

ELLIOT LAKE COMMISSION OF INQUIRY

DAY 2

March 05, 2013



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ELLIOT LAKE COMMISSION OF INQUIRY

--- This is Day 2 in the Inquiry proceedings held
before the Honourable Justice P.R. Bélanger
Commissioner, at the White Mountain Academy of the
Arts, 99 Spine Road, Elliot Lake, Ontario, on the
5th day of March, 2013, commencing at 9:30 a.m.

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Certified Shorthand Reporter

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1 --- Upon commencing at 9:30 a.m. on
2 Tuesday, March 5th, 2013.

3 THE COMMISSIONER: Morning, everybody.
4 Mr. Carr-Harris, are you prepared to proceed this
5 morning?

6 MR. CARR-HARRIS: I am. Thank you, your
7 Honour.

8 THE COMMISSIONER: Thank you, Mr. Clerk.

9 MR. CARR-HARRIS: Mr. Commissioner, our
10 first witness is Dale Craig sitting on your right.
11 Mr. Craig is a highly experienced and --

12 THE COMMISSIONER: We'll have him sworn
13 in.

14 DALE CRAIG, sworn.

15 EXAMINATION-IN-CHIEF BY MR. CARR-HARRIS:

16 THE COMMISSIONER: Good morning, Mr.
17 Craig. I'm sorry I interrupted you, Mr.
18 Carr-Harris.

19 BY MR. CARR-HARRIS:

20 1 Q. Good morning, Mr. Craig.

21 A. Good morning.

22 2 Q. Thank you for being here.

23 MR. CARR-HARRIS: Mr. Craig is a highly
24 experienced and highly respected professional
25 engineer that the Commission has retained to

1 assist them in their task.

2 His purpose here today, as we previously
3 indicated, is to provide an overview of the design
4 and build process in a large construction project.
5 The idea of Mr. Craig testifying here is to give
6 you -- the public and the lawyers, if they need it,
7 a primer in the issues and concepts that we'll be
8 dealing with over the days, weeks and months of this
9 Inquiry.

10 Although Mr. Craig is not being
11 qualified as an expert today, he is an expert.
12 And he will be dealing with, as I say, what is
13 essentially an educational exercise for those who
14 are watching this Inquiry and will need some
15 assistance with some of the terms and some of the
16 processes that will underlie much of the evidence.
17 Mr. Craig will not respond to questions which deal
18 with issues arising in this Inquiry. He is here
19 simply to provide background information. His
20 evidence today is not contentious and is not
21 intended to be contentious, but intended to be
22 helpful.

23 Let me briefly describe Mr. Craig's
24 professional background. He graduated from
25 Carleton University in Engineering in 1970 with

1 distinction. He shortly thereafter joined J.L.
2 Richards Professional Engineering Firm with
3 offices in several locations, including Sudbury,
4 and he has worked there solidly since for over 40
5 years.

6 For 20 of those 40 years, he practiced
7 as a structural engineer, then was chief
8 structural engineer. And he is now essentially,
9 for the last 20 years, been involved in project
10 management of major projects and multidisciplinary
11 construction projects.

12 The exhibits we'll be referring to, just
13 for your own edification, for the members here and
14 for others, he will begin by giving us a slide
15 presentation which deals with key aspects of the
16 overview you already have, and key terms, and
17 concepts.

18 That is Exhibit NO. 01891. That's the
19 slide presentation.

20 EXHIBIT NO. 01891: Report on building and
21 designing a large construction project
22 presentation.

23 MR. CARR-HARRIS: Second, he will show an
24 interactive structural slide presentation to show
25 you some of the key elements of the structure,

1 structural design, that's Exhibit NO. 01892.

2 EXHIBIT NO. 01892: Structural
3 components.

4 MR. CARR-HARRIS: He will then in the
5 process show you a model of a connection, which is
6 what is known as the construction that connects the
7 beams to the columns. That will be Exhibit NO.
8 01894.

9 MR. CARR-HARRIS: He will also show you a
10 graphic illustration of the relative sizes of those
11 -- of the actual relative sizes of the beams and the
12 columns typically used in this type of construction.
13 That is Exhibit NO. 01893.

14 EXHIBIT NO. 01893: Member compare.

15 MR. CARR-HARRIS: And then lastly he will
16 describe the -- what he understands is the Peterson
17 Roofing System that, as we all know, was used on
18 this roof, but simply in a non-contentious way in
19 order to describe some of the terms that are used
20 continuously while discussing the roofing system.

21 BY MR. CARR-HARRIS:

22 3 Q. So, Mr. Craig, do you care to begin,
23 sir?

24 A. Thank you very much, Mr. Carr-Harris.
25 Yes, today I would like to lead you

1 through a presentation which portrays the
2 traditional design, bid, build arrangement for
3 project delivery, that's as opposed to some other
4 modifications of project delivery mannerisms which
5 could be construction management, or fast track
6 design, build, and other things.

7 This particular project was done under
8 that traditional mode of delivery. And my
9 presentation is essentially a condensation of the
10 information presented in Exhibit NO. 6.

11 This is a depiction of the arrangement
12 between the various parties on a construction
13 project. We have at the center of everything is
14 the owner. This is the person that wishes to
15 construct a project and has his own financing in
16 place to build it.

17 He will consult with the municipality
18 through the chief building officials and the
19 Building Controls Department to make sure that the
20 zoning and the site plan control, and building
21 permit aspects of his application are in order and
22 in compliance with the Ontario Building Code.

23 The owner will usually, in a project of
24 this nature, contract with an architect, an
25 engineer, or a group of engineers, to prepare

1 construction documents consisting of drawings and
2 specifications to describe how the building needs
3 to be built, and the various qualities and
4 installation methods for the materials.

5 The architect traditionally has been the
6 prime consultant in this arrangement and
7 responsible for the architectural design and
8 co-ordination of the other engineering
9 consultants, and surveyors, and planners that
10 might be needed on a project.

11 Architects are expected to operate in
12 accordance with the guidelines and practices
13 dictated by the Ontario Association of Architects
14 and engineers practice under the regulations and
15 guidelines provide by the Professional Engineers
16 of Ontario.

17 Once the drawings, set of drawings or
18 contract documents, as they are referred to, are
19 completed, the owner will then take those, or the
20 architect on his behalf will advertise for tenders
21 from general contractors, or they will invite
22 tenders from selected contractors who they are
23 happy with and who come recommended to them.

24 After the bidding process and selection
25 is done, the general contractor will then sign a

1 contract with the owner to construct a project in
2 accordance with the plans and specifications and
3 the Health and Safety Laws and Regulations.
4 And he will often engage subcontractors for a number
5 of different aspects of the project, among them
6 masonry and concrete, painting, all of the various
7 pieces that go into a project.

8 Next slide please. I should, sorry, go
9 back. I should mention that there is a direct
10 contractual relationship between the owner and the
11 contractor, and as well between the owner and the
12 architect and the architect's engineers. But
13 there is no contractual relationship between the
14 architect and the contractor.

15 4 Q. I know what it says there, Mr. Craig.
16 It looks like a general review line between the --

17 A. That's correct.

18 5 Q. -- between the architect, the engineer
19 and the contractor.

20 A. Yes. During the construction, the
21 interface between the engineers, the architect and
22 the contractors is one of general review of
23 construction progress and the quality to make sure
24 that it's in general conformance with the documents
25 that they produced.

1 6 Q. And typically who does that general
2 review?

3 A. Well, it would be either be the
4 designers themselves or appropriate professionals or
5 technical specialists that they would designate to
6 act on their behalf to act essentially as their eyes
7 and ears.

8 7 Q. Thank you.

9 A. This is a bit of a replay of these.
10 The owner is ultimately responsible to make sure
11 that the building is structurally sound. He will
12 engage professionals to assist him in this.

13 Again the architect is a licensed
14 professional, design professional. He is
15 responsible for the esthetics, the building
16 appearance, the functionality, how the space is
17 relayed, how people function in the building,
18 including general Code compliance as well as
19 occupant safety.

20 Architects are regulated by the OAA and
21 they usually are retained as a prime consultant.
22 There is no definition that requires this to be
23 so, but it's been traditional practice and it was
24 very much in vogue at the time of -- in the 1970s
25 and '80s.

1 And also the architect is responsible
2 for the co-ordination and design of aspects,
3 important aspects such as the building envelope.
4 The engineers, the various disciplines of
5 engineering involved in any given project. The
6 extent and detail depends on the nature of the
7 project.

8 There's a structural engineer who
9 designs the structural elements, defines the
10 construction materials and procedures, and ensures
11 that it meets the Code.

12 He would retain a geotechnical engineer
13 usually on a project to define where rock might
14 be, or what the founding conditions might be at
15 the proposed foundation elevation; the defined
16 bearing pressures; provide lateral soil pressure
17 factors; and, important factors relative to
18 seismic design. And usually this involves
19 drilling or test pits to actually physically
20 sample the soil.

21 They will also be usually required to do
22 some quality assurance, quality control, which is
23 the acronym QAQC, testing on various elements
24 during the construction process.

25 You have mechanical engineers

1 responsible for the heating, ventilating and air
2 conditioning systems. The fire protection,
3 plumbing, building controls, you have electrical
4 engineers for the power, lighting data, fire alarm
5 systems.

6 Civil engineers who will design the
7 water and sewer services to the building, design
8 the drainage systems and the site grading, and the
9 roads, and access to the local streets.

