

IN THE MATTER OF the *Public Inquiries Act, 2009*, S.O. 2009,
c. 33, Sched. 6

AND IN THE MATTER OF the Elliot Lake Commission of
Inquiry, established by Order in Council 1097/2012

WRITTEN SUBMISSIONS OF CORESLAB STRUCTURES (ONT) INC.

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Overview

Coreslab Structures (Ont) Inc. (“Coreslab”) is a major supplier of precast concrete hollow core slabs (“slabs”) throughout Ontario. In 1979, Coreslab submitted a tender to Algocen Realty Holdings, which was accepted, for the provision and installation of slabs. As a result, it had a direct involvement in the construction of the Algo Centre Mall (“mall”). The slabs provided by Coreslab formed part of both the floors and the roof of the building, including the rooftop parking. As indicated in the NORR Report, these slabs “played no direct role in the ultimate failure of 2012.”¹ To date, Coreslab continues to manufacture slabs used in various construction projects.

These submissions are intended to assist in understanding (a) what transpired both during construction and post-construction and (b) the structural capabilities and load capacity of the slabs.

These submissions will make the following points:

- a) The Coreslab product was not the cause of the collapse – this fact is supported by NORR;
- b) The Coreslab product performed as specified in the contract and design/drawings;
- c) The Coreslab product was capable of and did support a load capacity of 120 psf as required by the design.
 - i. This was proven by the work and/or evidence of Mr. Hellyer, Trow and Ms. Saari; and

¹Exhibit 3007, pg v

- ii. As well as the fact that heavy vehicles were allowed to be on the parking structure which would require 250 psf; and

Evidence of Douglas Harman

Mr. Harman, the vice-president and general manager of Coreslab, provided general information with respect to the Coreslab product and manufacturing process.

Coreslab employs in-house structural engineers.² The process used today, with respect to hollow core slabs, is very similar to that used during the construction of the mall in 1979/1980.³ The Coreslab engineer who designed the hollow core slabs for the mall was David Hellyer.⁴

Mr. Harman's evidence indicated that Coreslab installs slabs in a variety of projects that involve a roofing or flooring system, including residential buildings and schools. Further, a smaller part of their market share is to provide slabs as a combination of a roof/parking deck.⁵

The Hollow Core Slab Product:

In his evidence, Mr. Harman described the basic structure of the hollow core slabs and how they are made. The hollow core slabs are comprised of concrete and pre-stressing strands that are within the slabs. The strands are half inch wire cable.⁶ The purpose of the pre-stressing strands is to provide tensile strength.⁷ The concrete once poured and hardened bonds to the

²March 7, 2013, pg 408, lines 14-23

³March 7, 2013, pg 427, lines 17-24

⁴March 7, 2013, pg 407, lines 23-25

⁵March 7, 2013, pg 431, lines 1-15

⁶March 7, 2013, pg 409, lines 19-24

⁷March 7, 2013, pg 410, lines 6-12

strands and the composite is what maintains the tensile strength.⁸ When the hollow core slabs are installed in a structure the grout is designed to serve as a key between two slabs so that they act as one, this allows for load transfer between the slabs.⁹ As indicated by Dr. Saffarini of NORR, slabs are a very robust product.¹⁰

Project Bidding:

When bidding on a project, the information required by Coreslab would include the contract documents and an architectural set of drawings, a structural set of drawings and specifications. These materials are used to provide information such as the loads, areas of coverage and design details.¹¹ From the contract drawings, precast shop drawings are created. These shop drawings include such things as specifications for the slabs, including the type of slab, the number of strands, the diameter of the strands and the strand capacity.

Coreslab's structural engineer would design the slabs to meet the specified load capacity.

