceiling tiles, ongoing leaks, water infiltration through the roof, and mold contamination, which were cited by both workers and business owners. Ministry inspectors visited the Mall on several occasions and issued orders requiring the building owner to repair specific conditions that posed health and safety risks to employees. However, these orders were narrowly defined and tended to focus on isolated symptoms, such as individual ceiling tiles or visible mold, rather than systemic structural deterioration (Elliot Lake Commission of Inquiry, 2014, pp. 145–149).

The Ministry appeared to treat the complaints as discrete, correctable maintenance issues rather than indicators of deeper, compounding structural failures. This approach was shaped in part by the Ministry's own organizational boundaries: its power did not include structural engineering assessments or broader building code enforcement, which are typically the responsibility of municipalities. As a result, inspectors operated with constrained tools and within a limited policy framework that did not allow them to trigger cross-jurisdictional safety reviews, even in the presence of repeated, serious concerns (Elliot Lake Commission of Inquiry, 2014, pp. 148–149).

Mental Model

The Ministry of Labour's response reflected a mental model in which worker safety was interpreted in narrow terms, focused on immediate, visible hazards, rather than as part of a broader system of structural integrity. Inspectors appeared to believe that as long as specific problems (like mold or broken tiles) were fixed, the workplace could be considered safe, regardless of the underlying building conditions. This reductionist view ignored the cumulative warning signs that the Mall was deteriorating beyond acceptable limits.

Furthermore, the Ministry lacked a robust system for aggregating repeat visits, recognizing patterns, or escalating persisting building-wide problems to higher authorities. There was no indication that any formal mechanism existed for notifying municipal building officials or engineers about recurring workplace safety issues that might reflect a failing structure. As the Commissioner noted, "The

repeated involvement of the Ministry of Labour inspectors. . . was not perceived as part of a broader structural failure" (Elliot Lake Commission of Inquiry, 2014, p. 148). This gap in inter-agency information sharing allowed serious risks to persist unchallenged.

Inadequate Control Actions

The Ministry of Labour failed to take several control actions that, while not required by existing regulations, were necessary to ensure workplace safety in this high-risk environment. It did not elevate repeated workplace hazards as indicators of a potentially catastrophic structural failure. While the Ministry did issue orders to repair mold, water infiltration, and ceiling damage, it did not initiate or recommend a higher-level structural investigation. This constitutes a failure to provide a necessary control action, particularly as the same issues reappeared across multiple inspections over several years (Elliot Lake Commission of Inquiry, 2014, pp. 145–149).

Additionally, the Ministry did not establish any formal coordination with the City of Elliot Lake or with engineering regulators to share concerns about the physical state of the Mall. There was also no evidence of an internal mechanism to flag facilities that had multiple outstanding or recurring safety issues. As a result, the Ministry treated its role as reactive and case-specific rather than preventative and systemic. By doing so, it implicitly reinforced the idea that the Mall remained a safe place to work, when in fact, the opposite was true.

3.4 Ministry of Municipal Affairs and Housing (Ontario)

The role of the Ministry of Municipal Affairs and Housing (MMAH) in this case reflects the structural dangers of separated enforcement without centralized accountability. By relying on municipalities to self-monitor and self-regulate, the Ministry distanced itself from the day-to-day realities of code enforcement. This arrangement might function adequately in large, well-resourced cities but fails in small, politically constrained municipalities like Elliot Lake. The tragedy illustrates that local autonomy must be balanced with provincial oversight, particularly when public safety is at stake.

Moreover, the Ministry's narrow interpretation of its role highlights the risks

of regulatory fragmentation. A good safety system requires shared responsibility, data sharing, and escalation pathways, none of which were present in MMAH's operational approach at the time. The Inquiry found that even though multiple actors knew about the risks in the Mall, their roles were so narrowly defined that no one agency took ownership of the structural threat (Elliot Lake Commission of Inquiry, 2014, pp. 6–7, 405–407). This suggests a need for provincial ministries to adopt broader, systems-level thinking and to institutionalize mechanisms for cross-jurisdictional safety governance.

Safety Requirements and Responsibilities

MMAH is the Ontario government body responsible for the administration and maintenance of the Building Code Act, 1992 and the Ontario Building Code. These instruments define minimum design, construction, and renovation standards for buildings in the province. The Ministry provides technical guidance to municipalities, supports training and certification of building officials, and proposes amendments to the Code as necessary. Through these mechanisms, MMAH plays a central role in shaping the safety and integrity of Ontario's built environment. However, enforcement is distributed to local governments, meaning that MMAH's role is primarily supervisory and advisory, rather than operational or enforcement-oriented (Elliot Lake Commission of Inquiry, 2014, pp. 2–3, 405–406).

The Ministry also has a responsibility to monitor the effectiveness of municipal enforcement and to ensure that local governments are capable of upholding provincial safety standards. It may issue policies or regulations requiring inspections or reviews, particularly in response to emerging risks or prior tragedies. Thus, even though MMAH does not inspect buildings directly, it is charged with maintaining the integrity of the regulatory system as a whole.

Context in Which Decisions Were Made

At the time leading up to the collapse of the Algo Centre Mall, the Ministry of Municipal Affairs and Housing operated within a system that heavily emphasized municipal autonomy in enforcing building codes. The Ministry did not systematically monitor municipal performance, nor did it impose mandatory re-inspection requirements for aging buildings, even in high-risk contexts. This approach was rooted in the broader political trend of the 1990s and 2000s that saw many respon-

sibilities downloaded to municipalities without proportional increases in oversight or support.

The Inquiry report makes clear that MMAH saw its role in limited terms. For example, although the Ministry occasionally consulted on technical issues or provided training through the Ontario Building Officials Association (OBOA), it did not review how municipalities like Elliot Lake were enforcing the Code, nor did it attempt to evaluate whether small communities had sufficient expertise or independence to take appropriate action on complex structural issues (Elliot Lake Commission of Inquiry, 2014, pp. 405–406). This passive behaviour remained in place even after warning signs from Elliot Lake, including reports of water damage, corrosion, and public complaints, became known to various arms of government.

Mental Model

The Ministry of Municipal Affairs and Housing appeared to operate with a narrow, law-focused mental model of its responsibilities. It viewed the enforcement of the Building Code as a purely municipal function and saw its own role as primarily technical and administrative. There was little evidence of a proactive or systems-thinking approach within the Ministry. Staff and leadership assumed that once a municipality was assigned enforcement authority under the Building Code Act, it would execute that responsibility effectively, regardless of its size, capacity, or economic pressures. This reliance on municipal self-sufficiency blinded MMAH to the real possibility that communities like Elliot Lake lacked both the political will and technical resources to properly manage deteriorating infrastructure (Elliot Lake Commission of Inquiry, 2014, p. 406).

Moreover, the Ministry's lack of a province-wide system for monitoring the enforcement performance of municipalities meant it had no data or indicators to prompt concern about Elliot Lake's regulatory practices. There was no escalation protocol when a municipality repeatedly failed to enforce the Code or appeared to overlook critical safety issues. As a result, MMAH's institutional model essentially presumed a level of confidence that, in practice, was not present.

Inadequate Control Actions

The Ministry of Municipal Affairs and Housing failed to provide several necessary control actions that could have helped prevent the collapse. Most significantly, it did not provide any form of periodic structural inspections for commercial buildings, despite the fact that such requirements existed in other jurisdictions and had been discussed following previous failures, such as the 2006 Laval roof collapse in Quebec (Elliot Lake Commission of Inquiry, 2014, pp. 406–407). This lack of regulatory foresight left buildings like the Algo Centre Mall to degrade unnoticed once they had passed initial construction inspections.

