

RED HILL VALLEY PARKWAY INQUIRY

TRANSCRIPT OF PROCEEDINGS
HEARD BEFORE THE HONOURABLE J. WILTON-SIEGEL
held via Arbitration Place Virtual
on Wednesday, May 25, 2022 at 9:30 a.m.

VOLUME 18

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1 Arbitration Place Virtual

2 --- Upon resuming on Wednesday, May 25, 2022

3 at 9:33 a.m.

4 MS. HENDRIE: Good morning,
5 Commissioner. First witness for the inquiry this
6 morning is Mr. Bob Gorman. If we could have the
7 court reporter affirm Mr. Gorman, please.

8 BOB GORMAN; AFFIRMED

9 EXAMINATION BY MR. HENDRIE:

10 MS. HENDRIE: Commissioner,
11 the affidavit has been prepared and affirmed by
12 Mr. Gorman, and Mr. Gorman's affidavit will form
13 much of the basis of his evidence in-chief this
14 morning, though I do have some additional
15 questions to supplement the affidavit he provided
16 in his affidavit, and I anticipate that some of
17 the other participants may similarly have some
18 questions for Mr. Gorman after I finish.

19 So just some preliminaries,
20 Registrar. If we could call up Mr. Gorman's
21 affidavit. Thank you. Mr. Gorman's affidavit
22 hasn't yet been assigned a document ID in the
23 inquiry database but I anticipate that once it
24 does it will have the document ID of RHV968.

25 And if we could mark this

1 document -- or mark this document as Exhibit 51, I
2 believe.

3 JUSTICE WILTON-SIEGEL:

4 Hm-hmm.

5 MS. HENDRIE: I'll be
6 referring it to during Mr. Gorman's testimony.

7 EXHIBIT NO. 51: Affidavit of
8 Bob Gorman affirmed May 25, 2022, RHV968

9 MS. HENDRIE: And the majority
10 of the documents that are referenced in
11 Mr. Gorman's affidavit are cited in overview
12 document number 4. As such, they have already
13 been -- they form one of the exhibits. But
14 there's one document referenced in Mr. Gorman's
15 affidavit that is not included in any of the
16 overview documents, and that is MTO 12945.

17 Registrar, if you could call
18 up that document. So if we could mark this
19 document as an exhibit, and that would be
20 Exhibit 52, please.

21 THE REGISTRAR: Thank you,
22 Counsel. Noted.

23 EXHIBIT NO. 52: Memorandum
24 to Stephen Lee dated April 2, 2014, MTO 12945

25 MS. HENDRIE: Thank you. And

1 we can have a callout of that document.

2 BY MS. HENDRIE:

3 Q. So Mr. Gorman, I don't
4 think I'll be very long in my questions today. As
5 I said, I have some questions to supplement the
6 evidence that you provided in your affidavit but I
7 don't intend to reread evidence that has already
8 been provided and to cover what's already been
9 covered.

10 I understand that you may
11 require some frequent breaks during your
12 testimony. I don't expect that I will be longer
13 than 15 minutes, but if you need a break at any
14 time just speak up and we can take a break.

15 A. Thank you.

16 Q. So I want to start this
17 morning by talking about some of the requirements
18 for the DSM applications, specifically talking
19 about the requirement for skid testing as part of
20 an application, first looking at it more generally
21 and then in the context of the testing that was
22 conducted by the MTO on the Red Hill Valley
23 Parkway for the Demix aggregates application.

24 So, Registrar, if we could
25 call up image 4, paragraph 7 of Mr. Gorman's

1 affidavit.

2 A. That's better.

3 Q. So Mr. Gorman, if you
4 need us to zoom in or zoom out on any of the
5 documents at any time you can just let the
6 registrar know.

7 So in paragraph 7 of your
8 affidavit, this is talking about the general
9 practice of skid testing for a DSM application,
10 and you state that in your experience evaluating
11 an application for DSM inclusion would typically
12 involve skid testing of a 500-metre asphalt test
13 strip on a road that was operated, owned --
14 operated and built by the MTO, using the applicant
15 aggregate and then a control section next to it.

16 So as I understand it, typical
17 practice would be to have the test section and
18 then the adjacent control section; is that
19 correct?

20 A. That was always typical
21 for King's Highway work. So if you had something,
22 for instance, on the 401 that they build that
23 minimum 500-metre test section right immediately
24 adjacent, that's correct.

25 Q. Okay. And adjacent to

1 the control section?

2 A. That's correct.

3 Q. And now moving to a
4 different paragraph in your affidavit, Registrar,
5 if we could call up image 10, paragraph 19.

6 So this paragraph is referring
7 to the Demix aggregates application, but focusing
8 on the second-last -- the last two sentences, it
9 says the RHVP pavement did not include a control
10 section using an already approved DSM list
11 aggregate and, as such, skid testing was conducted
12 only on the test section being a 3-kilometre
13 section of the RHVP SMA pavement that contained
14 the Demix aggregate.

15 And then in the last sentence,
16 although this deviated from normal procedure,
17 there have been instances where skid testing was
18 conducted for the purpose of a DSM application
19 only on a test section and without an adjacent
20 control section.

21 So as I understand your
22 evidence, it was usual practice, and as you just
23 confirmed, there would be an adjacent control
24 section but in some instances an aggregate would
25 be evaluated in the absence of a control section;

1 is that right?

2 A. That's correct. There
3 were -- what I would call them, they were
4 afterthoughts, they were after pavements. So
5 quite often a contractor would pave a piece of
6 road and down the road they would want that
7 included on the DSM for consideration. So of
8 course there normally was not a control involved
9 with that. If there was, then we had to dig it
10 out to see exactly what was paved adjacently on a
11 number of occasions, actually, but usually only
12 for the old HR1 and the modern-day FC1 pavements.

13 Q. Okay. And on so sort of
14 a scale of magnitude, how common was this. You
15 say in your --

16 A. Well, I can think of a
17 number of -- the DSM sources that were listed in
18 the province of Quebec were that way, of course,
19 because they were all after paved, and there were
20 some on Highway 11. Up on Highway 11 I remember
21 there was a large one, 40 kilometres, from Sudbury
22 to Hagar. That had -- I can't remember if that
23 had control before and after. And I think there
24 was a dolomitic somewhere but I don't remember
25 specific details.

1 Q. As I think you described,
2 the pavements that were test section without a
3 control section as sort of an after -- you
4 describe them as the afterthought?

5 A. Yeah, an afterthought,
6 exactly.

7 Q. And in your experience
8 what effect, if any, did the absence of a control
9 section have on the ability of you, or the soils
10 and aggregates section more broadly, to evaluate
11 an aggregate's frictional qualities?

12 A. Well, I don't remember
13 any issues. Most of the afterthoughts were done
14 with granites and gneisses, and they have
15 obviously a higher skid resistance than the trap
16 family. And in one case a dolomitic, which of
17 course is the Cadillac of premium iron courses.

18 So I really didn't find too
19 much of a difference without having a control. In
20 some cases it probably was better because you had
21 a lot more data points that you could look at over
22 a larger span rather than the data points that
23 would be included in a 500-metre test section with
24 control before and after.

25 Q. So just in terms of that,

1 would that be because typically the test sections
2 that didn't have -- sorry, the -- I will -- to use
3 your language, the afterthought test trips were
4 typically longer in length?

5 A. Well, normally, yeah,
6 they would probably pave the whole contract with
7 the aggregate in question. So they would be the
8 whole length of the contract. They could be
9 5 kilometres, 10 kilometres, what have you. But
10 for the most part, like I said, they were -- the
11 old HR1 Marshalls or FC1s were Superpave, so they
12 were not the DFCs on FC2 and certainly not the
13 SMA, so they didn't get really too much into that.
14 They were normally in the King's Highway put down
15 with control.

16 Q. And as you state here in
17 paragraph 19 of your affidavit, the Red Hill
18 Valley Parkway was used for Demix's application
19 and that was one of those instances where that
20 normal procedure was deviated from?

21 A. Yeah, I believe the
22 entire Red Hill Valley Parkway northbound and
23 southbound was considered as the trial. The head
24 of the section I had at the time had the power to
25 make that decision, and that's what the decision

1 was, because it -- actually in the 2007
2 requirement guidelines for DSM inclusion that I
3 remember there's a sentence in there that the head
4 can both approve the disapprove the trial section,
5 if I remember correctly. I think I do.

6 Q. So the head at that time
7 would have been Chris Rogers?

8 A. No, I believe not. I
9 think it was -- it was -- I believe Steve Senior
10 took over in -- after Chris retired in the spring
11 of 2008, if I'm not mistaken. I think so.

12 Q. You're correct on that.
13 It was just more in terms of the timing of when
14 that decision was made?

15 A. Oh, that was -- actually,
16 if I'm not mistaken, the 2007 requirement
17 guideline had that in there, and I -- of course I
18 don't have the previous ones but they would be
19 probably much the same.

20 So the whole DSM requirement
21 started off from a very small document that was
22 put in the body of the letter, and then after time
23 when slags were banned and a lot of rock people
24 were trying to get on the DSM, we had to come up
25 with a better system of dealing with the

1 applications because there were just so many. And
2 the requirement guideline was the one that seemed
3 to work the best, and it evolved over the years
4 into what it is now. It's probably changed since
5 I've retired.

6 Q. So just going back to
7 something you said moment ago. You said that it
8 wasn't common to have -- as I understand it, it
9 wasn't common to have a test strip in SMA without
10 an adjacent control section. Was I understanding
11 you correct on that?

12 A. Yeah, I don't remember
13 too many -- I have a hard time remembering too
14 many SMA pavements that went down in test
15 sections. I think, if I remember correctly --
16 now, this is going back a while, but there were a
17 lot of FC2 pavements down that went through the
18 process, and the transition from FC2 to SMA, I
19 don't think it was that big a -- big a deal
20 because the FC2s were already down and tested.
21 But I can't remember -- excuse me -- specifics
22 pertaining to how you went from an FC2 to an SMA.
23 I think it was fairly -- it wasn't that hard an
24 issue I believe. Obviously physicals had to pass
25 and the skid numbers had to be satisfactory.

1 Q. So just now to look more
2 specifically at the Demix application and the
3 decision around using the Red Hill as the test
4 strip, and we sort of touched on that. But to
5 situate you in time, on December 7th, 2007, Paul
6 Janicas of Dufferin e-mailed Chris Rogers and he
7 requested -- Mr. Janicas requested to begin the
8 process of placing the Demix aggregate on the DSM.
9 And then on December 10th, 2007, Mr. Rogers
10 forwarded that e-mail to you and the application
11 materials and asked you to prepare the draft
12 response. And as I understand it from your
13 affidavit, that was standard practice?

14 A. Correct. That's correct.

15 Q. And then the next day, on
16 December 11th, 2007 Mr. Marciello e-mailed
17 those -- the October 16th, 2007 Red Hill Valley
18 Parkway skid testing results to Mr. Rogers and you
19 were copied on that. And then a few days after
20 that, on December 13th, 2007, Mr. Rogers sent a
21 letter back to Demix.

22 And, Registrar, if we can call
23 up MTO 42. And this is the December 13th, 2007
24 letter from Chris Rogers.

25 A. Correct.

1 Q. As I understand it, you
2 prepared this letter; is that correct?

3 A. I prepared most
4 correspondence and Chris and Steve, of course
5 being the head, would look them over and when they
6 are happy with them they would sign them, correct.

7 Q. Registrar, if we could
8 call up as a side-by-side image 6 and paragraph 13
9 of Mr. Gorman's affidavit. Paragraph 13. Thank
10 you. So that's fine, Registrar, thank you.

11 So in that first sentence in
12 paragraph 13 it states:

13 "At the time I prepared the
14 December 13th, 2007 letter I
15 was aware the FRHVP was going
16 to be used as the de facto
17 test strip for Demix
18 Aggregates DSM application."

19 (As read)

20 And so we've touched on this,
21 but just to fill in some of the details about when
22 you learned that information and who you learned
23 that from, do you recall when that decision was
24 made to proceed with using the RHVP as the test
25 strip?

1 A. I don't recall exactly,
2 but I know it had to be decided because it was --
3 it was in the subsequent letter of test results.
4 So that would have been next step, obviously going
5 there to the quarry and testing it, and then that
6 letter would go back to Estel Gagnon, I believe.
7 And at that time I believe it was approved for the
8 trial, because that would be in the body of the
9 next trial.

10 Q. That's the December -- I
11 believe that's the December 4th, 2008 letter?

12 A. That would make sense
13 about the timing, by the time they got results I
14 would say, roughly.

15 Q. Okay. So as I understand
16 it -- I guess to clarify what your evidence is,
17 did you know at the time -- you knew at the time
18 you prepared the December 13th letter that the
19 RHVP would be used as the test strip?

20 A. I can't remember that,
21 I'm sorry. It's possible but I just don't
22 remember.

23 Q. Do you recall having any
24 discussion -- at the time of the December 13th
25 letter Chris Rogers was the head of the soils and

1 aggregates section --

2 A. No.

3 Q. Do you recall having any
4 discussion with Mr. Rogers about possibly using
5 the (speaker overlap) test strip?

6 A. That's possible, that's
7 quite possible. But I don't remember specific
8 details about that. I seem to remember more that
9 when the next letter went out with the physical
10 test results, that in the body of that letter
11 there was discussion about allowing the Red Hill
12 as a trial section and that wasn't until you said
13 December, I forget, 2008.

14 Q. So why don't -- we can
15 call up that letter, Registrar. We can end these
16 call outs and go to --

17 A. Because it would have
18 been -- I'm thinking it might have been too
19 premature to think about that at that time because
20 we weren't even at the quarry then yet.

21 Q. Registrar, it would be
22 MTO 44 and this is the December 4, 2008 letter.

23 A. Right. This is one I
24 remember it, exactly.

25 Q. Okay. So as I understand

1 it, you prepared this letter?

2 A. That's correct. I
3 prepared it for would have been Mr. Senior's
4 signature.

5 Q. Registrar, if we could
6 call out that last paragraph at the bottom of the
7 page. So there it says:

8 "Because your quarried
9 aggregate was used on
10 Hamilton's Red Hill Valley
11 Parkway in a 12.5 SMA mixture,
12 contract PWVR6243, we will
13 allow this city job to act as
14 the trial section needed for
15 your source to be included on
16 the ministry's designated
17 sources for material list."

18 (As read)

19 Is that what you're just
20 referring to?

21 A. Yeah, this is what I
22 remember, and this one would have been specific to
23 using the Red Hill as a trial. And this is the
24 only one actually I remember, more so than what
25 you said at the beginning.

1 Q. And do you recall if
2 this -- if you wrote this paragraph? Was this
3 something that you would have included in the
4 draft you gave to Mr. Senior?

5 A. Well, no, I wouldn't have
6 had the authority to make that decision. That
7 decision would normally be made by the head of the
8 section. And if I had the -- I must've had the
9 green light on it to put it in there.

10 Q. Do you recall any
11 discussion with Mr. Senior about this, about using
12 Red Hill as the test strip?

13 A. I don't recall. It
14 probably happened though, but I can't remember
15 exactly the discussion.

16 Q. But your recollection is
17 you wouldn't have put this in the letter
18 without --

19 A. No, no, not for something
20 that important. My power could only go so far.

21 Q. Okay. So this was a
22 decision above you?

23 A. That's correct. Normally
24 the head, or even possibly the heads may have
25 discussed it. They had a monthly meeting. And

1 they very well may have discussed the whole matter
2 too. So it may have been more than just
3 Mr. Senior, it's possible.