It would be designed based on the reinforcing steel in the product and an engineer would perform calculations to confirm loading requirements.¹²

The Use of Bonded Topping:

His evidence was that while a bonded topping has the ability to slightly increase the strength of the slab, not all slabs require a bonded topping. The slabs can carry loads without a

⁸March 7, 2013, pg 412 (lines 19-25) to pg 413(line 1)

⁹March 7, 2013, pg 425, lines 9-18

¹⁰May 29, 2013, pg 12374, lines 19-20

¹¹March 7, 2013, pg 432, lines 10-21

¹²March 7, 2013, pg 445, lines 1-6

topping.¹³ If a slab were to have a bonded topping, typically it would have a raked surface and a bonding agent is applied to improve the bond.¹⁴ The concrete topping itself is designed by the engineer of record, not by a Coreslab engineer. Coreslab does not install structural concrete toppings on slabs.¹⁵ In summary, Coreslab does not supervise the application of any topping, they do not design the topping and they do not set the parameters for the topping.¹⁶

Waterproofing:

His evidence was that Coreslab does not recommend that its product be left exposed because it is not designed to go through a freeze-thaw cycle and it is not designed to provide any waterproofing. “It is simply just a structural element”.¹⁷

He had no evidence as to what would be applied or included in a waterproofing membrane or system.¹⁸ With respect to the mall, Coreslab would want to know the type of waterproofing system to be installed on the slabs in order to determine how to prepare the top finish of the slabs, specifically whether they would be smooth or raked.¹⁹ Coreslab never makes recommendations with respect to what waterproofing system is applied to their slabs because this is not part of their scope of work – they only require that a waterproofing system be used.²⁰

¹³March 7, 2013, pg 426, lines 7-19

¹⁴March 7, 2013, pg 427 (lines 23-25) to pg 428 (line 1)

¹⁵March 7, 2013, pg 427, lines 6-16

¹⁶March 7, 2013, pg 468, lines 6-17

¹⁷March 7, 2013, pg 428 (lines 18-25) to pg 429 (line 1)

¹⁸March 7, 2013, pg 431 (lines 20-25) to pg 432 (lines 1-6)

¹⁹March 7, 2013, pg 436 (lines 23-25) to pg 437 (lines 1-6)

²⁰March 7, 2013, pg 449, lines 1-5

Post-Construction:

Coreslab may be approached after construction with respect to structural integrity questions. However, Coreslab would not be able to provide advice on how to fix leaks.²¹

Evidence of Sonia Saari

Ms. Saari is an engineer licenced in the province of Ontario who is currently employed by Coreslab. She is a member of the Professional Engineers Ontario, PEO. From 2007 until 2010 she was employed as a plant engineer, which required her to perform design calculations based on contract documents. This would require her to review the spans, loading (in order to determine how many reinforcing strands were required) and the thickness of the slab.²² Since January 2010 she has been employed as the chief engineer for Coreslab.²³ She attended to provide evidence with respect to the construction of the slabs. The focus of her evidence was with respect to whether the hollow core slabs, as delivered, could support a 120 psf load capacity as specified in the structural drawings.

It was Ms. Saari's opinion that the slabs were capable of supporting the waterproofing membrane and three inches of asphalt.²⁴ In fact, her calculations confirmed that the slabs were capable of supporting a load capacity of 120 psf.²⁵

²¹March 7, 2013, pg 451, lines 2-9

²²May 28, 2013, pg 11976 (lines 10-25) to pg 11977 (lines 1-9)

²³May 28, 2013, pg 11977, lines 10-15

²⁴May 28, 2013, pg 12087, lines 19-25

²⁵May 28, 2013, pg 11999 (lines 14-25) to pg 12000 (lines 1-17)

With respect to the use of the Coreslab product in parking areas, Ms. Saari advised that it was appropriate and they are used extensively in Europe in whole parking structures without problems, provided that an effective waterproofing system was installed.²⁶

Further, with respect to the use of the composite topping, it was Ms. Saari's understanding that a composite topping was used as part of the Peterson waterproofing system.²⁷

Ms. Saari's Calculations Regarding Load Capacity:

Ms. Saari's conclusions based on her analysis and calculations regarding the load carrying capacity of existing slabs were as follows:²⁸

1. Load tables are simply a guide and engineered site-specific calculations (such as the calculations performed by Ms. Saari) supersede the data in these tables. The tables are solely intended as a guideline to start the design process;
2. If a load table indicates that slabs are not capable of a required load capacity this does not necessarily mean that the slabs are "overcapacity" it merely means that engineering calculations are required to confirm their load capacity;
3. The calculations and computer analysis performed showed that the slabs were not overcapacity and the slabs did not require a composite topping to achieve the required strength and serviceability characteristics;
4. The slabs met the specified 120 psf load capacity.