Additionally, MMAH did not conduct performance evaluations of municipalities' enforcement of the Building Code. There was no system to assess whether local governments were adequately trained, appropriately resourced, or sufficiently independent from political or economic pressures to make unpopular safety decisions, such as condemning a deteriorating but economically vital shopping centre. The Ministry's failure to recognize these gaps represents a significant oversight in regulatory governance.

Finally, in the wake of mounting signs of trouble in Elliot Lake, the Ministry did not act to intervene or provide targeted support. It missed an opportunity to act as a coordinating authority that could have told engineers, safety officials, and municipal leaders to address the growing risks at the Mall.

3.5 Municipal Government – City of Elliot Lake

The failures of the municipal government illustrate how small-town politics, economic dependency, and institutional isolation can undermine safety enforcement. Elliot Lake's officials were embedded in a system that discouraged confrontation with powerful local stakeholders, especially the owners of economically important infrastructure. The City's reluctance to enforce safety regulations stemmed not only from limited resources but from a broader civic culture that emphasized stability over accountability (Elliot Lake Commission of Inquiry, 2014, pp. 6–7, 380–386).

This case reveals the fragility of relying on municipal enforcement in contexts where political and economic incentives are misaligned with public safety. Without strong oversight from the provincial level and without a robust culture of

documentation, transparency, and accountability, small municipalities can become structurally incapable of acting on known risks. The City of Elliot Lake's failures were not just procedural; they were cultural and systemic. The Commission concluded that these failures contributed directly to the deaths of Lucie Aylwin and Doloris Perizzolo, and that stronger municipal leadership could have prevented the tragedy.

Safety Requirements and Responsibilities

As an authority under Ontario's Building Code Act, the City of Elliot Lake had the legal responsibility to enforce the Ontario Building Code (OBC) within its jurisdiction. This included issuing building permits, inspecting construction and renovations, and taking enforcement action against buildings that failed to comply with minimum standards. In addition to its responsibilities under the OBC, the municipality was also obligated to enforce local property standards bylaws, such as those governing maintenance, structural soundness, and occupancy safety, through its municipal Property Standards Officer and Chief Building Official (CBO) (Elliot Lake Commission of Inquiry, 2014, pp. 380–381).

As the owner of public infrastructure and a regulator of private buildings, the City held a dual role: one as a watchdog of community well-being and another as an enforcer of provincial safety laws. This placed the City in a position of both legal responsibility and moral authority to act decisively when confronted with evidence of deteriorating structures like the Algo Centre Mall.

Context in Which Decisions Were Made

The actions of the City of Elliot Lake were shaped by its constrained political, economic, and administrative environment. Following the closure of uranium mines in the 1990s, the City had gone through a long-term economic decline, becoming heavily reliant on retirement tourism and the commercial activity generated by the Mall. By 2012, the Algo Centre was a symbolic and economic hub of the city. This context contributed to a pervasive reluctance to take enforcement actions that might result in the Mall's closure or economic destabilization (Elliot Lake Commission of Inquiry, 2014, pp. 6–7, 380–381).

These pressures resulted from a lack of administrative capacity and technical

independence. The City relied heavily on its contracted Chief Building Official, who often worked in isolation and had limited support or oversight. The Commission found that municipal officials were aware of long-standing water leakage and public complaints, yet consistently deferred to property owners or private engineers, choosing not to issue work orders or pursue more direct enforcement strategies. Decisions were frequently based on informal conversations and unwritten understandings, rather than documented inspections or formal code enforcement proceedings (Elliot Lake Commission of Inquiry, 2014, pp. 378–380).

Mental Model

The City of Elliot Lake operated with a deeply constrained process model, in which the primary goal was maintaining economic stability and civic calm. This model privileged compromise and continuity over risk detection or enforcement. Municipal staff, particularly the CBO and Property Standards Officer, repeatedly relied on verbal assurances from building owners or engineers, rather than objective evidence or detailed inspections. As the Inquiry report notes, "there was an almost unshakable belief in the integrity of the building and in the private engineers hired by the owner".

Moreover, municipal officials appeared to adopt a minimalistic interpretation of their enforcement powers. They believed that unless a structure was obviously unsafe or unless an engineer explicitly declared it dangerous, the City had little authority or obligation to act. This perspective ignored the broader purpose of the OBC and property standards regulations, to prevent precisely the kind of systemic decay that affected the Mall. The process model in place did not allow for anticipation, escalation, or intervention, even in the face of decades-long evidence of deterioration.

Inadequate Control Actions

The City of Elliot Lake failed to take multiple control actions that were within its power and duty. Most significantly, it did not issue any work orders or property standards orders that would have required the Mall's owners to repair persistent water infiltration or corrosion of the structural steel. Nor did it demand independent structural assessments once it became clear that the original waterproofing had failed and the Mall was suffering from ongoing leaks and ceiling collapses

(Elliot Lake Commission of Inquiry, 2014, pp. 380–385). Even after the 2008 resignation of an engineer hired by the owner, who cited professional concerns about the structural safety of the roof-deck parking system, the City did not act on the warning or require further investigation.

The City also failed to keep adequate records of complaints, inspections, or enforcement decisions. As a result, institutional memory was limited, and repeated red flags did not accumulate into a pattern that might have triggered more serious intervention. The lack of documentation made it easy for officials to deny prior knowledge or to frame each concern as an isolated incident, rather than part of a larger trend of systemic neglect.

Finally, during the emergency response, the City was slow to coordinate with provincial agencies and did not have a prepared plan for managing structural collapse or requesting heavy urban rescue equipment. This further delayed life-saving interventions in the critical hours after the collapse.

3.6 Professional Engineers Ontario (PEO)

The case of Professional Engineers Ontario highlights how professional self-regulation can fall short in protecting public safety when it relies too heavily on passive complaint-based mechanisms. In this case, the engineering profession failed to regulate itself in a context where it had privileged knowledge of structural deterioration, failed repairs, and design flaws. PEOs' respect for procedural formality over proactive oversight meant that critical risks remained unchallenged, even when known to insiders.

The Commission was especially critical of PEO's failure to act in the face of evidence of poor engineering judgment. It emphasized the need for a cultural and procedural shift in professional regulation: "Professional self-regulation should mean more than protecting the interests of professionals. It must include protecting the public" (Elliot Lake Commission of Inquiry, 2014, p. 395). This case illustrates the importance of instituting robust accountability systems within professional bodies and developing mechanisms to identify and monitor high-risk engineers, particularly those practicing in areas with significant public exposure, such as structural safety.

Safety Requirements and Responsibilities

Professional Engineers Ontario (PEO) is the self-regulating licensing body responsible for governing the practice of professional engineering in Ontario under the Professional Engineers Act. PEO sets licensing standards, enforces ethical conduct, investigates complaints, and disciplines members who violate its regulations. Its primary goal is to protect the public interest by ensuring that only qualified and competent individuals are allowed to practice engineering. In cases involving public safety, particularly structural engineering, PEO has the responsibility to investigate whether licensed engineers have failed to meet professional standards and to apply disciplinary measures where appropriate (Elliot Lake Commission of Inquiry, 2014, pp. 393–394).

In the context of the Algo Centre Mall, PEO was expected to oversee the quality of engineering work carried out on the building, especially given the clear signs of structural decay and the technical complexity of the rooftop parking deck. It had a duty to investigate engineers who supervised inspections, certified repairs, or provided assurances that the building remained structurally sound.