10 And all of these professionals, if they
11 are professional engineers, are regulated by the
12 Professional Engineers of Ontario. Next please.
13 Moving to the contractor. The contractor is, in
14 this case in the traditional sense, a general
15 contractor who undertakes the construction in
16 accordance with the plans, the specifications, and
17 other contract documents that he has actually signed
18 a physical contract with the owner to perform.

19 He will usually subcontract a great
20 number of components of the building process to
21 subtrades or suppliers and is responsible
22 essentially to act as co-ordinator or integrator
23 of all of these trades and suppliers into a whole
24 complete working process, a working building.
25 And it's very much the responsibility of the

1 contractor, the general contractor, to ensure that
2 the work is carried out in accordance with Health
3 and Safety Regulations.

4 And his subcontractors, as I mentioned,
5 can vary probably 15 or 16 different
6 subcontractors on a large project varying from
7 painting, drywall, masonry, concrete, concrete
8 forming, reinforcing steel placement, structural
9 steel, supply and fabrication.

10 THE COURT REPORTER: I'm sorry, slow down
11 please, sir.

12 THE WITNESS: Oh, I'm sorry. I got
13 carried away.

14 THE COMMISSIONER: Mr. Craig, bear in mind
15 we have not only live transcription, but live
16 translation. And you're in an area that is very
17 technical and I think you would be doing both these
18 ladies a favour by just slowing down a bit.

19 THE WITNESS: Various subtrades, such as
20 concrete, reinforcing steel, structural steel,
21 supply, fabrication, erection, masonry, painting,
22 roofing and waterproofing, electrical and
23 mechanical. Just all of the various pieces of a
24 building that require specialty subtrades.

25 Next please.

1 BY MR. CARR-HARRIS:

2 8 Q. The role of the municipality.

3 A. Yes. The municipality plays a
4 regulatory role under the Ontario Building Code.
5 They ensure that the local zoning requirements and
6 the building codes are met through the site plan
7 control and building permit application process.

8 The Building Controls Department usually
9 relies quite heavily on the architects and the
10 engineers who stamp their drawings and design and
11 take professional responsibility for them meeting
12 the applicable Code.

13 The chief building official will review
14 reports and certificates of general conformity
15 which are provided by the professionals at the end
16 of construction.

17 And one thing to note is that the chief
18 building official's qualifications may vary based
19 on the size and the location of a municipality.
20 It's not unusual for smaller or more remote
21 municipalities to find it difficult to afford and
22 attract professional engineers or architects to act
23 in that capacity on their behalf and, hence, they
24 often don't have registered professionals on staff.

25 In that case, they then decide on their

1 own whether they have the appropriate
2 qualifications and feel comfortable with reviewing
3 and approving the drawings or engaging other
4 professionals to assist them. Next please.

5 The construction project itself begins with the
6 choice of a site. It all comes down to location.

7 An owner may have a piece of land that he
8 wishes to develop a particular building on for
9 whatever purpose, or he may have an idea for a
10 building, or a process that he wants to construct,
11 and he will search for several sites. So it comes
12 down to location.

13 The size of the site will have a bearing
14 on what sort of building is on it, and the access
15 to the various services, and roads and
16 transportation networks if there's a product
17 involved or deliveries to and from it.

18 Each site has to be analyzed to determine
19 what its zoning is, what the required setbacks are,
20 the amount of parking that's required, the amount of
21 green space, and the various things that are set out
22 usually in the municipality ordinances and zoning
23 by-laws.

24 Next please.

25 Once the site is chosen the next phase

1 in the construction process is the site
2 investigation. Usually it involves a legal survey
3 to determine property boundaries, and any
4 impediments to that, any encroachments or liens on
5 the property that could render it unsuitable for
6 the proposed construction project.

7 Then you would get into a topographical
8 survey which would define the various elevations
9 and features on the site. So that you can -- the
10 designers can appropriately provide grading,
11 drainage, and foundation elevations suitable, and
12 set and establish the floor elevations to suit the
13 purpose of the building.

14 Then you would move on to geotechnical
15 studies to determine what the -- where the
16 founding elements will bear, whether it's on soil
17 or on rock. And if it's -- if the rock varies,
18 what the depth of the rock is.

19 And it would work in consultation with
20 the structural engineer to determine the
21 structural engineer's preferred system of
22 foundation. And the various parameters such as
23 allowable bearing capacity or depth of pyles in
24 that instance to found the building on.

25 Sometimes you engage in hydrogeological

1 studies to determine what the water ground levels
2 are, whether there is any contaminant transport
3 underground in the water table, or other various
4 features that you might engage a hydrogeological
5 consultant to do.

6 Next please. We come back to the
7 triangle with the architect acting as prime
8 consultant.

9 In this instance, the architect would
10 engage what we term now as building science
11 designers. The three major disciplines are
12 structural, mechanical and electrical.

13 A structural engineer for the building
14 frame and how the loads are carried and the
15 building is structured. Mechanical and
16 electrical, as I described for the HVAC, plumbing
17 systems and the various electrical and power and
18 lighting systems.

19 On the site side, the site development
20 and the planning would -- might involve civil
21 engineers, civil, or municipal sometimes they are
22 referred to as, geotechnical engineers, surveyors
23 and planner.

24 This is just a graphical representation
25 of the Codes. The one on the right is the Ontario

1 Building Code from 1975. I did a little
2 measurement. It's about one quarter of the
3 thickness of the 2006 Code and the pages are half
4 the size. So it's about one eighth of the volume
5 of printed material as compared to that that is in
6 effect today.

7 It's just an indication really of the
8 increased complexity of the building process, the
9 greater selection of materials, the greater
10 recognition of the regulations which need to go
11 into the building regulation process.

12 Next please.

13 THE COMMISSIONER: I take it, Mr. Craig,
14 in relation to the previous slide, the Code we have
15 seen is the one in existence at the time when the
16 Algo Mall was constructed?

17 THE WITNESS: Yes, the one on the right
18 is an old copy we have in the office of the 1975
19 Ontario Building Code. And, yes, it was in force
20 at the time.

21 The design process begins with what we
22 term in the industry the "conceptual design". The
23 architect comes up with a programming and
24 functional layout for the building; a design
25 concept with which he will select and recommend to

1 the owner various materials, massing of the
2 building, heights floor-to-floor; the actual
3 dimensions of the building and the orientation of
4 it on the site.

5 This will be discussed in detail with
6 the owner and preliminary budget estimates made.
7 Usually there is one or two, maybe even more,
8 concepts that are developed at this stage. They
9 might include a model of the building or a 3-D
10 rendering.

11 In the older days back in the '70s and
12 '80s, it would probably be a hand drawn
13 perspective of the building from various
14 orientation points.

15 BY MR. CARR-HARRIS:

16 9 Q. So this is the first phase and the
17 conceptual design. You now have the team together
18 and they are to come up with a conceptual design?

19 A. That's right.

20 10 Q. And there is one shown on the right
21 side of this page. What is that?

22 A. Those are -- since we had them handy,
23 those are some conceptual drawings and model of the
24 Living with Lakes Building that our firm did in
25 Sudbury at Laurentian University.

1 11 Q. It's beautiful.

2 A. Thank you. It was an award-winning
3 project, so I'm proud of it.

4 12 Q. And moving on to site planning and
5 approval.

6 A. Yes, please. The site planning and
7 approval process involves making sure that the
8 building -- that a site plan drawing is prepared
9 which shows the building placement, parking, access,
10 drainage, site services.

11 Site plan application to the Building
12 Controls Department is made on behalf of the owner
13 and with the owner's full knowledge. And it's
14 reviewed for compliance with the zoning by-laws
15 and the standards in effect at the time. And if
16 -- as the Building Controls Department finds
17 differences from what they expect to see in it and
18 their local by-laws, or the Building Code, they
19 will mention these to the design team and there
20 will be appropriate revisions to it.

21 And on the right, it's just a typical
22 building site plan control checklist from a
23 municipality. That indicates the various aspects
24 of the site plan control agreement that need to be
25 ensured as being submitted and meeting the

1 requirements.

2 13 Q. So once you've arrived at the concept
3 design, what's the next phase then for site
4 approval?

5 A. We've done the site plan design,
6 submitted for site plan approval and now you move
7 into the detailed design.

8 The detailed design would involve the
9 municipal and civil engineering for the site plan
10 and services, as I mentioned before.

11 The roads, the grading, parking, and
12 storm water management, which is certainly an
13 important aspect these days.

14 The engineers and architect would design
15 their various systems. The architect all of the
16 building finishes, the building envelope,
17 materials, and selection systems.

18 Structural engineers would address the
19 structure itself and the mechanical and electrical
20 design for the various systems that I described
21 earlier.

22 In the instance of the structural
23 engineer, they have to pay attention to various
24 prescribed load combinations for the dead load,
25 the live load and the related climatic conditions

1 and geographical location which are described in
2 the Code.

3 14 Q. And loads will be a subject we'll be
4 hearing evidence about through the course of this.

5 A. Yes.

6 15 Q. And you have, I think, a drawing to
7 illustrate that?

8 A. Yes. This is just a pictorial
9 illustration some of the nature of some of the
10 loads. We have dead loads from the walls, the
11 floors and the roof of the building itself.
12 You also have permanent partitions and fixtures, and
13 services that are embedded or attached to the --
14 permanently attached to the structure.