²⁶May 28, 2013, pg 12096, lines 3-12

²⁷May 28, 2013, pg. 12102, lines 6-12

²⁸Exhibit 5149, pg 1

Ms. Saari initially prepared calculations, dated May 3, 2013. These calculations were prepared with information pertaining to the 31 foot span of the slabs and the required loading amount. She did not have the structural drawings prepared by Beta Engineering.²⁹ In addition, at this time, she had a load table retrieved from Coreslab's archives applicable to the time of the construction of the mall.³⁰ However, since this time, she has reviewed the structural drawings and copies of the Coreslab shop drawings.³¹ Further, she received input from NORR with respect to her calculations. This resulted in her re-doing her calculations – resulting in the May 27, 2013 Appendix.³² However, there were no changes to her conclusions as a result of her re-doing the calculations.³³ Ms. Saari's ultimate conclusion was that the slabs could support the loading requirements.

Load Tables:

Ms. Saari's evidence with respect to load tables is that they are used as a sales document for building owners and for architects. Further, different manufacturers will have different load tables and generic load tables will exist within the various handbooks.³⁴

Originally load tables were developed by the machine manufacturers who created the machines that made the hollow core slabs. As a result, there was a level of safety built into the table. However in order to understand the actual capacity of the slabs one must perform further analysis and engineering calculations.³⁵ The load tables have safety factors built into them

²⁹May 28, 2013, pg 11980, lines 9-18

³⁰May 28, 2013, pg 11981, lines 3-15

³¹May 28, 2013, pg 11981, lines 16-24

³²May 28, 2013, pg 11983 (lines 23-25) to pg 11984 (lines 1-21)

³³Exhibit 5150, pg. 1

³⁴May 28, 2013, pg 11986-87, lines 24-25, 1-5

³⁵May 28, 2013, pg 11987, lines 6-17

because they are used in different jurisdictions with different load requirements.³⁶ In addition, while the load table identifies the strength of the steel and the type of steel used for the strands, it does not specify the location of the strands in the slabs.³⁷ Furthermore, the load tables do not differentiate between the live load and the dead load components. The live load component will have a greater safety level than a dead load and the safety factor added to each of these loads varies from jurisdiction to jurisdiction.³⁸ “The table doesn’t take into account any factor of safety differences.”³⁹

Ms. Saari’s evidence is that the live load requirement for the parking deck of the mall was 75 psf and the dead load was 45 psf.⁴⁰ The load table it indicates a load capacity of 87 psf.⁴¹ However, just because the load table indicates 87 psf as the load capacity this does not mean that the slabs cannot support a higher load capacity. In these instances the engineer of record would contact Coreslab to determine the actual capacity.⁴² Ms. Saari indicated that when doing her calculations she was able to demonstrate that the slabs were capable of a 120 psf load.⁴³

In Ms. Saari’s May 27th Appendix to her calculations, she has enclosed a more accurate load table. This load table is from an out-dated sales document/brochure.⁴⁴ This sales brochure features a statement with respect to the latest CSA Standards and Ontario Code editions, reflecting the fact that it is an engineered product.⁴⁵

³⁶May 28, 2013, pg 11990, lines 1-8

³⁷May 28, 2013, pg 11990 (lines 22-25) to pg 11991 (lines 1-6)

³⁸May 28, 2013, pg 11992 (lines 12-16) to pg 11993 (lines 7-18)

³⁹May 28, 2013, pg 11994, lines 15-18

⁴⁰May 28, 2013, pg 11993, lines 19-24

⁴¹Exhibit 1926, pg 1

⁴²May 28, 2013, pg 11997 (lines 20-25) to pg 11998 (lines 1-9)

⁴³May 28, 2013, pg 11999 (lines 14-25) to pg 12000 (lines 1-17)

⁴⁴May 28, 2013, pg 12092 (lines 21-25) to pg 12093 (lines 1-12)

⁴⁵May 28, 2013, pg 12093 (lines 19-25) to pg 12094 (lines 1-13)