Context in Which Decisions Were Made

PEO's conduct in the Algo Mall case was shaped by a complaint-driven enforcement model. Although it has the authority to initiate investigations, PEO typically responds to public complaints or referrals. Between the 1990s and the time of the collapse in 2012, several engineers were involved in assessing and advising on the Mall's condition, including those who failed to recognize or act on significant structural deterioration. Despite concerns raised by members of the public and warnings issued by at least one resigning engineer, PEO did not investigate any of the engineers involved until after the collapse occurred (Elliot Lake Commission of Inquiry, 2014, pp. 393–395).

One engineer, Robert Wood, conducted a visual inspection of the Mall just weeks before the collapse and concluded that there was no significant structural concern, despite severe corrosion of steel beams. He failed to identify the urgency of the damage and did not recommend immediate action. PEO did not intervene at the time, even though Wood had previously faced disciplinary action and had resigned from the engineering firm that had earlier expressed concerns about the Mall's safety. The Commission found that PEO had opportunities to scrutinize

Wood's conduct more rigorously but failed to do so (Elliot Lake Commission of Inquiry, 2014, pp. 393–396).

Mental Model

PEO's process model was predominantly reactive, built around the assumption that unprofessional or unsafe conduct would be brought to its attention through formal complaints. There was little evidence of proactive oversight or review of engineering work, even in situations where members had a history of disciplinary action or where buildings presented high public risk. This model assumes that public institutions or property owners will reliably recognize engineering misconduct or incompetence and that complaints will be sufficiently detailed and timely to prompt effective regulation.

In the case of the Algo Centre Mall, this model proved inadequate. PEO did not maintain a risk-based monitoring system for engineers with past disciplinary issues, nor did it develop protocols for escalating concerns when buildings under the supervision of licensed engineers presented persisting maintenance or structural problems. As a result, engineers like Wood were able to practice largely unsupervised, even after repeated complaints about the Mall's condition and mounting evidence of structural deterioration (Elliot Lake Commission of Inquiry, 2014, pp. 393–395).

Inadequate Control Actions

PEO failed to take several critical control actions in the years preceding the Mall's collapse. Most notably, it did not initiate an investigation into Robert Wood or other engineers who had provided structural assessments despite obvious evidence of corrosion and water infiltration. This failure occurred despite Wood's prior disciplinary record and the serious consequences of his incorrect assurances regarding the building's condition. PEO also failed to act on systemic red flags, such as the resignation of an engineering firm from the project due to ethical concerns, treating them as outside the scope of its regulatory interest (Elliot Lake Commission of Inquiry, 2014, pp. 393–396).

After the collapse, PEO did eventually launch an investigation into Wood's conduct and brought forward disciplinary charges. However, these actions were

reactive and came only after lives had been lost. The lack of earlier intervention illustrates the gap between PEO's regulatory authority and its willingness to exercise that authority in the public interest. No broader review was undertaken of PEO's processes for monitoring high-risk practitioners or for overseeing engineering in aging infrastructure.

3.7 Ontario Association of Architects (OAA)

The OAA's limited role in the Algo Centre Mall case reveals a deeper systemic issue in the relationship between design professions and long-term building safety. Like PEO, the OAA operates on a complaint-based model that is reactive rather than proactive. This model assumes that design risks are resolved at the drawing board and that long-term operational hazards are outside the architect's responsibility. Such a stance neglects the reality that architectural decisions, particularly those involving building envelopes, drainage, and structural exposure, can generate risks over time.

Furthermore, the absence of a professional review within the OAA after the collapse illustrates the limitations of self-regulation when institutional learning is not structurally encouraged. A system committed to public safety must go beyond assigning blame only when misconduct is proven and instead foster a culture of inquiry, continuous improvement, and cross-disciplinary accountability. The Commission concluded that institutions like the OAA must broaden their mandates to engage with the real-world consequences of the designs they license and endorse (Elliot Lake Commission of Inquiry, 2014, pp. 396–398).

Safety Requirements and Responsibilities

The Ontario Association of Architects (OAA) is the self-regulating professional body responsible for licensing and overseeing architects in Ontario under the authority of the Architects Act. Its mandate includes protecting the public interest by ensuring that architectural services are delivered competently and ethically. The OAA establishes professional standards, conducts investigations into complaints, and imposes disciplinary action where necessary. Like Professional Engineers Ontario (PEO), the OAA is expected to intervene when architects fail to meet their legal or ethical obligations, particularly when public safety may be at risk (Elliot Lake Commission of Inquiry, 2014, pp. 396–398).

In the case of the Algo Centre Mall, the original design of the building, including the decision to place a parking deck on the roof, was executed by a licensed architect. This design feature introduced long-term vulnerabilities, especially in relation to waterproofing and corrosion protection. Although the architect was no longer actively involved in the building at the time of the collapse, the design choices made in the 1970s had a direct influence on the building's failure more than 30 years later.

Context in Which Decisions Were Made

The OAA's role in the events leading to the Algo Mall collapse was minimal in an operational sense, as it had no active involvement in the building after its initial construction. However, the Inquiry identified the building's original architectural design as a root contributor to the structural issues that developed over time. Specifically, the decision to locate the parking deck directly above occupied commercial space introduced a foreseeable and ongoing risk of water penetration, which accelerated corrosion of the steel frame (Elliot Lake Commission of Inquiry, 2014, pp. 396–397).

Despite these risks, no system existed within the OAA, or within Ontario's broader architectural or engineering oversight structure, to trigger reassessment or review of aging buildings designed with such vulnerabilities. Furthermore, there is no indication that the OAA took steps to analyze or learn from the collapse once it occurred, nor did it issue guidance to its members regarding rooftop parking structures or waterproofing failures in response to the tragedy.

Mental Model

The OAA appeared to operate with a time-bounded and discipline-limited process model: its role was conceived as ending at the point of a project's completion and sign-off. In this model, liability and oversight are limited to the architect's direct involvement and do not extend into the building's operational lifespan unless a complaint is filed. This perspective does not accommodate the long-term safety consequences of architectural decisions, particularly those involving complex environmental interfaces like parking decks above occupied space.

The OAA also appeared to share the broader cultural assumptions common

in many self-regulating professions, that professional competence and ethical behaviour are sufficient safeguards for public safety, and that external or proactive review is not necessary unless prompted by a formal complaint. In the absence of a complaint or new design activity, the OAA remained detached from the ongoing deterioration and eventual failure of the Mall (Elliot Lake Commission of Inquiry, 2014, p. 398).

Inadequate Control Actions

Although the OAA was not directly involved in ongoing inspections or repair decisions, it failed to provide broader systemic safety oversight or post-incident analysis. Most notably, the Association did not launch any internal review or issue any public statement in the immediate aftermath of the collapse to examine the architectural decisions that contributed to the disaster. Nor did it recommend enhanced design guidelines or professional education around rooftop waterproofing or corrosion-resistant detailing in exposed structural systems.

The Inquiry noted that the decision to place a parking structure directly above a retail facility was both unusual and risky, and that the building's design lacked the necessary durability measures to make such a system viable over time. That the OAA did not respond to these revelations with industry guidance, review, or public engagement reflects a failure to take responsibility for the long-term safety implications of architectural design choices (Elliot Lake Commission of Inquiry, 2014, pp. 396–398).

3.8 Ontario Association of Certified Engineering Technicians and Technologists (OACETT)

The involvement of a certified technologist in structural evaluations at the Algo Centre Mall illustrates a broader systems-level issue: when the boundaries between regulated professions blur, and oversight systems are passive, safety-critical decisions can be made by underqualified individuals without detection. OACETT's case demonstrates the dangers of weak coordination between related regulatory bodies, namely, between the technologists' and engineers' associations.

