

Infrastructure Ontario and Ontario Science Centre Update

July 11, 2024

Ontario Science Centre – Current Activities



Summer Camp: Opened this week. Hundreds of campers learning about chemistry, biology, physics and more with enthusiastic Ontario Science Centre camp counsellors.

Youth-for-Youth Innovation Program: July/August. Offer teens from Flemington Park and Thorncliffe Park the opportunity to explore STEM and learn from mentors across fields of science.

Science Activities: New and engaging ways to bring science to the community and online: mobile STEM experiences popping-up at festivals, events and partner locations within the province. Science experiences delivered online.

School Visits: Plans under way to bring science educators into classrooms for 2024-2025 school year and deliver virtual learning experiences for schools.

Interim Science Centre: Request for Proposals has been issued to identify interim Science Centre facility. Submissions due July 23.



Structural Roof Assessment – Peer Review

A peer review of the Rimkus report and related White Paper on Reinforced Autoclaved Aerated Concrete (RAAC) was conducted by VanBoxmeer & Stranges Ltd. (“VB&S”).

- The peer review confirms the original engineering report published on June 21, 2024, was conducted in accordance with standard engineering practices, noting “...immediate remediation via temporary shoring or secondary framing to reduce the span of these [Critical Risk and High Risk] panels are appropriate strategies to temporarily maintain structural safety and should be implemented prior to October 31, 2024.”
- The peer review also agreed “that the replacement of all RAAC roof panels should be undertaken simultaneous with a roofing assembly replacement as soon as it is feasible thereafter.”





Structural Roof Assessment – RAAC Details

- RAAC is a lightweight material susceptible to faster degradation over time due to increased water infiltration through the porous structure.
- The panels are typically 18 inches wide by either 5, 10 or 20 feet long.
- They are held in place by tension and gravity, with little physical connection or anchoring to secure them.
- Individual panels in a roof system will have varying levels of degradation, all of which contribute to the overall risk for the entire roof system. The risk is further compounded by the distribution of the panels and the condition of the entire roof assembly.
- Failure of the critical and high-risk panels due to snow load requires mitigation prior to October 31, 2024.

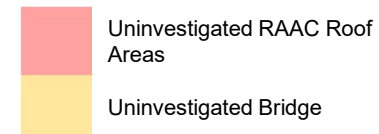


Sawn cross section of a typical RAAC panel
(Loughborough University)



Structural Roof Assessment - Continued Investigation Required

- Significant roof areas of approximately 24,200 square feet (28 per cent of Building A and 36 per cent of Building B) have not been investigated and would require closure to complete.
- In Building A, uninvestigated areas would require highly intrusive access through reinforced concrete which could cause significant impacts (i.e., vibration, structural shifting) to the existing RAAC panels, creating risk to occupants within the building.
- In Building B, the roofs above the Great Hall and Auditorium would both require:
 - Significant protective measures due to risk of disrupting asbestos, which must be contained.
 - Large openings or complete removal of the finished ceiling would be required, with significant scaffolding built in place to provide the necessary platform to conduct inspection and abatement work.
- A recent roof leak in Building C occurred in an area adjacent to an uninvestigated area, which further reinforces the ongoing risk associated with the unknown condition of these areas.





Growing number of problems at the Ontario Science Centre

- A 2022 Building Condition Assessment (cited in 2023 Business Case) conducted by consulting firm Pinchin (estimating a minimum investment of \$478 million) noted several areas that include but are not limited to:

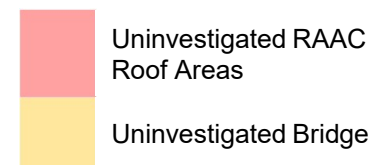
Structural Repairs of Building Envelope	Escalators
Mechanical Building Controls Systems	Sprinkler and Fire Protection
Electrical Switchgears and Distribution	Chilling and Cooling Tower
Elevators	Emergency Generator Fuel Tanks

- Since this report other significant issues have developed that are not included in the estimated cost above:
 - RAAC roof panel and roof assembly (+\$20M-\$40M)
 - Pedestrian Bridge (costing TBD)
 - Restoring heating in Building B (currently no heat for the coming fall/winter – costing TBD)
 - New Heating and Cooling issues (+\$1M-\$5M)

All three buildings would need to be vacant to undertake critical repairs.