Independent Verification that Load Capacity Exceeded 120 psf Specification:

Ms. Saari advised that she was familiar with Exhibit 26, which is correspondence from the Trow Group Limited with respect to a load test that they carried out in 1980.⁴⁶ This letter indicates that there was a load test conducted on one of the upper levels of the mall and indicates that the slabs could actually carry a 152 psf load. This was consistent with Ms. Saari's analysis that the slabs were capable, and in fact had exceeded, a 120 psf load capacity.⁴⁷

Further, there was evidence that the owners had allowed heavy vehicles on the parking deck. Ms. Saari advised that the current Building Code requires that a structure be designed for 250 psf of live load component when heavy vehicles are present.⁴⁸ The mall parking deck was designed with significantly lower loading requirements. This is significant because it demonstrates the actual load capacity of the slabs. The slabs would have had to exceed their 120 psf design load capacity.

When questioned with respect to other consultants that have determined that the waterproofing system would exceed the requisite load capacity, Ms. Saari postulated that these consultants may have referred to more conservative load tables or they may have considered just adding additional loading onto the existing structure.⁴⁹

⁴⁶Exhibit 26, page 1-2

⁴⁷May 28, 2013, pg 12090, lines 12-25

⁴⁸May 28, 2013, pg 12091, lines 11-21

⁴⁹May 28, 2013, pg 12107 (lines 23-25) to pg 12108 (lines 1-11)

Bonded Topping:

Ms. Saari's evidence was that based on the structural drawings and Coreslab shop drawings there was no indication on these documents of a "bonded" topping to the hollow core slabs. The slabs were to obtain a 120 psf on their own without a topping.⁵⁰

Ms. Saari also examined the load capacity of the slabs if a 2 inch topping was bonded to the hollow core slabs and her analysis indicated that this would result in the slabs achieving a 150 psf.⁵¹

David Hellyer:

Ms. Saari agreed that the letter of Mr. Hellyer, dated February 1, 1980⁵² represented that the slabs on both the upper and lower floors could support a superimposed load of 120 psf.⁵³ Mr. Hellyer indicated that the slabs could carry 120 psf but they could actually carry more.⁵⁴ As seen in Mr. Hellyer's letter he was very confident that the slabs could achieve the required loading.⁵⁵

Mr. Shaikh, Mr. Karaluk and subsequent observations with respect to the slabs post-construction:

Ms. Saari indicated that when they reviewed the mall and the slab capacity issue they may have only had the published document/drawings and the load table. They would not have known if the slabs were tailor-made or whether there were any changes within the parameters to create a different condition.⁵⁶

⁵⁰May 28, 2013, pg 11982, lines 1-12

⁵¹May 28, 2013, pg 12055, lines 12-18

⁵²Exhibit 1922, pages 1-2

⁵³May 28, 2013, pg 11983, lines 17-22

⁵⁴May 28, 2013, pg 12004, lines 12-25

⁵⁵May 28, 2013, pg 12016, lines 1-2

⁵⁶May 28, 2013, pg 12085, lines 1-11

When asked whether she would “sign off” on the additional weight being put on the roof, Ms. Saari advised that “it would depend on the parameters of what was – what was known of the project at the time, and what was the proposal.”⁵⁷ Based on her calculations, if there was a fully bonded topping, there would be a load capacity of 150 psf - then the slabs would carry more waterproofing materials.⁵⁸ However, knowing the history of the building, she would hesitate.⁵⁹

Ms. Saari agreed with Mr. Kearns that based on the observations of Halsall in 1999 the slabs were in good shape.⁶⁰

Evidence of Dale Craig

Mr. Craig was called as an engineering expert to advise the Commission. During his evidence, he touched upon the use of the hollow core slabs.