The Commission emphasized that while technologists play a vital role in supporting engineering projects, clear regulatory structures must ensure they do not

practice beyond their scope, particularly when public safety is at risk. The absence of enforcement mechanisms and real-time accountability structures within OACETT allowed inappropriate practice to persist unnoticed. In its final report, the Inquiry called for improved inter-professional oversight and urged OACETT to adopt stronger protocols for ensuring its members operate within their lawful roles (Elliot Lake Commission of Inquiry, 2014, pp. 398–400).

Safety Requirements and Responsibilities

The Ontario Association of Certified Engineering Technicians and Technologists (OACETT) is the professional regulatory body for certified engineering technicians and technologists in Ontario. Governed by the Ontario Association of Certified Engineering Technicians and Technologists Act, OACETT is responsible for licensing, certifying, and setting ethical and professional standards for its members. Its core mandate is to protect the public by ensuring that certified members practice within their area of competence and under appropriate supervision, especially when engaging in work that has implications for public safety or that borders on professional engineering practice (Elliot Lake Commission of Inquiry, 2014, pp. 398–400).

While OACETT members are not licensed to practice professional engineering independently, they often work in roles that support or interface with engineering functions. As such, OACETT is expected to monitor whether its members comply with legal limits on their practice and to intervene when they perform duties beyond their certified scope.

Context in Which Decisions Were Made

In the years preceding the Algo Centre Mall collapse, at least one OACETT-certified individual, Lucien Lemire, was involved in assessing and advising on structural issues at the Mall. Lemire, a certified engineering technologist, had formed his own consulting business and took on responsibilities typically associated with professional engineers, including conducting structural inspections and writing reports about the condition of the rooftop parking deck (Elliot Lake Commission of Inquiry, 2014, pp. 398–399). His involvement was not supervised by a professional engineer, and his reports were submitted under his own letterhead.

Despite the fact that Lemire's actions may have exceeded the legal scope of a technologist's practice, OACETT did not detect or investigate his conduct prior to the collapse. The Inquiry found that this failure stemmed in part from OACETT's own process limitations. It relied on complaints and did not routinely monitor or review the practice boundaries of its members. OACETT had no mechanism for identifying when a technologist had transitioned from supporting roles to unsupervised consulting on matters involving life safety.

Mental Model

OACETT's internal model appeared to emphasize credentials and professional development over enforcement. The organization assumed that certified members understood the legal limits of their practice and would voluntarily operate within them. The regulatory philosophy came from self-awareness, self-limitation, and complaint-driven discipline. There was little active surveillance or pattern recognition to detect when members were moving into unauthorized domains.

In the case of Lucien Lemire, this model failed. Lemire's reports were treated by building officials and the property owner as functionally equivalent to those of a professional engineer, despite lacking the qualifications or oversight to make such judgments. OACETT did not identify this issue until after the collapse, when it became publicly clear that a technologist had been functioning as an unsupervised structural evaluator for a major commercial facility (Elliot Lake Commission of Inquiry, 2014, p. 399).

Inadequate Control Actions

OACETT failed to take necessary control actions to prevent or deter inappropriate practice by its members. Most importantly, it did not take steps to ensure that its members were not conducting professional engineering work without appropriate supervision. The case of Lemire demonstrates that even when technologists formally lacked the authority to approve or certify structural safety, they could occupy engineering roles with little institutional resistance or oversight.

Furthermore, OACETT did not issue proactive guidance or education to its membership, emphasizing the risks and legal implications of overstepping into the domain of professional engineering. Nor did it maintain a process for escalating

suspected cases of unsupervised or unauthorized practice to Professional Engineers Ontario or to the Ministry of Municipal Affairs and Housing. These gaps allowed the practice of boundary-crossing work to go unchecked, even in buildings like the Algo Centre Mall, where public safety was directly at stake (Elliot Lake Commission of Inquiry, 2014, pp. 398–400).

3.9 Mall Owners

The role of the Mall owners in this disaster illustrates how private interests, when unchecked by effective oversight, can become active contributors to public risk. While property owners are assumed to act as managers of their buildings, this case demonstrates how economic pressures, regulatory gaps, and weak enforcement systems can encourage neglect and even deception. Nazarian's actions were shaped not only by financial self-interest but by the absence of meaningful consequences. Municipal inspectors failed to hold him accountable, and professional engineers continued to work with him even after safety concerns were ignored.

This case exposes a dangerous imbalance in Ontario's building safety structure: the assumption that private owners will act rationally in the public interest is not valid in high-risk, low-capacity environments. The Mall's deterioration was not sudden. It was persisti, visible, and preventable. Yet the institutional structure allowed an owner with clear conflicts of interest to override professional advice and suppress risk information. As the Commissioner concluded, the collapse of the Algo Centre Mall was not a random tragedy but the predictable result of years of regulatory and ethical failure, with the owner playing a central role (Elliot Lake Commission of Inquiry, 2014, pp. 6–7, 243–248).

Safety Requirements and Responsibilities

As private property owners and landlords, the owners of the Algo Centre Mall were legally responsible for ensuring that their building met structural safety standards and that it was maintained in a condition that did not pose a hazard to occupants or the public. This included complying with municipal property standards bylaws and ensuring that necessary repairs were performed in accordance with the Ontario Building Code. The owners were also expected to act upon advice from professional engineers and to commission timely inspections and repairs when structural issues were suspected or identified. Their responsibilities extended beyond tenant

comfort to include a duty of care to the public and legal accountability under civil and potentially criminal law for failures that result in harm (Elliot Lake Commission of Inquiry, 2014, pp. 160–161, 171–172).

From the time of the Mall's construction in 1979 until its collapse in 2012, the building passed through several different owners. While the identity of the legal owner changed, each successive owner inherited the same responsibilities to manage, repair, and maintain the structure, especially its compromised waterproofing system and deteriorating steel supports.

Context in Which Decisions Were Made

Throughout the Mall's history, particularly from the 1990s onward, the owners operated under a persisting state of financial constraint and deferred maintenance. The building suffered from a known design flaw: the rooftop parking deck allowed water to leak directly onto the structural steel below, initiating corrosion that worsened over decades. Rather than investing in a complete repair or membrane replacement, successive owners, including Eastwood Mall Inc. under Bob Nazarian, chose temporary patchwork solutions such as sealing membranes or partial grouting (Elliot Lake Commission of Inquiry, 2014, pp. 183–185, 243–245).

By the late 2000s, the corrosion had become extensive and visible. In 2009, Nazarian sought to refinance the Mall through a loan from Royal Bank of Canada and later a mortgage insurer. During this process, he withheld engineering reports and failed to disclose the full extent of the building's deterioration. His conduct during these years was shaped by financial desperation and a clear attempt to avoid major capital expenditures. The Inquiry found that Nazarian knowingly prioritized financial survival over public safety, concealing reports and ignoring engineers' recommendations for serious structural repairs (Elliot Lake Commission of Inquiry, 2014, pp. 246–248).

Mental Model

The Mall owners, especially during the final years of the Mall's life, appeared to operate with a self-serving and dangerously flawed mental model. They viewed the Mall primarily as a financial asset, to be maintained only to the extent necessary to preserve cash flow and avoid tenant losses. Structural deterioration was treated

as a cost management issue rather than a life safety concern. When engineering reports raised concerns, Nazarian routinely downplayed their severity or rejected them. In one case, he failed to submit an engineer's report to a mortgage insurer because it could harm refinancing (Elliot Lake Commission of Inquiry, 2014, pp. 246–247).

Rather than viewing engineers as trusted safety professionals, the owner treated them as service providers whose recommendations could be accepted or rejected based on cost. This stance toward engineering advice created a culture of non-compliance, in which the most urgent warnings were ignored, and consultants were pressured to revise their language or conclusions. Nazarian's mental model did not prioritize systemic risk or duty of care. It prioritized short-term monetary feedback and public appearance.