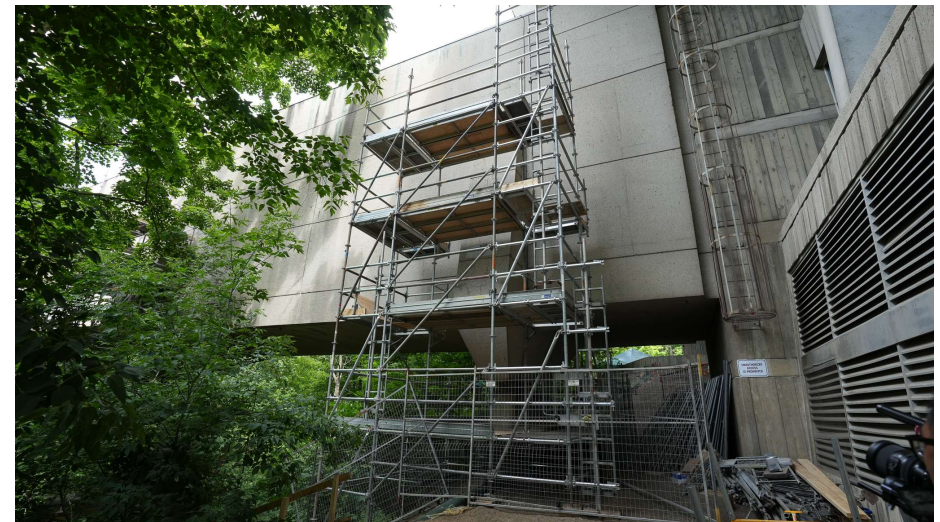
Buildings A, B and C

- The Ontario Science Centre buildings are unique, bespoke, purpose-built assets that have reached the end of their useful life.
- Building Condition Assessments and construction estimates are based on industry standards that are only partially applicable to these unique facilities and do not take into account the difficulty of the construction methods required to undertake the repair and replacement process. This difficulty includes:
 - Building B is surrounded by dense forest and, together with Building A, is alongside a steep ravine. A road would likely need to be built to provide access for materials and construction equipment.
 - Building A serves as the centre for all building systems. A mechanical tunnel services Building C. All services for Building B run through the non-accessible pedestrian bridge.



Pedestrian Bridge

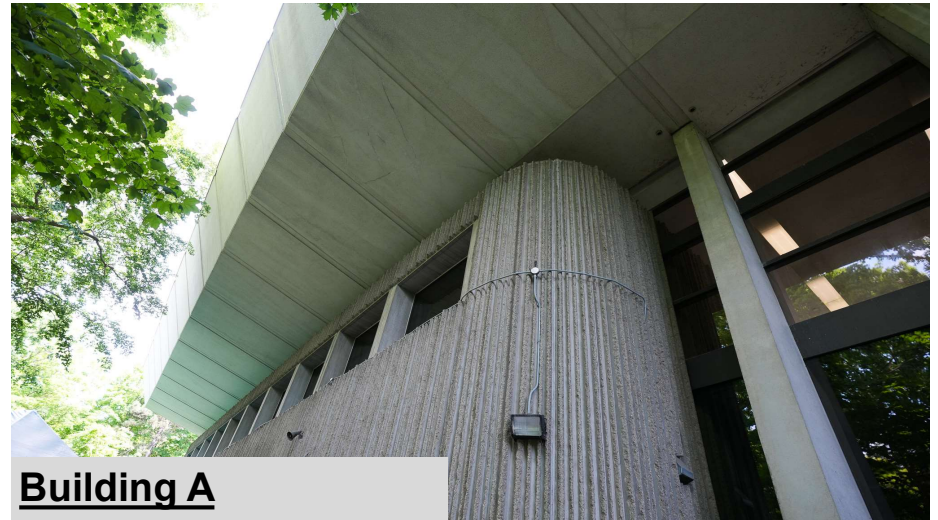
- The pedestrian bridge has been closed since summer 2022, due to structural integrity concerns. Since that time, the bridge has been monitored on an ongoing basis, and further investigations are underway.
- The location of the bridge across the deep ravine through dense forest creates an extremely difficult environment for addressing building issues. As a result, standard construction costing is not applicable.
- The area between the edge of the building and the steep decline of the ravine is very narrow – approximately 5'-10'.
- As mentioned previously, all services to Building B run through a very small mechanical channel built into the pedestrian bridge, which is not currently accessible.
 - Currently, there is **no heat in Building B** due to a malfunction of the heating pipes in this mechanical channel. This must be fixed before the winter season commences due to the potential for sprinkler system freezing, which creates fire safety risks.