15 And the structural engineer will
16 estimate the amount of that weight or load on the
17 structure.

18 You have permanent equipment that will
19 exert heavier loads in certain areas that have to
20 be taken into account.

21 At the foundation level, you will have
22 soil and hydraulic loads, water pressure on
23 basement walls if they are not drained, or you
24 can't drain them effectively, and the soil itself
25 exerts a lateral pressure on the wall.

1 In terms of live loads, you have those
2 such as snow, which we -- which in the northern
3 Ontario area we know all about. Live loads from
4 the wind exerting lateral pressure on the walls
5 and roof and uplift in some cases, depending on
6 the nature of the wind.

7 You might have loads for collected
8 water, unintentional collected water on a roof or
9 swimming pool that is built in there.
10 And the one -- and you have lateral loads related to
11 earthquakes. Although in northern Ontario, in
12 general, that's of a lesser concern because it's a
13 lower seismic activity area.

14 And then you have live loads from the
15 people and moveable furniture.

16 16 Q. Forgive me again for interrupting, by
17 what magical route do you arrive what the wind loads
18 and snow loads are? Where do you get that
19 information?

20 A. The Ontario Building Code is very good
21 in both 1975 and 2006. There is a complete list of
22 climatic conditions and wind pressures, earthquakes,
23 seismic factors, ground snow loads. And then the
24 design portion of the Code, section 4, dictates to
25 the structural engineer how he uses those loads and

1 the factors that he works into his load
2 combinations.

3 17 Q. And are these loads particular or
4 specific to each community?

5 A. Yes. There is a large list of loads
6 for particular communities. And it is interesting
7 to note that neither edition of the Code has Elliot
8 Lake factors.

9 18 Q. Whereas Sudbury would be there?

10 A. Sudbury's there, Espanola's there,
11 Sault Ste. Marie's there, Timmins is there. It's a
12 factor of the available data that was there and
13 used.

14 And a designer in that instance where
15 there is a particular municipality of the building
16 that he is designing is not -- does not have
17 specific factors would try and triangulate and
18 assess that location's uniqueness perhaps, if
19 there's anything that is known to be unusual there
20 in terms of the climatic conditions.

21 If not, you would actually take the
22 surrounding municipalities and engage which of
23 those factors you would use.

24 You might take a look at Sudbury's snow
25 load, Espanola's snow load, Sault Ste. Marie's

1 snow load and say, okay, I would say that Elliot
2 Lake should have this. You make a professional
3 judgment on it.

4 19 Q. Thank you.

5 A. At the end of detail design process
6 there's a building permit application and review by
7 the Building Controls Department of the
8 municipality.

9 That review may be internal or may be
10 assisted by a third party retained to assist the
11 Building Controls Department.

12 Generally that application is -- it's
13 desirable to have the application done towards the
14 end of the design process, before tender, so that
15 the results of the building permit review are
16 known and incorporated into the contract documents
17 before you do a tender.

18 It's not always the case in a fast-track
19 or a rushed situation. You might take the chance
20 that you will incorporate the changes later and
21 negotiate any change in cost with the contractor.
22 Following the -- generally following the building
23 permit application, you would then go to tender or
24 bidding to the general contractors, review those
25 bids, receive and award a contract to the selected

1 contractor.

2 And that's just a copy of a typical
3 building permit notice that's posted on the site.

4 Once the contractor has been engaged,
5 awarded the contract, and has mobilized and
6 started to assemble and construct the process --
7 the construction progress requires clarification
8 and instructions from the professionals as to the
9 design intent.

10 No set of documents is perfect, but it's
11 expected that any imperfections, or
12 clarifications, or unintentional -- how do I put
13 it? Unintentional blunders are clarified to the
14 builder in site instructions, and clarifications
15 through sketches, if necessary, to make sure that
16 it's clear to the builder what's required to build
17 the building in accordance with the documents and
18 the intent of the design.

19 And as well there is general site review
20 by the -- by the professional team, or agents of
21 theirs that they have selected or approved to act
22 on their behalf, to make sure that the general
23 progress of construction is proceeding in
24 accordance with the documents, and that the
25 quality of the materials being supplied on the

1 project is as specified.

2 And they will also engage a testing team
3 to do quality assurance, quality control testing.

4 20 Q. And typically is the -- I meant to ask
5 you this earlier. The review by the designers, does
6 it have to be a professional, an architect or an
7 engineer?

8 A. It doesn't have to be. The designers
9 ultimately have to take professional responsibility
10 for whatever review is done. They could assign
11 agents. In fact if they were in another city far
12 from the site, it's not uncommon, in the past
13 especially, to hire a local inspection firm or
14 testing firm, or another local consulting firm to
15 act on their behalf and do the inspections, give
16 them written reports. And I would expect that
17 occasionally the original designers would visit the
18 site.

19 During the contract administration, as I
20 mentioned, there is review of the quality
21 assurance and quality control by the design team
22 either through an agent or personally.

23 There would be a testing program for
24 various materials, concrete, sometimes sections of
25 structural steel are tested to make sure they have

1 the proper yield strength.

2 You might have an inspection of the
3 roofing process to make sure that it's applied
4 correctly. It's a unique science in many
5 respects.

6 And so the designers would set out in
7 their specifications which materials need testing,
8 the nature of the testing, and the codes to which
9 the tests must comply.

10 And there is a professional obligation
11 to ensure that there is general compliance or
12 conformity with the design documents. And this
13 general review process is required by the Ontario
14 Building Code.

15 As you move towards the end of the
16 construction process, you move into what we term
17 as the commissioning phase. It's generally --
18 it's generally focused to a large extent on the
19 review of the mechanical and electrical systems
20 and their controls to make sure they're operating
21 correctly and will provide power, heat, light and
22 comfort to the occupants.

23 Usually the commissioning process
24 involves owner staff training and a provision of
25 operations and maintenance manuals to guide future

1 maintenance of the buildings.

2 And there is particular attention paid
3 to fire and life safety and egress systems at this
4 time.

5 21 Q. Is the commissioning done before or
6 after substantial completion?

7 A. It's usually done just before
8 substantial completion. It's usually one of the
9 elements that the designer would want to have in his
10 pocket to make sure that the air systems are
11 balanced properly, that all of the equipment is
12 working. Because one of the tenets of substantial
13 performance is that the building is suitable for its
14 intended use and purpose.

15 So it's most designers' position that
16 unless all of the life, safety and occupant
17 comfort systems are working properly, it's not
18 ready for its intended use.

19 22 Q. Thank you.

20 A. At the substantial completion or
21 substantial performance, as it is now referred to,
22 the design team will inspect the building thoroughly
23 to determine what deficiencies there are or how much
24 is left to be done and make a determination -- their
25 professional determination as to whether the

1 building is ready to be accepted as substantially
2 performed.

3 If it is, there is a requirement in the
4 Construction Lien Act to advertise this
5 substantial performance in the daily commercial
6 news so that any suppliers or subcontractors who
7 might have lien rights know when they expire and
8 that they have to get their claims in before the
9 expiry of that date.

10 Following that, the Building Controls
11 Department or the chief building official and the
12 fire department would be notified that the
13 building is ready for occupancy, in the opinion of
14 the contractor and the professionals.

15 And they would inspect the facility,
16 determine whether it meets the requirements that
17 they've laid out. And if it does, they will issue
18 an occupancy permit. If it doesn't, corrective
19 measures are taken.

20 23 Q. Thank you. On the right is a
21 Certificate of Substantial Completion that you
22 mention should be published.

23 A. Yes.

24 24 Q. And Quinn Construction was not part of
25 any construction of the mall.

1 A. Yes.

2 25 Q. This is typical --

3 A. It's public record that we just pulled
4 from the daily commercial news, it just happened to
5 be this one is Elliot Lake.

6 26 Q. Thank you.

7 A. That signifies really the end of the
8 building construction and commissioning and the
9 turnover process. The owner now takes
10 responsibility for the building and for its ongoing
11 maintenance and review.

12 There is normal maintenance required on
13 all building systems. Some are more cogent than
14 others. The architectural and structural systems,
15 in my opinion, their maintenance, although it's
16 important, is often ignored until problems occur.

17 You don't pay attention to your roof
18 until it leaks. You don't think about the
19 caulking until you have seepage around the window.
20 You don't think about a structural problem until
21 something deflects, or breaks, or moves, or you
22 feel some vibration and some undue stress.
23 So it's just -- it's the old adage of out of sight
24 out of mind in many respects.

25 There's a note here that major

1 renovations require upgrading to current Codes.
2 If there is a significant renovation to an
3 existing building that was designed under a
4 previous Code, that portion, or if it's extensive
5 enough, all of the building must be upgraded to
6 current Code requirements.

7 But the big reason that mechanical and
8 electrical systems receive most of the maintenance
9 and repair attention are simply because they
10 affect users, they are obvious to the building
11 users. If you don't have enough heat, or if
12 you've got no power, or a toilet doesn't flush,
13 somebody gets upset, there is a complaint, and
14 usually the building maintenance is taken care of.

15 This is the final slide. It just is a
16 typical excerpt of some of the major codes and
17 standards and organizations that are involved in
18 both the setting of standards and establishing
19 regulations to which the buildings must be
20 designed and various agencies that designers will
21 refer to for the guidance.

22 27 Q. Thank you. I understand now you have
23 an interactive display of structural components
24 you'd like to show us?