4 Q. Registrar, if we can end
5 this callout, and just to go back -- jumping back
6 to the December 2007 letter, Registrar, if we
7 could call back up MTO 42. You'll see in this
8 letter in paragraph 3 it says:

9 "I note that your quarried
10 aggregate was recently used on
11 Hamilton's Red Hill Valley
12 Parkway in a 12.5 SMA mixture.
13 We plan to monitor the
14 performance of your aggregate
15 in the Expressway." (As read)
16 So here the reference to
17 monitoring, do you know that means?

18 A. Well, it looks like --
19 that doesn't look like my writing, that looks more
20 like what Chris would have put in. But monitoring
21 would be, in my opinion, looking at it in person
22 and certainly monitoring by way of using the brake
23 force trailer for skid numbers.

24 Q. So monitoring would
25 include a visual inspection and also the use of

1 the skid trailer?

2 A. Right, brake force data.

3 Q. So that would be the
4 friction testing that Mr. Marciello conducts?

5 A. He was -- yeah, Frank
6 Marciello was the chap that did that work with the
7 brake force trailer, exactly.

8 Q. So from your review of
9 this letter, it looks there's at least some
10 contemplation of doing skid testing on the Red
11 Hill as of December 2007?

12 A. Sorry, I didn't get the
13 first part. There was -- I couldn't hear the
14 first part.

15 Q. Sorry. So from your
16 review of this letter, the December 2007 letter,
17 now that we've looked at this third paragraph
18 there's at least some contemplation of doing skid
19 testing on the Red Hill?

20 A. Well, there was friction
21 testing done in October '07, and that would have
22 been I imagine on the opened lane, which was the
23 southbound lane, not the northbound because of
24 construction. So there was data already in
25 existence two months prior to this. So I don't

1 know if that -- it's a little confusing this, I
2 have to admit. It's hard to remember back that
3 many years.

4 Q. That's fair.

5 A. But you know....

6 Q. So as of December 13th,
7 2007, some indication that there would be
8 monitoring and then your recollection is that by
9 December 2008 the decision had been made to allow
10 the Red Hill to be the test section; is that
11 right?

12 A. Right. Normally any
13 applicant would have the friction testing done.
14 And it's not just a short term. I always would
15 call it up every year when I did my memorandum to
16 head of pavement and foundation and I had a whole
17 list of test sections to test. So it could --
18 depending on which one it was, it could go for --
19 I've seen them go 10 years possibly, just to keep
20 maintaining an eye on the data.

21 Q. And just to close the
22 loop on the use of the Red Hill as the test strip,
23 Registrar, if we could go back to Mr. Gorman's
24 affidavit and call up images 7 and 8.
25 Paragraph 13. I'm way off, it would be 6 and 7.

1 My reference is off. Bear with me for a moment.

2 A. That's okay. I have a
3 hard time seeing this.

4 Q. I believe it's image 6
5 and image 9 up. Should be image 6. 7. Thank
6 you.

7 We looked at this paragraph
8 before, but if we could call out -- just looking
9 at the last sentence in the paragraph, it says:

10 "An applicant would be assumed
11 to have the requisite
12 authorization from the owner
13 to propose or agree to a test
14 site at the heart of its
15 application." (As read)

16 So as I understand it, is this
17 a general assumption you're referring to here?

18 A. It looks like it to me.

19 Q. And that's an assumption
20 that you held?

21 A. Right.

22 Q. So this -- in the context
23 of what we've been talking about here, the Demix
24 application, did this assumption described in
25 paragraph 13 also apply?

1 A. I couldn't hear half of
2 what you said, I'm sorry. Let me read:
3 "An applicant would be assumed
4 (witness reading) from the
5 owner to propose to agree to a
6 test site in the heart of the
7 application." (As read)
8 So they had to have permission
9 from MTO in order to place it. Is that what --
10 yeah.

11 Q. So in the context of the
12 Red Hill and the Demix Aggregate, would your
13 assumption have been that the Demix Aggregate, who
14 was the applicant, have had the authorization from
15 the owner, in this case the City of Hamilton, to
16 propose or agree to use the Red Hill as the test
17 site?

18 A. I don't know. That's
19 pretty tough. And 2008 it's clear to me because
20 it says it right there, but I -- I don't remember.
21 It would have to have been vaguely with
22 Mr. Rogers, a discussion, but in the initial
23 letter I don't remember -- I can't honestly
24 remember far back. It's a little confusing too
25 because we're going from Mr. Senior and then back

1 to Mr. Rogers. So that's when -- he was pretty
2 close retiring then. But I don't remember a
3 discussion about that, unless I'm mistaken. I'm
4 sorry, I just can't remember.

5 Q. Okay. But leaving aside
6 any discussions, would you have -- or upon
7 receiving an application would the assumption be
8 that the applicant would have permission to use or
9 authorization to use a test strip for the
10 application purposes?

11 A. Well, they may very well
12 have thought that, but that -- as I said before,
13 that decision can't be made by me. That wasn't my
14 decision. That had to come from management. It
15 was already in existence and maybe it was a
16 logical thing, but the green light would have to
17 come from a member of management. But it wasn't
18 typical type -- as we said not, typical type trial
19 with control, et cetera, et cetera.

20 Q. Right. Okay.

21 And, Registrar, we can end
22 that callout now.

23 And one last topic to cover.
24 Registrar, if we can pull up image 12,
25 paragraph 26 of Mr. Gorman's affidavit. And this

1 paragraph states:

2 "I do not recall having a
3 discussion with Becca Lane,
4 Mr. Senior and Mr. Marciello
5 regarding the 2014 RHVP skid
6 testing results and the status
7 of the Demix aggregate on the
8 DSM as it pertained to the
9 2014 results." (As read)

10 A. No, I don't remember
11 having a discussion. I read this and thought
12 about it, and had there been a discussion, usually
13 there's some type of work function associated with
14 it so there would be a follow-up to that. So this
15 is why I -- I don't remember. There's a lot of
16 things I don't remember anymore, I'm sorry.

17 Q. So Ms. Lane testified
18 last week that she recalls having an internal
19 discussion with herself, Mr. Marciello and
20 Mr. Senior and you about the Demix aggregates, and
21 what she told us is that she recalls that you and
22 Mr. Marciello came into her office with the 2014
23 results and that you wanted to speak with her
24 about the DSM and the Demix aggregate and whether
25 the MTO was satisfied with Demix's performance,

1 and that she recalls that the three of you then
2 went to Mr. Senior's office and you spoke about
3 this, and the end result of that discussion was
4 that Demix aggregate would remain on the DSM and
5 would not be delisted.

6 So in context of what Ms. Lane
7 recalls -- I just want to make sure I understand
8 what your evidence is. So is it your evidence --

9 A. You're right, I don't
10 remember, but if Ms. Lane said that then it's no
11 doubt true. She's a lot younger than me and she's
12 got a better memory. So it's entirely possible.

13 Q. So it's possible that if
14 she recalls it it happened but you don't have a
15 recollection of it?

16 A. That's right.

17 Q. If that conversation did
18 take place you just don't remember what was
19 discussed or what was said?

20 A. That's correct.

21 MS. HENDRIE: Thank you.

22 Commissioner, I have no
23 further questions for Mr. Gorman. I wonder if --
24 Mr. Gorman, if it would be a good time, if you
25 would like to take a break we can take a brief

1 break.

2 THE WITNESS: Personally I'm
3 okay as long as there's an option maybe later.

4 MS. HENDRIE: For sure.

5 So, Commissioner, I haven't
6 had a chance to canvass with counsel for the other
7 participants this morning about their time
8 estimates. I understand that the City may have
9 some questions for Mr. Gorman.

10 JUSTICE WILTON-SIEGEL: Let's
11 go through the panel.

12 Ms. Jenene Roberts for the
13 City, will you have some questions?

14 MS. JENENE ROBERTS: Yeah, I
15 think I'll just have a couple of questions. I
16 won't need any more than five minutes.

17 JUSTICE WILTON-SIEGEL: Why
18 don't we proceed with your questions.

19 MS. JENENE ROBERTS: Great.
20 Thank you, Commissioner.

21 EXAMINATION BY MS. JENENE ROBERTS:

22 Q. Mr. Gorman, I just want
23 to ask a couple of follow-up questions on the
24 discussion you just had with commission counsel on
25 paragraph 13 of your affidavit.

1 And maybe, Mr. Registrar, we
2 can put that paragraph up again. It spans images
3 6 and 7. Apologies for having to get you to call
4 those out again. Thank you, Registrar.

5 Mr. Gorman, I just wanted to
6 ask you again about that last sentence, in
7 particular and I wanted to make sure I understood
8 your evidence. When you say there that an
9 applicant would be assumed to have the requisite
10 authorization from the owner to propose or agree
11 to a test site at the heart of its application,
12 and here in the context of the Red Hill itself and
13 Demix Aggregates making its application for
14 listing on the DSM, am I right then that for that
15 particular application for the particular Red Hill
16 testing that you didn't actually inquire with
17 Demix as to whether or not it had authorization
18 from the City of Hamilton for the friction testing
19 to be conducted on the Red Hill?

20 A. No, you're right. I had
21 no contact with the City of Hamilton on this
22 matter.

23 Q. Okay. And am I right you
24 also had no contact with Demix Aggregates
25 specifically to ask them if they had contact --

1 A. No, I don't remember -- I
2 don't remember speaking -- well, it was only Estel
3 because she was bilingual, and I don't remember
4 speaking to her about that matter.

5 Q. Okay. Thank you,
6 Mr. Gorman those are all my questions.

7 Thank you, Commissioner.

8 JUSTICE WILTON-SIEGEL:
9 Ms. Jennifer Roberts.

10 MS. JENNIFER ROBERTS: Thank
11 you, Commissioner. Mr. Gorman. I have no
12 questions. Thank you.

13 JUSTICE WILTON-SIEGEL: Okay.
14 Who else is on the line?

15 MS. HENDRIE: I don't believe
16 counsel for Dufferin, Mr. Buck, had any questions.

17 JUSTICE WILTON-SIEGEL: Okay.

18 MS. HENDRIE: And that would
19 just leave the MTO.

20 MR. SAAD: I just have one
21 brief question for Mr. Gorman.

22 JUSTICE WILTON-SIEGEL: Go
23 ahead.

24 MR. SAAD: Thank you.

25 EXAMINATION BY MR. SAAD:

1 Q. Good morning, Mr. Gorman,
2 I just have one question for you about the use of
3 a test section, which is a control section.

4 In the context of a DSM
5 application isn't the purpose of a control section
6 to compare the results to the -- pardon me -- of
7 the test section with an already approved
8 aggregate essentially to rule out any
9 non-aggregate factors in friction results?

10 A. Right, that's correct,
11 like weather. And there's other things that are
12 useful to make sure that the test section is in
13 control, so to speak, with the control. So no
14 matter what happened both should have reflectance
15 in the SN data.

16 MR. SAAD: Thank you,
17 Mr. Gorman.

18 Mr. Commissioner, those are
19 all my questions.

20 JUSTICE WILTON-SIEGEL: Okay.

21 MR. SAAD: Thank you.

22 MS. HENDRIE: No further
23 questions from me.

24 JUSTICE WILTON-SIEGEL:
25 Nothing further. All right. Well, that's short

1 and sweet, Mr. Gorman. Thank you for both the
2 time spent with respect to the affidavit and for
3 appearing this morning. You are excused.

4 THE WITNESS: Thank you very
5 much. I hope my memory lapses are not too much of
6 a problem.

7 JUSTICE WILTON-SIEGEL: We
8 understand.

9 THE WITNESS: Thank you.

10 JUSTICE WILTON-SIEGEL:
11 Ms. Hendrie.

12 MS. HENDRIE: Yes. We do have
13 another witness. I believe -- I'm not sure if
14 he's in the building and ready to go but we
15 might -- it's a bit early, but perhaps we might
16 take a break now, give some time for the next
17 witness to get set up and --

18 JUSTICE WILTON-SIEGEL:
19 Mr. Saad, are you responsible for the next
20 witness?

21 MR. SAAD: Pardon me for
22 having been on mute. Yes, Mr. Commissioner, I can
23 confirm that Mr. Tom Klement has arrived. We
24 would just need about 15 minutes just to get him
25 set up in the room where Mr. Gorman is, so perhaps

1 we could do that.

2 JUSTICE WILTON-SIEGEL: Sure.

3 Then let's stand adjourned until 10:30.

4 --- Recess taken at 10:12 a.m.

5 --- Upon resuming at 10:32 a.m.

6 MR. LEWIS: Good morning,
7 Commissioner, Counsel, Mr. Klement. Could the
8 court reporter please affirm the witness.

9 THOMAS J. KLEMENT; AFFIRMED

10 EXAMINATION BY MR. LEWIS:

11 Q. Mr. Klement, I would like
12 to go through, before we get into any details,
13 your education and work history.

14 So Registrar, could we go to
15 MTO 38706. It's a little hard on the eyes. Could
16 we expand that a little bit.

17 A. That's good.

18 Q. So this is your CV?

19 A. Yeah, that's my CV.

20 MR. LEWIS: If we could make
21 that an exhibit, please, Registrar. I think that
22 is 53?

23 THE REGISTRAR: Counsel, yes,
24 Exhibit 53.

25 EXHIBIT NO. 53: Curriculum

1 Vitae of Thomas J. Klement, MTO 38706

2 BY MR. LEWIS:

3 Q. So I understand,
4 Mr. Klement, you were employed by the MTO from
5 1978 to the end of January 2012; is that correct?

6 A. That's correct.

7 Q. And in terms of
8 education, you have a bachelor of science in civil
9 engineering in 1971 from the University of London,
10 England?

11 A. Correct.

12 Q. And a master's in
13 concrete structures and technology from the same
14 institution in 1972?

15 A. Correct.

16 Q. And you're a professional
17 engineer licenced in Ontario with the PEO?

18 A. Yes.

19 Q. Are you still?

20 A. Yes.

21 Q. And you held a few
22 different positions with the MTO which are dealt
23 with there. The last one there is the one that
24 I'm going to focus on. But just leave it there,
25 please, Registrar.

1 But prior to that I understand
2 that you were senior systems analyst in the
3 computer systems branch from 1978 to 1986; is that
4 right?

5 A. That's right.

6 Q. And then a manager in the
7 highway planning and design of the engineering
8 standards branch from 1986 to 1994?

9 A. Correct.

10 Q. And then a senior
11 research engineer in the research and development
12 branch from 1994 to 1999?

13 A. Correct.

14 Q. And then, as indicated
15 here, you were the senior research engineer in the
16 materials engineering and research, also known as
17 MERO, from 1999 to your retirement in 2012; is
18 that right?

19 A. That's correct.

20 Q. Could you describe that
21 role, the last one as senior research engineer?
22 Just generally describe the kind of things that
23 you did in that position, what your role was.

24 A. My role was to monitor
25 research and practices in other jurisdictions for

1 potential adoption in Ontario. Also to address
2 special projects that demand or that came from the
3 minister's office, typically proposals from the
4 industry to introduce new technology in Ontario.

5 Many of my projects were
6 self-directed where I identified a need for a
7 standard, for a policy or for training, and then I
8 ask for approval and typically got approval to
9 proceed, and also to handle special projects that
10 were assigned to me by senior management of MTO.

11 Q. Okay. And I think the
12 second-last thing you mentioned was that -- was
13 self-directed projects. So this is something
14 where you would -- you would identify an issue or
15 a need and then research and issue a report or
16 make a presentation for --

17 A. That's right. Yeah,
18 that's correct.

19 Q. Okay.

20 A. Also I forgot to mention
21 training for the regions and sometimes
22 municipalities.

23 Q. And during your tenure in
24 this role am I correct that you were first in the
25 concrete section but then were loaned or seconded

1 to pavements and foundations?

