

**MR MILLS:**

I prepared a written opening statement which the Commissioners have, it has also been distributed amongst other counsel, and in light of the comments Your Honour has just made I will not go through the first four paragraphs in  
5 that written submission which express a similar view about the tragedy really that has given rise to this hearing and the sad experiences many people have had and still are having.

**JUSTICE COOPER:**

10 Mr Mills, I think it wouldn't hurt if you read most of what you've said there.

**MR MILLS:**

All right. Well as the Commissioners have just said, this is the first of several hearings that will examine a building collapse in which people died. Eighteen  
15 people died as a result of the collapse of the Pyne Gould Corporation building which I will refer to generally as the PGC building, on the 22<sup>nd</sup> of February of this year. Those of you who were here will recall that the names of the people who had died were read out to the Royal Commission on the first day of its hearings along with other deaths that occurred in other buildings, particularly  
20 the CTV building. There were also a number of people injured in the collapse, some seriously. Unlike those who died the Royal Commission does not have a definitive list of their names, or the names of those injured in the CTV building, and the other buildings around Christchurch. It has been reported that there were thousands of people injured in one way or another.

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For some of those people the physical injuries were severe and life changing. Others would have suffered minor physical injuries but still face ongoing emotional and mental suffering as a result of their experiences. Those affected by the collapse of the PGC building and other buildings around  
30 Christchurch will have included building tenants, people who were visiting those buildings, families of those who were killed and injured, the by-standers who were witnesses to these events, and the rescuers who risked their own safety in the days and weeks that followed the 22<sup>nd</sup> of February.

It is important though I think to make the point that none of the buildings that led to these deaths and injuries were what I think we would commonly think of as modern buildings, constructed in compliance with current building standards. In my submission one of the important lessons from the terrible events that Christchurch has endured is the importance of identifying critical structural weaknesses in existing buildings, and then having a regulatory regime that enables these issues to be dealt with effectively when they are identified. The evidence in this hearing I hope will assist the Commission in its challenging task of grappling with that complex issue.

I have asked to have put up on the screen there photographs of the PGC building as it was and as it was on the 22<sup>nd</sup> of February. Those are photographs which will be familiar to most people but we will come back to them and also some other photographs and drawings that will go up during the course of this opening to try and assist people to understand the key issues that were triggered on the 22<sup>nd</sup> of February.

I want to turn next to the Commission's terms of reference in relation to the PGC building and then make a few preliminary comments in response to each of those terms of reference. The issues will of course be developed much more fully during the course of the hearing, but I do want to try and give an overview at this stage of the key issues. Now of course, as the Commissioners are all well aware the terms of reference in relation to the PGC building are set out there on the second page of my opening.

The first and obvious question is why the PGC building failed severely and why the failure caused extensive injury and death. The second issue the Royal Commission is required to address is why the building differed from other buildings in the way it failed. Third, whether particular features of the building contributed to its failure.

Then, whether as originally designed and constructed and as altered and maintained the PGC building complied with earthquake risk and other legal and best practice requirements that were current when it was designed and constructed and then on or before 4 September 2010.

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The Commission is then required to consider the land on which the building was built and whether that had any effect on the building collapse. Then the Commission is required to look at whether the building was identified as 'earthquake prone' using that as it is used as a technical term in the Building Act 2004 and finally the nature and effectiveness of the assessments that were made of the building between the initial earthquake on 4 September 2010 and the catastrophic event on 22 February 2011.

Just to then briefly touch on those various issues, on the first one the expert evidence the Royal Commission will hear involves a substantial level of agreement amongst the experts on why the PGC building collapsed as it did. The consensus, as I understand it, of the experts and that includes Beca's who did the original DBH report, the panel of experts who then reviewed that for DBH and also the Commission's own expert reviewer, Mr William Holmes from San Francisco all agree that the event that actually brought the building down on the 22<sup>nd</sup> of February was that the central core tower failed and that is outlined in yellow up there between levels 1 and level 2 and that caused large lateral displacements which triggered the collapse and, as I note in the opening, the term "shear walls" is frequently used to describe what is outlined there in yellow. So that seems to be a common view that that is what actually happened and I will expand on that a little bit more as I go through but, that said, there does still seem to be a live issue in relation to the extent which other factors might have contributed to the collapse or might have done so if the collapse hadn't already occurred. In other words, if that event hadn't brought the building down might there have been other weaknesses in the building which would then have been triggered with the same or similar outcome.

As I say in the written submission, that is an important issue because determining what the critical structural weaknesses were in this building, determining it as accurately as possible goes directly to the question of what other buildings in New Zealand might have similar problems and identifying that really obviously matters a lot.