Inadequate Control Actions

The Mall owners failed to take virtually every control action necessary to prevent structural failure. They ignored or minimized multiple engineering assessments warning of serious corrosion and structural risk. For instance, a 2009 report explicitly described rust, metal loss, and the risk of collapse if deterioration continued unchecked. Yet no meaningful repairs were carried out (Elliot Lake Commission of Inquiry, 2014, pp. 245–246). The owner repeatedly delayed or cancelled planned repairs, citing costs or concerns about tenant disruptions.

In some cases, the owner took steps to actively mislead stakeholders. During refinancing negotiations, Nazarian failed to disclose engineering reports that would have revealed the Mall's compromised condition. When engineers offered assessments that were too critical, he sought more vague opinions from others. The result was a pattern of behaviour in which risks were deliberately concealed or reframed to avoid triggering costly interventions. These actions were not just inadequate. They were recklessly unconcerned to public safety and regulatory obligations.

3.10 Building Department – Robert Wood

Robert Wood's dual roles, as former CBO and then retained engineer, highlight the ethical and structural vulnerabilities that can emerge in small municipalities

where regulatory and professional roles blur. His case illustrates how individual professional failures can become systemic when oversight is weak, institutions are deferential, and warning signs are normalized. Wood was not someone operating outside of institutional norms; rather, his behaviour reflected a broader culture of accommodation, risk tolerance, and procedural minimalism.

The Commission criticized Wood for prioritizing his professional relationship with the client over his duty to the public. It emphasized that engineers must not only act competently but must resist pressure to provide convenient or optimistic assessments when evidence suggests otherwise (Elliot Lake Commission of Inquiry, 2014, pp. 393–396). The tragedy underscores the need for stronger systems of peer review, public disclosure, and escalation protocols when engineers are working in high-risk, publicly occupied buildings.

Safety Requirements and Responsibilities

Robert Wood played a dual role in the Algo Centre Mall disaster. First, as a professional engineer contracted by the Mall's owner, he was responsible for conducting structural assessments and providing expert evaluations of the integrity of the Mall's structure. Second, prior to that role, he served as Chief Building Official (CBO) for the City of Elliot Lake, where he was tasked with enforcing the Ontario Building Code and ensuring that buildings under his jurisdiction complied with safety regulations. As both an engineer and a former municipal official, Wood held professional and ethical obligations to protect public safety, provide objective assessments, and disclose critical structural deficiencies (Elliot Lake Commission of Inquiry, 2014, pp. 374–377, 387–388, 393–396).

As an engineer licensed by Professional Engineers Ontario (PEO), Wood was expected to act with independence, competence, and integrity. His reports and judgments carried significant weight with building owners, tenants, financial institutions, and municipal authorities.

Context in Which Decisions Were Made

In 2009, Wood left his role as CBO and began working privately. He was later recruited by Bob Nazarian to inspect the Mall in 2012, just weeks before its collapse. In this capacity, Wood conducted a visual inspection of the rooftop

parking deck and issued a report stating that the structure was safe and that no immediate repairs were necessary. This report played a key role in reassuring the owner, tenants, and the public that the Mall remained safe to occupy (Elliot Lake Commission of Inquiry, 2014, pp. 392–394).

However, his inspection was extremely limited: Wood failed to review prior engineering reports, did not perform intrusive testing, and did not fully investigate visible corrosion or water damage. Despite having access to documentation describing years of water infiltration, prior resignations by other engineers, and visual evidence of structural decay, Wood minimized the risks and declared the building fit for continued occupancy. The Commission concluded that his assessment was not only incorrect but largely negligent given the context (Elliot Lake Commission of Inquiry, 2014, pp. 393–394).

Mental Model

Wood appeared to operate under a dangerously flawed mental model that prioritized client satisfaction over public safety. He relied heavily on visual cues and interpreted his role narrowly, treating the inspection as a surface-level task rather than a serious investigation of known structural issues. Despite knowing that he was evaluating a building with a history of leaks and visible corrosion, he failed to recognize, or chose to ignore, the systemic risks posed by the failing rooftop parking structure.

His mental model also seemed shaped by familiarity and confidence. Having previously worked as the CBO in Elliot Lake, he may have developed an overly informal relationship with the built environment and its political stakeholders. Rather than adopting a precautionary or skeptical approach, Wood accepted the owner's framing of the issues and interpreted them as cosmetic or low-risk. This lack of professional distance significantly compromised his judgment.

Inadequate Control Actions

Robert Wood's conduct represents one of the most critical failures in the safety control structure. His engineering report, completed in May 2012, concluded that the building remained structurally sound, a conclusion that directly contradicted years of warning signs and photographic evidence of severe corrosion. This assess-

ment gave the Mall's owner justification to defer repairs and to continue operating the facility. The Commission found that Wood's report was materially deficient and failed to meet the standard of care expected of a professional engineer (Elliot Lake Commission of Inquiry, 2014, pp. 393–394).

Moreover, Wood did not recommend follow-up evaluations, additional testing, or structural reinforcement, despite observing signs that the rooftop beams had suffered significant damage. He also failed to alert municipal officials or regulatory authorities, even though he had reason to believe the building was not safe. His actions constituted both a failure to provide required control actions and a provision of incorrect, unsafe information that contributed directly to the conditions of collapse.

Following the collapse, PEO initiated disciplinary proceedings against Wood. The fact that such action only occurred after fatalities underscores the inadequacy of both Wood's own decisions and the broader system of accountability within which he operated.

3.11 City Council – City of Elliot Lake

The role of Elliot Lake's City Council in this tragedy illustrates the systemic dangers of political complacency in small, economically vulnerable communities. While councillors did not harm or act with intent to deceive, their inaction was pivotal in sustaining a permissive environment where unsafe conditions were tolerated. Their failure to prioritize safety over short-term economic outlook reveals how elected officials can unintentionally undermine public protection when they mix civic optimism with silence on risk.

This case also raises important questions about the distribution of responsibility in municipal governance. When elected officials disengage from technical matters, believing them to be solely the domain of staff, they may strip those staff of the political mandate needed to act assertively. The Commission concluded that the Council's failure to question or challenge the status quo contributed to a culture of normalization in which no one demanded proof of safety, even when the Mall's failure was imminent and visible (Elliot Lake Commission of Inquiry, 2014, pp. 375–377).

Safety Requirements and Responsibilities

The City Council of Elliot Lake, as the elected governing body of the municipality, held the ultimate political authority over municipal governance, including the administration of local bylaws, resource allocation, and strategic oversight of departments such as the Building Department and Property Standards enforcement. While day-to-day code enforcement was assigned to staff such as the Chief Building Official (CBO) and Property Standards Officer, the Council was responsible for creating a policy environment that supported or hindered strict safety enforcement. Council members also had a duty to act in the public interest, to remain informed about major safety issues within the community, and to intervene when administrative processes failed to protect residents (Elliot Lake Commission of Inquiry, 2014, pp. 375–377).

In small communities like Elliot Lake, municipal councils often play a more hands-on role in setting the tone for enforcement culture, especially when politically sensitive properties, like the Algo Centre Mall, are involved.

Context in Which Decisions Were Made

The City Council's actions were shaped by Elliot Lake's economic context. Following the collapse of the uranium mining industry, the city was heavily reliant on the Mall as a source of commercial activity, public services, and community identity. The Council was acutely aware of the Mall's deteriorating condition, but prioritized economic and political stability over regulatory intervention. Public complaints about leaks, aesthetic degradation, and interior damage were known to councillors, yet they chose not to press for stronger enforcement or demand structural reassessment (Elliot Lake Commission of Inquiry, 2014, p. 377).