2 A. Administratively I was a
3 part of the concrete section, but in the I would
4 say second half of my tenure in MERO practically
5 100 percent of my work was for the pavement and
6 foundation section.

7 Q. And so in that capacity
8 you first would have reported, am I correct, to
9 Tom Kazmierowski?

10 A. Correct.

11 Q. And then to Becca Lane
12 predominantly?

13 A. Correct, yes.

14 Q. And at the top of your CV
15 on that page you refer to yourself as a road
16 safety expert. Was that your primary focus during
17 your years at the MTO?

18 A. Safety always has been my
19 personal interest and my passion. So whenever I
20 could I focused on safety, but I handled --
21 particularly when I was in highway design office,
22 I was heading an engineering unit that was the
23 head of headquarters or head office for planning
24 and design. So my focus was broad. It covered
25 the entire area of planning and design.

1 Q. And then after you left
2 MTO I see there from May 2012 to December 2018 you
3 were at MEA Forensic Engineers and Scientists?

4 A. That's correct.

5 Q. And did you finish there
6 at the end of 2018?

7 A. That's correct.

8 Q. Since then have you been
9 fully retired?

10 A. Since then I've been
11 fully retired.

12 Q. You can take that down,
13 Registrar, thank you.

14 So there's a number of
15 presentations and papers by you. That's what I
16 want to focus on with you today. And before I
17 take you to that, I just want to cover sort of one
18 major area, which is we've heard from a number
19 people that the MTO had practices around friction
20 testing and monitoring and remediation, but
21 nothing -- no formally published or documented
22 policy or directive in that regard. Would you
23 agree with that?

24 A. I would agree with that,
25 but there are two exceptions. For minimum

1 oversight contracts and for pavement warranty
2 contracts there was a specification that de facto
3 was a standard. But that was only for projects --
4 paving projects that were outsourced outside of
5 the ministry.

6 Q. Right. So you're talking
7 specifically about when a friction number was
8 specified in a contract?

9 A. Correct.

10 Q. And we have heard about
11 those as well. And I think in one of the
12 presentations and papers we'll be talking about
13 that as well, but, okay, I understand your
14 qualification there.

15 If we could go to overview
16 document 4, images 36 and 37. It's paragraph 75,
17 an e-mail. This is an April 16, 2007 e-mail from
18 Ted Phillips, who was supervisor in geotechnical
19 engineering in the eastern region of the MTO,
20 e-mailed a number of people, including you. And
21 he attached a presentation which -- of yours which
22 I'm going to come to next, but it's the second
23 paragraph I just want to touch on it that we
24 already discussed, where he states:

25 "The quandary we will face is

1 that Ontario has never
2 published any target skid
3 numbers, whereas other
4 jurisdictions have. We have
5 always handled our skid
6 resistance issues through a
7 set of aggregate requirements
8 in different areas and on
9 higher volumes. We use skid
10 resistance in combination with
11 other factors as indicators to
12 make our decision, but have
13 always resisted publishing
14 target numbers." (As read)
15 And then he says:
16 "FYI, the topic of target skid
17 numbers hot on the ATC scene.
18 Here's some background
19 presentations for you."
20 He attaches to that a
21 presentation by you from 2005, but again would you
22 agree with that statement by Mr. Phillips?
23 A. Yes, I do.
24 Q. So the attached
25 presentation, if you take that down, Registrar,

1 and if we could pull up MTO 13105. And this is
2 indicated -- it's titled "Pavement Friction
3 Testing and Management in MTO," June 7, 2005 by
4 you. And it says "Pavement Condition Rating
5 Circuit Workshop - North Bay." Do you recall this
6 presentation?

7 A. Yes, I do.

8 Q. Who was it presented to?

9 A. It was presented to
10 geotechnical people that were in charge of
11 monitoring and making decisions including whether
12 friction requires treatment or not. There were
13 both technicians and engineers from all the
14 regions present.

15 Q. On the next image titled
16 "Presentation Context," and does it sort of set
17 out the overall purpose of the presentation?

18 A. Yes.

19 Q. If we can go to image 3.
20 "Dispelling Myths About Safety." It says "Drivers
21 Hate Surprises" and then you go on to have a
22 little explanation. Can you explain for us?

23 A. I would say probably
24 90 percent of crashes are caused by driver error
25 resulting from a driver surprise. Either the

1 geometry could be deficient or surprising. It
2 could be the designing is not clear or delineation
3 is not clear. And obviously another element is
4 another driver error.

5 So the purpose here was to
6 somehow introduce safety considerations to the
7 geotechnical people that may not have come across
8 this material before.

9 Q. And then if I understand
10 it correctly, the wording below there is talking
11 about "pavement surface distress, including low
12 friction, typically does not affect collisions
13 unless," and you give some examples of that. So
14 those are again about driver expectation; is that
15 right?

16 A. That's right. It could
17 be that the driver is surprised when suddenly
18 there is not the friction on the road that he or
19 she expects, or if the road somehow poses another
20 type of surprise and the driver is going too fast
21 for conditions, then the crash happens, typically
22 in areas of high friction demand or where the
23 friction is perhaps slightly lower than one would
24 desire. So the crash is not necessarily caused by
25 friction, it's caused by the deficiency in the

1 road.

2 Q. The next paragraph,
3 image 4, this is just showing the MTO's friction
4 trailer at the time; is that right?

5 A. That's right.

6 Q. And then the next image,
7 types of testing. Am I correct this is setting
8 out typical reasons that the MTO is conducting
9 skid testing?

10 A. Yes.

11 Q. And again, your purpose,
12 I think you said that you're doing this
13 presentation to individuals, many of whom may not
14 be familiar with these concepts; is that right?

15 A. Yes.

16 Q. And image 6, "Test Facts"
17 is the title, and as I understand it, you're
18 talking about certain parameters around skid
19 testing using the locked-wheel skid tester; is
20 that right?

21 A. Yes.

22 Q. The air temperature must
23 be above 3 degrees, why is that?

24 A. The friction tester is
25 using a spray of water ahead of the vehicle to

1 simulate wet pavement, and when the weather is
2 freezing this would be -- this would make the test
3 ineffective. So that means that testing can be
4 only carried out in late spring, summer and early
5 fall. MTO does not test in winter months.

6 Q. We've heard that. I'm
7 curious if you're laying down a film of water it's
8 not going to freeze in the couple of seconds
9 presumably after it's put down if it's at -- and
10 certainly not if it's at 1 or 2 degrees. So is
11 there also a concern that if you are putting down
12 a film of water and it freezes it could create a
13 safety hazard for cars following? Is that also --

14 A. It's not sufficient
15 amount of water to pose a hazard because if it's
16 freezing there is other water that is likely
17 freezing on the road as well. So safety was not a
18 reason for this decision; it was the accuracy of
19 the test.

20 Q. And then in the last
21 bullet it refers to "FN readings go down with
22 speed, compensated by higher friction demand."
23 And then it says "FN typically range from 28
24 to 50; severely flushed pavement friction number
25 around 10."

1 With respect to the 28 to 50,
2 do you recall what dataset that is coming from?

3 A. Sorry, I didn't hear
4 properly.

5 Q. Sorry. Do you recall
6 what dataset the range of typical FN was taken
7 from, from 28 to 50?

8 A. I just mentioned numbers.
9 This is just an example to give them the feeling
10 for the numbers.

11 Q. Right, but it was based
12 on MTO testing presumably?

13 A. That's correct. These
14 numbers are FN numbers from the MTO friction
15 tester.

16 Q. Right. And I'm just
17 wondering was there a particular set of tests that
18 those were taken from or are these from all sorts
19 of different -- you know, different sources of
20 testing that you mentioned earlier on?

21 A. This represents a typical
22 testing at posted speed limits.

23 Q. Right.

24 A. Because in other
25 jurisdictions they do not test at posted speed

1 limit but at a lower speed, which has a
2 significant affect on the FN numbers.

3 Q. Right. So the ASTM
4 standard for the locked-wheel tester is at
5 40 miles per hour, which is 64 or 65 kilometres an
6 hour; is that right?

7 A. That's correct. This is
8 where most jurisdictions have been testing, but
9 more recently they started testing at higher
10 speeds because it's safer and then they adjust the
11 results to the 40 miles per hour pace. To give
12 you an idea, the difference between 65 kilometres
13 per hour and 100 kilometres per hour is 10 units
14 of FN.

15 So in Ontario, when we test a
16 section of highway at posted speed limit
17 100 kilometres per hour -- let's assume that we
18 get a value 30. If we test at the very same spot
19 but only at 65 kilometres per hour the reading
20 would be 40.

21 Q. And that's assuming all
22 other things being equal like --

23 A. Assuming all other
24 things -- yeah, that's correct.

25 Q. Same road, same pavement,

1 same --

2 A. Same road. Same

3 conditions. Same spot.

4 Q. Same temperature?

5 A. Same temperature.

6 Q. And what's that based on,

7 that -- the difference between the two? Where do

8 you get that number from?

9 A. There's a substantive

10 body of research that shows this practically

11 linear relationship and also there are directives

12 in various US states that clearly state that this

13 is the adjustment. There's a formula that

14 basically allows them to adjust the FN numbers if

15 they are using speed higher or lower than 40 miles

16 per hour. So that's where it comes from. It

17 comes from the United States.

18 Q. Right. And the range

19 that you're taking typical range from, and these

20 are from the MTO test results, are those the ones

21 are -- you already said that it's from the types

22 of testing that are mentioned earlier on, but that

23 includes the requests by regions for testing once

24 they have identified that there may be an issue;

25 is that fair?

1 A. Yeah, that's fair.

2 Q. Okay. As well as all the
3 other -- would it include when trial sections are
4 done for DSM purposes or no?

5 A. This is not a number
6 which I based on statistics. There are certainly
7 section on MTO network that may be lower than the
8 28, but the vast majority would be in this range.

9 Q. Based on your experience
10 and the results?

11 A. Based on my experience,
12 correct. Clearly the 50 would be more applicable
13 to northern Ontario where the aggregate is the
14 highest quality.

15 Q. If we go to image 7,
16 "Test Requests: Hints." Am I reading this
17 correctly that these were your suggestions about
18 when an MTO regional office or geotechnical office
19 should be -- ought to be making requests for skid
20 testing?

21 A. That's correct. This is
22 just a practical way of, I would say, optimizing
23 our testing resources.

24 Q. And the fourth bullet,
25 which is something -- there is a paper on that

1 we'll talk about in a bit, but it's about the
2 wet/dry collision ratio. And it says:

3 "Consider adding to the test
4 request segments with above
5 average wet/dry collision
6 ratio of greater than or equal
7 to 0.45 (provincial average
8 0.3)." (As read)

9 So is that -- are you saying
10 that if the ratio is equal or greater to 0.45 wet
11 weather conditions for every one dry weather
12 collision then a request for skid testing should
13 be made?

14 A. No. You don't speak
15 about individual collisions. You take the average
16 condition of all collisions cumulatively over a
17 period two to three years, and you look how many
18 of those hundreds and thousands of collisions took
19 place on dry pavement and how many took place on
20 wet pavement and then you divide one by the other.

21 Now, the .45 is something that
22 I have just used experimentally in my pilot
23 project. It could be higher. It could be lower.
24 It all depends how well it works once it's put in
25 practice.

1 Q. Okay. And I understood
2 that the 0.3 provincial average is based on an
3 average, not individual, but in terms of the ratio
4 it's -- for the provincial average you're talking
5 about 0.3 wet weather collisions for every dry
6 weather condition collision; is that right?

7 A. That means that wet
8 collisions are .3 of dry collisions. In other
9 words, less than half the collisions are wet.

10 Q. Well, less than a third?

11 A. And this comes from the
12 Ministry of Transportation ORSAR statistics.

13 Q. Image 8, please,
14 Registrar. This is a graph about stopping
15 distance and friction, and I think we've seen a
16 similar one in prior evidence, but just to make
17 sure I understand what this is showing, is that --
18 if I've got it correctly, it's that the stopping
19 distance of the vehicle on the y-axis, how the
20 stopping distance increases as the friction number
21 on the x-axis decreases?

22 A. Correct.

23 Q. And each of the
24 individual lines are speed -- different speeds
25 ranging in 10 kilometres per hour increments from

1 10 to 80 kilometres per hour?

2 A. Now, this chart has
3 significance only for road design. It has nothing
4 to do with friction testing.

5 Q. Okay.

6 A. I just used it for
7 illustration.

8 Q. Right, right. I
9 understand that. And the point is if -- the
10 overall point is that there is a decreasing
11 incremental difference in stopping distance as the
12 friction number gets higher, if I can put that the
13 right way.

14 A. That's the right way.

15 Q. And so there's less of a
16 difference in improved stopping distance between
17 50 and 60 than there is between 20 and 30 --
18 between FN -- right? Okay. That's -- just
19 over -- directionally that's what this is showing,
20 that it's not a linear change in stopping
21 distance?

22 A. It's not linear, no,
23 because it's the second -- it's the square of the
24 velocity which makes it nonlinear.

25 Q. And image 10. Am I

1 correct that this is the sort of typical or the
2 template friction survey request form that the MTO
3 used?

4 A. This is the request form
5 that Frank Marciello puts together and the regions
6 ask to use this form to provide information for
7 him before the test.

8 Q. Right --

9 A. For testing.

10 Q. And he mentioned it
11 yesterday, and I didn't have it handy to show to
12 him so I just wanted to confirm that that's what
13 it is, and --

14 A. I confirm that this form
15 was produced by Frank Marciello for his own
16 purposes.

17 Q. Okay. And so the region,
18 if they are making a request, it has the fields to
19 fill in, including the test limits that are
20 requested and the reason for investigation with a
21 number of categories and comments and a
22 description of the location, and then at the
23 bottom it has a collision history or accident data
24 including the wet weather percentage, right?

25 A. That's right. This form

1 would help Frank to decide what section of road
2 requires testing, and most importantly, to decide
3 what testing interval would be most suitable.

4 The normal testing interval is
5 say 500 metres. In other words, he would take one
6 test every 500 metres. But it could be made much
7 shorter if the investigation involved safety or if
8 the suspect location was relatively small --
9 short.

10 Q. Right. And the interval
11 that you're referring to is the interval between
12 when the brake is applied on the locked-wheel
13 tester?

14 A. Yeah, that's correct.

15 Q. Image 17. Under the
16 heading "Friction-Related Intervention Decisions"
17 you indicate:

18 "There is no magic formula
19 linking FN to a requirement to
20 enhance friction. Instead,
21 multiple criteria are used in
22 an engineering analysis." (As
23 read)

24 And is the list below then,
25 those are some of the criteria to apply in

1 addition to whatever the friction test results
2 are?

3 A. Well, this would be
4 collected and used in an assessment of whether the
5 friction results obtained by the tester require
6 action or not -- or what kind of an action and how
7 urgent the action should be. All of this would be
8 evaluated to determine -- to interpret those
9 friction FN numbers.

10 Q. Right. Because a
11 particular FN might matter more in one instance of
12 friction demand than another, for just -- to
13 give --

14 A. To give you an example,
15 if you have a road where the FN number is not 30
16 but is let's assume 24, 25, but the road is safe,
17 has got relatively little traffic where people are
18 unlikely to brake, that it has very gentle or no
19 curves, there's little collision history, the
20 roadside is relatively safe, in that case that
21 road can function perfectly safely until years
22 later the road gets resurfaced in any case,
23 perhaps for other reasons such as surface
24 deficiencies.