Mr. Craig indicated that based on his review of the Coreslab documents there were two or three methods of lateral support provided for the beam. Furthermore, from his analysis and review of the photographs it was his opinion that lateral support was provided for as indicated in the Coreslab drawings.⁶¹

Mr. Craig further advised the Commission that his advice did not preclude the use of hollow core slabs in the construction of parking structures. Rather, he recommended that there is

⁵⁷May 28, 2013, pg 12087, lines 6-18

⁵⁸May 28, 2013, pg 12088 (lines 18-25) to pg 12089 (lines 1-6)

⁵⁹May 28, 2013, pg 120889, lines 9-11

⁶⁰May 28, 2013, pg 12119, lines 1-7

⁶¹ July 31, 2013, pg 19407-19408 (lines 1-25)

assurance that if slabs or materials are used they are appropriate for the circumstances and tested and approved for that application.⁶²

Evidence of NORR

The NORR Report, issued on March 8, 2013, is extremely helpful in understanding, from a construction perspective, the cause of the collapse of the mall. We agree with its ultimate conclusions that:

- a. The trigger of the collapse was the connection between the roof level beam on gridline 16 and when the connection was lost the beam could no longer support the roof parking deck and that the concrete panels fell onto the upper mall level and caused a similar collapse;⁶³
- b. That the collapse took place when the roof slab was subjected to a significantly smaller live load than it was designed for and that “In other words, the collapse occurred due to the loss of capacity due to corrosion and not due to exceeding the design load.”⁶⁴
- c. The failed connection was severely corroded;⁶⁵
- d. That corrosion was the culprit of the failure and could only occur in the presence of water and oxygen and that there was an abundance of evidence of water leakage in the mall from the day that it opened;⁶⁶ and

⁶² July 31, 2013, pg19407 (line 25) to 19412 (lines 1-7)

⁶³Exhibit 3007, pg 126

⁶⁴Exhibit 3007, pg 126

⁶⁵Exhibit 3007, pg 126

⁶⁶Exhibit 3007, pg 127

- e. That the original structural steel design of the mall was done for the most part in compliance with the prevailing codes of the time and in keeping with the common construction practice at that time.⁶⁷

The NORR Report also draws conclusions with respect to the design, supply and erection of the slabs by Coreslab. These conclusions were drawn notwithstanding the fact that there was a lack of evidence to support them and regardless of the finding that the slabs were not the cause of the accident. Further, these conclusions are not credible due to contradictory independent evidence and as a result of cross-examination. In summary, the NORR Report conclusions that have been discredited and contradicted are:

- a. That Coreslab engaged in aggressive bidding;

The evidence indicated that Precon flip flopped with respect to whether or not a bonded topping was required. Throughout the bidding process Coreslab's position was consistent with respect to the load capacity of the slabs that they did not require a bonded topping. This position is supported by the evidence of Ms. Saari. As a result a reasonable owner would prefer Coreslab.

- b. That Coreslab misrepresented the load capacity of the slabs;

The evidence indicated that the load capacity of the slabs achieved 120 psf as per the evidence of Mr. Hellyer and Ms. Saari. In addition, the capacity of the slabs was further demonstrated by the fact that the slabs had to withstand heavy vehicles which require a load carrying capacity of

⁶⁷Exhibit 3007, pg 127

250 psf and was found to have a load carrying capacity of at least 152 psf by physical load testing conducted by Trow.

- c. That the load tables indicated that the slabs did not have capacity;

The evidence of Ms. Saari was that load tables could not be accepted as gospel because they were only guidelines. Engineering analysis is required to determine and advise of the actual capacity of slabs.

Moreover, there was disregard without cause to the facts that (a) the drawings were stamped by a professional engineer confirming the load capacity of the slabs and (b) the results of the structural load test for the slabs which was carried out by a third party (Trow).

- d. That Coreslab thwarted efforts to fix the waterproofing;

The evidence was that regardless of the input of Mr. Shaikh a topping was applied to the roof and various options were presented to the owners with respect to solutions to the waterproofing issue/repair.