The Inquiry found that the Council failed to provide the necessary political support to municipal staff for assertive action against the Mall's owners. There was no indication that Council members challenged the CBO's minimal engagement with the building or asked whether repeated complaints pointed to a deeper structural issue. Their focus remained on promoting Elliot Lake as a safe, attractive retirement community—even as physical evidence of building failure accumulated.

Mental Model

City Council's mental model appears to have been driven by a desire to preserve economic continuity and avoid public alarm. Councillors viewed the Mall as a civic and commercial cornerstone, home to federal and provincial offices, retail tenants, and public gathering spaces. From this perspective, acknowledging that the Mall posed a structural risk would have meant confronting the possible closure of the city's primary shopping facility, with devastating economic and reputational consequences. This fear of risk shaped a collective mindset in which it was preferable to defer to staff, accept minimal reports of compliance, and avoid deep engagement with safety concerns.

There was also a limited understanding of the long-term consequences of inaction. Council members failed to understand that the cumulative effects of water infiltration and corrosion represented not just a maintenance issue, but a systemic threat to public safety. Their model of responsibility was passive and reactive, assuming that if something were truly unsafe, the engineers or inspectors would say so.

Inadequate Control Actions

Elliot Lake's City Council failed to take multiple critical control actions that fell within its political authority. Most significantly, it did not question or challenge the adequacy of inspections or reports relating to the Mall. Council never initiated or demanded a third-party structural review, even though councillors were aware of persisting water damage and recurring public complaints. They accepted without looking into the assurances of staff who had, in turn, relied on flawed or minimal assessments by external engineers (Elliot Lake Commission of Inquiry, 2014, pp. 375–377).

Council also failed to create an institutional culture of safety and accountability. It did not allocate resources to improve enforcement capacity, provide leadership on risk management, or ensure that departments dealing with public safety had the independence and political cover to act decisively. This left staff in a vulnerable position, caught between the known deficiencies of the Mall and an unspoken political rule not to cause disruption.

Finally, the Council did not request updates on the state of the Mall despite

widespread community awareness of its problems. It failed to exercise its oversight function in a meaningful way, allowing regulatory inertia to persist in the face of escalating structural risk.

4 Event Analysis (tentative name)

4.1 FAILURE POINTS

Ignored Persistent Warnings - Leaks and other issues began shortly after the mall opened. This was just one of the early indicators of the roof's flawed designs. With the knowledge of the roof's missing waterproof layer, as well as its lasting consequences to the structure, each subsequent owner and management team continued the same maintenance practices that did not address the root cause of the leaks. Even though there was an initial report filed, an inspector never arrived to do the inspection, allowing the negligent management to continue like no wrong was done.

Inadequate and Superficial roof repairs - Even with decades of complaints from various stakeholders, including customers and shops themselves, the mall management decided to use temporary and weak solutions to fix these issues instead of addressing the actual cause of the issues. This was done to avoid the higher cost of a more permanent and effective solution.

Ignored / Rescinded city orders - The city council of Eliot Lake issued multiple warnings regarding the safety of customers and tenants, as well as several maintenance issues. In 2006, the City Council filed a notice of violation under the fire code and an order to remedy property standards. Measures were put in place due to these notices, but the solutions were either temporary or inadequately enforced. The City Council's failure to enforce its orders allowed the structural issues to persist and gave a false sense of safety for both management and the public.

Inadequate Structural Interventions - When the structural issues were being addressed, the repairs were either badly planned, insufficient, or incomplete. An example of this was how fireproofing was applied directly over the corroded beams. Furthermore, in 2008/2009, there were plans to install a proper waterproofing membrane, but Eastwood cancelled the contract in order to save.

Instead, it hired a contractor who provided a cheaper solution that was ineffective in the long term. Other repairs done over the decades were also merely superficial and cosmetic.

Superficial Engineering Report by Robert Wood - In April of 2012 (two months before the roof collapse), engineer Robert Wood signed a report stating that there were no structural issues visible at the mall. However, he never removed any finishes or investigated areas that were prone to corrosion. He was pressured by the mall's owner to downplay his concerns, which later contributed to the false sense of safety, delaying any action that could have prevented the collapse.

Unchecked and widespread corrosion - Over 30 years, water leaks from the rooftop parking area caused severe rust on steel beams and welds. Investigations after the collapse indicated that some welds had corroded to only 12% of their original strength and that approximately 40% of structural connections showed deterioration. Third party inspections by RBC and MoL failed to identify and report this corrosion, leaving it to develop unchecked.

Roof Design Flaws - Algo Centre Mall employed a novel design with the inclusion of a rooftop parking deck. The company that designed and built the mall did not have any prior experience with this type of design, which led to the improper construction of that deck. The hollow core slabs, along with the concrete layer on top of it, were insufficient to prevent water from reaching the steel structure below. This was made worse by road salt brought in by the vehicles, as well as the de-icing salt used by building management. Decades of salt water exposure to the steel frame caused severe corrosion, which became the direct cause of the roof collapse.

Uncontrolled vehicle loads - Reports indicate that heavy and unregulated loads were applied to the roof without structural reinforcements in place. The weakened structure struggled to support the weight of vehicles, as well as the snow during winter.

Fabricated maintenance records - Mall owner, Bob Nazarian, submitted falsified financial records to the bank and lenders. Each owner also omitted engineering reports from the next one. The combined effect kept the mall operating under the false pretense that its structural problems were being retified or being addressed by relevant authorities.

4.2 SYSTEMIC FACTORS

Cost-cutting over safety - Throughout the mall's history, it has had a recurring theme prioritizing cost savings over maintaining the mall's safety and structural integrity. The most notable example is how one of its owners, Bob Nazarian, canceled a $1 million contract to install the proper waterproofing system because it seemed too expensive. Instead, he hired a contractor at the lowest possible price and terminated their service before the waterproofing system was properly installed with the asphalt layer on top. The sloppy work carried out by the contractor caused further leaks and property damage to the mall's tenants.

Organizational negligence and poor maintenance culture - The problems that plagued the mall over the years were frequently ignored, overlooked, or, if addressed, only superficially. The maintenance team that was responsible for the mall's upkeep during most of its history only carried out the repairs reactively rather than proactively. These problems were further exacerbated during the Eastwood years, when complaints from tenants were routinely dismissed. These indicate a culture that lacked accountability and responsibility, which contributed to the oversight when a significant problem incubated.

Weak communication among stakeholders - A systemic failure existed in the communications between vital stakeholders, including past and present owners, engineers, government officials, and tenants. Instead of taking responsibility, each owner only sought to sell the mall and its problems to the next one. They routinely assured the buyers that the leaks were minor, fixable issues, while engineering reports and tenant complaints indicated otherwise. The responses from the mall about tenant complaints were also sparse and far between. The dysfunctional communication between the mall's various stakeholders led to neither substantial actions nor governmental interventions.

Ethical lapses among professionals - Several professional engineers involved in the mall ignored their duty to public safety. Robert Wood admitted that he did not conduct a proper inspection and included false reassurances in his report. Similar lapses can be seen at multiple levels of organizations. Bob Nazarian routinely demonstrated questionable business practices and a lack of managerial ethics; the use of hollow-core slabs was a sign of a lapse in the engineers' judgment, as they were not suitable for the humid and cold environment of Elliot Lake.

