

The Elliot Lake Inquiry Lessons Learned

“Though it was rust that defeated the structure of the Algo Mall, the real story behind the collapse is one of human, not material, failure.”
(Paul R. Bélanger)

Presentation by Chris Roney, FEC, P.Eng.
to the Engineers Canada February 2015 Board Meeting

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The Algo Centre Mall

- Built in 1979
- Called “Crowning Achievement for Elliot Lake”
- Mall & Hotel
- Rooftop Parking deck



The Collapse



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The Collapse



Photo credit: OPP

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Leaks, mould, corrosion

- Leakage problems started shortly after opening
- Numerous band-aid patches
- None were effective
- None addressed the root problem



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Engineering Reports

- ◆ First in 1991
 - Investigate water problems
 - Propose solutions
 - Investigate the effect of the leakage on the structure
 - Leaks doubled between 1991 and 1994

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Engineering Reports

- ◆ Numerous engineering reports over the years
 - “no evidence of structural distress or deterioration”
 - “corrosion evident, but not of concern”
 - “no evidence of deterioration compromising the integrity of the structure”

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Engineering Reports

- ◆ Last Engineering investigation before the collapse
 - Inspection: April 12, 2012
 - Report: May 3, 2012

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Structural Environmental Geotechnical Civil Materials Testing

MRW Project: S12076

May 3, 2012

Ms. Rhonda Bisc, Manager
Algo Centre Mall
c/o Eastwood Mall Inc.,
Elliot Lake, ON N3A 2T2

Re: Structural Condition Inspection
Algo Centre Mall, Elliot Lake, ON

Dear Rhonda

As per your request we met with your maintenance staff on Thursday April 12, 2012 to inspect the above noted mall complex. We are familiar with the mall in Elliot Lake from previous inspections of the parking deck structure and completion of steel beam fire proofing conducted for the Building Department in 2009.

The complex was constructed in 1980 and has therefore been occupied for 32 years. The building footprint is 140,000 square feet. The mall was designed by James W. Kiewit Architect, structural design by Bate Engineering.

We have always been of the opinion that the complex was designed and constructed to the stated design documents.

Our inspection revealed evidence of rusting on the structural steel beam members in areas where the parking deck has settled as shown in Pictures 1 through 8. The area of open walkways shown in Pictures 9 through 12 also have areas with surface rust.

It is important to note that the steel deck and the vehicle concrete deck members are structurally sound. The rusting along the south wall of the Algo Mall, near the municipal library. As per Pictures 5 and 6 we noted vehicular impact on wall siding in this area, that may also have added to the problem.

The Mall is conducting further waterproofing maintenance on the parking deck this spring. Other upper surface waterproofing improvements may be temporary location. A permanent repair needs to be budgeted for to seriously protect the structure.

It is our opinion that the observed rusting at this time has not significantly changed the load carrying capacity of the structure, and no steel beams or structural members were displaced.

11 Brook Road, Unit 8
Mississauga, Ontario
M5S 1B2
www.mrw.ca

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Phone: (705) 645-0800
Fax: (705) 645-0804
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Engineering Reports

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Structure: Environmental: Geotechnical: Civil: Materials Testing

MRW Project: S12076

May 3, 2012
Mr. Florindo Bear, Manager

All beams inspected had little loss of section and we would consider the members still structurally sound. The ongoing leakage from the parking deck is of particular concern in the areas of Zellers, and the expansion joint located along the south wall of the Algo Inn over the municipal library.

As per your request we met with your maintenance staff on Thursday April 12, 2012 to inspect the above noted mall complex. We are familiar with the mall in Elliot Lake from previous inspections of the parking deck.

It is our opinion that the observed rusting at this time has not detrimentally changed the load carrying capacities of the structure, and no visual signs of structural distress were observed.

Our inspection revealed evidence of rusting on the structural steel beam members in areas where the parking deck has leaked as shown in Pictures 7 through 9. The area of open walkways shown in Pictures 8 through 12 also have areas with surface rust.

All beams inspected had little loss of section and we would consider the members still structurally sound. The ongoing leakage from the parking deck is of particular concern in the areas of Zellers, and the expansion joint located along the south wall of the Algo Inn, over the municipal library. As per Pictures 5 and 6 we noted vehicular impact on wall siding in this area that may also have added to the problem.

The Mall is conducting further waterproofing maintenance on the parking deck this spring. (The upper surface waterproofing is dependent on a temporary solution. A permanent repair needs to be budgeted for to suitably protect the structure.)

It is our opinion that the observed rusting at this time has not detrimentally changed the load carrying capacities of the structure, and no visual signs of structural distress were observed.

11 Brook Road, Unit 8
East St. Marys, Ontario
www.mrw.ca

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Phone: (705) 845-0000
Fax: (705) 845-0000
Email: mrw@mrw.ca

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Elliot Lake: How could so many engineers be so wrong?