Turning to the second of the issues that the Royal Commission is required to address, whether the building differed from other buildings in the way it failed, that will be examined of course in detail in the course of the hearing but in the report that Beca did for DBH on the collapse of the building they noted the following and I just read this. It is essentially a quote, although not quite. “The collapse of the PGC building has highlighted the potential vulnerability in large earthquakes of likely centrally reinforced shear walls with flanges and without concrete confinement.” Now there is some technicality about those words and it will be developed in the course of the hearing but that is the comment that is made about one of the major lessons to come from this and they then go on to say, “This is a particular concern where the horizontal resistance to earthquakes is provided solely by the shear wall” and again we’re back to remembering that yellow outline on the previous drawing and when one looks at that bottom photograph there it’s probably not as clear for the people sitting behind me as it would be in the original but one can see that that central shear core has fallen to the right of that photograph and it’s still standing essentially. The rest of the building has collapsed around it but the shear core has fallen to the east and is still essentially standing there but on an angle.

On the next issue the Commission has to address – this issue of compliance with the standards in place when it was built – the evidence that the Commission is going to hear from Beca’s is that the building did comply with the standards that were in place in 1963 when the building permit was issued by the Christchurch City Council. Dr Clark Hyland of Hyland Fatigue & Earthquake Engineering who is also engaged by the Department of Building and Housing to investigate the collapse of the building but on the materials

side of the investigation he tested concrete and reinforcing steel from the structural remnants of the building and he concluded that the beams and the concrete that he tested met the specified strengths at the time of the permit.

- 5 Now I do note at paragraph 11 of the opening that while again there doesn't appear to be any dispute over that conclusion that it does need to be noted that the building was almost entirely demolished before the appointed Department of Building and Housing team, including Dr Hyland were able to get access to the site. It was down I think to about level 2 by the time they got  
10 in there and, as Dr Hyland acknowledges, that inevitably meant that there was some limit on the extent of the testing that could be done.

On the fourth issue that's listed in the Commission's terms of references, the Beca report concludes that soil conditions had no bearing on the collapse of  
15 the building, unlike a number of the other events in Christchurch where really soil liquefaction was a significant issue, not so here, is again a view that does not seem to be disputed amongst the experts.

On the two other issues that the Royal Commission is required to consider –  
20 first whether the building was identified as earthquake prone and then, secondly, the assessments that were carried out between September and the collapse in February, they will be examined during the course of the hearing but I do just note at this stage that the Beca report did conclude that prior to  
25 September 2010 the building achieved between thirty and forty percent of the new building standard when assessed against the New Zealand Society of Earthquake Engineers' Guidelines. Now as the Commissioners will know, and it was dealt with in detail at the previous hearing, at thirty percent the building would have come within the definition of an earthquake prone building under both the Building Act 2004 and the relevant regulations and  
30 also the Christchurch City Council's Earthquake Prone Policy that was in place at that time. However, the PGC building was never formally identified as an earthquake prone building and even if it had been there would have been no material regulatory response that would have been triggered by that

at that time and, again as the Royal Commission knows from the last hearing, that is because at that time the Christchurch City Council had a purely passive earthquake prone policy and so identifying it as an earthquake prone building would not have triggered any deadline by which any up-grading would have  
5 been required.

Turning finally then in relation to those terms of reference to the assessment question, there were five structural assessments that were carried out between 4 September and 22 February. The first was the one done by the  
10 Council under its emergency powers that were in place immediately after the September earthquake and that resulted in a green sticker, and Mr Steve McCarthy from the council will give evidence about that as well as some other matters. Following that there were four assessments done by Holmes Consulting Group. The evidence the Commissioner is going to hear from  
15 them I think is going to say that as far as the engineers who did the assessments were concerned that they were all what they regarded as level 2 assessments and what that means is a matter that will be dealt with by Mr John Hare in his evidence. He is a director of Holmes. All of those assessments concluded that the building was safe to occupy or words to  
20 similar effect and the Commission will be hearing from the two engineers from Holmes who did those assessments, Mr Whiteside and Mr Boys, as well as I have already noted from John Hare. Turning then to the question of the information that the Commission has obtained preparatory to this hearing. Since the building collapsed, as has been the case with a lot of other buildings  
25 that we have been looking at, extensive power has been made of the Commission's statutory powers to require information.

**JUSTICE COOPER ADDRESSES MR MILLS:**

- Q. Extensive use I think you meant to say.
- 30 A. Sorry what was that?
- Q. I think you meant to say extensive use has been made by the Royal Commission.
- A. What did I say?

Q. Extensive power.

A. Extensive use, yes, you are right, thank you Your Honour.

**MR MILLS CONTINUES:**

5 So extensive use has been made of those powers by counsel assisting but of  
course as with other cases those information requests and this hearing are  
simply part of the same process and the hearing continues that fact  
investigation. The Department of Building and Housing, as I have already  
mentioned, also has conducted an investigation into the collapse of the PGC  
10 building. Its report was released publicly in late September. The Royal  
Commission is required under its terms of reference and in determining the  
sequence of its own enquiry to have regard to the availability of the  
department's report and the timing of this hearing has been deliberately  
scheduled to allow that report to be considered as part of this hearing  
15 process. It does not bind the Commission in any way, it is merely another  
piece of evidence relevant to the Commission's enquiry but the Commission  
was required to have regard to its availability in scheduling this hearing.