Superficial inspections - Many of the inspections, especially the potentially most influential ones by the Ministry of Labor, which were conducted to assess the condition of the structure, were done superficially. There was no visual inspection beyond the surface material, no destructive tests, and no testing for corrosion of the internal structure. This allowed the deteriorated welds and extensive rust to go unnoticed and undocumented for decades. The mall was repeatedly declared to be in a structurally good condition even with obvious external and internal issues.

· Profit-driven concealment = Nazarian and previous mall owners hid the truth about the mall's conditions to maintain financial viability. As previously mentioned, there is evidence of falsified invoices to lenders to make the appearance that repairs had been implemented. Negative findings during inspections were either omitted from reports or softened so that the mall could continue to operate in its current conditions without having to make repairs and maintenance. By hiding the true structural deficiency of the mall and its risks, management protected the short-term financial viability of the mall while exposing the community to increasing danger.

· Inadequate regulatory standards = The Ontario building code and inspection framework did not require invasive structural changes or account for specific risks (such as the rooftop parking). At the time, there was no regulatory guidance for long-term corrosion or structural integrity in environments with repeated water infiltration. Without the mandatory corrosion inspection or structural health monitoring, regulators had limited tools to enforce deeper reviews even with obvious and apparent structural issues. The 2012 Ontario Building Code was effective from January 1st, 2014. This code included provisions addressing corrosion, which is expected to be upheld in subsequent versions.

5 Causal Factors and Contributing Conditions

5.1 Immediate Causes

1. The Failed Beam-to-Column Connection at Gridline G-16
By 2012, the beam-to-column connection at grid location G-16 had been degraded past the point of safety. This connection was part of the framing supporting the rooftop parking deck near the mall's food court and escalator. The connection detail was a standard double-angle shear connection: "two steel angles bolted

to the web of the W24×110 beam... and welded to the flange of the column at gridline intersection G-16. The failure occurred in the welded connection between the steel angles and the flange of the column." In simple words, two L-shaped steel angle brackets were attached to the side of the column's flange by welding, and the beam's vertical web was then bolted to these angles. This kind of connection is pretty common and it allows the beam to carry vertical loads through the shear resistance of the angles and bolts. Under normal conditions, this connection would have a generous safety margin to support the parking deck loads. However, the condition of the grid G-16 connection in 2012 was extremely poor. Decades of water intrusion had rusted it to an extreme degree. The Commission's forensic report indicates that by the time of the collapse, "more than 85% of the original weld capacity of the failed connection had been lost to corrosion." This means that only approximately 15% of its expected strength. The angles and bolts were also described as "severely corroded" in the later examination. Photographic evidence from Exhibit 3015 showed that the angle and bolted connection were already severely corroded. Essentially, the welds that connected the angle iron to the columns have become very fragile, covered with damaged parts and oxides.

Suprisingly, this connection and technical design did not have any potential risks or non-compliant sections. The Commission claims that: "The connection at gridline G-16 did not fail because of a construction defect. It failed because of exposure over the years to constant wetting and drying conditions in the presence of chlorides..." This means, the connection was originally built as intended, but it was not protected from the environment that it was subjected to. Neither the design nor the construction anticipated that this steel connection would be covered in salt water for years. Thus, while the design of the Algo Mall's structure met the building code, an implicit design flaw was the lack of durability in wet conditions, especially in water that contians chloride. The inquiry report pointed to "those design inadequacies (including, in particular, the lack of a waterproof membrane as part of the original design or as a later addition)" which "led inevitably to the exceptional corrosion that precipitated the collapse." In sum, the beam-to-column connection failed because it was heavily rusted, rather than any structural, assembly, or construction issues. Once approximately 85% of the weld's cross-section was rusted, the remaining metal could no longer carry the normal loads of the parking deck structure.

2. Collapse Sequence and Structural Failure Mechanism

The collapse was triggered by the failure of a weak weld at the G-16 connection. The Commission's engineering analysis and an animated video re-creation showed

how the failure progressed: "On June 23, 2012, failure occurred in this steel connection which is located just below the deck... Without support, the concrete panels [of the parking deck] collapsed into the upper mall adjacent to the food court." The end of the steel beam fell downward when its welded anchor broke, and the hollow concrete slab supported by the beam at that edge also collapsed. This concrete slab (and possibly several adjacent concrete slabs connected by the concrete above) fell onto the open space in the atrium of the shopping mall's second-floor. Shoppers on the second floor were hit by this piece of concrete and steel, and the impact was devastating: "Large pieces of steel and concrete ('widow makers,' the rescuers called them) hung precariously over the huge pile of debris" in the aftermath.

The collapse did not stop after the initial collapse. According to the inquire, the falling debris caused a secondary structural failure in the mall's second-floor. When the heavy rooftop slab and beam fell onto the second floor (the "upper mall"), they lead to another critical connection or beam on that level to fail, which in turn brought down a section of the second floor onto the ground floor. The Commission report refers to this as "a secondary collapse of a portion of the upper-level Mall framing". As a result, the roof of the shopping mall and a roughly triangular or square area on the second floor collapsed all the way to the ground, leaving a large hole open to the sky.

3. Two-Stage Weld Failure and Material Analysis

In the course of the Commission's inquiry, structural engineers, metallurgists, and corrosion specialists performed a detailed analysis on the failed connection. Their findings revealed that the weld failure did not happen instantaneous, but rather a "two-stage" failure that had begun some time before the collapse. Specifically, evidence of an earlier, partial crack was found on the weld surface. NORR reported that the weld had likely broken months before June 2012, but had remained partially intact until the day of collapse. The report notes that the presence of pitting and black oxide on some portions of the broken weld, and the absence of such corrosion on other portions. This pitting and black rust indicate that a crack surface had been exposed to the environment for a really long period. In the connection part, one portion of the weld fracture showed these features, this implys that this part of the weld was damaged earlier, and then kept corroding for a while. In contrast, another portion of the final breaking surface was clean, which implys a sudden break at the moment of collapse. NORR's experts then concluded that the weld had experienced an initial failure before the collapse, the remaining section then suffered further corrosion across months. Eventually, when the residual

intact part could not support the load, the final collapse occured. Additionally. A small triangular piece of the steel was found, and was still attached to the column flange after the collapse. Upon microscopic inspection, engineers observed that this piece have been pried or bent off, rather than a sudden break. This analysis strongly confirms that the collapse was not caused by sudden overload, but was the result of a long-term process.

5.2 Underlying Systemic Causes

1. Structural Design of the Algo Centre Mall and Its Roof System
The Algo Centre Mall was a steel-framed building with a parking deck on the roof, and it was opened in 1979. The building was made of hollow-core concrete slab panels for both roof and floors, and the steel columns and beams were used to support them. The rooftop parking deck was built with 8-inch-thick hollow-core concrete slabs topped with a cast-in-place concrete wearing surface (topping) for additional strength and to protect the panels. This topping was used to help the roof deck achieve the required load capacity for parking (approximately 120 pounds per square foot). The Commission found that the overall structural design technically met the 1975 Ontario Building Code requirements. However, meeting the bare minimum requirements was not sufficient in this case. A notable feature of the mall's original design was its unconventional waterproofing strategy for the rooftop parking deck. Instead of incorporating a continuous membrane or a sloped drainage layer, the roof was designed as a flat concrete deck with a surface-applied waterproofing sealer to keep water out. The architectural drawings only indicated a "waterproofing sealer" on top of the concrete, but the specific product was not clearly specified. In principle, the 1975 Building Code required that a roof should "shed or drain water effectively", but the mall's designers simply addressed this by calling for a waterproof coating. In practice, the roof failed to remain watertight from the very beginning. As one of the NORR members concluded, the design "narrowly meets the requirements of Part 4 of the OBC (1975) but relies entirely upon the 'WATERPROOFING SEALER' material", this means that this design could not survive for a long time in a severe climate. In addition to the design, the waterproofing system's implementation during construction was extremely poor. The evidence shows that "the waterproofing of the roof failed virtually from the outset". From the very first day the mall opened, water started to penetrate the rooftop deck. The mall's roof was flat and supposed to drain water as quickly as possible, but in fact, it did not appear to have happened. The joints between

the slabs, the small cracks in the concrete top and the interfaces around the drains or the expansion joints became pathways for the ingress of water. Within weeks of opening, there was already evidence of leaks throughout the building. In summary, the mall's roof system was fundamentally flawed. The building lacked any membrane design or drainage strategy to manage this condition caused by water and salt. This design deficiency set the stage for the corrosive destruction of the mall's structural components over its years.