25 So that's one example where

1 low FN numbers doesn't necessarily trigger an
2 immediate resurfacing or surface treatment. There
3 could -- on the opposite side you could have
4 unexpectedly sharp curve or you can have an
5 isolated curve that suddenly happens in kilometres
6 and kilometres of straight tangential alignment
7 where the driver can be taken by surprise, or you
8 could have a location where drivers are often
9 forced to brake, such as when you have, for
10 example, congestion at an exit ramp or location
11 where very often vehicles are suddenly stopped and
12 the following traffic has to brake in an
13 emergency.

14 So all of this has to be taken
15 into consideration when you interpret the friction
16 testing results.

17 Q. And if we go to image 18.
18 And as we've already discussed, you indicate that
19 currently the MTO does not use trigger values for
20 site investigations, and then you give an example
21 of a protocol based on selected U.S. practice.

22 Now, then there's a number of
23 slides that follow that that we can go through,
24 but am I correct that what you are going to do is
25 propose a formal investigatory level guidance?

1 A. I was proposing that a
2 formalized process is instituted where within
3 these three ranges different types of decisions
4 are made. Typically in MTO when FN is greater
5 than 30 no immediate action is warranted. In
6 range 26 to 30 one should monitor the road, one
7 should get a feeling of the crash rate and the
8 number of collisions in wet weather and then make
9 a decision when to -- based on monitoring, to
10 treat the surface.

11 And below 26 it becomes more
12 of an urgent situation and definitely a detail
13 site investigation is recommended to ascertain all
14 those factors that I already previously discussed,
15 such as friction demand and geometric signing,
16 drainage issues, whether the pavement gets flooded
17 during a heavy rain. All of this has to be
18 investigated in detail to decide the urgency of
19 treating pavement.

20 Q. Okay. And to be clear,
21 is this -- this is what you are proposing as a
22 policy or -- is that right?

23 A. Ideally I would have
24 liked to see this as a policy and documented in
25 one of the pavement manuals.

1 Q. It was not implemented in
2 that fashion though; right?

3 A. It was not implemented,
4 no. But it also reflects what the Ministry
5 practice has been. The Ministry practice has been
6 to use 30 as a, I would call it, rule of thumb,
7 where generally the road does not warrant -- the
8 surface does not warrant any action. And the
9 number 26 was roughly the boundary or an indicator
10 to decide how detailed investigation is required
11 and how urgent the situation is. It was a
12 practice when I proposed this.

13 Q. And from where did you
14 gain your understanding that this was the -- that
15 this was the existing practice?

16 A. I spent over a decade in
17 MERO office, and you talk to colleagues and I had
18 lengthy discussions with Frank and you learn -- I
19 learned indirectly how the regions responded to
20 various friction testing reports.

21 Now, these decisions were
22 typically in the regional hands in consultation
23 with the manager of pavements and foundations. So
24 it would be either Tom Kazmierowski or Becca Lane.
25 They deal directly with the regions and perhaps

1 assisted them with the decision.

2 Q. If we go to images 29
3 and 30. Am I correct these are -- it's titled
4 "Factors Affecting Intervention Analysis"?

5 A. That's correct.

6 Q. But what you're doing is
7 setting out examples of factors that once there
8 is -- a friction test has been done and the
9 friction number is less than you would want,
10 presumably less than FN30, these are things that
11 you would look at in order to determine whether or
12 not some sort of intervention needs to take place;
13 is that right?

14 A. All of this would be part
15 of the detailed investigation once the FN number
16 is typically below 26. All of this would not have
17 to be investigated when the FN is number
18 between -- is in range between 26 and 30. That
19 was my suggestion.

20 MR. LEWIS: Right, right.
21 That's your proposal. Got it.

22 Commissioner, we're in a
23 little bit of an unusual timing for today. It's
24 quarter after 11. We already took a break, so I'm
25 in your hands but I thought this would be a good

1 time for -- to ask you when you would like to --
2 if you want to take a morning break, what would
3 you like to do.

4 JUSTICE WILTON-SIEGEL: How
5 much time do you anticipate with Mr. Klement?

6 MR. LEWIS: I'll certainly be
7 done prior to the lunch break or by the lunch
8 break, no later than that I do not expect.

9 JUSTICE WILTON-SIEGEL: Why
10 don't we take another 15 minutes with Mr. Klement
11 and stop -- take a morning break at 11:30.

12 MR. LEWIS: Okay.

13 BY MR. LEWIS:

14 Q. And then if we could take
15 that document down and go to MTO 38685. And this
16 is, as I understand it, a report from 2006 about
17 identifying low friction areas via the wet-to-dry
18 collision ratio; is that right?

19 A. That's right.

20 Q. And this isn't marked
21 draft, but it seems to be lacking a report number.
22 There's a question mark down there. Was this
23 finalized or?

24 A. No, this report was never
25 published.

1 Q. Did you present it
2 internally?

3 A. Internally I presented
4 it; the regions had it and obviously my superiors
5 had it.

6 Q. If we could go to the
7 abstract at image 2. And if you can just expand
8 the abstract portion of it just where it says
9 "abstract." The date is September 2006. Easier
10 to read there.

11 So do you recall this paper
12 obviously?

13 A. Yes, I do.

14 Q. And could you just
15 describe it. The abstract says what it says but
16 if you can just give us a description I would
17 appreciate it.

18 A. Okay. This was pilot
19 project which I conducted in eastern region, and
20 it has to address I would say a limitation of
21 friction testing that was MTO conducting at that
22 time. Most of the tests originating in the
23 regions they requested based on visual assessment
24 alone. In other words, if the pavement looked
25 slippery or looked flush, then and only then the

1 region would request testing. And some of the
2 request may have come from outside, such as from
3 the police, if there is a location with too many
4 collisions on the pavement.

5 Now, my approach was to
6 systematically look at collision data, identify
7 and use the wet-to-dry ratio as possibly an
8 indicator that there might be a low friction area
9 in that segment. And this actually was the
10 correct hunch.

11 The pilot proved that
12 40 percent of the sites that were identified from
13 collision statistics using the wet-to-dry ratio,
14 40 percent were found having low friction, as
15 opposed to 30 percent that found when tested
16 having low friction based on visual request.

17 So this was a successful
18 method how to add to the existing system of
19 identifying friction or requesting friction
20 testing based on a visual assessment and using
21 collision statistics to increase the number of
22 tested sites. And this particular pilot was
23 expanded in the following year to other regions as
24 well.

25 Q. In the last paragraph of

1 the abstract there starting with:

2 "Unfortunately no correlation
3 was found between friction
4 values determined by testing
5 pavement condition or
6 collision information."

7 Could you explain that? I had
8 a little trouble understanding that.

9 A. Okay. Where I
10 established that there was a good correlation
11 between dry-to-wet ratio and probability of
12 encountering low friction, a direct relationship
13 between friction numbers and number of collision
14 at that location, I couldn't find a correlation.

15 I'm not unique in this because
16 dozens of researchers attempted to find
17 relationship and they couldn't establish it. The
18 reason probably is that there are just far too
19 much uncontrolled variables that make it
20 impossible.

21 Q. Right, and fair to say --
22 and you tell me if I'm wrong, that while friction
23 can be a contributor to an accident, there's the
24 other variables that come into it as well?

25 A. That's correct. In

1 another related research I looked at friction
2 testing that the ministry conducted in Owen Sound
3 and -- in Huntsville, sorry for the interruption.

4 So Owen Sound and Huntsville
5 some 820 kilometres of road tested, and I
6 established in that investigation that when the
7 friction is in the range 26 to 30 and the road
8 gets resurfaced, there is no effect on collisions
9 on average. It means that when such road gets
10 resurfaced some segment experience very small
11 increase in collisions, some of them some a small
12 decrease, but on average it has got no effect.

13 In other words, from cost
14 effective point of view, one shouldn't really
15 automatically resurface roads in this range, 26 to
16 30.

17 But then I looked at what
18 happened to roads that were below 26, and then on
19 average the collisions decreased after resurfacing
20 by 15 percent. Again because they decrease only
21 by 15 percent, this shows you that there are other
22 factors other than friction that are likely
23 responsible. In other words, likely driver
24 expectation was violated and the drivers were
25 going in the road segments at speeds much higher

1 than what the conditions demanded.

2 MR. LEWIS: If we could go
3 back -- sorry, could we make that Exhibit 5 --
4 actually I should make -- this is -- sorry, if we
5 could make this draft paper Exhibit 54, please,
6 Commissioner?

7 JUSTICE WILTON-SIEGEL: Yes.

8 EXHIBIT NO. 54: MTO Materials
9 Engineering and Research Office Report, MTO 38685

10 BY MR. LEWIS:

11 Q. On that point if we could
12 go back before we break to MTO 13105 and image 19.

13 And this just goes back to
14 then I asked you about the -- what you were
15 proposing for investigation levels, and this --
16 there's three slides here, the first dealing with
17 friction numbers dealing with or equal to 25. And
18 you set out some criteria that you're proposing
19 for whether there's enough compelling factors to
20 warrant an investigation. And that includes the
21 ratio of wet-to-dry collisions, and then you set
22 out the issues about friction demand and pavement
23 condition consequences of not taking an action.
24 So that's for the 25 and under, right?

25 A. Yes.

1 Q. And then at the next
2 image, 20, is your proposal for the area between
3 FN26 and 30, right?

4 A. Well, yes. This is I
5 would call almost notwithstanding clause. What
6 I'm saying here is that even though the FN numbers
7 might be in a range 26 to 30, which does not
8 indicate a great urgency, there are exceptions.
9 And one is that wet-to-dry ratio is exceptionally
10 high, say over 1, or that the number of crashes
11 per a hundred million vehicle kilometre travelled
12 are much, much higher than the provincial
13 aggregate, which is about 60. And in that case,
14 even in this instance a detailed investigation
15 should be carried out.

16 Q. Right. So what you're
17 proposing is that there's an investigation take
18 place but around these parameters?

19 A. A detailed investigation
20 is required only if the collision ratio wet to dry
21 is exceptionally high and the number of collision
22 or the crash rate is exceptionally high, then you
23 perform a detailed site investigation as if the FN
24 number was below 26, otherwise you just monitor
25 the collisions, you monitor the friction and

1 observe.

2 Q. Sorry, I got that. So
3 the first step though is to look at the collision
4 history and then that -- and then what you're
5 proposing is the rest flows from that?

6 A. Yes.

7 MR. LEWIS: It's 11:30,
8 Commissioner. Would that be a good time for a
9 break?

10 JUSTICE WILTON-SIEGEL: Yes.
11 It's 11:30. We'll take a break and come back at
12 quarter to 12:00.

13 --- Recess taken at 11:30 a.m.

14 --- Upon resuming at 11:45 a.m.

15 BY MR. LEWIS:

16 Q. We're back. Registrar,
17 could we get a -- before I move on to other
18 things, if we go back to MTO 13105 at image 3.

19 And I just wanted to be clear
20 on this slide quoted -- titled "Dispelling Myths
21 About Safety," and what the myth is. Am I correct
22 that you're not -- in the text lower down you're
23 not saying that that's a myth; is that right?

24 A. No.

25 Q. "Drivers hate surprises."

1 You're not saying that is a myth, right?

2 A. No. Perhaps what I
3 thought of was that there are causes other than
4 perhaps human factors, like the road or the
5 vehicle. It's not the most appropriate title for
6 this slide.

7 Q. That's okay. I just
8 wanted to make sure that we understood it.

9 A. No, you are right that
10 (indiscernible) on the side is not a myth, no.

11 Q. And I think your point is
12 that it's -- that the low friction is a -- can be
13 a contributing factor, but it's not certainly the
14 only one.

15 A. Yes.

16 Q. Okay. And then -- you
17 can take that down, thank you.

18 And then the other thing is
19 when we were talking about the -- your proposal
20 and the -- sort of the staged over 30, 26 to 30,
21 below 26, and the type of investigation that would
22 take place, and you were quite clear that
23 you're -- the proposal was not made into a policy.
24 That was very clear. And I just -- you talked
25 your -- it being an existing practice, and I think

1 what you said was that you learned indirectly how
2 the regions responded to the various friction test
3 reports to the results, and you said that you
4 learned indirectly, and you referred to lengthy
5 discussions with Frank.

6 So is that the source, it's
7 Frank Marciello based on what regions did
8 following getting the skid test results?

9 A. It's not only Frank.
10 It's many other colleagues as well, including my
11 discussions with (indiscernible) Becca. Sometimes
12 just out of interest, I would inquire what is it,
13 you know, that the regions did or -- I learned
14 indirectly that way rather than --

15 Q. So you're talking --
16 right. So specific -- if I got you correctly, in
17 certain instances you heard that that is what a
18 region did in response --

19 A. Yeah.

20 Q. -- is that right? Okay.

21 A. I note that there was a
22 variation in the regional response depending on
23 the individual, perhaps depending on funding,
24 depending on risk tolerance. So my aim behind
25 this guideline was to bring a uniformity across

1 Ontario and also to ensure that pavement treatment
2 for friction is performed in a cost affective
3 manner. In other words, we are not automatically
4 resurfacing when the numbers are a little bit low
5 because the benefit in reduced collisions, it's
6 minimal or nonexistent. So I just wanted to
7 basically through the money (indiscernible) the
8 greatest potential safety gain could be
9 materialized.

10 Q. Right. And so what
11 you're proposing isn't an intervention level; it's
12 investigation levels. Because if --

13 A. Investigation levels and
14 intervention level.

15 Q. Well, even on -- even if
16 it's -- in what you proposed if it was 25 or
17 below, you're still suggest -- you still suggest
18 that there's got to be the investigation. You're
19 not saying at any level that it's an automatic
20 resurfacing, right?

21 A. You have to understand
22 that 30 is not a boundary between safe and unsafe.

23 Q. Right.

24 A. In fact, it was derived
25 across North America based on what was deemed

1 acceptable or I would say comfortable level for a
2 driver. So it represents not necessarily
3 emergency braking but a braking that the driver
4 finds tolerable, and because it deals with comfort
5 level it was incorporated in all the design
6 principles that are behind the geometric manual.

7 Now, the actual number where
8 the vehicle loses -- where the driver loses
9 control of the vehicle, the FN is below 20, well
10 below 20. So there is a safety padding, so to
11 speak. So at 30 there's still a lot of margin in
12 friction where the driver can go safely provided
13 they don't go well beyond what is the posted or
14 the designed speed.

15 Q. Right. And you're
16 talking about stopping distance, right? In the
17 design guidelines are you talking about the --

18 A. I'm talking about losing
19 control. So having -- for example, having
20 insufficient stopping distance, yes, that's
21 included.

22 Q. Right, so there's --

23 A. Or when you are on a
24 curve, basically losing control and departing the
25 roadway.

1 Q. Right. So there's --
2 exactly, so there's two things. So the first is
3 with respect to stopping distance. In the design
4 guide the stopping distance is calculated in
5 relation to the coefficient of friction, the
6 assumed coefficient of friction, and the design
7 speed, right?

8 A. Yeah. Yes.

9 Q. Right. So that's the one
10 aspect of it. And then the other is on curves,
11 and you're talking about losing control as a
12 result of skidding out essentially?

13 A. Yes.

14 Q. Okay. But in the design
15 guidelines they actually assume a much lower
16 friction on curves, right?

17 A. In design guideline
18 what's built in is the FN30, but that is for
19 additional built-in safety. That's an extra
20 safety, safety margin.

21 Q. Right, on --

22 A. Designing roads not to be
23 at the brink of failure, but with sufficient
24 safety padding.

25 Q. Right. Okay. And so if

1 we could then go to another presentation that you
2 did, which is MTO 20403.

3 This indicates around the same
4 time as the other one, May 22nd, 2000 -- sorry,
5 it's around the same time as the other -- the
6 e-mail that's sent around your earlier
7 presentation, May 22, 2007, and this is to the
8 geotechnical committee. Do you recall this one?