Just to touch briefly then on the process that the department itself has  
20 followed in the work that it has done and its investigations and it is the same  
process that has been followed in the two other buildings that it has already  
reported on which is the Hotel Grand Chancellor and Forsyth Barr with the  
CTV building report still to come. It has had two principal components. First, it  
has involved the appointment of structural engineers to prepare reports.  
25 Second, those reports have then been reviewed by a DBH panel of experts.  
As I have mentioned before in the case of the PGC building, Beca was the  
firm selected to prepare that initial report and the Commission will be hearing  
from two Beca engineers who were involved in the report preparation. In  
addition and at the Commission's request the Commission will be hearing  
30 evidence from Mr Nigel Priestley, a distinguished member of that review  
panel. The Royal Commission again, as I mentioned briefly previously, has  
engaged its own distinguished independent reviewer to assess both the  
investigative process that has been followed by Beca and the panel and also

the conclusions that have been reached, and Mr William Holmes, the San Francisco based reviewer will also be giving evidence in the course of this hearing.

5 I want to turn now to just to set out the chronology of the history of the PGC building and I have asked for a brief form of that chronology to go up there. I think the Commission has been given fuller chronology, so this sort of picks the eyes out of it. I am going to go through this but I thought it would be helpful for people sitting in this hearing to be able to possibly see it for  
10 themselves as I go through it. Now I should just note about this that the, and I make this point in paragraph 22 of the opening, that the chronology is not strictly speaking an agreed chronology. The process it was followed, there was a draft circulated to all affected parties and interested persons. Not all replied but as the chronology is based on documentation that has been  
15 produced to the Royal Commission any disagreement seems likely to be that something has been omitted rather than something is in there which is incorrect.

So starting the chronology, 29 October 1963 the building plans were prepared  
20 by Paul Pascoe and Linton, a firm of architects. The structural engineering work was done by I L Holmes, the predecessor firm of Holmes Consulting Group. An application for a building permit was granted by the council in 1964 and as best I can ascertain the building appears to have been constructed in about 1965-1966. These dates of course all being relevant to the regulatory  
25 requirements and standards that applied at the time the building was designed and built.

The building was originally owned and occupied by the Christchurch Drainage Board. The Christchurch Drainage Board was subsequently merged into the  
30 Christchurch City Council so at that point the Christchurch City Council became the owner of the building and the council owned it until 1997. At that point it was sold to Pyne Gould Corporation Limited. The sale was registered on 5 March 1997. Now some significance to the issues in this hearing, and it



will be dealt with in the evidence, shortly after the sale and at the request of PGC, Holmes carried out a seismic assessment of the building and that was done, not by reference to the standards that applied when the building was built but by the standards that then applied in 1992 under NZS 4203. That, of course, by then had replaced NZS 95. Now the Holmes report concluded that  
5 assessed against that standard –

**JUSTICE COOPER ADDRESSES MR MILLS:**

Q. What standard are you talking about?

10 A. I am talking about NZS 4203 1992 which was the one, as I understand it, they did this assessment.

Q. And that was in force?

A. 19, I think 1992 and this is 1997 they are now doing.

Q. Yes.

15 A. Yes, the assessment.

**MR MILLS CONTINUES:**

Their conclusion, I am going to have an extract from this put up as soon is convenient, assessed against the 1992 standards Holmes identified some  
20 potential issues with both the shear walls and with the columns. Now I have set out from the executive summary there but I will have it put up as well because I imagine this will be a matter of some significance to a number of people. Again if that can be expanded it would be helpful.

25 So you will see there what the Holmes report concluded that, “The column plastic rotations in the gravity columns exceed their capacity for earthquakes with a return period of from 35 to 70 years, one-third to one-half of the NZS 4203 loadings. The consequences of this are severe as the columns would lose gravity support capabilities leading to extensive collapse.” Then on the  
30 question of the shear wall the report concluded that, “That also initiated at relatively low loads. Cracking is generally limited to coupling beams and around openings. This cracking would lead to permanent damage but the consequences are not as severe as column damage, as the wall portion

support only small tributary areas of gravity load. An alternative gravity load system should be provided as a matter of some urgency, given the small return period” - that's a reference to the earthquake return periods, – “for severe damage and the consequences of this damage”. And then a comment about what would be done to the shear walls if it was to be done. They could be strengthened “by adding concrete to the wall face which will reduce damage to the walls, but not eliminate it unless all walls are strengthened. Wall strengthening will not significantly reduce the danger of column collapse as foundation rocking and wall flexural yielding imposes rotations on columns regardless of wall shear strength.”

So that's the executive summary as an accurate depiction of what the body of that report says and I want to now go to the next slide which also relates to the same report. Again if that could be enlarged that would be helpful.

The important – well all of it may be of interest but the part that I particularly want to draw attention to is the preliminary recommendations at the bottom of that page, sorry in the middle there, “From this we conclude the following. The potential failure of the columns is a life safety issue as it could result in the loss of support and consequential collapse of all or part of the building.