25 A. Yes, I do. I think we have to take a

1 small break to get the board up though.

2 THE COMMISSIONER: Let's do that. Is it
3 your intention, Mr. Carr-Harris to file Mr. Craig's
4 CV? What is your intention?

5 MR. CARR-HARRIS: It wasn't my plan.
6 But if it's your wish, I'm happy to circulate it.
7 We're certainly not hiding it.

8 THE COMMISSIONER: No, and this is not
9 meant to be a criticism, but you were rather
10 cursory in explaining Mr. Craig's experience. But
11 I know that he has had major responsibilities with
12 major professional organizations, perhaps this
13 ought to be known to everyone.

14 MR. CARR-HARRIS: Well, then, we can
15 mark it.

16 THE COMMISSIONER: Sir, I'm sure you
17 have one.

18 THE WITNESS: Yes.

19 MR. CARR-HARRIS: Yes, we provided it.
20 Unfortunately it's fairly immodest in terms of
21 what's in it, so I have taken sort of the main
22 threads.

23 THE COMMISSIONER: The highlights.

24 MR. CARR-HARRIS: But we'd be happy to
25 file a full CV with all your organizations.

1 THE COMMISSIONER: Is that possible, Mr.
2 Craig?

3 THE WITNESS: Yes.

4 THE COMMISSIONER: That would be of
5 service to everyone.

6 MR. CARR-HARRIS: Should we take a break
7 then?

8 THE COMMISSIONER: We'll take five minutes
9 and it will give Madam Stenographer and the
10 interpreter a minute or two to relax. Let's take
11 five then.

12 --- Break taken at 10:10 a.m.

13 --- Upon resuming at 10:15

14 MR. CARR-HARRIS: Mr. Commissioner,
15 Mr. Craig is now set up to show the structural
16 elements and the graphic.

17 THE COMMISSIONER: Thank you.

18 THE WITNESS: Am I live here?

19 This is an interactive graphic model
20 that we have prepared just to illustrate the
21 different components of a typical structural steel
22 frame construction. It's not the Algo Centre Mall
23 by any means, but I will go through and show you
24 some of the various terminology and members that
25 we use in the structural engineering profession.

1 This is, in its entirety, a structural steel frame.
2 These are reinforced concrete piers with spread
3 footings.

4 We have many components in a structural
5 system. The vertical load carrying members are
6 called columns. The area where they connect to
7 one another is a connection.

8 Some of the horizontal load carrying
9 members, they're secondary members, can be
10 open-web, steel joists which are lighter, more
11 slender members, similar to the wood joists in a
12 floor which span between major walls or beams.
13 And they consist of a top and bottom chord,
14 interconnected by a steel rod, sloped series of
15 web members.

16 Secondary load carrying members can also
17 be lighter steel beams and spanning to other beams
18 or, in this case, directly to a column.

19 This beam is what we call a cantilevered
20 beam. It extends across its support at the column
21 and cantilevers out so it doesn't need other
22 exterior support because it's stabilized by the
23 weight and connection of the beam in the main
24 span.

25 This is a depiction of hollow core,

1 pre-stress concrete slabs. See if I can rotate it
2 a bit. You can see the ends of the slabs are --
3 actually -- they come in four foot sections. And
4 they are any given length, and the depth of them
5 in some instances goes 8, 10 or 12 inches in depth
6 sometimes even more.

7 BY MR. CARR-HARRIS:

8 28 Q. And the significance of those? There
9 is no dispute.

10 A. These slabs were used at the Algo
11 Centre Mall and they constituted the platform on
12 which well, the platform that sat on the structural
13 steel frame at the roof parking level.
14 And those are manufactured off site. Those are
15 manufactured in a pre-stress concrete manufacturing
16 plant and prepared and delivered to the site and
17 erected.

18 Sometimes joists will support a thin
19 concrete slab that's placed on a form, or a V-pan
20 we call it. And a two and a half or three-inch or
21 more topping of concrete, with some welded wire
22 fabric, which is light reinforcing in a square
23 pattern, is installed in the slab.

24 These diagonal members are typical
25 crossed bracing to prevent the frame from swaying

1 under lateral load wind or earthquake.

2 This is an infill wall, you will hear referred to.

3 And those, I guess, are the various significant

4 elements of a steel frame.

5 29 Q. Now, I think you have a mock-up of the
6 -- of an example of a connection.

7 A. Yes, I do.

8 30 Q. I wonder if we start off by saying
9 it's not to scale. It is only for illustrative
10 purposes?

11 A. No. We couldn't have lifted anything
12 of this nature if it was done in structural steel.
13 We used fibre reinforced plastic members, and they
14 aren't to the scale, that we've referred to in this
15 project.

16 This is a column, again a vertical member supporting
17 load. This is a column web, a central part, and it
18 has two flanges.

19 This is a beam that's connected to the
20 column through two clip angles. And the beam has
21 a web again and a top. This is the beam top
22 flange, the beam bottom flange, just by virtue of
23 its orientation.

24 It's very common that the columns are
25 prepared well, all of the members are fabricated

1 in a shop to a set of shop drawings that are based
2 on the design drawings that the structural
3 engineer prepares.

4 And the connection design in this case
5 consists of a pair of clip angles that are -- in
6 the case of the Algo Centre Mall were welded in
7 certain instances, welded to the face of the
8 column flange. These are out of scale. They
9 would terminate here and have a weld running the
10 length of them and up and across the top and
11 front. And a pair of angles would be on the
12 column when it's erected on the site. And this
13 beam would be brought in, dropped in place between
14 the angles, and bolted in place with high strength
15 bolts.

16 31 Q. And that's what transferred the load
17 on the beam to the column?

18 A. That's correct.

19 32 Q. That connection.

20 A. Any loads that happen on this span
21 such as this, the load from the slabs of the joists
22 is carried by the beam to the column and transferred
23 into the column through this connection.

24 33 Q. Can you read that exhibit number for
25 me?

1 A. Yes, NO. 01894.

2 34 Q. Thank you, Exhibit NO. 01894.

3 EXHIBIT NO. 01894: Structural steel
4 frame.

5 BY MR. CARR-HARRIS:

6 35 Q. Now, you mentioned in your description
7 that these are not to actual size, but I understand
8 that you have a graphic illustration of their
9 relative sizes versus the beam?

10 A. Typical beams in the floor or in the
11 roof framing of the Algo Centre Mall were wide
12 flange -- 24-inch deep, wide flange. This is to
13 scale. This is 24 inches deep and it's 12 inches
14 wide, or the width of the flange is 12 inches.
15 This is the actual size of the column it was
16 connected to. It's called a W10 by 49. It's
17 10 inches deep, just under 10 inches deep, and
18 10 inches wide across the flange. It is virtually a
19 square section.
20 These are all hot rolled, structural sections that
21 are produced in a structural steel mill.

22 36 Q. So that gives you the sense,
23 Mr. Commissioner, of the actual size and why we
24 didn't carry them in here.

25 A. This column here would have been 10

1 inches this way and 10 inches that way. And this
2 beam would have been 24 inches. So it would have
3 been this high if it was sitting on the desk.

4 37 Q. Okay.

5 THE COMMISSIONER: Was that made an
6 exhibit?

7 MR. CARR-HARRIS: I believe it's Exhibit
8 No. 01893.

9 THE COMMISSIONER: Thank you.

10 BY MR. CARR-HARRIS:

11 38 Q. Now, could we bring up Exhibit NO. 14?
12 What we're look at there is the roofing system,
13 so-called Peterson Roofing System, which is alleged
14 to have been installed on the roof of the building.
15 I don't think there's much doubt about that at this
16 point.

17 But to avoid any contentious points, all
18 we'd like you to do, Mr. Craig, is simply
19 translate for the public, and for the lawyers,
20 what the roof system consisted of. This is what
21 was we understand there when the building was
22 built in 1979, '80.

23 A. This is a sketch from the Peterson
24 proposal to the owner indicating what is believed to
25 have been the system as it was installed.

1 It consists in the middle of the eight-inch, hollow
2 core pre-stress hollow score slabs. On the
3 underside it's three-inch thick, thermafibre
4 insulation with a foil facing.

5 39 Q. So the wavy line at the bottom is --

6 A. This is insulation here. That's the
7 indication across here. And it looks like they are
8 indicating mechanical attachment of the insulation
9 to the underside of the concrete slabs. These are
10 the grouted joints at longitudinal joints between
11 adjacent four-foot wide panels.

12 And this is a concrete -- it's indicated as a
13 three-inch durable concrete composite wearing slab,
14 which is concrete placed on top of the hollow core
15 slabs and intended to be bonded to them.

16 And the dotted line with the X's
17 indicates what's again termed as welded wire
18 fabric, which is a light drawn steel, square grid
19 of reinforcing --

20 THE COMMISSIONER: That was poured
21 concrete?

22 THE WITNESS: This is placed on site.
23 The slabs would have been in place, prepared as
24 needed to ensure that you got the bond of the
25 concrete topping to them.

1 And then this concrete would have been
2 placed. And it was a variable thickness,
3 according to what I've been advised, to provide
4 some drainage at the top surface. This is
5 indicated as a barrier penetrating concrete
6 sealant.

7 This is an Iso-Flex sealant in the crack
8 control system. These were intended to be tooled
9 joints in the concrete just before it hardens to
10 try and encourage cracking in a controlled pattern
11 along these joints and then filled with a sealant
12 later. And as I mentioned, the barrier sealant
13 was to be put on top.