Further, the evidence of Dr. Saffarini contradicts these comments made in the NORR Report and Dr. Saffarini stated that they [NORR] were “not here to criticise anybody” – the purpose of the report was not to cast blame.⁶⁸ The NORR Report takes issue with respect to the fact that:

- a. According to Coreslab’s tables it was not achievable to obtain a load capacity of 120 psf for a slab with a 31’ span; and

⁶⁸May 29, 2013, pg 12346, lines 22-23 & May 30, 2013, pg 12611, lines 8-24

- b. Coreslab could have advised the owner, as did their competitor Precon, that the hollow core slabs were not capable of achieving a load capacity of 120 psf and that they failed to warn Beta Engineering because they did not want to reveal the shortcoming.⁶⁹

We submit that these conclusions drawn by NORR with respect to Coreslab are not sustainable. Further, these conclusions were directly contradicted by the evidence of Ms. Saari, who conducted a thorough analysis and calculations, applying applicable standards of the time, wherein she was able to conclude and advise:

- a. That the Coreslab load tables were generic documents with incomplete data that were used as sales documents. A load capacity of 120 psf could be obtained by the slabs, as required for this structure, regardless of what the table indicated they were capable of. Further, engineering analysis would be required to determine the actual capacity of the slabs, which she has done; and
- b. That based on her detailed calculations, she concluded that the hollow core slabs were not overcapacity and did not require the composite topping in order to obtain a load capacity of 120 psf. Therefore, the slabs were capable of supporting the required load requirements as per the designs.

With respect to the load table issue, Dr. Saffarini acknowledged that the load table he was referring to in the Report was Exhibit 1926.⁷⁰ This is the load table which Ms. Saari's evidence indicated was not with respect to the slabs used at the mall. The configuration of the slabs in

⁶⁹Exhibit 3007, pg 128

⁷⁰May 29, 2013, pg 12364, lines 11-17

Exhibit 1926 was different than those used in the construction. Furthermore, Dr. Saffarini agreed with Ms. Saari's evidence that a load table may be a simple guideline and starting point for the analysis of the capacity of a slab.⁷¹

When questioned with respect to the letter of Mr. Hellyer, Exhibit 1922, Dr. Saffarini agreed that Mr. Hellyer was certifying that the slabs were capable of a load capacity of 120 psf.⁷² Further, Dr. Saffarini confirmed that he did not have at his disposal any of the calculations that would have been done by Mr. Hellyer with respect to the capacity of the slab.⁷³ It was his position that it was improbable that the slabs would have a load capacity of 120 psf rather than 87 psf, as published in the load tables.⁷⁴ However, Dr. Saffarini acknowledged that he had not done any calculations of the load capacity of the slabs based on the factors, codes and methodologies that existed at the time of construction.⁷⁵ Dr. Saffarini's conclusions and comments were based on his opinion and were not supported by engineering or technical evidence.

When questioned with respect to the letters of Mr. Shaikh in the 1990's, Dr. Saffarini would not speculate (there was no evidence) that Mr. Shaikh had been provided with either the Trow Report which found that the slabs had a load capacity of 152 psf or the letter from Mr. Hellyer certifying that the slabs had a capacity of 120 psf.⁷⁶ Further, he did not know whether the

⁷¹May 29, 2013, pg 12366-67, lines 22-25, 1-14

⁷²May 29, 2013, pg 12369 (lines 9-25) to pg 12370 (lines 1-3) & Exhibit 1922, pg 1-2

⁷³May 29, 2013, pg 12370, lines 8-20

⁷⁴May 29, 2013, pg 12370 (lines 23-25) to pg 12371 (line 1)

⁷⁵May 29, 2013, pg 12371, lines 15-22

⁷⁶May 29, 2013, pg 12382-84

owner had ever communicated with Mr. Shaikh that there were leaking problems with the mall dating back to the beginning of the project.⁷⁷

Any criticism of subsequent communications with Coreslab, in particular Mr. Shaikh, at a later date is without merit due to the lack of any evidence with respect to what he would have known and/or been aware of when advice was sought. In addition, Mr. Shaikh may have known of an ongoing leak which existed since construction – this would naturally result in a more conservative approach when making recommendations.

Further, Dr. Saffarini acknowledged that based on correspondence dated September 17, 1992, from Beta Engineering to the owner Mr. Caughill that Beta was consistently recommending that a load test be performed if they needed to add additional load.⁷⁸ However, no load test was ever done.⁷⁹

It was acknowledged by Dr. Saffarini that after meeting with Mr. Shaikh, ATA issued a report that recommended that a 20 psf waterproofing system could be added to the existing slabs with a bonded concrete topping. Dr. Saffarini advised that this was carried out.⁸⁰ As a result, it is untenable to allege that the advice of Mr. Shaikh impeded any attempts to rectify the waterproofing of the structure.