“The cracking and movement of the walls” – and this is a reference to the shear walls, repeating what was said earlier – “does not appear to carry any life safety implications. The failure is concentrated in the lateral walls which do not carry significant gravity loads. However as the damage becomes more extensive the lateral load carrying capacity drops resulting in increased deflection and consequent non-structural damage. This may have implications for business continuance in the event of a major earthquake unless personnel and resources can be temporarily relocated.”

Now coming back to my written opening at paragraph 29, Holmes advised that the work recommended to address the life safety issues was essential as we've just seen, but the damage reduction measures were optional, the shear wall issues. PGC subsequently carried out the recommended life safety work

but not the optional measures and that work that was done under the life safety issues involved additional steel columns that were added to the existing perimeter reinforced concrete columns. Their purpose, and this is to be noted in light of what happened I think, the purpose was to enhance the vertical load bearing capacity, not the horizontal resilience of the building.

Now moving on, in July 1997, if we could just go back to chronology that was up there, in July 1997 a resource consent was granted for alterations to the facade, and in April 1998 an application for building consent for an office fit out on level 4 was made and there were code compliance certificates for all of that work. In May 2001 there was a new roof support beam put in, again code compliance certificate issued. This is really, in the end I don't think of any ultimate relevance but just the history of the building which I thought I should go through.

In 2004 and 2005 there was further work on levels 3 and 4, and in 2007 there was a code compliance certificate issued for an office fit out on level 1. Now a matter of more current significance is the point I deal with in paragraph 34. In 2007 the Pyne Gould group considered various options for the redesign of the building. There are canvassed issues such as another floor on top, another building at the back and various other possibilities and in the course of that advice was again sought from Holmes and the structural performance of the building was again reviewed.

I'm not going to deal at the moment with that advice that was given at that point, I think it's better that that be dealt with in the course of the evidence, but there are one or two points there that also will have some interest. An application for a building consent to fit out the ground floor offices was made. The consented work was carried out and the Commission will hear evidence about that.

The building was then sold on the 15<sup>th</sup> of September 2009 to its current owner, Cambridge 233 Limited. Mr Steven Collins is the sole director of

Cambridge 233 Limited and a trustee of the trust that is the sole shareholder of that company, and he will be giving evidence. After the building was sold PGC continued to lease the ground floor of the building. Other members of the Pyne Gould group, namely Perpetual and MARAC occupied the first and  
5 second levels in the building. The third level was occupied by the Education Review Office and Leech and Company, an accountancy firm, and level 4 was occupied by Marsh, the insurance broker firm. So that's the history really of the building up to the present.

10 Turning then to the earthquake events and the inspections of the building following those. Now as we all know well and it will be dealt with in more detail in the evidence, the building did suffer damage in the 4 September magnitude 7.1 earthquake. Following that the first of the assessments was carried out and as I mentioned before it was done by the Council under the  
15 emergency power provisions it was, what is known as a level 1 assessment, and it resulted in a green sticker, so on the 5<sup>th</sup> of September it's green stickered.

Now as I mentioned before and I just expand on this a little bit more now,  
20 Holmes was engaged by the building manager, Harcourts or NAI Harcourts to use its strict term, to inspect the building. The instructions to do that as I understand it from the written brief that's come from Mr Collins, came from him. He directed Harcourts to arrange an inspection of the building. Harcourts then arranged it. There was a standard form contract entered into,  
25 I'm just going to ask for that to be put up, between Harcourt and Holmes which described the required work and as you will see when it goes up, it's referred to in the written opening as well, again we'll just need to enlarge that a little bit, there's the contract, it was a Holmes contract, entirely standard form and we will see momentarily I hope just under that information of  
30 services or information or services, that's the part we want enlarged, so the contract was – that's not the part I'm looking for, it's the actual content.

Any rate it's the part that says, "Initial earthquake inspection. Securing measures as considered necessary." There we are, so that's the scope of the services that were required, initial earthquake inspection, securing measures as considered necessary. And the evidence indicates that while

5 that was the only contract that was signed and it was signed initially for this first inspection, that it continued to apply for the subsequent inspections that were carried out, although evidence will be given about the specific discussions that took place and so on around each of these inspections.

10 So in the course of this hearing the Commission will hear from three Harcourt witnesses about the instructions that were given to Holmes, the verbal instructions that were given as well as their understanding of this, and Mr Collins will also give evidence about the instructions he gave to Harcourts, and the reports that he received from the firm from time to time between

15 September and the end of February.

The first of the assessments that were carried out by Holmes was the 7<sup>th</sup> of September so it really just comes right on the heels of the Council's assessment essentially doing what the wording on the Council green sticker

20 encourages owners to do which is to get their own assessments and so exactly that was done.

The initial inspection was carried out by Mr Mark Whiteside who was a Chartered Professional Engineer with Beca's and that inspection appears to

25 have been what engineers refer to as a 'level 2 rapid assessment.'