14 And this is simply a section at an
15 expansion joint with another Iso-Flex pre-molded
16 expansion joint seal in here. And the expansion
17 joints are intended or designed to allow for
18 building expansion and contraction in a controlled
19 nature so it doesn't induce needless stress on the
20 building.

21 BY MR. CARR-HARRIS:

22 40 Q. Okay. And I understand that there's
23 some evidence that the strip that's described as
24 item one there may have been a plug later on by some
25 kind of change, but other than that?

1 A. It's possible, but we have no evidence
2 that we've seen.

3 THE COMMISSIONER: You mentioned bonding
4 between the core slab and the upper layer. How is
5 that bonding achieved, sir?

6 THE WITNESS: There are various ways to
7 do it. I don't know what the specification was,
8 Mr. Commissioner. Sometimes you would brush the
9 slab, clean the base slab well. If it was
10 properly roughened, we would dampen it to make
11 sure it didn't suck the water out of the fresh
12 concrete too quickly and impair the bond.

13 And you can use a mortar slurry of paste
14 to brush into the slab to help bond the new
15 concrete to it. Or there are various chemical
16 products such as latex additive or epoxy bonding
17 agents. I don't know what was intended or used
18 here.

19 But there's a definite process to make
20 sure that you get a proper bond to the fresh
21 concrete, to this hardened, preplaced concrete.

22 THE COMMISSIONER: And the lower third,
23 which is the insulation material, is that added on
24 after?

25 THE WITNESS: Yes.

1 THE COMMISSIONER: Is that sprayed on?

2 THE WITNESS: No. This apparently is a
3 rigid foil-faced insulation board, three inches
4 thick that would be like -- it would appear to be
5 rigid fiberglass or something like that. I
6 honestly don't know what this thermafibre is, but
7 it sounds like a fiber product that has a glossy
8 foil facing, probably intended to act both as a
9 vapour barrier and as heat rejection to help its
10 heat properties.

11 And that would be actually cut and fit
12 to the underside and attached.

13 THE COMMISSIONER: After the core slab has
14 been installed.

15 THE WITNESS: That's correct. And
16 usually welded down in the process once the
17 building is completely water proofed and sealed
18 because you don't want unintentional leakage
19 getting through and damaging the insulation.

20 THE COMMISSIONER: Thank you.

21 BY MR. CARR-HARRIS:

22 41 Q. Thank you, Mr. Craig. Subject to your
23 wishes, Mr. Commissioner, those are my questions.
24 And there may be some questions from the floor.

25 THE COMMISSIONER: All right. Anybody

1 have any questions of Mr. Craig? Would you like me
2 to take a short break as you consider whether or not
3 or how to formulate your questions? Mr. Longo,
4 you're indicating yes?

5 MR. LONGO: Yes, I would like that.

6 THE COMMISSIONER: Let's take the
7 morning break at this point and we'll hear from
8 you after that.

9 --- Morning break taken at 10:32 a.m.

10 --- Upon resuming at 10:50 a.m.

11 MR. CARR-HARRIS: I understand there are a
12 number of questions, Mr. Commissioner.

13 THE COMMISSIONER: All right.

14 CROSS-EXAMINATION BY MR. BISCEGLIA:

15 42 Q. Good morning, Mr. Craig. My name is
16 Joe Bisceglia and I'm Mr. Saunder's lawyer. Thank
17 you for your help this morning.

18 I just want to clear up one matter you
19 touched on. It's my appreciation that as general
20 protocol within an engineering firm, or a project,
21 there are technicians or individuals who obtain
22 information or raw data and provide that even to
23 the architect or the engineer for his or her
24 opinion. Is that fair?

25 A. That's correct.

1 43 Q. And that applies not only with respect
2 to new construction, but also doing inspections of
3 existing buildings.

4 An engineer may have staff members or
5 technicians attend there, take the raw data or
6 information, provide that information and then the
7 engineer exercises his or her opinion with respect
8 to that information. Is that fair?

9 A. That's fair.

10 44 Q. And that provision is provided for in
11 the regulation 260/08 of the Professional Engineers
12 Act, and the document number is OR_E000000004. If
13 we could have that brought up, please? The
14 attachment is part of that overview report. It's
15 part of the regulation. It's page 62 if I
16 understand my printout correctly. The last numbers
17 are .62.

18 Yes, thank you. Section 1 indicates the
19 duties and responsibilities. And then subsection
20 2 of that regulation states that,

21 "The professional engineer may delegate
22 one or more of the functions or
23 requirements described in paragraph 1 to
24 another person if it is consistent with
25 prudent engineering practice to do so..."

1 and so forth. Is that fair?

2 A. I don't see that on the screen. I
3 just want to --

4 45 Q. Oh.

5 A. Oh, okay. There we go. Okay. And
6 does the sentence finish on the next page?

7 46 Q. Yes.

8 A. I would agree with that.

9 47 Q. Thank you very much, sir.

10 A. Thank you.

11 48 Q. Those are all my questions.

12 MR. MACRAE: I wonder if I might go
13 next, Mr. Commissioner?

14 THE COMMISSIONER: Yes, Mr. MacRae.

15 CROSS-EXAMINATION BY MR. MACRAE:

16 49 Q. Good morning, my name is Bob MacRae
17 and I am here as a representative of Mr. Bob Wood.
18 As Mr. Bisceglia indicated, thank you very much for
19 the information you provided. I have a couple of
20 questions with respect to the information.

21 MR. MACRAE: Mr. Commissioner, I
22 understand that from speaking with Mr. Carr-Harris
23 that there may be a number of technical questions
24 that wouldn't necessary -- this wouldn't necessarily
25 be the time to ask those questions today.

1 And just for the purpose of a clear
2 understanding, Mr. Carr-Harris has indicated that
3 if the questions are not fully answered by the
4 professionals or the witnesses that attend, that
5 we'd be in a position to recall the witness. And
6 we could put those questions to him by way
7 possibly in advance of written interrogatories so
8 that questions could be answered.

9 THE COMMISSIONER: That is what Mr. Doody
10 indicated yesterday. That for our purposes today,
11 Mr. Craig's evidence is restricted to generalities,
12 if I can use that expression, rather than specifics.
13 But if that is of concern, certainly you can
14 re-apply to me and I would most likely be favourably
15 disposed to allow the recall of the witness.

16 MR. MACRAE: Thank you very much, Mr.
17 Commissioner.

18 BY MR. MACRAE:

19 50 Q. You gave evidence with respect to a
20 roofing structure, the Peterson Roofing Structure.
21 I wonder if we could bring that slide up, Ms. Kuka?

22 THE COMMISSIONER: Is that the one?

23 MR. MACRAE: Yes, I thought it would be
24 appearing there.

25 BY MR. MACRAE:

1 51 Q. Are you able to see it, Mr. Craig?

2 A. Yes, I have my cheaters on now.

3 52 Q. Okay, great. You talked about the
4 insulation being that's detail number three
5 reflected in the bottom of each of the
6 cross-sections as the insulation being installed
7 below the precast concrete?

8 A. That's what this section indicates,
9 yes.

10 53 Q. Okay. Is that a common -- within the
11 building industry, is that a common procedure to
12 install the insulation on the underside of precast?

13 A. It would be up to the professional who
14 designed the system to consider the various
15 influences and the conditions to which he is
16 prepared to make sure that the system works overall.
17 It's a matter of building science.

18 54 Q. And as part of that building science,
19 then, would it be a calculation to determine thermal
20 expansion and how that would be impacted?

21 MR. CARR-HARRIS: Forgive me, Mr. MacRae,
22 for interrupting.

23 Mr. Commissioner, I think that my friend
24 is getting into areas that may be contentious in
25 the ultimate evidence. And I want to make it

1 clear to all that the witness, as you have said,
2 is not here to deal with contentious issues, but
3 simply as a background.

4 He has described what the roofing system
5 consisted of, which is our purpose today, and not
6 to have a discussion with others about what is an
7 appropriate element and what isn't.

8 MR. MACRAE: May I respond, Mr.
9 Commissioner?

10 THE COMMISSIONER: Yes.

11 MR. MACRAE: Mr. Carr-Harris is
12 referring to this as a roofing system and in my
13 submission that's to be determined at some point
14 this time.

15 I didn't understand it to be contentious
16 with respect to thermal expansion whether the
17 insulation -- whether this witness was able to
18 indicate if it's insulated from the inside whether
19 that would have an impact on the thermal expansion
20 of the precast concrete that would be then exposed
21 to the elements and not subject to the protection
22 of the insulation.

23 THE COMMISSIONER: My view at this point
24 is that this is sufficiently general,
25 Mr. Carr-Harris, that the question can be allowed

1 and that can be explored if the witness can answer.

2 THE WITNESS: I can give you a general
3 answer in principles. If the insulation is
4 applied to the inside of the structure, the
5 structure is then subjected to greater thermal
6 expansion and contraction. If the insulation is
7 applied above or outside the structure, then the
8 structure is protected and has a less likelihood
9 of large thermal expansion and contraction under
10 climatic conditions.

11 BY MR. MACRAE:

12 55 Q. Thank you very much. Then with
13 respect to core slab, and you spoke about core slab
14 and the bonding of a concrete, if we can call it a
15 screen or topping on top of the core slab.
16 Am I correct that there are two designs of a
17 Coreslab -- one being a smooth finish that is
18 intended to accept carpet or something of that
19 nature, and the other a raked finish that is
20 designed specifically to receive a topping?