When questioned with respect to the bidding process for the provision of the hollow core slab product, Dr. Saffarini agreed that:

⁷⁷May 29, 2013, pg 12384, lines 10-17

⁷⁸May 29, 2013, pg 12386 (lines 6-25) to pg 12387 (lines 1-2) & Exhibit 607, pg 1

⁷⁹May 29, 2013, pg 12387, lines 13-15

⁸⁰May 29, 2013, pg 12406, lines 9-21

- a. What Coreslab was asked to bid on was a slab product that had a topping on it separated by insulation (it was not a bonded topping);⁸¹
- b. That on March 28, 1979 there was no talk of using a bonded topping;⁸²
- c. That the slab product supplied for the roof level was the same as supplied for the mall level;⁸³
- d. That during the bidding process Coreslab consistently bid to a specification that did not require a composite topping;⁸⁴
- e. That with respect to Coreslab's competitor, Precon, on March 27 they indicated that a composite topping would not be required.⁸⁵ However, on March 28, Precon indicated that the topping is now needed to support the load – a bonded topping;⁸⁶
- f. That Precon's conduct during the bidding process would not inspire confidence due to their flip-flopping position, compared with Coreslab's consistent bid.⁸⁷

Furthermore, Dr. Saffarini acknowledged the Trow Report with respect to the load test on the slabs, which indicated that the hollow core slabs had a load capacity of 152 psf in early 1980.⁸⁸ A load capacity of 152 psf is significantly higher than a load capacity of 87 psf; the load capacity that Dr. Saffarini believed to be applicable due to the load table. In addition, he agreed that the structure was not designed to carry heavy vehicles, only small vehicles.⁸⁹ Yet, the evidence is that heavy vehicles and loaded buses had travelled on the rooftop parking. Ms.

⁸¹May 29, 2013, pg. 12389, lines 3-13

⁸²May 29, 2013, pg 12390 (lines 6-10) to pg 12391 (lines 3-7)

⁸³May 29, 2013, pg 12392, lines 4-8

⁸⁴May 29, 2013, pg 12392, lines 14-21

⁸⁵May 29, 2013, pg 12394, lines 3-22

⁸⁶May 29, 2013, pg 12395, lines 1-18

⁸⁷May 29, 2013, pg 12396 (lines 12-25) to pg 12397 (lines 1-10)

⁸⁸May 29, 2013, pg. 12375, lines 15-24 & Exhibit 26, pg 1-2

⁸⁹May 29, 2013, pg 12378 (lines 22-25) to pg 12379 (lines 1-5)

Saari's evidence was that this would require a load capacity of 250 psf. Based on the foregoing, the slabs were capable of supporting a load capacity of 120 psf, as required by the structure designs.

Ultimately, Dr. Saffarini agreed that the hollow core slabs were a very robust product.⁹⁰

Other NORR evidence favourable to Coreslab:

Dr. Ghods reviewed the results from NRC and concluded that there was no major deficiency in the concrete. In particular, he noted that the compressive strength of the hollow core slabs met and exceeded the specified values.⁹¹ This is further evidence of the high quality of the Coreslab product.

Conclusion

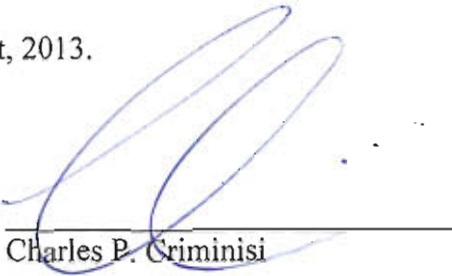
In summary, it is Coreslab's position that:

- a. The Coreslab product was not the cause of the collapse;
- b. The Coreslab product performed as specified in the contract and design/drawings; and
- c. The Coreslab product was capable of and did support a load capacity of 120 psf as required by the design.

⁹⁰May 29, 2013, pg 12374, lines 19-20

⁹¹May 29, 2013, pg 12313, lines 7-13

All of which is respectfully submitted this 8th day of August, 2013.



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