**JUSTICE COOPER:**

Q. Did you say he was employed by Beca's Mr Mills?

A. Sorry, by Holmes I'm sorry.

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**MR MILLS CONTINUES:**

- a Chartered Professional Engineer with Holmes and that appears to have been considered as, by the engineers, as a level 2 assessment. The

assessment confirmed the green sticker that had already been placed on it by the Council and there's the essence of the report. The Commission will see there the last line that it confirmed 'green placard – building okay to occupy (structurally)' and Mr Whiteside will give evidence.

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The second Holmes' assessment is dated 16 September. It too appears to have been a level 2 rapid assessment. There it is. This one was prepared by a Mr Alistair Boys who was a structural engineer but, at least as I understand it, not a CP Eng. qualification. It retained the green status and you'll see there again the observations and comments – 'all cracks observed minor in shear walls'. Refers then to other cracks, inspection of the parapet and simply observes it's okay to park below the parapet. So essentially while it doesn't go into great detail, it is confirming the green sticker.

The third assessment from Holmes was done on the 15<sup>th</sup> of October. Again this went back to Mr Whiteside as did the fourth one and there is his report just coming up now and what he concluded there was again, you'll see that last line there – 'Building remains structurally okay to occupy on above observations' but when you look at what the observations are, at least as I read that report and he'll be asked about this, is that they relate to the ground floor and the second floor, both of which say, "No structural issues." Conclusion: "Building remains structurally okay to occupy on above observations." You'll also note that it was limited on the face of it to those two issues – the ground floor and the second floor – and the Commission will hear evidence from witnesses who were involved in seeking this further assessment and we'll just have to examine issues around this interface between what tenants and others were asking for, what the engineers were doing, and so on. That's the report.

Turning then to paragraph 44 of my opening and the fourth inspection, this was carried out on the 27<sup>th</sup> of January after Boxing Day of course and it was the result of another aftershock and the tenants had discovered new cracks in the building which had caused concern and they had asked for this further assessment and again there's what it concluded – "Building remains safe to

occupy”, the third bullet point there or arrowhead. You’ll see that it’s described as re-inspection of previously observed damage on level 1 and new cracks, the new cracks being the ones which the tenants had asked about and had expressed concern about.

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The other aspect of this that I just draw the Commission’s attention to at this point which I pick up in paragraph 45 is that throughout this period from the September earthquake and up to the end of January 2011 Harcourts was issuing monthly reports on the PGC building to the owner and it included a section each month on earthquake issues and throughout that period, with one exception which I’ve noted, the advice was the building was structurally safe to occupy. That was the monthly reporting that went out from Harcourts. The one exception I’ve noted was the status of the building at 31 October, the end of the month report for October which said, “Engineers’ re-inspection after large aftershocks, earthquakes and I’ve taken you to the report that came after that but, other than that, but other than that it was consistently structurally safe to occupy and I think the Commission will hear in the evidence from the tenants and the staff in the building that that reassurance was, that sort of reassurance, not coming from Harcourts but coming from the engineering assessments, was repeatedly conveyed to the tenants and the staff.

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**JUSTICE COOPER:**

Q. Mr Mills, the 27<sup>th</sup> of January report was presumably prompted by the Boxing Day event?

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A. No, not specifically. There was apparently, it’s not identified precisely but the correspondence, the email chain which I will take the Commission to during the course of the hearing identifies a large aftershock. It doesn’t appear to have been the Boxing Day event.

30 Q. I see but it was some event that occurred –

A. Post Boxing Day in February which the tenants considered to be cracking that caused alarm and that led them to press for another assessment.

Q. Well going back then to what was said in this monthly report in October that you mention in paragraph 45, the status is given as, 'Engineers' re-inspection after large aftershocks and earthquakes'. That is being said after the third assessment had been received presumably.

5 A. No, I think probably what happened and I'll have to ask Harcourts about this but it's a routine end of month reporting date that will be picking up issues during the month so of course it's encompassing that third assessment date of the 15<sup>th</sup> of October. Exactly how this –

10 Q. Well is it saying effectively there was an engineer's re-inspection. Is it looking backwards rather than –

A. It says what I said in that note there but again it may just be the way in which these things are done so that when the end of the month report is done it hasn't picked up the fact that by then the assessment had been done but when I look through the monthly reports that's the only month  
15 in which I didn't find the repeated statement, "Safe to occupy."

Q. So there was a report was there at the end of, or for the end of November –

A. Yes.

Q. – in which the same words were used?

20 A. "The building was safe to occupy". It's the same every month except for that one month. That was the one that I noted when I was reading them through that changed the language, changed the advice.