21 A. That's correct.

22 56 Q. And a raked finish, is that applied at
23 the company or rather at the factory?

24 A. I believe it is, yes.

25 57 Q. And would you be -- are you able to

1 provide any evidence today with respect to the
2 ability of the contractor to utilize a smooth
3 surface precast, the top side, in order to properly
4 bond a topping mixture to that?

5 A. It's more difficult to get a complete
6 and thorough mechanical bond to a smooth surface
7 than to a rough surface. If the slab is smooth, it
8 requires more preparation to obtain a suitable bond.

9 58 Q. Fair enough. And that, as I
10 understand it, that's why from the factory a precast
11 that is intended to have a topping bond to it
12 actually has a very course raked finish?

13 A. Usually.

14 59 Q. Okay. Thank you. And with respect to
15 core slabs and the installation of core slabs, are
16 you aware of any requirements or design -- a design
17 issue with respect to where the core slabs join
18 together, the use of reinforcing bars in order to
19 create a certain redundancy?

20 A. The best reference to that would be
21 the manufacturer's recommended installation details.
22 And that's what -- that's what you would refer to to
23 see what -- what they recommend for their system in
24 place and its complete installation methodology.
25 And that's what you would normally specify to be

1 done.

2 I can't state for sure because I don't
3 have the Coreslab literature with me whether they
4 were recommending installation of steel or
5 whatever. So I -- without that to refer to I
6 would be speculating.

7 THE COMMISSIONER: We'll have someone from
8 Coreslab, Mr. Carr-Harris, is that correct?

9 MR. CARR-HARRIS: That's correct.

10 THE COMMISSIONER: That question would
11 probably be better put to the individuals who make
12 the material.

13 MR. MACRAE: Certainly,
14 Mr. Commissioner, thank you.

15 BY MR. MACRAE:

16 60 Q. Then my last question deals with how
17 you would properly -- as an engineer how you would
18 properly describe the structure in the Algo Mall is
19 in. In some of the documents it's referred to as a
20 parking structure. Some documents refer to it as an
21 overhead parking structure. Is there a formal
22 engineering designation with respect to the
23 distinction between a parking structure and, say, a
24 ceiling over a mercantile area?

25 A. I think this is an adaptation of a

1 building form -- of building forms. You have a
2 parking deck over top of an occupied space. So the
3 deck itself has to now serve two functions. It has
4 to serve a function for carrying the load of the
5 vehicles and the conditions to which that is -- are
6 going to impose on the structure. And it also has
7 to function as a roof over the occupied spaces to
8 keep the elements out.

9 61 Q. Thank you. Then with respect to that,
10 how is that distinction actually carried out as part
11 of the planning process? Does it then have to
12 conform or would it then have to conform to two
13 different sections of a Building Code?

14 A. You would have to look at all of the
15 conditions that it was subject to, and I think as a
16 prudent designer take into account the worst of
17 either condition.

18 You say, what are the conditions imposed
19 in its function as a parking deck? And what do I
20 have to ensure is done to make sure that it can
21 function effectively that way and to carry the
22 loads, et cetera.

23 And what -- as a building enclosure,
24 what do I have to put in place in my design to
25 ensure that it functions effectively that way?

1 62 Q. Okay. And one final question. When
2 you talked about there being a requirement to
3 essentially deal with designs or issues that may
4 arise as a result of the construction, could you
5 provide me an explanation of how that information
6 would normally flow with respect to -- let's say, by
7 way of example, there is an issue with a foundation,
8 there is an issue with being able to fit a
9 foundation into a certain area, but that's just
10 hypothetical.

11 How does that flow back to the person in
12 a normal construction process who would then be
13 able to make a final decision in respect of
14 modifying that?

15 A. If you're indicating that the question
16 is related to a contractor discovering that he can't
17 do what is shown on the drawings. I can't -- I
18 can't physically accommodate this, what you have
19 shown, in the space you have shown or whatever.

20 He would then contact -- the traditional
21 process would be request a request for
22 information. We are more formally referring to
23 them as RFI's today, request for information.
24 And he would communicate, depending on the urgency
25 would dictate the type of communication, communicate

1 with the architect or engineer, whoever is in charge
2 of the project, his question and say, This is the
3 problem. This is what the drawings show or what
4 they don't show. How should I proceed? I need some
5 information to allow me to construct this.

6 The professional would then, in whatever
7 discipline this affects, would review the request
8 for information and as promptly as possible
9 consider all of the factors, give a clarification
10 or instruction if it meant changing from what was
11 shown on the drawings.

12 63 Q. When you say clarification or
13 instructions, would that be done formally normally?

14 A. Usually. It should be done in writing
15 if you want to ensure that everybody understands
16 everything. And all of the appropriate parties
17 should be included in that correspondence.

18 And if it affects -- if the instruction
19 or clarification, in the contractor's opinion,
20 affects his timing of progress, or the cost, or
21 difficulty, he would then most likely submit a
22 change order, or a request for additional
23 compensation in whatever form he termed it and/or
24 an extension.

25 And then there would be another

1 judgment, usually in consultation with the owner,
2 with the architect or engineer, the consulting
3 team, to see whether this would be accepted and
4 how it would be paid for.

5 64 Q. All right. And then say that that
6 modification required a change or a modification to
7 a drawing, a structural drawing or an architectural
8 drawing, how does that change get incorporated into
9 the drawing?

10 A. Well, usually if there is to be a
11 change to a document prepared by a professional,
12 they should prepare a sketch or a written
13 notification as to what the change is, how it
14 affects the contract documents they prepared, and it
15 should be in writing and communicated to everybody.

16 65 Q. When you say how it affects, how does
17 someone determine, an example, where the contractor
18 comes back to the general contractor and says, I
19 just can't do that and I need a change and that
20 change is accepted?

21 Who would be responsible for ensuring
22 that all of the design -- the individuals who are
23 involved in the design of a building would be
24 notified of that change so they could determine
25 whether it impacted their design?

1 A. Well, at the beginning of a job you
2 should set up lines of communication between the
3 contractor and the design team, the design and
4 contract administration team, to determine how this
5 information would be transferred. Whether there is
6 a single person point-to-point, whether the project
7 manager for the architect, or whoever is the prime
8 consultant, is the single distributor -- receiver
9 and distributor of information both ways, taking it
10 in, getting an answer and getting it back. Or some
11 other process that was put in place at the beginning
12 of the job.

13 66 Q. And that would be designed to ensure
14 that all of the parties that needed to be made aware
15 of that would in fact be made aware of that?

16 A. That's the intent. That's the purpose
17 of doing it that way.

18 67 Q. Thank you very much.

19 A. Thank you.

20 MR. MACRAE: Thank you very much,
21 Mr. Commissioner.

22 THE COMMISSIONER: Thank you, Mr.
23 MacRae.

24 CROSS-EXAMINATION BY MR. LONGO:

25 68 Q. Good morning, sir. I introduced

1 myself before the session. I am Leo Longo and
2 represent the Ontario Building Officials.
3 There were three areas I wanted to briefly address
4 with you.

5 The first dealt with prime consultant.
6 In your own words, how would you describe the
7 role, the responsibilities and the obligations of
8 a prime consultant?

9 A. Well, very briefly, the prime
10 consultant is the owner's prime contact for his
11 design and contract administration process. It's
12 the entity who will lead that process on his behalf
13 and subcontract with others or co-ordinate with
14 others.

15 If the owner has specific preferences
16 and decides to contract directly with other
17 sub-consultants, he should still choose one of his
18 consultants, and it is usually the architect, to
19 be the prime consultant who is responsible for his
20 discipline, and co-ordination of the other
21 disciplines, to provide a complete co-ordinated
22 package.

23 69 Q. Is the name indicative of the
24 significance of the role? Prime consultant.

25 A. I don't know what you're getting at to

1 tell you the truth. It's the -- the primary
2 consultant, if you wish to call it that. The lead
3 consultant. That's how I would determine it.
4 So in a pecking order, they would be the leader and
5 the rest of the disciplines supporting process would
6 be the followers, working cooperatively to produce a
7 co-ordinated set of documents.

8 70 Q. Now, in your overview statement and in
9 your presentation this morning, you indicated that
10 architects are usually the prime consultant, or can
11 be the prime consultant, is that correct?

12 A. That's correct.

13 71 Q. And with your permission,
14 Mr. Commissioner, I just have an extract of the
15 Architects Act. Just so that the record would
16 indicate that the Architects Act actually makes
17 provision for an architect being a prime consultant.

18 That's section 11, sub 4, paragraph 8 of
19 the Architects Act. Are you familiar with that or
20 understand that --

21 A. I understand what it's saying.

22 72 Q. Thank you. And just so the record is
23 clear, if I could remove that and place this on the
24 screen. You'll see the prime consultant is also
25 addressed just a little lower, Ms. Kuka, if you can

1 bring it down? No, the other way.

2 So the Professional Engineers Act
3 section 12, sub 6, paragraph 8 has a mirror image
4 of the same clause, that an engineer as well as an
5 architect can be a prime consultant?

6 A. That's correct.

7 73 Q. Sir, I've checked both Acts, and apart
8 from this reference that I have just taken you to, I
9 see nothing in either the Engineers Act or the
10 Architects Act that actually describes what the role
11 and the responsibilities are of a prime consultant.
12 Do you agree with that?