2. Chronic Water Leakage and Corrosion of Structural Components

The immediate technical cause of the Algo Mall collapse was the severe corrosion at a critical steel connection, and the corrosion on these components is the direct result of the uncontrolled water leakage. The Commission's investigation states that leaks at the exact location of the ultimate collapse (gridline 16) were observed as early as August 1981. Over the next decades, water infiltrated along the gridline G-16 area, which corresponded to a column line supporting a portion of the rooftop parking slab. As mentioned before, during winters, cars brought in snow and road salt, and every spring, salt-water would seep through the cracked topping concrete. The inquiry report states that the connection on the G-16 gridline "failed due to exposure over the years to constant wetting and drying conditions in the presence of chlorides, which leaked from the rooftop parking deck unabated for more than 30 years". Therefore, this slow but continuous corrosion led to the eventual collapse. The penetrating water carried dissolved road salt that contains chlorid from the parking deck, creating a brine that reached the steel beams, columns, and connectors. These steel components were not designed for use in a wet, salt-contaminated environment. The chlorides from road salt used to melt snow would significantly damage concrete structures and the embedded steel strands within hollow slabs. Chlorides can also penetrate the concrete, reducing its alkaline properties, destroying the protective layer around the steel strands and causing a loss of section. Once this protective layer is damaged, the steel strands start to corrode, and lose their original strength and integrity. Since Corrosion increases the volume of the steel strands, exerting internal pressure, it causes the concrete to crack and break. The mall occupants claim that these damages were even clearly visible, and they took photographs of these parts.

6 Recommendations

6.1 Regulatory Reforms:

6.1.1 Strengthening Building Inspections and Maintenance

One of the most noticeable issues with Ontario's current system, is the absence of rigours and continuous inspections for existing structures. Under the status quo, once a building has passed its initial occupancy inspection, mandatory periodic structural reviews are not typically conducted, and issues are usually only addressed when complaints or obvious hazards appear [4]. In Algo Centre Mall's case, over 33 years, multiple warning signs (leaks, rust, even falling concrete) were either ignored or addressed with superficial fixes; many inspections were very simple and meaningless. As the Commission stated, "inadequate or no inspection for structural safety" was a major factor leading to the collapse. Inspectors did not check the structure inside the ceiling panels or corrosion test, thus missing the severe rusting that weakened the steel frame. In some cases, negative findings were even hidden, omitted or softened in reports to avoid costly repairs. These issues show that Ontario urgently needs to change how it checks and supervises building inspections and maintenance. To address this issue, the Ontario provincial government should institute a comprehensive Periodic Building Safety Inspection program for existing buildings:

1. Mandatory Structural Inspections at Regular Intervals: Structural inspections must be strictly enforced and conducted regularly. All large or aging buildings that are open to the public should undergo thorough structural inspections by qualified engineers on a fixed cycle (e.g. every 5 years). The Elliot Lake Commission explicitly considered "mandatory periodic inspection of all buildings in the province" by either the owner or public authorities. Regular building status updates would ensure problems like water penetration and corrosion are caught early before they escalate. Commissioner Paul Bélanger recommended that building owners should be required to ensure not only that their structures are initially safe but that they remain safe throughout their useful life. This obligation can be enforced by requiring owners to submit structural reports summarized by authorized agencies regularly to prove the stability of the building. These reports would point out any signs of deterioration and certify that the building meets at least the minimum structural standards at the time of inspection.

2. Empowering Building Officials: Even the best standards mean little without enforcement. Therefore, Ontario should strengthen the powers of local building officials, while preventing abuse of power and corruption, so that they can intervene when safety hazards are identified during inspections. The inquiry proposed "increased powers for all building officials... to make orders with respect to buildings that are or could become unsafe". In practice, this could allow Chief Building Officials (CBO) to require preventive repairs or further expert assessments if an inspection report indicates potential structural issues. Building officials might also be empowered to mandate an independent peer review of a suspect building's condition. Additionally, it is essential to improve the training and qualifications of building inspectors and property standards officers. The Commission noted that some officials in Elliot Lake took a narrowly bureaucratic view and missed the bigger safety picture. Enhanced training in building safety would enable inspectors to recognize potential hazards and enforce standards more effectively.

6.1.2 Enhancing Professional Accountability and Standards

Another key area for reform is the accountability of professionals (engineers, architects, etc.). Engineers have a duty to put public safety first in building design and assessment. However, the Elliot Lake investigation found that some engineers forgot (or ignored) this moral and ethical foundation. In the decades before the collapse, multiple engineering reports on the Algo Mall either downplayed the severity of the structural problems or failed to press for the necessary fixes. If engineers can sign off on unsafe structures with impunity or without rigorous standards, the public is left at risk. Thus, strengthening professional accountability is vital:

1. Ethical Duties: Engineers and architects should be obligated to report any serious safety hazard they encounter, even if it means displeasing a client or employer. Current engineering ethics standards do indeed prioritize public safety, but the Elliot Lake case shows that in practice, engineers feel pressure (or are willing) to downplay warnings. In the future, regulatory agencies should issue clear instructions specifying that if engineers discover imminent dangers (such as the risk of collapse), they must clearly inform the owner in writing and notify the relevant departments. The Commission in fact recommended that engineering reports' contents should not be altered due to client pressure, and that PEO should explicitly inform its members such requirements. In addition, The Ontario provincial government could introduce whistleblower protections for certain pro-

fessionals: if engineers report safety issues in good faith to the authorities (e.g., bypassing unresponsive owners), they should be protected from legal or professional repercussions. This encourages professionals to act in the public interest first and foremost.

2. Qualified Structural Engineers and Standardized Reporting: These critical inspections should be performed by professionals and experts from certified institutions or third parties. The inquiry found that some engineers who assessed the Algo Mall lacked the required diligence or expertise. Some reports of the Algo Centre Mall were so cursory as to be essentially meaningless. To prevent substandard assessments, such structural inspections must be conducted by appropriately qualified structural engineers, especially those with specific qualifications or certifications in structural safety. The Commission urged the Association of Professional Engineers of Ontario (PEO) to "toughen its standards" for licensing engineers who conduct structural inspections. One concrete measure would be creating a "structural engineering specialist" designation, as recommended in the inquiry report, with defined qualifications and a code of practice for evaluating existing buildings. In addition to certification, PEOs should also establish clear performance standards that specify the appropriate scope of structural inspections in detail. For example, engineers should be required to inspect critical connections for corrosion and detect known leak areas, rather than relying simply on visual observation. This was actually a commission recommendation: "PEO should enunciate a Performance Standard for the prescribed structural inspection" to guide practitioners. Every inspection report should also follow a consistent template, including all the investigative steps that are performed, all the evident and factual findings and the final investigation result, to reduce the chance of oversight or intentional downplaying of issues.

7 Aftermath

8 Conclusion

Appendices

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