9 A. Yes.

10 Q. Okay. And sort of what
11 you were just talking about, am I correct that
12 it's, in a nutshell, about applying a cost benefit
13 analysis to identify low friction areas in part by
14 the wet-dry collision analysis and friction
15 testing, and then what type of remediation action
16 ought to be taken in areas of -- that are
17 identified as being low friction; Is that fair?

18 A. The main purpose of this
19 presentation was to show a tool for the
20 geotechnical staff to use -- to use cost benefit
21 analysis to choose between different treatments.

22 Q. Right, okay. And if we
23 go to image 28 -- it's actually near the end.

24 And we'll go back to the other
25 stuff, but this seems to be the best summary that

1 I could identify in there about the presentation.
2 And you point out, as you have before, that there
3 isn't a single value at which a highway segment
4 transforms from being safe to hazardous and that
5 decisions can be made on an individual
6 site-specific basis taking into account all the
7 factors, right? That's sort of what -- you've
8 been talking about that as well.

9 A. Yes.

10 Q. And then you indicate in
11 the second bullet, again, about the goal not being
12 to violate driver expectations, and so:

13 "While area consistent low FN
14 values could be tolerated,
15 isolated low FN values
16 particularly in high friction
17 demand segments are to be
18 avoided." (As read)

19 So you're talking about
20 changes in FN particularly if there's high
21 friction demand.

22 A. Yes.

23 Q. Okay. And then there's
24 the next bullet, and we'll go back to it, but the
25 red to green range in two-lane highways, and you

1 categorize the three levels that we looked at
2 before above 30, 26 to 30, and below, 25 and
3 below, by colours in this presentation, and that's
4 what you're referring to there; is that right?

5 A. That's correct.

6 Q. Okay. And the reduction
7 in collisions that you're talking about there, in
8 the last paragraph your conclusion is that if
9 you're going to restore by whatever method,
10 restoration from the middle range, the 26 to 30
11 range, that you can only expect the reduction in
12 collisions in high friction demand segments?

13 A. Yeah, that's correct.

14 Q. Okay. And so if we could
15 look at images 23 and 24.

16 And this is the colour coating
17 that I was referring to from that previous slide.
18 So the red, you call the under 26, are typically
19 going to treated, and the 26 to 30 in the
20 right-hand slide are the yellow segments that you
21 were proposing then be monitored on an annual
22 basis, but only have the friction restored if
23 certain -- if those criteria were met; is that
24 right?

25 A. Yeah, that's right.

1 Q. And, again, those are
2 that it has high friction demand is the first one,
3 and then the second one -- and it refers to FN80,
4 so this study and the segments that -- highway
5 segments you were working from were highways that
6 were tested at 80 kilometres an hour; is that
7 right?

8 A. Tested at the posted
9 speed.

10 Q. Right, right, and then --
11 right. So that's what FN80, though, is talking
12 about here, right?

13 A. FN80 means it was tested
14 at 80 kilometres per hour.

15 Q. Right. I think the --
16 earlier on it was Owen Sound and eastern region
17 that it was mostly two-lane highways that you were
18 basing this on; is that correct?

19 A. Yeah, most of them,
20 they're 80.

21 Q. Yeah. Okay. And then
22 the second one is, look, if there's -- surrounding
23 highways have much higher friction levels than
24 that can impact it as well because the drivers are
25 expecting a certain level of friction if it's

1 lower on the particular highway that has the
2 number between 26 and 30?

3 A. What I'm saying is that
4 the friction in surrounding highways or similar
5 highways in the vicinity must be similar to what
6 was measured.

7 Q. Right.

8 A. In other words, you don't
9 have very high friction a few kilometres away and
10 low friction in this examined segment which would
11 make the driver surprised.

12 Q. Right. The comparison
13 aspect to --

14 A. It would be unexpected.

15 Q. Right. Okay. And then
16 the last one being where there's an above average
17 number of collisions based on the collision
18 history.

19 A. Yes. Basically these are
20 the exceptions where even FN below 26 would be
21 safe. These are all the exceptions when the FN
22 below 26 would be tolerable for (indiscernible).

23 Q. Would be tolerable?

24 A. It would be a non-urgent
25 or less urgent situation.

1 Q. Okay, right, right. Less
2 urgent than if it's below 26?

3 A. No. All of these are
4 already below 26, but these are conditions when
5 immediate surface treatment is not warranted.

6 Q. Sorry, I was actually
7 looking at -- they are quite similar.

8 A. I'm looking at 23.

9 Q. Okay. I was looking at
10 24, so that's the confusion, and I apologize for
11 that. So let's make sure we're talking about the
12 same thing, then.

13 On 23, which is the red
14 highway segments below 26 --

15 A. Yes.

16 Q. -- the default is that
17 you're going to restore it unless those categories
18 apply?

19 A. That's correct.

20 Q. Okay. And whereas
21 between 26 and 30 on the right-hand image, that
22 the default is that your -- that friction would
23 not be restored unless those three categories --

24 A. That's correct.

25 Q. -- one of those three

1 categories are met?

2 A. That's correct.

3 Q. Sorry, we were talking --

4 the language is the same, but we were talking

5 about the different default. Or the language is

6 similar but we're talking about the different

7 default. Is that --

8 A. You're talking about the

9 confusion here. The defaults are opposite.

10 Q. Right, I understand.

11 A. One is typically treated

12 unless certain conditions are met, and the

13 number 24 is rarely treated unless those

14 conditions are met.

15 Q. Okay. This is

16 characterized -- if we could go to image 22 for a

17 moment.

18 Those are the -- sort of the

19 summary of it is the proposed methodology. You

20 see that? That's the summary of those three

21 categories that then --

22 A. Oh, yes.

23 Q. -- dealt with after that.

24 Okay.

25 And just to close off the

1 third one, at image 25 is the green category where
2 it's over 30, where the FN80 is over 30. And
3 the -- here the default is unsurprisingly that
4 friction isn't going to be restored, and here
5 you're proposing that it will only happen if both
6 those categories are met, meaning the surrounding
7 highways all have substantially higher FN than the
8 segment that's in issue?

9 A. I know it doesn't seem to
10 be making much sense to you, but -- for example,
11 let's take --

12 Q. I wouldn't say that, but
13 I just want to make sure --

14 A. Okay.

15 Q. -- that we understand
16 you.

17 A. The very first one --
18 let's take the highway in northern Ontario where
19 all the roads in the vicinity of similar
20 classification have FN number 40 or 50, and then
21 suddenly there's one segment that has got number
22 FN32 --

23 Q. Right.

24 A. -- or 31 or even 30. I
25 would still consider treating such a segment

1 because it's an unexpectedly low friction relative
2 to what the drivers in the local area are
3 conditioned to. Now, also the number 30,
4 notwithstanding, if there is an exceptionally high
5 number of wet collisions, I would still
6 investigate it even if it's number 30.

7 Q. Right.

8 A. In other words, there is
9 no magical value to number 30. I would still look
10 at it if the collisions in wet weather are
11 exceptionally high.

12 For example, they may discover
13 that the drainage of the road is deficient or the
14 signage is deficient, and the drivers are entering
15 the area too fast. So there might be a reason
16 other than the actual friction, and that's why I'm
17 saying that it should be investigated even if the
18 number is above 30 provided those conditions are
19 met.

20 Q. Right, and if it turns
21 out that it's something else when do you the
22 investigation, then obviously you're not going
23 engage in friction remediation.

24 A. That's correct. Then a
25 different remedial action would be called for.

1 Q. Right, and there's a
2 large number of slides after that. But am I
3 right, you're -- when you're talking about the
4 cost effectiveness of remediation efforts, you're
5 talking about the difference between just a
6 shave-and-pave, doing a resurfacing versus
7 microsurfacing. Is that --

8 A. That's correct.

9 Q. Fair?

10 A. Yeah.

11 Q. Okay. Okay. Those are
12 the two options that you're looking at in terms of
13 the analysis, and by microsurfacing, can you just
14 describe what you mean by that, what that is
15 exactly?

16 A. Microsurfacing I believe
17 is just applying a thin coat of asphalt to the
18 existing surface and then placing chips into that
19 asphalt.

20 Q. Right, so it's a --

21 A. It's --

22 Q. By that you mean an
23 aggregate -- like aggregate chips?

24 A. Yeah, aggregate chip,
25 yeah. For this Becca Lane would be your expert.

1 Q. Well, we did hear from
2 one expert on it, Dr. Gerardo Flintsch and he
3 described microsurfacing as being:

4 "A common preservation for
5 high volume, high speed
6 roadways. That it's a mixture
7 of crushed, well-graded
8 aggregate mineral filler and
9 latex-modified emulsified
10 asphalt spread --" sorry "--
11 asphalt spread over the width
12 of the payment." (As read)

13 Is that sort of the idea that
14 you're talking about?

15 A. Yes.

16 Q. Okay.

17 A. Same thing.

18 Q. Yeah. I just wanted to
19 make sure that we're talking about the same thing.

20 Yeah, okay.

21 And then if we could go to,
22 take this down then, overview document 4,
23 image 45. Actually I guess it would be 45 and 46.
24 And if you could expand the first paragraph 96.

25 In relation to your

1 presentation Dale Smith of the MTO had some
2 questions for you -- and I just want to be clear
3 I'm not asking about legal advice here.
4 Mr. Bourrier will quite rightly jump up if I do,
5 so I'm not asking you about any legal advice or
6 the MTO received about this.

7 He asks a number questions
8 about litigation risk -- if a -- you're --
9 actually I'll back up. You're proposing, again, a
10 policy or directive and so forth, and then he's
11 asking here about your presentation:

12 "Would a policy result in more
13 or less litigation risk?"

14 And secondly would it:

15 "...result in more
16 accident-related requests for
17 skid test results or testing?"

18 And third:

19 "Would lower levels of
20 government in Ontario
21 municipalities be obligated to
22 adhere to the policy either
23 legally or by default?"

24 And then he refers to -- from
25 travels:

1 "He expects substantial
2 lengths of country roads in
3 southwestern Ontario posted at
4 80 would fall into the class 1
5 category." (As read)
6 Which I think he means the low
7 friction category.

8 And then you reply -- if you
9 take that down, Registrar -- and you talk about --
10 and before you -- you don't need to expand it, but
11 you refer to needing a legal opinion, but don't --
12 haven't gotten one yet. But then it's really
13 number 3 at the top that I'm interested in.

14 And if you could expand that,
15 please.

16 A. Uh...

17 Q. Yes?

18 A. If the policy that I'm
19 proposing would have been adopted by ministry, in
20 all likelihood it would put pressure on the
21 municipalities to also follow such policy, and it
22 would probably require them relying on external
23 experts to assess the safety of their roads and
24 also to -- it would be additional constraints on
25 the budget because they typically don't have

1 enough money to service roads that are in extreme
2 distress. So they would have to find additional
3 funding to resurface roads where low friction is
4 found.

5 So this policy would have to
6 be very, very carefully crafted in respect of
7 municipalities because most of them do not have
8 internal resources to follow the guideline as I
9 outlined it.

10 Q. Right.

11 A. Only the larger ones or
12 the largest ones would be in that position.

13 Q. Right. Because it would
14 require skid testing on a -- potentially on a
15 fairly regular basis. It would require the
16 analysis to be done with respect to collision
17 rates and all of the other things that you
18 outlined?

19 A. It would have to be very,
20 very carefully crafted not to overburden the
21 municipal sector because they wouldn't have the
22 funding to support such a program.

23 Q. Okay.

24 A. So it was a perfectly
25 legitimate concern coming from the regions.

1 Q. Right. Okay. And as you
2 said, this was not implemented as a policy?

3 A. It was not implemented as
4 a policy. Also what I was suggesting came at the
5 wrong time where the ministry was gradually
6 outsourcing the paving contracts using the minimum
7 oversight and (indiscernible) contracts that
8 called for oversimplification. They certainly
9 contractually couldn't handle hiring a traffic or
10 safety expert to provide input whether the road
11 requires resurfacing or not. So therefore a very,
12 very simple solution: Does it meet 30 or does it
13 not, was called for.

14 So this -- what I was
15 suggesting would create a certain conflict where
16 the ministry managed paved roads would be handled
17 one way and the outsourced roads would be handled
18 in a completely different manner.

19 Q. Okay. You can take that
20 down, please, Registrar. Thank you.

21 And did you ever ride with --
22 you can take down overview document too.

23 Did you ever ride with
24 Mr. Marciello when he was doing skid testing?

25 A. Yes, I joined him when we

1 were testing the eastern region project, so I
2 spent with him, I don't recall whether it was four
3 days or five days, so I closely observed his
4 routine and from the very favourable opinion of
5 him.

6 Q. And by "favourable," are
7 you referring to his diligence in the way he
8 handled the testing? Is that what you're talking
9 about?

10 A. Yes.

11 Q. Okay. And what about his
12 calibration of the equipment? Is that something
13 that he did when you were there?

14 A. He went by the book and
15 certainly there wasn't skipping steps. He was
16 very highly diligent --

17 Q. Okay. How many days did
18 you ride with him?

19 A. It was around four
20 days --

21 Q. Okay.

22 A. -- but I'm not sure.

23 Q. If we could go to
24 overview document 4, image 106, and it's
25 paragraphs 252 and 253, if you could expand those.

1 And this is just an instance
2 in June 2008 where Mr. Marciello e-mails an
3 individual at the City of Mississauga the results
4 of some testing that -- friction test results from
5 Mississauga Road. And he in his e-mail to that
6 gentleman sets out where he did it, did the
7 testing and so forth. And then in the second
8 paragraph he has qualitative comments on the test
9 results on the test results, and says in the last
10 two lines:

11 "Pavement friction levels at
12 this time do not pose a safety
13 problem at the posted speed of
14 50 kilometres per hour."

15 And then you write just back
16 to Mr. Marciello:

17 "A friendly suggestion: If I
18 were you, next time when you
19 do work in response to an
20 external request, I would
21 refrain from judgments on
22 safety. It is 'safer' for you
23 and MTO to comment on how the
24 measured friction values
25 compare to those for other

1 routes we have for the
2 same/similar posted
3 speed/circumstances, or
4 relative to higher posted
5 speeds. This way you are less
6 likely to be dragged into a
7 courtroom should the
8 frictional safety of a
9 municipal road be the focus of
10 a lawsuit." (As read)

11 And so this is an instance
12 where Mr. Marciello is indicating that there was
13 not a safety problem and -- can you just describe
14 why that was your advice?

15 A. Okay. I concur with him
16 that the road wasn't a safety concern, but it was
17 not his position to make such a statement. This
18 request came us in a very, I would say, unorthodox
19 way. Normally municipalities would approach the
20 pavements and foundation section from the top
21 down. It would come from senior management to
22 manager of pavement and foundations and then to
23 Frank, and it would be returned the same way. So
24 that's perhaps, you know, where problem was. That
25 it was an unusual road by which we received this

1 request. And --

2 Q. Sorry, do you mean the
3 request was directly then to Mr. Marciello?

4 A. Request for testing.

5 Q. Yeah, okay.

6 A. So my concern was only
7 that Frank or I shouldn't make a suggestion to a
8 municipality that the road was safe or unsafe
9 independent on perhaps more detail investigation
10 or assessment than just looking at the friction
11 number alone.

12 Q. And comes back to your
13 point before I gather that that's a -- because you
14 have to look at friction in concert with other
15 factors?

16 A. Yes.

17 Q. Okay.

18 A. Now, I didn't mean to
19 admonish Frank because we were on excellent terms,
20 so it was just educating him.

21 Q. I understand. If we
22 could now go to MTO 38672. And this document is
23 not in the overview document I don't believe.