Engineering Reports

Deadly Elliot Lake mall collapse was a failure of the 'engineering profession of Ontario,' Inquiry hears

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so many

Elliot Lake engineers

It is not

carrying capacities

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Elliot Lake Inquiry

◆ Mandate

- Inquire into and report on events
 - ◆ surrounding the collapse
 - ◆ The deaths & injuries
 - ◆ Emergency management & response
 - ◆ Prepare recommendations



PEO's Role at the Inquiry

◆ Standing

- Participate in hearings
- Participate in examining witnesses

- Provide evidence concerning the engineers involved with the mall
- Provide evidence concerning the regulation of engineering in Ontario

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PEO's Role at the Inquiry

◆ Standing

- Make written and oral submissions to the Inquiry

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PEO's Role at the Inquiry

◆ Standing

- Make written and oral submissions to the Inquiry

◆ Not PEO's role:

- Engineering evidence
- Opinions on technical matters

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Key Themes from the Inquiry

◆ Transparency

- Inquiry heard from many witnesses that they were unaware of the discipline history of the engineers involved.
- Information was not readily to the public

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Key Themes from the Inquiry

◆ Standards and Guidelines

- No legally binding standards for engineering inspections of existing buildings
- Scope of investigations
 - ◆ Dictated by clients
 - ◆ Budget limitations
 - ◆ Presence of finishes concealing the structure
 - ◆ Not clearly articulated in the reports
 - ◆ Pressure by clients to alter reports

Key Themes from the Inquiry

◆ Standards and Guidelines

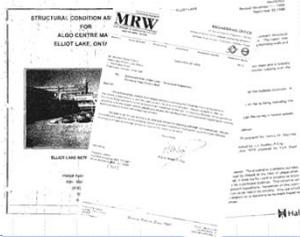
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Key Themes from the Inquiry

◆ Availability of Past Reports

- Previous reports not passed on
- Reports not provided to Municipality
- Witnesses: had they known of previous findings.....



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Key Themes from the Inquiry

◆ Competence and Qualifications

- No constraints on the areas in which a licensee may practice
- Engineers free to self-determine and self-declare their area of expertise & competence
- No requirement for continuing education

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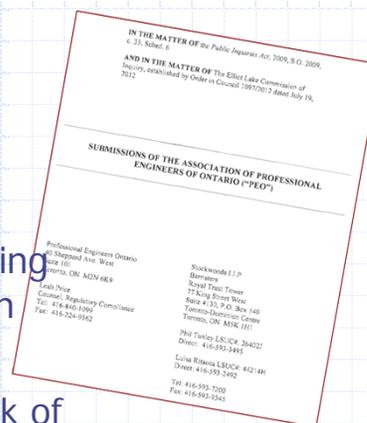
Key Themes from the Inquiry

- ◆ Practicing while suspended
 - Nothing prevents this
 - Just need another P.Eng. to sign off
 - Does this really meet the intention of a suspension?

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PEO's Recommendations

- ◆ 11 recommendations
 - Structural review of existing buildings
 - Availability of Reports
 - Public Access to Licensing & Discipline information
 - Specialist Certification
 - Supervision of the Work of Others



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Inquiry Roundtables

◆ Three Roundtables

1. Increasing Public Safety
2. Improved sharing of reports & information
3. Role of Professionals & other building consultants



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Report of the Elliot Lake Commission of Inquiry



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Report of the Elliot Lake Commission of Inquiry

“Some engineers forgot the moral and ethical foundation of their vocation and profession – to hold paramount the safety, health and welfare of the public”

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PEO's Key Media Messages

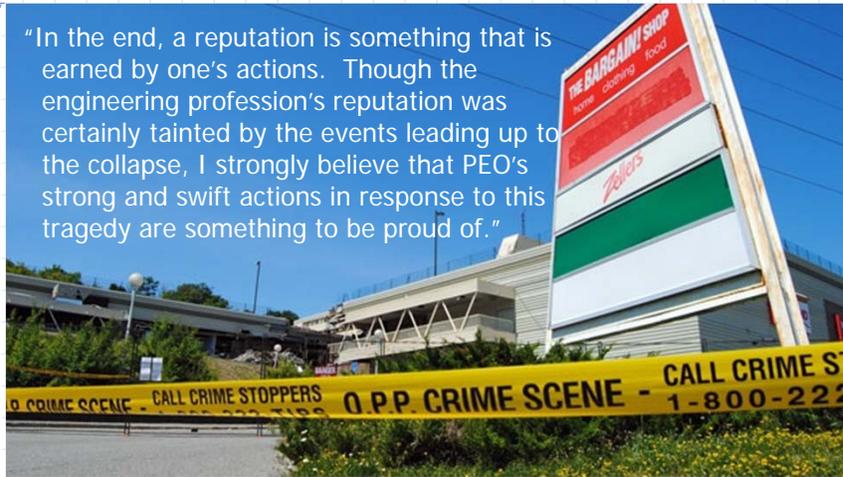
- Acted immediately to learn from this tragedy and to make the necessary changes to make sure it doesn't happen again.
- Began immediate investigation into the actions of the engineers involved
- Participated in the Inquiry
- Almost all of our 11 recommendations were endorsed
- We've already acted to make the necessary changes
- We need the concurrence of the Government

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Conclusion

"In the end, a reputation is something that is earned by one's actions. Though the engineering profession's reputation was certainly tainted by the events leading up to the collapse, I strongly believe that PEO's strong and swift actions in response to this tragedy are something to be proud of."



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