13 A. I'm not sure if it's in the Acts
14 themselves because I haven't reviewed the Act for
15 those wordings.

16 74 Q. Okay. If you notice on the screen
17 that is in front of you is an extract of Exhibit
18 No.6-1, which is your Professional Engineers
19 Guideline dealing with structural engineer services
20 and it gives a definition of prime consultant. Is
21 that, in your view, an accurate description of a
22 prime consultant?

23 A. I believe that's the role I was
24 describing to you, yes.

25 75 Q. Thank you. And if I could go back to

1 the first sheet. I take it, sir, in your experience
2 you've had to deal with the Building Code and the
3 Building Code Act?

4 A. Yes, I have.

5 76 Q. Would you agree with me that the term
6 "prime consultant" is not found in either the
7 Building Code Act or the Building Code itself?

8 A. Without doing a complete search of the
9 Act, I would not want to make that statement.

10 77 Q. All right. Would it be fair to say,
11 in your experience, if one were to try to find what
12 the role and responsibility of a prime consultant,
13 if they looked in the Building Code Act in the
14 Building Code, they'd come up short? Or that might
15 not be --

16 A. I don't know if that would be the
17 case.

18 78 Q. All right. Thank you. And I
19 appreciate that.

20 In your view, I know you haven't been
21 qualified as an expert yet, but Mr. Carr said you
22 are highly qualified so I'll ask.

23 Would you agree that those very two
24 thick volumes of the Building Code 2006 that you
25 have on the bookshelf there, that amongst its

1 terms it might be useful if somewhere in the Code
2 a description was given of a prime consultant and
3 perhaps described the duties and obligations and
4 role of such a person? If that definition isn't
5 there now.

6 A. I think it would be useful, yes, in my
7 opinion.

8 79 Q. Thank you. Secondly, I would like to
9 turn to maintenance of buildings. And if I can ask
10 Ms. Kuka to turn up Exhibit NO.6?

11 THE COMMISSIONER: Shall we make those
12 documents you provided, Mr. Longo, exhibits?

13 MR. LONGO: Would you like to mark them?

14 THE COMMISSIONER: Yes, we might as well
15 mark them for completeness. What numbers should
16 we assign to them, Ms. Kuka?

17 MS. KUKA: NO. 01896 and NO. 01897.

18 EXHIBIT NO. 1896: Prime Consultant, LFL
19 Briefing note.

20 EXHIBIT NO. 1897: Professional Engineers
21 Act, R.S.O., 1990 c. P. 28.

22 BY MR. LONGO:

23 80 Q. If I can ask for Exhibit No.6,
24 paragraph 68 of the overviews.

25 Mr. Craig, in there you indicate that,

1 "Under the Ontario Building Code Act
2 and the Ontario Building Code, once a
3 building like a shopping mall has been
4 completed and an occupancy permit is
5 issued, ongoing inspections by the
6 municipalities of the structural elements
7 of the building are not required."

8 Inspections normally occur on specific
9 complaints, is that correct?

10 A. That's our opinion as to the process.

11 81 Q. And just to confirm, it's the Ontario
12 Building Code, it's not the Ontario Maintenance
13 Code, is it?

14 A. That's correct.

15 82 Q. All right. And, sir, I have an
16 extract from the Building Code Act which isn't part
17 of Exhibit No. 6.

18 You're familiar with section 34, sub 1
19 of the Building Code is the regulation power for
20 the Building Code itself and explains all the
21 things that can be in a code.

22 What I'm showing on the screen is
23 exhibit -- is section 34, sub 2 of the Building
24 Code which was only introduced in 1992 with the
25 new Building Code. And that section says,

1 "The lieutenant governor and council
2 may make regulations to establish
3 standards that existing buildings must
4 meet even though no construction is
5 proposed, including regulations sub B,
6 establishing standards for maintenance,
7 occupancy and repair."

8 And, sir, you will see in sub-clause 3
9 that it says, "A regulation made under this Act
10 can apply to buildings whether erected before or
11 after the coming into force of this Act."
12 And then you see the purpose of the regulation under
13 subsection 5.

14 Sir, to my knowledge the province has
15 never exercised its power and actually made a
16 regulation under subsection 34(2) dealing with the
17 maintenance of buildings. Is that your
18 understanding as well?

19 A. That would be my understanding. I
20 could not state for certain because I'm not aware,
21 but that would be my understanding.

22 83 Q. And, sir, in your practice over the
23 years, have you ever mused as to whether it would be
24 useful if there was a building maintenance standard
25 that had been issued by the province?

1 A. Well, generally we've experienced the
2 situation where the municipality itself has enacted
3 property standards which deal with the maintenance
4 and safety of buildings and maintaining the
5 conditions of buildings.

6 So we really don't postulate as to
7 whether the province should get into that process
8 or not. So I can't -- I can't give you a
9 definitive answer on that.

10 84 Q. With respect to this issue of property
11 standards you've mentioned and municipal by-laws,
12 you will agree with me that those are discretionary
13 and not required of a municipality to enact?

14 A. That's correct.

15 85 Q. Thank you.

16 MR. LONGO: Mr. Commissioner, is it your
17 wish that that should be marked?

18 THE COMMISSIONER: Yes.

19 EXHIBIT NO. 1898: Maintenance of
20 Buildings, LFL Briefing Note.

21 BY MR. LONGO:

22 86 Q. And the final area I wanted to explore
23 with you was site plan control, just two very brief
24 questions arising from that.

25 I started practicing in the late '70s.

1 And my recollection is that that is about the time
2 that site plan control was first introduced in the
3 Planning Act.

4 Sir, is it your understanding or will
5 you confirm for me that it's fair to say that site
6 plan control was a discretionary power that
7 municipalities had as an extra layer of approval,
8 but it was not a required power that they must
9 exercise?

10 A. That's my understanding, Mr. Longo,
11 but I couldn't confirm that for sure. We have
12 planners on staff that make sure we understand that
13 afterwards.

14 87 Q. And secondly, I take it that in
15 providing your overview, you're not in any way
16 suggesting that Elliot Lake had site plan control at
17 the time of the construction of this mall?

18 A. No. This is a general description of
19 the process as it exists primarily today.

20 88 Q. Thank you very much, Mr. Craig. Thank
21 you, sir.

22 THE COMMISSIONER: Thank you.

23 MS. RITACCA: Good morning.

24 CROSS-EXAMINATION BY MS. RITACCA:

25 89 Q. Q. Good morning, Mr. Commissioner.

1 Mr. Craig, I introduced myself to you on the break.
2 My name is Luisa Ritacca. I'm counsel for PEO.

3 If I could have Exhibit No. 0189 brought
4 up, should be Mr. Craig's PowerPoint. If we could
5 have the third page in? So the title page, the
6 first page and the second page.

7 Do you have that up on your screen?

8 A. Yes.

9 90 Q. I have just one question or two for
10 you, sir. In the last bullet point you describe in
11 the usual course the architect being retained as the
12 prime consultant, and Mr. Longo talked to you about
13 that a few moments ago.

14 And you said that the architect as prime
15 consultant usually has responsibility for overall
16 design and co-ordination including the building
17 envelope. Can you describe what you mean by the
18 building envelope, sir?

19 A. The building envelope are the walls
20 and roof of a building which separate the interior
21 from the exterior. That is the envelope which
22 encloses the building.

23 91 Q. Great. And in your experience, would
24 waterproofing be included in the building envelope
25 over which the architect would be responsible?

1 A. In our experience, yes.

2 92 Q. Thank you, sir.

3 MS. RITACCA: Thank you,
4 Mr. Commissioner.

5 THE COMMISSIONER: Thank you. Mr. Kearns.

6 CROSS-EXAMINATION BY MR. KEARNS:

7 93 Q. Good morning, Mr. Craig. My name is
8 Doug Kearns and I'm the lawyer for -- one of the
9 lawyers of the building in the course of its
10 history. I have a couple of questions for you.

11 The first is, in your overview you
12 indicate that one of the options available to the
13 chief building official when they're presented
14 with plans is to ask the PEO to review them.
15 Was that option available in 1978 to your knowledge?

16 A. I don't know that I actually said that
17 to tell you the truth.

18 94 Q. Oh.

19 A. I think the chief building official
20 has the option of retaining other assistance, but I
21 don't know that I said that.

22 THE COMMISSIONER: I didn't recall him
23 saying that, referring specifically to PEO.

24 THE WITNESS: In reviewing plans and
25 specifications for a building permit?

1 BY MR. KEARNS:

2 95 Q. Yes.

3 A. I don't believe I said that.

4 96 Q. Okay. Let's just have a look then.
5 You, I think, prepared the overview report talking
6 about designing and building a large construction
7 project? Is that you? Did you prepare --

8 A. Yes. I and my staff, yes.

9 97 Q. Okay. On page 10 of that --

10 A. What page?

11 98 Q. Page 10 of the overview report,
12 paragraph 43. This is under the section for
13 building permits

14 A. Oh. They have the discretion if they
15 wish to do that, yes.

16 99 Q. Sorry?

17 A. I didn't say that in my presentation.
18 I thought that's what you were saying. I didn't
19 allude to that in my presentation. It's not in our
20 experience a likely thing for them to do, unless
21 they have a question as to the professionalism of
22 the design that is presented to them.