24 Do you recall this draft paper
25 dated June the 6th, 2011?

1 A. Yes, I do.

2 Q. It's titled "Ontario
3 Friction Testing Equipment and Test Site Selection
4 Methodology Review"?

5 A. Yes.

6 Q. And was it prepared by
7 you?

8 A. It was prepared by me,
9 yes.

10 MR. LEWIS: Okay. Could we
11 mark that as a an exhibit, please, Commissioner?

12 JUSTICE WILTON-SIEGEL: Yes.

13 MR. LEWIS: I believe it will
14 be Exhibit 55.

15 EXHIBIT NO. 55: Draft paper
16 titled "Ontario Friction Testing Equipment and
17 Test Site Selection Methodology Review dated
18 June 6, 2011, MTO 38672

19 BY MR. LEWIS:

20 Q. And it's a -- it
21 indicates it's a draft. Was this report
22 finalized?

23 A. It was not finalized.
24 One of the reasons was that that was about the
25 time I received by notice.

1 Q. Notice departure from the
2 MTO?

3 A. Yes.

4 Q. Okay. Did you present
5 it?

6 A. I presented it to Becca
7 Lane and she was satisfied with my conclusions,
8 with my recommendations.

9 Q. All right. And we'll
10 look at it in more detail. But can I summarize
11 this as being your research and conclusions about
12 what friction measuring device the MTO should use,
13 and were comparing the ASTM skid trailer that the
14 MTO had been using and continues to use against
15 other continuous friction measuring equipment,
16 including the grip testers; is that right?

17 A. That's right.

18 Q. Okay. And when I read
19 the paper, it appears that at least part of what
20 prompted it is what you were just describing about
21 the consideration by the MTO of moving away from
22 the front-ended friction management approach
23 involving pre-qualification of aggregates via the
24 DSM to performance-based contracts that you
25 described with friction number thresholds and --

1 to be met during warrant periods; is that right?

2 A. Could you say that again.

3 I didn't quite --

4 Q. Yeah, sorry. That one of
5 the things that prompted this, or at least you're
6 dealing with in the paper, is the MTO's
7 consideration of moving to performance-based
8 contracts containing friction number warranty
9 requirements.

10 A. That's correct.

11 Q. Yeah, and moving away
12 from the DSM approach?

13 A. Yeah. Now, in addition
14 also MTO was about to introduce the network
15 testing. So rather than testing only on request
16 or perhaps identifying sections to the --
17 according to the wet-dry ratio, there was an
18 expanded testing plan. So this also necessitated
19 the review of what kind equipment MTO used.

20 Q. Okay. And we know that
21 the MTO did do network friction testing in 2013.
22 So are you saying that it was in -- was it in
23 contemplation of that?

24 A. Yes.

25 Q. Okay. As well. All

1 right. And so you were looking at, then, if I
2 understand you correctly, at what friction testing
3 measuring devices would be best for that new
4 environment potentially?

5 A. Yes.

6 Q. Okay. And if we could go
7 to image of 6. I think there's -- the two large
8 paragraphs in the middle, if you can expand those.

9 I think this deals with a
10 couple of the things that we were just talking
11 about. If you take a moment to review those.

12 A. (Witness reviews
13 document). So do you have any questions?

14 Q. Yeah, I just -- those
15 are -- I just want to confirm those are really the
16 two sort of things that we're talking about,
17 right? One, the first paragraph is talking about
18 the move from the, as you call it, the front end
19 friction control to warranty contracts,
20 performance contracts.

21 A. Yeah.

22 Q. And then the second part
23 is the part about network testing?

24 A. Yeah, those are the two
25 parts.

1 Q. Right, and then there's
2 the AASHTO 2008 guide for pavement friction that
3 you're referencing and considering?

4 A. Yes.

5 Q. Okay. And what was your
6 ultimate conclusion? What was your ultimate
7 recommendation?

8 A. Was to stay with the ASTM
9 272 friction tester because the alternatives, such
10 as Gripsters, in my opinion not appropriate,
11 certainly not for network testing. They were not
12 robust enough and they didn't have the capacity in
13 terms of tested length.

14 And also in 2009 Federal
15 Highway Administration purchased I believe it was
16 five or six pieces of continually friction
17 testers, and they sent them out to individual
18 states to be evaluated. So the outcome of that
19 experiment hasn't been published at that time by
20 2011. So one could revisit this decision later on
21 at once the Americans share with us the
22 experience.

23 Q. Right. And if we could
24 go to image 12. There's an additional item in the
25 paragraph -- the fourth paragraph there, the big

1 one in the middle, "MTO has accumulated."

2 As I understand it an
3 additional reason that you had was the
4 correlation, the -- and not -- the poor
5 correlation between the skid tester the MTO had
6 been using and CFME whether -- the grip tester or
7 the SCRIM, and so that there would be a loss of
8 the MTO's knowledge effectively by moving to the
9 new device because of the difficulty in
10 correlating between -- moving to a CFME from the
11 locked-wheel tester. Is that another --

12 A. That's correct because
13 the grip tester produces completely different set
14 of results. There's no correlation to the skid
15 tester, and even though they may present a FN or a
16 friction number, they are performing such a
17 conversion internally.

18 So since they are -- since the
19 correlation was so poor, I was suspicious of how
20 they converting the grip numbers, that's what they
21 initially measure, to friction numbers.

22 Q. I see.

23 A. This would also create
24 difficulty on the warranty contracts and on MERO
25 contracts because let's assume if they were

1 monitored using Gripster, and they would claim
2 that the work they performed met the
3 specification, and they would be employing various
4 experts that would testify to the that effect.
5 The Ministry would have their own experts, and it
6 would be a nightmare to resolve because we are
7 dealing with millions of dollars.

8 So I could foresee certain
9 difficulties if we started using this technology
10 at this stage without additional work, without
11 satisfying ourselves that they can produce
12 satisfactory results. For example, the
13 Australians, they use grip tester, and they found
14 that it did not produce reproducible results which
15 is critical when it comes to warranty contracts.
16 They would be testing the same spot under the same
17 conditions, and the results would vary greatly.
18 So this was one of the findings that the
19 Australians did.

20 Q. The Australians used the
21 SCRIM for their testing, I believe.

22 A. Okay, sorry, SCRIM. But
23 it doesn't matter, when you use an equipment --
24 but it -- I would have to check again because
25 somehow I thought that the research paper I looked

1 at looked at grip tester, but I would have to
2 verify going back to the research report. But it
3 doesn't really matter; one needs to use equipment
4 which both parties, the contractors and the MTO,
5 would accept.

6 Q. Right, and have to be on
7 the same page and the device --

8 A. Yes --

9 Q. If you're using a
10 different device, obviously it can create disputes
11 about what the result -- meaning of the results
12 are in relation to the warranty contract.

13 A. Grip tester has totally
14 different character from the skid -- the --

15 Q. Right. We've actually
16 heard about -- we've heard about that, and I
17 understand it, so if I could just take you very
18 briefly to image 8 in your paper.

19 Registrar, if you could go to
20 image 8, please.

21 And here you're talking about
22 measurement differences, and in your figure 2
23 you're showing a curve that involves -- and we've
24 seen a very similar figure to this. And your
25 point as set out below the figure is that the grip

1 tester is measuring at peak friction whereas the
2 locked-wheel tester measures at the fully locked
3 part of the curve at the far right of the graph;
4 is that right?

5 A. That's correct. Also
6 grip tester is using smooth tire while the skid
7 trailer is using ribbed (ph) tire, so that's
8 another major difference. The wheel of grip
9 tester has got 10-inch diameter, the outside
10 diameter, while the skid trailer has got 20. So
11 it's the size of the wheel that also matters. And
12 also important is the weight of the device. Grip
13 tester weighs, I think, 85 kilos, while the skid
14 trailer, you know, is close to 500. So there are
15 major differences, and based on those difference
16 alone one would expect the grip numbers to be
17 totally different from the friction numbers.

18 Q. Right, and we've heard
19 that typically they would be higher, that it
20 returns a grip number than a --

21 A. Yeah, that would much
22 higher. I mean, when you look at the peak
23 friction, this is what they measure.

24 Q. Right, and your point
25 about the -- also the weight has to do with, I

1 think you referred to the robustness of the
2 machine --

3 A. Not only robustness.
4 When the road has got high roughness because of
5 its slight weight, grip tester tends to bounce,
6 and that's the reason why its results are not
7 easily reproducible because bounces, so each time
8 it may take a different reading.

9 Q. If we could go to
10 image 15 under "Testing Conditions." And a
11 reference to use -- in the third paragraph there,
12 and you're, again, talking about the issue of
13 performance criteria in contracts. And then you
14 talk about temperature, and specifically you
15 reference that you must limit testing in the
16 period between first of May and September 30th to
17 minimize the effect of temperature on the measured
18 FN, and where 10 degrees Celsius difference may
19 represent two units of FN and to avoid seasonal
20 impacts such as winter sanding.

21 Then, testing ahead of May can
22 produce FN of more than five units higher than in
23 peak of summer and thus get a project past -- it
24 says passed, but I take you as meaning past the
25 warranty provisions.

1 So if your --

2 A. Can I say something?

3 Q. Yeah, please.

4 A. Since you mentioned this,
5 this is from the Australian's report, but when you
6 look at U.S. research, you will find the effect to
7 be of half of what the Australians report. So in
8 other words, for every 10 degrees Celsius there is
9 only one unit of FN difference. So when you are
10 measuring, for example, at 30 degrees Celsius, you
11 would have to add one unit to what the skid
12 trailer measured, and here you are measuring at
13 10 degrees Celsius, you would have to subtract
14 one. So this particle adjustment might be good
15 for what the -- for the equipment that the
16 Australians were testing, but for the skid trailer
17 it's half. So 10 degrees difference from 20, it's
18 only unit FN.

19 Q. I had understood that it
20 was -- that at the lower temperature caused the --
21 whatever the difference is, that the lower the
22 temperature is, the higher the reading.

23 A. No. Sorry, when -- at
24 higher temperature, say at 30 degrees, the reading
25 is lower. So you may read, say, for example, 29,

1 but if you tested at 30 degrees you would have to
2 add one to it, and it would become 30.

3 Q. Right. Okay. I
4 understand what you mean now, and I think we're
5 just coming at it from opposite points.
6 Directionally speaking at a lower temperature you
7 would get a higher FN?

8 A. Yeah, that's correct.

9 Q. Okay. And -- but the --
10 there's differences of opinion from the U.S.
11 literature versus the Australian literature as to
12 the effect per 10-degree increment?

13 A. Well, it could be that
14 this is what they found for the equipment that
15 they were using.

16 Q. Right.

17 A. But the Americans are
18 looking specifically at skid trailer.

19 Q. Okay. And then you talk
20 about:

21 "Testing ahead of May can
22 produce FN more than
23 five units higher than the
24 peak of summer." (As read)
25 Is that referring -- is that

1 partially temperature, or is that talking about
2 the effects of having passed through the winter,
3 or both?

4 A. Quite frankly, I don't
5 know because I must have been quoting from the
6 Australian paper, so --

7 Q. The quote is blocked in
8 the second paragraph, not in the third paragraph.
9 I'm not sure. But if you're not sure, that's
10 fine.

11 A. I'm not sure, no.

12 Q. Okay.

13 A. I know that Frank was
14 very carefully choosing test conditions, not only
15 that he could bunch several test requests together
16 so he wouldn't have to travel long distance, you
17 know, north and then come back to Toronto and
18 return few days later. So he was trying to string
19 up request for testing so that they would be
20 geographically connected. He was very carefully
21 choosing the time of testing so that he could test
22 at posted speed limit because speed limit has got
23 much greater effect on the result than the
24 temperature. But also he would not be testing in
25 extreme temperatures if he could help it. So he

1 avoided testing in very cold or very hot weather
2 and definitely if it was -- if the pavement was
3 wet, or if it was going to rain, he would not
4 test.

5 Q. Because if the pavement
6 was already wet, then that would affect -- I mean,
7 the tester deposits water on the surface of the
8 pavement in order to --

9 A. That's correct. That
10 would result in a greater depth of water ahead of
11 the test field than what was specified.

12 Q. Right. And then if we
13 could go to images 15 and 16 in this paper. And
14 it's the recommendation at the bottom of 15.

15 I think you've already
16 addressed what these recommendations are, but
17 in -- you first refer under the recommendation at
18 bottom in the left hand there that based on the
19 AASHTO guide that the network testing can be set
20 up to suit Ontario conditions, and you recommend
21 re-evaluating the CFME devices in three to five
22 years once U.S. FHWA, Federal Highways Agency,
23 completes their evaluation.

24 That was the sort of -- the
25 first thing, and then you recommend continuing

1 with the skid tester and talk about how that's --
2 the majority of states in the U.S. use the same
3 device.

4 A. That's correct.

5 Q. Okay.

6 A. Now, you mentioned in
7 2013 the ministry conducted network testing. They
8 obviously couldn't have -- and now I am making,
9 you know, a reasonable speculation. They couldn't
10 have handled it one friction trailer, but they
11 used up the -- probably Ontario and even U.S.
12 capacity from nearby providers of the services for
13 this purpose.

14 Q. Well, I think we've heard
15 that Mr. Marciello did it, but it wasn't every
16 highway. It wasn't every highway in Ontario that
17 was done, but it was --

18 A. There is no way how he
19 could have handled the volume.

20 Q. Well --

21 A. They probably outsourced
22 some of the testing.

23 Q. I --

24 A. But I'm speculating. I
25 was no longer employed by MTO by then.

1 Q. Right, I understand.

2 Now, the last thing I want to
3 ask you about is that -- we see some e-mails that
4 in 2008 there was a gentleman by the name of Amir
5 Abd El Halim of the University of Waterloo at the
6 time who was conducting a study involving the
7 relationship between pavement friction and
8 collisions as part of his Ph.D. work. And there
9 was a -- there are some e-mails where you indicate
10 that you gave him the pavement friction survey and
11 collision data, but the -- there's a -- it sort of
12 ends, the e-mail trail ends. Do you recall what
13 happened with that?

14 A. Yes, I recall. Initially
15 I was thinking about doing this research, and then
16 I was approached either by Becca or by Tom
17 Kazmierowski, I'm not sure which, who suggested
18 that perhaps it would be better to outsource this
19 research to Waterloo and give it to Amir for his
20 Ph.D.

21 So what I did, I arranged for
22 collision data from central region to be given to
23 Amir, and I checked with him from time to time,
24 and I don't -- after approximately six months, I
25 don't recall exactly, but Amir indicated that he

1 couldn't finish the work or that the work would be
2 delayed. I don't know whether it was the birth of
3 his child or sickness or problem with his work,
4 but basically everything was put on hold. So I
5 was keeping the geotechnical committee appraised
6 of the progress, but there was no progress, and it
7 kind of fizzled out.

8 I should also note that in
9 connection with this inquiry I was searching the
10 internet, and I came across Amir's thesis.

11 Q. Yeah. He published in
12 2010?

13 A. He published it, but he
14 didn't publish it on the original topic, but he
15 focused on network testing. I haven't read the
16 thesis, so it would be inappropriate for me to
17 comment because I was no longer with MTO.

18 Q. No, that's fine. I just
19 wanted -- there's some references in the overview
20 document to your communications with him, and then
21 it sort of ceases. It just sort of fizzled out,
22 as you said.

23 A. As I mentioned earlier,
24 there are so many parameters that affect
25 collisions in wet weather that the friction is

1 just one of them. So numerous researchers, dozens
2 probably, in past 50 years tried to find this
3 correlation, and they didn't find it.