**MR MILLS CONTINUES:**

25 I turn then to the actual building collapse at paragraph 47 of the opening. Now of course –

**JUSTICE COOPER:**

Q. Did you read paragraph 46?

30 A. Yes, well I made reference to it. As I said, the re-assurance, and in case there's any ambiguity in the written form of it, it's not the re-assurance that was conveyed from Harcourts to the owner of the building. It's the re-assurance that came through the engineering



assessments was fed through into various tenants and others and the message appears to have been essentially the same, at least in the way it was interpreted as what was being passed on by Harcourts, the building owner, the building was safe to occupy although in fairness to the engineers who did this work and as you will have seen and we will come back to this, the precise wording used in those assessments was on occasion did not use that precisely. Mr Boys, for example, does not use that language, just continues the green sticker and as you saw some of the ones from Mark Whiteside had some other words added, remember the one that had in square brackets “structurally” but essentially in my submission what they add up to and what they were taken to mean was the building is okay to occupy. But it will be the subject of evidence.

**15 MR MILLS CONTINUES:**

Turning then to the collapse. As we know the building collapsed in that 12.51 am [*sic*] earthquake on the 22<sup>nd</sup> of February, and if we could just go back to those original photographs, we might as well keep those up while we are dealing with this aspect of it, in its report to the Department of Building and Housing, Beca concluded that, “The building collapsed eastwards,” and we can see that there, collapsed from west to east.

**JUSTICE COOPER ADDRESSES MR MILLS:**

Q. Let us just orientate ourselves. North is at the top of that image, is it not? So the east is to the right. The west is to the left. Is that right?

A. That is correct. And that photograph does indicate very clearly, or confirm very clearly, what Beca has concluded about the direction in which it collapsed, and as I note in paragraph 48 the principal direction of ground shaking in this February event was east/west, so it was hitting it from those sides. Beca’s conclude, “That the collapse was initiated by combination of...” what engineer’s, I have learned, refer to as ‘tension’, “in the western wall of that central core, the shear wall which caused that wall to yield,” and then again that engineer’s term, “compression on

the eastern wall which caused the wall to collapse catastrophically,” so that is in essence my understanding of what Beca’s say and I will be corrected pretty quickly by the two engineer Commissioners but in lay terms what I generally understand that to mean is that that western wall stretched as it was pushed, then that eastern wall was squashed as the wall came over on to it. Tension on the one side, compression on the other. The other thing that Beca’s do and again I think you can see that in that photograph is that they say the point of failure was between levels 1 and 2 and the conclusion is supported in the Beca report by, I think, it is that photograph. You can see that parts of the, well the ground floor is still substantially standing as are parts of level 1. The Beca report concludes that, “The perimeter columns and/or the joints between the columns and the beams and the connections between the floor slabs and the shear core,” so two things, columns and beams, the connections, “and also the connections of the floor slab to the shear core gave way and that then caused the building to pancake.”

**MR MILLS CONTINUES:**

The DBH panel report observes that, “A feature of the PGC building that affected the way it responded to February earthquake was that between the ground floor and level 1 the structure was significantly stronger and stiffer than it was immediately above level 1.” That explains why the ground floor was still standing and also had an impact on the way the building responded and rather than try to turn myself into an engineer I will simply note that that will be dealt with in detail in the expert evidence, but that was a contributing factor.

The PGC report, and I am now at paragraph 51, also concluded that, “The ground shaking the building was subjected to in an east/west direction was several times more intense than the capacity of the building to resist it.” In other words much more force than the building was designed to resist. So there is the summary from their report of the way the collapse occurred.

Now the Beca witnesses and Messrs Nigel Priestley and William Holmes will address these issues in more detail and again, as I understand the report that I have seen from Mr Holmes, he does not disagree with the central thesis of the Beca report but he has identified some further issues that he will address  
5 in his evidence.

In paragraph 53 I note a point that has come out of correspondence between counsel assisting and Beca's about this issue that was identified previously by Holmes when they were recommending the work that should be done back in  
10 1997 and the issues that have now occurred in February and Beca has said in this correspondence that, "To the best of its knowledge the reference to the shear walls in that 1997 Holmes Group report which was not considered at the time to give rise to a life safety risk is a reference to the same structural element that has now been identified as the cause of the building collapse."  
15 But having said that it does need to be emphasised that Beca make no criticism of the conclusion that Holmes reached in 1997. In their view it was reasonable to reach that conclusion in the state of knowledge at that time. They observe that it is only with hindsight and with the experience of what occurred in February that this view now appears overly optimistic, and they  
20 observe that in hindsight overly optimistic, insufficient recognition of the possibility that the flanges of the shear core could fail to the point where they could no longer carry the vertical load when the building was subjected to overload. Now of course those issues again will have to be explored in the course of the hearing but at this point anyway I do say it is important that that  
25 linkage that Beca's have made is put in that context.

I turn then to some issues that have emerged about, from the tenants really, the tenants of the building and staff of the tenants about concerns that they had between September and the February collapse, and as I think the  
30 Commissioners will be aware during that period there were a number of concerns being expressed by tenants and we have already seen some of that when I put up the four assessments that were done by Holmes which came generally off the back of concerns being expressed by tenants and by staff.