23 100 Q. Okay. And that's really my question.
24 Is that something that's done from time-to-time in
25 your experience, or is that an option that's there

1 that is almost never used?

2 A. I believe it is occasionally used.
3 And I think only the PEO can comment on the
4 frequency with which it happens, but it's an option
5 that the CBO does have.

6 101 Q. Okay. The next question I had has to
7 do with a statement that you made which was no set
8 of plans is perfect.

9 A. That's correct.

10 102 Q. Okay. Tell me what are the reasons
11 for that? What imperfections ought we expect to
12 find in a set of plans?

13 A. Well, a -- that's a broad question.
14 You can have -- people are human. Humans make
15 errors. Professionals still maker errors. It's
16 about keeping the errors to a small and manageable
17 amount and making sure they're not serious errors.
18 That's what a professional's job is.

19 So you might have a discrepancy between
20 one drawing on the architectural drawings and a
21 dimension that is given there, and a discrepancy
22 between the similar dimension on a structural set
23 of drawings, or something, so that there was --
24 there is a clarification required.

25 Where if the contractor just built it

1 according to the one set of drawings, the
2 architectural drawings, he would maybe miss
3 something that the structural engineer should have
4 known about.

5 So there's co-ordination that can be
6 overlooked, or missed, or a mistake made. Those
7 are the types of errors that are common.

8 You know, it's usually related to
9 dimensions or some other misunderstanding of a
10 detail or something shown inappropriately that
11 requires correlation and was missed.

12 103 Q. So these plans could often be living
13 documents. They need to be changed and amended and
14 varied from time-to-time?

15 A. That's correct. But if they're
16 properly prepared in the first place, they are a
17 complete, coherent set which require minor
18 clarifications and tweaking.

19 104 Q. Thank you. The next question has to
20 do with bonding. Mr. MacRae asked you a bit about
21 bonding and the Commissioner as well asked you about
22 bonding.

23 What's the purpose of bonding the
24 concrete topping to the precast slabs?

25 A. Well Coreslab, or the manufacturer of

1 these precast slabs, would be the ones who were
2 recommending that it be a bonded topping. That's
3 what they wished to have as part of their
4 performance.

5 105 Q. But as an engineer, is there --

6 A. Well, there are times when you are
7 looking for what we term "composite action" between
8 the topping and the main body of the concrete, to
9 act -- to help give it additional design strength
10 where you really rely on that bond, but that I do
11 not believe is the case in this instance.
12 So it was a desire to have a tight, uninterrupted
13 adhesion between the new concrete and the existing
14 -- and the concrete core slabs.

15 106 Q. As an engineer you're not a hundred
16 per cent certain why that would be wanted in these
17 circumstances?

18 A. I think it's the preference of -- you
19 can design an unbonded topping that still functions
20 correctly. And you have to -- you have to take into
21 account the different factors that would be involved
22 because it's now not expected to be bonded to the
23 top of the slab. So you have to increase the
24 structural capacity of the slab because it might be
25 thicker.

1 But it's not innately required unless
2 the designer of the system, Coreslab in this
3 instance, said that any topping should be bonded.

4 107 Q. Okay. And the last thing is if I
5 could have Ms. Kuka pull up Exhibit No.14. Do you
6 have that, Mr. Craig?

7 A. Yes.

8 108 Q. It's just not clear to me in this
9 picture. I see the top layer is the topping, the
10 middle layer is the concrete slab, the bottom wavy
11 layer is the insulation?

12 A. That's correct.

13 109 Q. Where's the beam that would be --

14 A. It's not shown.

15 110 Q. Is it going to be -- whereabouts
16 should it be?

17 A. Well, it would be somewhere either in
18 the distance beyond where this section is cut or
19 this side of it. You just don't see the beam.
20 The beam -- the top of the beam or the top of the
21 slab -- of the flange, if you see the top of that,
22 would be behind this. It would interrupt the
23 insulation of course because the beam would be
24 spanning this way.

25 And the slabs -- you'll see the cores in

1 the slabs are indicating that the slabs are
2 spanning perpendicular to the page.

3 So that model that I showed indicated
4 that the slabs are supported on one end by a beam
5 and on another end by a beam, and this is a
6 section cut through that slab system in between
7 that location.

8 111 Q. Thank you very much, that explains it
9 exactly. Thank you, those are my questions.

10 THE COMMISSIONER: Thank you, Mr.
11 Kearns.

12 MS. CARR: Good morning,
13 Mr. Commissioner, Mr. Craig.

14 THE COMMISSIONER: Ms. Carr.

15 CROSS-EXAMINATION BY MS. CARR:

16 112 Q. Mr. Craig, my name is Alexandra Carr.
17 I represent two community groups, ELMAC and SAGE in
18 this Inquiry.

19 And I have one question. If Ms. Kuka
20 could pull up Exhibit No.14 again that we were
21 just on?

22 Mr. Craig, would you be able to describe
23 -- we were talking earlier about the Peterson
24 waterproofing system. And I'm wondering if you
25 can describe the difference between this system

1 and a conventional waterproofing system? If there
2 is such a thing as a conventional waterproofing
3 system.

4 A. Yeah, that's a -- this system by its
5 design relies on the integrity of the topping and
6 the joint system, and the water proofing sealer on
7 the surface to prevent water ingress into the slabs
8 and hence into the structure.

9 A conventional system would incorporate
10 a waterproofing membrane somewhere in this
11 assembly, either on top of the -- directly on top
12 of the structural slab.

13 And then you would build up from there
14 with protection layers, or drainage layers, and
15 the surfacing. And that water proofing membrane
16 would serve the function of protecting against
17 water ingress into the structure and into the
18 inside of the occupancy.

19 113 Q. Thank you.

20 THE COMMISSIONER: You've used the
21 expression Peterson System. There are other systems
22 obviously. Can you give us a couple of examples?

23 THE WITNESS: As far as I know this was
24 a relatively unique system that came into -- that
25 was being promoted at the time -- around this time

1 and previous for toppings on parking garages.
2 And I believe that this system was proposed for this
3 situation which enclosed an occupied structure and
4 probably was getting to its limits, or testing its
5 ability in a more serious situation because now you
6 have any leakage that's unintended gets right
7 through it.

8 But I do not know of other systems that
9 were intended to rely on the concrete topping and
10 a jointing system with sealant in the joints, and
11 a sealer on the surface, to act as the
12 waterproofing system over an occupied area. I
13 don't know of any others.

14 THE COMMISSIONER: What would you see
15 today?

16 THE WITNESS: What I just described. I
17 would expect that you would have a sound sloped
18 structural system that was clearly sloped to
19 drains; a water proofing membrane with appropriate
20 flashings for any penetration curbs, etc;
21 something to protect the waterproofing membrane
22 from physical damage during construction; and then
23 drainage, and insulation, and a wear course that
24 again was sloped to the drains.

25 And you would expect drains that drained

1 at the surface and at the membrane level to ensure
2 that water on the surface, the bulk of the water,
3 would be deflected to drains and run off.

4 And any water that got through the wear
5 course or topping system would get into a drainage
6 layer and then be able to find its way into a
7 drainage system and protect against unintentional
8 penetration.

9 THE COMMISSIONER: And is there a name to
10 that?

11 THE WITNESS: No. There are numerous
12 compounds that can be used for the waterproofing
13 membrane.

14 In fact in a pure garage where you don't
15 require insulation, often you've got what they're
16 now calling traffic bearing systems, which are
17 layers of urethane coating, or other elastomeric
18 material with a wear core, a wearing surface on
19 the top of them that are applied directly to the
20 sloped concrete structure. And it simply protects
21 it against penetration of chlorides and water
22 through to the cars and other areas of the garage.

23 If that's over top of a lived-in area,
24 it becomes more problematic because now you don't
25 have insulation, so you then have to go to

1 something like I described where a system is built
2 up.

3 THE COMMISSIONER: I suppose by -- the
4 only reason for my question is you're describing a
5 Peterson System. Is there another system that has a
6 name that is in common use? For instance, is there
7 a Bélanger System?

8 THE WITNESS: No, not that I'm aware.
9 This was the only one I've come across in my
10 experience.

11 THE COMMISSIONER: All right, thank you.
12 Anyone else have questions of Mr. Craig?
13 Mr. Carr-Harris, in reply?

14 MR. CARR-HARRIS: No further follow-up
15 questions.

16 THE COMMISSIONER: Thank you very much,
17 Mr. Craig. We may see you later on.

18 THE WITNESS: Thank you.

19 THE COMMISSIONER: Mr. Carr-Harris.

20 MR. CARR-HARRIS: Mr. Commissioner,
21 Mr. Craig is our last witness of the day.

22 THE COMMISSIONER: We will rise until
23 9:30 tomorrow morning.

24 --- Whereupon the Inquiry proceedings
25 adjourned for the day at 11:35 a.m.

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REPORTER'S CERTIFICATE

I, HELEN MARTINEAU, CSR, Certified
Shorthand Reporter, certify;

That the foregoing proceedings were
taken before me at the time and place therein set
forth;

That the testimony of the witness and
all objections made at the time of the examination
were recorded stenographically by me and were
thereafter transcribed;

That the foregoing is a true and
accurate transcript of my shorthand notes so
taken.

Dated this 10th day of March 2013.

Helen Martineau

PER: Helen Martineau

Certified Shorthand Reporter

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