4 Q. Right. When you talk
5 about that, though, about there being -- trying
6 find the correlation, I take it you're not
7 suggesting that there's no relationship between
8 friction, that it's -- between low friction and
9 collisions, it's just assigning the -- a specific
10 cause is where the -- to a collision involving
11 friction is difficult; is that fair?

12 A. That's correct.
13 Generally speaking, you are absolutely right on.
14 The lower the friction, the less collisions are
15 experienced. That's a general trend. But you
16 can't really say that friction number of a certain
17 value is associated with a certain number of
18 collisions.

19 Q. And sorry, you said that
20 the lower the friction the less collisions are
21 experienced. I think that was --

22 A. Sorry, my apologies, I
23 misspoke. The higher the friction, the less
24 collisions. I'm sorry. I'm glad you caught me.

25 Q. That's my job.

1 MR. LEWIS: Okay.
2 Commissioner, it is about 10 to 1:00. I don't
3 believe I have any further questions. I would
4 like to review my notes, but I haven't canvassed
5 also with participants' counsel, so perhaps this
6 would be a good time for the lunch break.

7 JUSTICE WILTON-SIEGEL: Sure.
8 Let's take our lunch break and we'll return at 10
9 past 2:00.

10 --- Recess taken at 12:51 p.m.

11 --- Upon resuming at 2:10 p.m.

12 MR. LEWIS: Good afternoon,
13 Commissioner. I just have a couple of short areas
14 to cover, and then -- if that's okay, and then
15 I'll turn it over to participants' counsel. May I
16 proceed?

17 JUSTICE WILTON-SIEGEL: Please
18 proceed.

19 BY MR. LEWIS:

20 Q. So, Mr. Klement, before
21 lunch, I just want to make sure we're clear on one
22 issue which is: You had indicated that the grip
23 tester would give much higher grip numbers than
24 the friction numbers returned by the locked-wheel
25 tester, and you referred to it because it tests at

1 the peak friction on the figure we looked at. Do
2 you recall saying that?

3 A. Yes, that's my
4 understanding from reading various reports.

5 Q. Right. Okay. And
6 actually on that point am I correct that your --
7 you have lots of experience with the locked-wheel
8 tester. As you described, you even rode with
9 Mr. Marciello, but you don't have any personal
10 experience with the grip tester or other CFME; is
11 that correct?

12 A. No, none.

13 Q. Okay. And to make sure,
14 then, that I understand, you're -- in terms of the
15 grip tester returning a higher grip number,
16 they're reported with a different -- they're both
17 dealing with the coefficient of friction, but its
18 grip number is what's reported for the grip
19 tester, and either the SN or FN is reported for
20 the locked-wheel tester.

21 But if you were testing the
22 same highway under the same conditions at the same
23 time of year, am I correct you're saying that the
24 grip tester measurements, the grip number that's
25 returned would be higher over the length of the

1 highway than the locked-wheel tester results?

2 A. That's my understanding,
3 but also what is my understanding that the --
4 there's a software that converts grip number to
5 friction number. So what you would see in a
6 report, you know, like this something, something
7 wind (ph), you would already see converted grip
8 numbers.

9 Q. Okay. And would --

10 (Speaker overlap)

11 A. You would see whatever
12 the company produced as being equivalent friction
13 numbers.

14 Q. Right, and that's what
15 you were saying is -- you had questions about the
16 accuracy of the correlation between the two?

17 A. I wouldn't put too much
18 trust in them.

19 Q. Right. Okay. I
20 understand. But my -- just to be clear, because
21 you said, yes, but -- and then you went on to talk
22 about the company providing that comparison. But
23 the numbers are -- you would expect the grip
24 number to be higher across the board on the same
25 highway, same conditions than the friction number

1 from a locked-wheel tester?

2 A. That's what I have seen
3 in the literature.

4 Q. Yeah. Okay. Thank you.
5 And then in respect of the literature, and going
6 back to your paper, you mentioned the Australian
7 literature showing that the grip tester had poor
8 reproducibility I think what was said, and I just
9 wanted to look at the paper itself.

10 So if we could go back to
11 MTO 38672, Registrar, and images 12 to 13. And
12 it's at the bottom of page 12, the last paragraph
13 and the top of 13.

14 I just wanted to first see
15 that this is what you're talking about. You refer
16 to Department of Defence Policy Manual from
17 January 2004 stating that:

18 "It's widely acknowledged that
19 continuous friction measuring
20 equipment, CFME, has poor
21 repeatability and can also
22 have calibration problems.
23 Therefore the use of CFME to
24 demonstrate regulatory
25 compliance is questionable.

1 However -- it is, however, a
2 valuable tool to assist in the
3 management of runway
4 friction." (As read)

5 That's the quote. Am I
6 correct that is what you were referring back to?

7 A. Yeah, that is what I was
8 referring to.

9 Q. Okay. And I see from
10 that that it's actually referring to CFME
11 generally, which is what the grip test, CFME
12 generally, and the grip tester is one of those,
13 right?

14 A. This would include other
15 devices as well --

16 Q. Right.

17 A. -- but I would have to
18 look at the original report to see whether they
19 actually referred to grip tester or just to
20 general CFME devices. I would find it -- I would
21 have jumped in my report to conclusion that grip
22 tester would have been included in this or in the
23 original paper they (indiscernible) to refer to
24 grip tester to start with, so I don't really know
25 without examining the paper.

1 Q. The one referred to?

2 A. I could try to locate the
3 original paper for you and that would be the proof
4 of the pudding, so to speak.

5 Q. Okay. Well, that's fine,
6 but I'm not -- that may be the case. Let's assume
7 that that's the case for a moment, but it's -- you
8 refer later to that -- and I mentioned it before,
9 and I see your paper does refer to Australia using
10 the SCRIM.

11 If we go to image 14 in the
12 second last sentence it refers to -- second last
13 paragraph:

14 "Grip tester tried by
15 Australian jurisdictions for
16 network friction testing has
17 not performed satisfactorily
18 as the mainstay Australian
19 testing equipment SCRIM."

20 (As read)

21 So you had referred to that.

22 And the SCRIM though -- the SCRIM is a CFME,
23 though, right?

24 A. SCRIM is also a British
25 system but much more robust.

1 Q. Right, so it's a big
2 machine.

3 A. It's a (indiscernible).

4 Q. Yeah, and it measures
5 differently. It's a sideways force.

6 A. It has got some
7 commonality with the grip tester. I believe that
8 it also tests slip. It has got a, I think,
9 variable slip, and also, if I recall correctly, it
10 measure also side friction. The wheel is slightly
11 at an angle to the direction of travel --

12 Q. That's right.

13 A. -- if my memory serves me
14 right, but it was long time since I looked at it.

15 Q. Yeah. No, we heard from
16 Dr. Flintsch that that is correct. It's a
17 sideways force device, and it measures at an --
18 the wheel is at an angle to the direction the
19 device is travelling.

20 So then to come back to it,
21 you also refer at page 9 -- image 9 at the top
22 there under number 1 you're talking about the grip
23 tester specifically, and it has over 450 units
24 currently in operation worldwide, and that it's --
25 and above that you talk about the CFME devices

1 used for runway friction monitor, right? That's
2 its primary use up to that point, right?

3 A. Its primary use for
4 airport friction monitoring. Used at airports.

5 Q. Right. And so -- and
6 they use it -- you aren't saying that the grip
7 tester is unable to return accurate results for
8 airports, right? That's not --

9 A. I did not say that. To
10 start with, at the airport the runways are much
11 more -- much less rougher than the roads, so the
12 grip tester, it's not likely to bounce as much and
13 therefore it may provide repeatable results. Also
14 it might be driven at lower speeds because you
15 don't have a traffic behind, so speed is not the
16 concern, so the slower you go, the more accurate
17 the reading would be.

18 Q. Okay.

19 A. I am guessing here
20 because I have never participated in grip tester
21 testing, so I can't really say.

22 Q. No. And we're just
23 asking you about your actual knowledge. And so
24 the -- and just to come back to the jumping off
25 the road, your -- I think your point is, look, if

1 you're testing on a highway at the posted at a --
2 it's a 400 series highway at a hundred and it's
3 rougher than a -- or 80, whatever, and it's
4 rougher than a runway, then given the relative
5 lightness of the device, then it can bounce around
6 some.

7 A. But my understanding is
8 that grip tester is not used at posted speed.
9 It's used, I don't know, around 60 kilometres per
10 hour max even though it's capable -- they say that
11 it's capable of going up to 135 kilometres per
12 hour in theory.

13 Q. Right.

14 A. But in practice I think
15 the way it's being used it's probably close to 60.

16 Q. I think it's 50 is
17 typical, but in any event it's slower than --

18 A. Okay. So I stand
19 corrected. You know better than me.

20 Q. Okay. But if -- so it
21 was your concern here that if the MTO was testing
22 as per its practice at the posted speed, that that
23 could pose a problem for the grip tester?

24 A. I believe so, yes. I
25 would not recommend to run grip tester at posted

1 speed, not on freeway.

2 Q. Right, and then if I
3 could take you to image 11 at the bottom there.
4 It's the top item under the heading "Disadvantages
5 of CFME," and you refer to the grip tester
6 specifically that:

7 "The grip tester has been used
8 in North America mostly at
9 airports and on a research
10 basis for roads. Therefore,
11 it would be imprudent to
12 pioneer its application in
13 network testing before enough
14 is known of the system's
15 efficacy for that purpose."

16 (As read)

17 And I think if I'm correct
18 that's then reflected in your recommendations that
19 we discussed which is, look, before we, you know,
20 make a decision to use the grip tester for network
21 testing, there needs to be more analysis done, and
22 that's what you were proposing waiting on the FHWA
23 for; is that right?

24 A. Yes, that's right.

25 MR. LEWIS: Okay. Thanks.

1 That's all my questions. Thank you, Mr. Klement.

2 And I don't believe,

3 Commissioner, that it won't be terribly long for

4 the participants' questions, but I think perhaps

5 Ms. Roberts for Golder would be first based on

6 time estimates.

7 MS. JENNIFER ROBERTS: Hello,

8 Mr. Klement. I'm Jennifer Roberts. I'm counsel

9 for Golder.

10 THE WITNESS: Hello.

11 MS. JENNIFER ROBERTS:

12 Commissioner, may I begin?

13 JUSTICE WILTON-SIEGEL: Yes,

14 please begin.

15 EXAMINATION BY MS. JENNIFER ROBERTS:

16 Q. So, Mr. Klement, I'm

17 going to just take you back to a couple of pieces

18 of evidence from this morning and ask a number of

19 questions. I want to talk first about the 2007

20 pavement friction update that you prepared.

21 One of the points that you

22 made is, you talked about instances where you

23 might take steps to have friction restored even

24 where friction levels were at 30 or above. And

25 the one that's referenced there is where the

1 surrounding highway has substantially higher
2 friction numbers than the analyzed segment. Do
3 you remember that?

4 A. Yes.

5 Q. And you talked about
6 there being instances where there's a discrepancy
7 in the friction values that might affect the
8 driver's expectation. Do you remember that?

9 A. Yeah, I remember.

10 Q. Okay. But just for
11 clarity isn't it constantly the case that there
12 will be disparities in friction values between
13 sections of highways just because they are on
14 different pavement maintenance schedules? One
15 instance you'll have a newly paved section with
16 very high values, another older maybe more
17 polished section. Isn't that the norm on a
18 highway?

19 A. Yes. You may have some
20 disparities; that's unavoidable. When I speak
21 about differences, I'm talking about major
22 differences. For example, between 40 or 50 on one
23 segment and 30 on another.

24 Q. Okay.

25 A. But that doesn't mean

1 that I would automatically repave the one that is
2 30. But if that segment also had a very high
3 number of wet surface collisions, I would
4 definitely like to investigate whether these
5 sudden change or violating driver expectation for
6 the friction is the cause. Possibly I would also
7 look at substandard geometric elements where
8 perhaps the driver expects very high friction from
9 the previous segment and then find themselves to
10 go far too fast into a curve.

11 Q. Okay. Thank you. And
12 I'll get to questions about geometry. But just on
13 the point of the different friction numbers, and
14 you've made the point I was asking about. In
15 order to assess whether driver expectation is
16 being violated, you'd need to look at the
17 collision numbers and presumably the location of
18 the collisions?

19 A. You would also have to
20 look at collision numbers because unless you've
21 got the collisions there, just because the numbers
22 are somehow lower on one segment or another that
23 would not necessarily trigger resurfacing.

24 Q. Thank you. And going on
25 to questions about geometry, I want to then ask

1 some follow-up questions about your presentation
2 "Pavement Friction Testing and Management in the
3 MTO."

4 And essentially as I
5 understand it, this is proposed policy for a set
6 of guidelines to make decisions about whether to
7 take -- make decisions about friction treatment or
8 not. That's right?

9 A. Yes.

10 Q. Okay. And you talked
11 about, you know, evaluating where -- there are
12 different levels where the friction is -- numbers
13 are below 25, where they're 26 to 30 and where
14 they're greater than 30. And you described the
15 circumstances where you engaged in a more detailed
16 evaluation as being triggered where there's a
17 ratio of wet to dry collisions equal to or
18 exceeding .45 and above average number of wet
19 pavement collisions. And what I want to look at
20 is the sort of criteria that you say you need to
21 look at for the investigation.

22 A. I would look at the
23 ratio, and also I would look at the crash rate on
24 that pavement or perhaps, you know, total crashes
25 which would be an indication there is some kind of

1 a problem for drivers to control their vehicles.

2 Q. Okay. So let's make some
3 assumptions for the purposes of my questions.

4 Let's assume we've got a segment of highway with a
5 friction number of between 26 and 30.

6 A. Yes.

7 Q. So not great friction.

8 And you've got wet weather -- you've got
9 collisions in wet conditions, and you've got, you
10 know, a high rate of accidents. Then you start to
11 evaluate a series of factors, and I want to look
12 at those.

13 And, Registrar, can I please
14 ask you to turn up MTO 13105. And can you please
15 turn to image 29. It's page 29. I'm hoping it's
16 the same thing. Yeah, okay.

17 And this is in the appendices
18 to this presentation, and this is -- am I reading
19 this right that these are the factors that you
20 would consider in an evaluation of whether to make
21 a decision to intervene?

22 A. This is just a sample
23 list of factors which I would have to consider.

24 Q. Okay. And this is a
25 first page of two, so it's fairly extensive even

1 if it's just a sample. Okay.

2 And when I look at the first
3 ones, the International Roughness Index, that's --
4 can I put that sort of in simple terms as bumps
5 and dips on the surface?

6 A. That is basically
7 longitudinally how variable the road is; in other
8 words, you know, sloping down, sloping up.

9 Q. Okay.

10 A. This one has to be very
11 careful because roughness also influences how fast
12 the drivers go. When the load becomes to be very
13 rough they tend to slow down. So then, in that
14 case, even though the friction might be lower,
15 it's not that important.

16 Q. Right. It would slow
17 people down. Okay.

18 So these first numbers,
19 though, the International Roughness Index, the
20 rutting, the pavement surface has distortions,
21 these I might consider indications that the
22 pavement is deteriorating in any event?

23 A. Sometimes, you know, it's
24 constructed fully, but typically you are right, it
25 would be deteriorating. Now, if the IRI was

1 consistently high or consistently low over a long
2 segment, that is not so disturbing as if it is
3 only highly localized, because in that case the
4 driver does not make the adjustment to slow down.

5 Q. Okay. Got that. So if
6 we go forward, if we can please turn up the next
7 page, 30.

8 And in this part of your list
9 of potential factors you identify a number of
10 items that I would contemplate as being in the
11 nature of geometric design. Do I understand that
12 correctly?