There are a number of people who have come forward to provide evidence about this and not necessarily evidence here but meetings that have been held with counsel assisting and as a result of that a schedule has been prepared which was prepared by my learned friend, Mr Elliott, and that has  
5 been provided I think to the Commission. What it does is it sets out the observations that people made about the building between the 4<sup>th</sup> of September and the 22<sup>nd</sup> of February. It does not identify the size of the listed cracking or separate out the structural from the non-structural components so obviously from the point of view of forensic analysis it is lacking some issues  
10 that no doubt the engineers on the Commission would want to have, but it does appear to be an accurate record of what was observed and some of these issues will be dealt with in evidence that the commission will hear today and more questions can be asked about the location of some of these cracks so it is put into evidence simply on the basis that this appears to be an  
15 accurate record of what the tenants and the staff in that building observed and raised during that period from 4 September to 22 February.

The schedule was given to the current owner of the building. It was also given to Holmes and to the Pyne Gould Group and to Beca. None of them disagreed  
20 with the content of the schedule although they are not all in a position to positively affirm every item either and so it is just simply put in on that basis and it has been put on the Commission website.

I just then turn to one particular aspect of these tenant and staff concerns and  
25 that is picked up in paragraph 58 and I just observe there that some tenants have notified counsel assisting of concerns they had with the building following the 4 September earthquake that included cracking of the shear wall and the columns. They have also raised some concerns about construction work that was done on the building that they thought might have reduced the  
30 strength of the shear core. The commission will hear evidence about that, that there were openings that were cut in to the shear core in the course of changes that were being made and some of the tenants were, I suppose in

retrospect and in some cases at the time, concerned about whether that might be impacting the strength of the building.

5 So I have listed there two matters that the tenants have raised with counsel assisting. The first is cracking around the shear walls and columns, that they observed after 4 September, and second this work that was done to the building before September the 4<sup>th</sup> which included alterations to the ground floor in 2008 and workmen cutting through beams to install air conditioning.

10 Now that said, the Beca report looked at these matters and concluded that the primary cause of the collapse, while it did relate to the shear core they did not consider the damage observed prior to the collapse should have been seen as any warning of the collapse that ultimately occurred. Again, it might be contested in the course of this hearing but that is the view they expressed.

15 They also expressed the view that the modifications to the building structure including an additional opening into the shear wall on level 1 that was made in 1998 following that Holmes report in 1997 and with advice from Holmes about what they could do and how they should do it, that that was not a significant contributor to the collapse either, although it is interesting looking at the notes  
20 that Holmes did at the time about this as to how carefully this work was being done and the Commission will see that during the course of the hearing.

So as I say at paragraph 61 it is not proposed to call evidence about the areas of damage which do not appear to have been causative of the collapse. There  
25 will be some evidence given about that when we call witnesses who were present in the building during the period that we are interested in but in general we have not decided to call a lot of evidence about the cracking and so on, so unless at some point the Commission itself wanted to hear more about that, that is where we have left it because it does not appear at this  
30 stage to have been causative of what happened in February although that remains potentially a contestable issue.

I turn now to the inspections issue which I have touched on before from the engineering assessment end but now I just want to just touch on it from the tenant end and the concerns that they were expressing and how they understood the assessments that were being done. Now as I note at  
5 paragraph 63 tenants repeatedly raised concerns about the building and identified new cracks and other areas of concern. They were told, and this is all in the email trail, including by Harcourts, that engineers had been brought in to check the building. In the period from 4 September to 22 February they were repeatedly assured that the engineers' reports said that the building was  
10 safe to occupy or advice to similar effect and they will be asked when they give evidence about their understanding of that, but that's what the email chain certainly supports.

Now as I say in paragraph 64, whether the advice from the engineers based  
15 as it was on only limited investigations, should have been couched in the terms that the building was structurally safe to occupy, or indeed even whether the assessing engineers meant to convey that in the way in which a lay person would understand it is an important issue, maybe an issue here about the way in which this is conveyed engineer to engineer, but then when it  
20 feeds through to lay people whether there is a mismatch between understandings between those two groups in their understandings of what's been said.

Again Beca has reviewed the engineering assessments that Holmes did  
25 during this period, the four assessments that were done and concluded that the damage which would have been evident to the engineers who inspected the building following the 4 September and Boxing Day earthquakes, gave few if any signs that the building had been significantly distressed in the shaking that had occurred, or that the collapse or a collapse was a possibility. I  
30 observe though that it does remain the case as the Commissioners will be well aware, that what is involved in a level 2 assessment is relatively limited and that will be dealt with specifically in Mr John Hare's evidence where he describes his understanding of a level 2 assessment.

So that's the substantive opening. I'll just now touch on the hearing structure so that people who haven't seen the detailed schedule will understand what's coming. Now the hearing is expected to take five days, there are four hearing  
5 days this week and then a further day on Monday next week, and continuing into the Tuesday morning if that is required, although it's not expected at this point that it will be. The first witness the Commission will hear from is Mr Robert Wynn. He was a witness to the collapse and he will simply describe what he saw as he watched the building come down. Following Mr  
10 Wynn, the Commission will hear from four witnesses who were all employees of tenants in the PGC building. They were all in the building when it collapsed on the 22<sup>nd</sup> of February and they will describe their experiences of the building both before the September earthquake and after that, and before the 22<sup>nd</sup> and also their experiences on the 22<sup>nd</sup> which were obviously very harrowing.