Photos taken July 8, 2024

Building A and B – Overhang

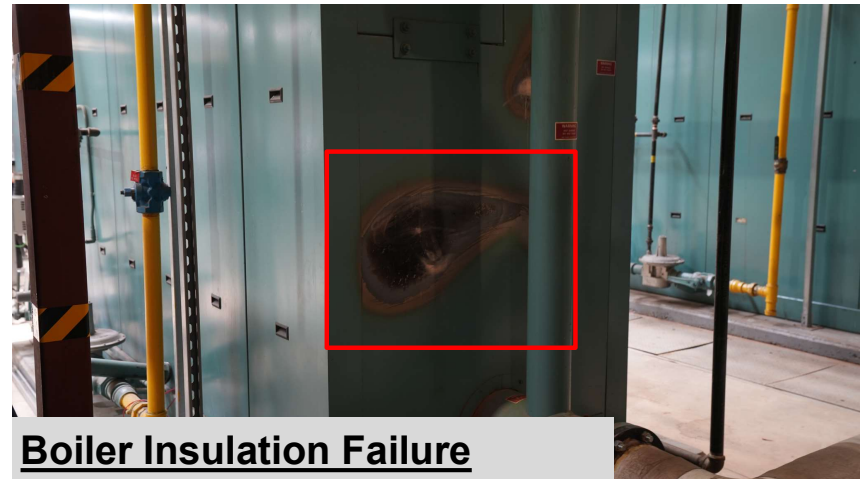
- Buildings A and B have decorative concrete overhang features tied into the roof assembly. This makes RAAC replacement significantly more challenging and costly than replacing a typical flat roof.
- In order to replace the RAAC panels in this area, the engineers have specified that the decorative concrete overhangs must be removed.
- Construction complexities for both buildings are due to:
 - Building A overhang is above the pedestrian bridge.
 - Building B overhang is above the window façade, which has less structural integrity than the poured-in-place concrete walls elsewhere.



Photos taken July 8, 2024

Building A - Boiler Insulation Failure and Chiller Repair

- Building A is the mechanical and electrical hub for the entire facility. There is no longer any redundancy for cooling, heating or hot water supply.
- There is no guarantee that any of the operational equipment will last until October 31, 2024.
- Further to the 2022 Pinchin Report, the electrical systems are at the end of their useful life. Any reworking of this system, in addition to modernizing the building, would require new wiring throughout the decorative concrete walls.



Photos taken July 8, 2024

Building A – Critical Panel Reinforcement

- This is a critical risk panel in Building A that required immediate reinforcement due to the level of deterioration.



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Building B

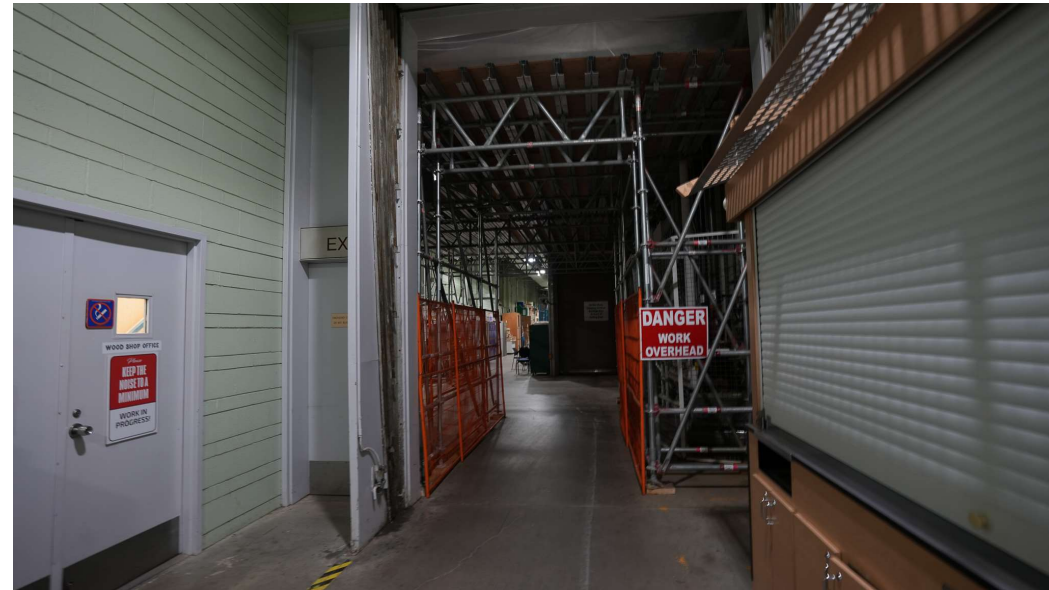
- Approximately 80 per cent of visitors spend time in Building B.
- There is currently no heat, and the location is extremely challenging to access due to its proximity to a ravine, which makes bringing in materials and construction equipment extremely difficult.
- 36 per cent of this building has not been investigated for RAAC due to its challenging location over the exhibition space. It also has the highest concentration of high-risk panels in a single area.
- Skylights in Building B drain most of the water onto the Great Hall roof, which is an uninvestigated area of RAAC panels.
- Further complexity for RAAC investigation is the presence of friable asbestos which must be abated in-place.



Photos taken July 8, 2024

Building C – Critical Risk Panels and Safety Hoarding

- Critical risk panels in Building C are currently undergoing repair and the open permit with the City of Toronto covers this work.
- Structural hoarding has been designed to keep occupants safe in the event RAAC panels above fail.
- Reinforcement was not available here due to mechanical systems running under the critical RAAC panels.
- This is an example of structural overhead hoarding that would be required throughout the buildings to mitigate high-risk panels prior to October 31, 2024.



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