13 A. That's correct, but all
14 these are not necessarily carved in stone. These
15 are just initial suggestions which would have to
16 be agreed on by the ministry traffic office. They
17 could, for example, say that they require the
18 speed differential to be 20 kilometres instead of
19 15. So none of this is really final. This is
20 just to give you an example of how the guideline
21 could look like.

22 Q. Got it.

23 A. This is not something
24 that I spent a lot of time on, and I didn't get a
25 consensus of the relevant offices on this.

1 Q. Okay. No, I totally
2 understand that. But let's just look at some of
3 them because you've identified factors which
4 you -- which -- I think what you're saying here is
5 that these are factors ultimately which might
6 affect friction demand.

7 A. Yes.

8 Q. Am I categorizing that
9 correctly?

10 A. Yeah, that's correct.

11 Q. Okay. So for instance if
12 we look at the second one:

13 "Curves at or near the minimum
14 recommended speed radius."

15 (As read)

16 If I can make sure I
17 understand that, that would be a curve which is
18 close to or at the minimum tightness for the
19 design speed?

20 A. Yeah.

21 Q. Second one?

22 A. That's partially correct.

23 You see the geometric manual allows individual
24 curves to be designed for a speed up to
25 20 kilometres lower than is the design speed of

1 the rest of the highway. So as long as it is
2 posted correctly, this is not a concern because
3 the geometric manual allows it, up to 20. But if,
4 for example, the roadway is 120 and the curves are
5 less than 100, that would be a concern. That
6 would be a serious concern.

7 Q. Okay. So where you've
8 got -- so I think I had it right, that if you've
9 got the speed, the design speed -- or sorry, the
10 radius of the turn close to the design speed, that
11 that might be problematic depending on the posted
12 speed?

13 A. Yes.

14 Q. Okay. And you -- the
15 next item is broken back curves. I'm not sure I
16 know what that means.

17 A. That basically mean that
18 in a very short interval you have a curve going
19 right and then immediately another curve going
20 left.

21 Q. Okay.

22 A. That's the definition a
23 broken back curve. Sorry about the technical
24 jargon.

25 Q. No, that's helpful. So I

1 might have phrased that as being the same thing as
2 where you've got a curvilinear alignment? Where
3 you've got turns left and right?

4 A. The curvilinear
5 alignment, all that means is that there are some
6 curves present.

7 Q. Okay.

8 A. But only some curves have
9 broken back.

10 Q. I see. So broken back is
11 where you've got a left to a right to a left, for
12 instance?

13 A. Yeah. Yes.

14 Q. Okay. Grades at or
15 beyond the maximum of the design speed.

16 A. The geometric manual
17 recommends certain maximum grades for each design
18 speed. So when we are at the limit, when somebody
19 is going down the grade which is beyond the design
20 grade, one could expect that they would be
21 speeding and exceeding the design speed --

22 Q. Right.

23 A. -- and therefore such
24 collision -- such a location could have high
25 friction demand particularly if you have hidden

1 entrances there or intersections.

2 Q. Right. Okay. And then
3 closely spaced interchange and -- or above normal
4 weaving. So if you've got -- you've got
5 interchanges which are, in effect, closer than the
6 recommended minimums in the design guide, that
7 also might provide an additional demand on
8 friction?

9 A. That's correct. Because
10 at the interchanges or intersections some vehicles
11 are leaving the roadway and exiting and through
12 traffic behind them may break as a result. It may
13 caught them by surprise.

14 Q. Right.

15 A. So whenever you have a
16 speed differential that one vehicle is moving much
17 faster than the other, this is a concern.

18 Q. Okay. And related to
19 that is just the weaving. So that's as cars are
20 coming onto the main line and cars coming off,
21 there's the weaving?

22 A. That's right. That means
23 changing lane. Weaving, it means changing lane.

24 Q. Right. And, again, as
25 people are coming on the main line, you've got an

1 impact on the through traffic?

2 A. That's correct because
3 some traffic is already at the maximum speed, and
4 it's being joined by a slower speed traffic which
5 can cause conflict.

6 Q. And so if you've got a
7 series of these, so where you've got curves at or
8 near the minimum radius, you've got broken back
9 curves, and you've got grades, and you've got
10 closely spaced interchange, I take it that all of
11 these individual (indiscernible) that would create
12 more of a demand on drivers?

13 A. And on friction.

14 Q. And on friction. And is
15 there a cumulative effect where you have a
16 sequence of these factors that you've identified?

17 A. The more you have, the
18 greater concerns, greater safety concern.

19 Q. Okay, okay. So we've
20 talked about these things being in contemplation,
21 or things that you would have to consider for
22 safety analysis if you've got friction numbers and
23 that sort of middle range that you've identified
24 of 26 to 30.

25 In this paper you identify

1 where friction is above 31 as an instance where
2 you're not expecting to have to take intervening
3 or intervention to improve friction.

4 A. Okay. Let's put it this
5 way. In all my practice in MERO I haven't come
6 across a single case where friction on the road
7 that already measures 30 and above was upgraded.
8 I just stated it, you know, for completeness just
9 more or less as a theoretical exercise.

10 Q. Okay.

11 A. But such instances would
12 be extremely rare. Normally 30 is a cutoff where
13 people are no longer concerned.

14 Q. And if you had friction
15 above 30, but you had these factors that are on
16 the screen that affect driver demand, affect
17 friction demand, would you then look very closely
18 at the geometry, at the signage, at the speed in
19 trying to assess why you had high numbers of
20 accidents?

21 A. You're absolutely right.
22 You would make a good engineer.

23 Q. I'm working on it.

24 A. You look obvious -- for
25 the obvious, and you can't automatically jump into

1 the conclusion that it must be friction. Whether
2 it's 30 or whether it's just below, if you've got
3 a very high number of wet weather collisions,
4 because it might be completely other than
5 friction, they just happen to be there because
6 obviously, everything being equal, when you --
7 when somebody is speeding on a dry pavement or wet
8 pavement, the chances are that the collision will
9 happen on wet pavement. The same way if somebody
10 is on a very tight curve and the --

11 Q. Right.

12 A. -- curve is so tight that
13 it's unexpected by the driver, the chances are
14 that the majority of such collisions will happen
15 during wet weather when the friction is the lowest
16 because of the rain.

17 Q. Right, right.

18 A. So one has to look at
19 first at geometric, signage, delineation, and that
20 might be the primary cause, say, that causes, say,
21 85, 90 percent of all those collisions rather than
22 friction.

23 Q. Got it.

24 A. Because as I explained
25 earlier, friction of FN30 is for a driver comfort.

1 It's not a limit when the road becomes suddenly
2 unsafe. So there's still very large safety margin
3 below 30, and it has to be typically other factors
4 such as geometry, signing and delineation, which
5 is the primary cause for those crashes.

6 Q. Got it, okay. Thank you,
7 sir. Those are my questions.

8 MR. LEWIS: I believe,
9 Commissioner, that Mr. Chen had some questions for
10 the City.

11 JUSTICE WILTON-SIEGEL: Okay.
12 Mr. Chen.

13 MR. CHEN: Yes. Thank you,
14 Mr. Commissioner, Mr. Klement.

15 EXAMINATION BY MR. CHEN:

16 Q. I just have a couple of
17 questions. Perhaps I should have gone before
18 Ms. Roberts because I'm going to ask to bring back
19 up MTO 38672, Mr. Registrar. Thank you.

20 Just while the registrar is
21 bringing that document up, it's the report,
22 Mr. Klement, where you compare the grip tester to
23 the skid trailer with the ribbed tire that I just
24 have a couple of questions for you about.

25 Okay. And if we could just go

1 to image 12 Mr. Registrar. Okay.

2 Mr. Klement, in discussing
3 this report with Mr. Lewis you talked about
4 obviously some of the weaknesses of the grip
5 tester, and so we have heard about one issue,
6 which is the correlation between the grip tester
7 and the skid trailer results; is that right?

8 A. Yes.

9 Q. Okay. And I understand
10 which -- it's the fourth paragraph on this page if
11 you can call that out -- that based on your
12 research that there is an extremely poor
13 correlation between the skid trailer with a ribbed
14 tire which is used by the MTO and the grip tester;
15 is that right?

16 A. Hm-hmm.

17 Q. And in fact, you go on to
18 state in your report that it would be impossible
19 to accurately convert the MTO's historical data.
20 I take it you still agree with that statement?

21 A. Yes, that's true.

22 Q. Okay. And we can get rid
23 of this callout and go to image 11. Another
24 aspect that you compare are the tires between the
25 skid trailer and the grip tester, and that's at

1 paragraph 4. And so I understand that the grip
2 tester, as you say there, is fitted with a smooth
3 tire, right?

4 A. That's correct.

5 Q. And the MTO skid trailer
6 is fitted with a ribbed tire, correct?

7 A. * yes, that's correct.

8 Q. And so in terms of
9 testing is it right that one would want to use a
10 test tire that resembles the tire that's more
11 commonly used in Ontario?

12 A. It's used exclusively by
13 MTO. MTO is using a skid trailer with ribbed
14 tires.

15 Q. Right. And so as I --
16 it's just that last sentence there you say:

17 "Intuitively one would wish a
18 test tire to resemble the most commonly
19 encountered tire on the road." (As read)

20 And I understand that it's the
21 all season tire that you're talking about there,
22 right?

23 A. Yes. Well, this is a
24 pure intuition. When you are modelling --

25 Q. Yeah.

1 A. -- real life using a
2 model, it's always desirable to be as close to
3 what you are modelling as possible. So if most
4 tires encountered on the road are ribbed,
5 intuition says that perhaps, you know, well, this
6 might be a better fit. But quite apart from that
7 you know, the jury is out, so to speak, whether to
8 use ribbed tire or smooth tire. There was a
9 survey in United States in year 2000 where 39
10 responses from different U.S. and Canadian
11 jurisdictions came back, and out of 39, only six
12 used the smooth tire. That was in 2000.

13 Q. Okay. I understand.

14 A. So you could say that for
15 better or worse Ontario has chosen what the vast
16 majority of other jurisdictions use.

17 Q. Right. Okay. Got it.
18 One other aspect that you look at is -- if you can
19 back to image 12 -- is mass. And this is the -- I
20 guess the -- it starts with "one of the reasons,"
21 so the second last paragraph.

22 And simply put, I understand
23 that the skid trailer weighs significantly more
24 than the grip tester. Is that right?

25 A. Yes, that's correct.

1 Q. Okay. And in your view
2 the weight difference is one reason that has led
3 to the difficulty with correlating the results?

4 A. Yes. The reasoning is as
5 follows; at high speed about 95 percent of the
6 friction is provided by hysteresis, in other
7 words, penetration of the aggregate into the
8 rubber, and only 5 percent is attributable to
9 microtexture, which is really sort of adhesion.

10 Q. Right, and you kind of
11 get at that at the last section of that paragraph
12 where you talk about the hysteresis, right?

13 A. Yes.

14 Q. Okay. Sorry, I wasn't
15 sure if you were going to say more than that. All
16 right.

17 And then just the paragraph
18 following that, if we can just call that - you can
19 take this down and call out the next one.

20 And you had talked about
21 modelling and what was ideal earlier, and so
22 taking all the factors that, you know, we
23 discussed and some of the factors you discussed
24 with Mr. Lewis, I think you conclude here that one
25 may argue that the skid trailer with a full scale

1 tire with tire thread closely matching Ontario's
2 predominant all season tire and with the weight
3 more closely resembling an axle of a passenger
4 car, that provides a more meaningful friction
5 reading than the much smaller, smooth tire
6 equipped and lighter with the grip tester.

7 A. Now, the external
8 diameter of the grip tested tire is half the
9 diameter of what is normally on a vehicle and what
10 is the skid trailer using. So that tire is scaled
11 down; it's half. So you could argue that the
12 contact area with the pavement would be also
13 smaller.

14 Q. Right, okay. And the --
15 kind of the gist of why this statement here,
16 though, I think goes back to what you were trying
17 to explain to me earlier is that ideally, you
18 know, the testing apparatus should replicate the
19 real world situation as much as possible; is that
20 fair?

21 A. Yeah, that is my belief
22 why I personally prefer the skid trailer. Just --
23 not that I'm biased against grip tester. It has
24 got some wonderful qualities, and what I mean by
25 that is, A, it's a continuous testing, so you get

1 a lot more results, and also majority of vehicles
2 nowadays have antilock brakes, so they are
3 actually, when they brake, they are using the slip
4 friction of a grip tester close to 14, 15 percent.
5 That's when the -- that's how the antilock brake
6 operates. So grip tester in a way emulates in
7 this respect the majority of vehicles now to be
8 found in Ontario or in North America. So that's a
9 positive feature for the grip tester.

10 Q. Okay. I understand. And
11 so I just want to switch documents now. I have a
12 clarification question to ask you. MTO 20403.

13 Just to show you the cover of
14 slide. This is another presentation that
15 Mr. Lewis took you to, and in this presentation
16 you looked at the relationship between pavement
17 friction and the collision rate using data from
18 Owen Sound and the eastern region.

19 And if we can turn up image
20 21. All right.

21 And so you see here a slide
22 titled "Data Rectification" and --

23 A. Those formulas are
24 incorrect.

25 Q. Okay.

1 A. This is what MTO was
2 using at that time, but since then they have been
3 revised.

4 Q. Okay. And --

5 A. As I explained to you,
6 based on the relationship that 65 kilometres per
7 hour and 100 kilometres per hour, the difference
8 between FNs is exactly 10. So for 80 -- but one
9 would have to linearly extrapolate, and instead of
10 a one, it would probably be somewhere close to
11 five. I don't know, I don't have the calculation
12 handy. But this figure has been revised since.

13 Q. Okay. No, that was my
14 question because earlier today you testified about
15 a conversion as well, and it was inconsistent what
16 I saw in the slide here, but I think you've now
17 answered that question.

18 So those are all my questions.

19 A. Now, you must understand
20 is that one is measuring at a posted speed, and
21 those values as long as they are -- as the test is
22 performed at the posted speed do not require any
23 adjustment unless you choose to adjust for
24 temperature.

25 Q. Right, right.

1 A. But the only time you are
2 using an adjustment from your revised formula
3 would be if instead of a posted speed, you are
4 testing at the lower speed, and then you have to
5 adjust your reading so that everything is on the
6 same basis which is posted speed.

7 MR. CHEN: Okay. Thank you
8 for that clarification. Mr. Commissioner, those
9 are my questions.

10 JUSTICE WILTON-SIEGEL: Okay.

11 MR. LEWIS: I believe counsel
12 for Dufferin doesn't have any questions, and so it
13 would be over to Mr. Bourrier for MTO.

14 MR. BOURRIER: I don't have
15 any questions, Mr. Commissioner. Thank you.

16 MR. LEWIS: I have no further
17 questions.

18 JUSTICE WILTON-SIEGEL:

19 Mr. Klement, thank you very much for attending and
20 appearing before the inquiry today. You're
21 excused if you want to leave.

22 THE WITNESS: Thank you very
23 much. It's been a pleasure, and good luck.

24 JUSTICE WILTON-SIEGEL: I
25 think that completes the evidence for this

1 afternoon. Is that correct, Mr. Lewis?

2 MR. LEWIS: Yes, that is
3 correct.

4 JUSTICE WILTON-SIEGEL: And so
5 the next witness will appear tomorrow at 9:30.
6 Unless is anything else that we have to do this
7 afternoon, we'll stand adjourned until that time.
8 Then we stand adjourned until 9:30 tomorrow
9 morning.

10 --- Whereupon at 2:58 p.m. the proceedings were
11 adjourned until Thursday, May 26, 2022 at
12 9:30 a.m.

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