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The first of those is Helen Guiney who worked for Perpetual. She's followed by Julia Stannius who worked for MARAC, and then by Glenys Ryan who was with the Education Review Office, and then David Sandeman who was with Marsh. They have been selected on the basis that there would be one  
20 witness speak from each floor, each tenanted floor of the building. They are followed by Mr Stephen Collins for the building owner and then by Mr McCarthy for the Council.

As I say at paragraph 71, Mr McCarthy's evidence is expected to continue into  
25 tomorrow and he then is followed by Mr Colin Hair, the company secretary for Pyne Gould. By reference to the documentary record he will give the history of the PGC building during Pyne Gould's ownership of it.

After the morning adjournment tomorrow the Commission will hear from  
30 Mr James West, the Operations and Financial Controller for Pyne Gould Corporation. Its evidence includes an account of the observed damage and the engineering assessments.

Following Mr West the Commission will hear from Helen Golding who is an employee of Pyne Gould. Her name appears in quite a lot of the emails which relate to the assessment process which is why I'd asked that she was prepared to give evidence and so she will give evidence about the communication of the engineers' advice to the tenants.

5 She is then followed by the three Harcourts witnesses who will give evidence about the engineering assessments as well and the advice that Harcourts gave to both the building owner and the tenants.

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Following the afternoon adjournment tomorrow if we run to time the Commission will hear from the two engineers from Holmes who did the four inspections. That evidence is expected to continue through until Wednesday morning and, as I noted previously, because Mr John Hare, a Director of Holmes, is not available to immediately follow them which would be the logical order, he will be heard from on the Monday and so following the two engineers from Beca's the Commission will hear from the expert witnesses or start hearing from the expert witnesses.

15 The first two expert witnesses, as the Commission knows, are Mr Rob Jury and Dr Richard Sharpe from Beca and they will speak jointly to the report they prepared for the Department of Building and Housing. They will do that by reference to Power Points and that evidence is expected to continue into the Wednesday afternoon.

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Following that afternoon adjournment the Commission will hear from Professor Nigel Priestly who, as I mentioned previously, was a member of the expert panel that reviewed the Beca report and I've simply noted there that he has been asked to appear in his own right not as a representative of the panel. That evidence is expected to continue into Thursday of this week, day 4, until about lunch time.

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After that evidence concludes the Commission will then hear from William Holmes, from Rutherford and Chekene, San Francisco. Again, as I mentioned previously, he is the distinguished peer reviewer engaged by the Royal Commission to look at both the process that was followed in the preparation of the Department's report on the PGC building and also the substance of the report and its recommendations and findings.

We then go into next week and on the Monday John Hare will give evidence and that's followed by an expert panel so to that extent it follows a similar procedure to what we've adopted in earlier hearings. It seems to be helpful to do this and that expert panel will consist of Messrs Jury and Sharpe, Professor Priestley and William Holmes. It is principally intended as a chance for the Commissioners to engage directly with that group, for them to engage with each other and to explore some of the difficult issues that remain.

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Finally the Commission is going to hear from the Department itself and Mr Dave Kelly who is the Deputy Chief Executive of the Department will give evidence. The Department was invited to appear by counsel assisting as we develop this hearing programme principally to address the recommendations that come out of the Beca report and the expert panel report. As the Commissioners are aware, there are a number of recommendations in there that address the lessons that have been learned from the tragedy of the PGC building collapse. Recommendations have also been made about the Hotel Grand Chancellor or the issues coming out of that and also Forsyth Barr, particularly the stair collapse in the Forsyth Barr building and its implications and the Royal Commission of course also in its interim report made a number of recommendations about urgent steps that are needed. Because a number of those steps are going to require legislative change or some other form of intervention by the principal regulator of this area which is the Department of Building and Housing, the Department wish to address these issues or perhaps more accurately they are invited to address these issues and after discussion it was also thought that this hearing rather than after the Grand Chancellor hearing or after the Forsyth Barr hearing was the most appropriate

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one for the Department to be heard to give its current thinking and views on statutory and other regulatory changes that might be required to give effect to these recommendations and, as I say in paragraph 82, the decision to do it here is really because of the few comforts that can now be offered to the families of the bereaved and those who were injured is the assurance that lessons have been learned and they will be addressed which ultimately means they need to be addressed by those with decision-making power, local authorities and the Department.

10 So that's the hearing structure. I've set out and I don't think I need to read this out. I just made a note there for the Commissioners about which witnesses are going to be led by their own counsel and there are six witnesses where they have got their own counsel representing them and, as they are entitled to do under the practice note for this hearing, they have elected to have their own counsel read that evidence.

15 So unless there are any other matters I will call the first witness.

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