

In the matter of the Commissions of Inquiry Act 1908

And

In the matter of the Canterbury Earthquakes Royal Commission

Brief of evidence of Henry John Hare

Date: 28 November 2011



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I, **Henry John Hare**, of Holmes Consulting Group Limited, Unit 5, 295 Blenheim Road, Upper Riccarton, Christchurch, do solemnly and sincerely declare that:

Qualifications and Experience

- 1 My full name is Henry John Hare.
- 1 I am a Director of Holmes Consulting Group Limited ('**HCG**'). I have a Bachelor of Engineering (Civil) with Honours, and am a Chartered Professional Engineer. I hold professional memberships with the Institution of Professional Engineers, the Structural Engineering Society (of which I am the current President) and the New Zealand Society of Earthquake Engineering. In addition I am a licensed Professional Engineer in California.
- 2 I have over 25 years of experience in structural engineering in New Zealand, England, Hong Kong and the United States, where I was resident from 2000 to 2005. The majority of my professional career has been with HCG, where I have worked at various times in Auckland, New Plymouth and Christchurch. My project experience has been mainly in buildings, with a combination of both new building design and evaluation and strengthening of existing buildings. I am currently seconded for the majority of my time to CERA where I am the acting Principal Engineering Adviser.

Scope of Evidence

- 3 I, on behalf of HCG, provide this Brief of evidence pursuant to the Canterbury Earthquakes Royal Commission's letter dated 21 November 2011 relating to the Forsyth Barr Building ('**Forsyth Barr Building**').

Forsyth Barr Building Stairs' design and construction

- 4 HCG is asked to comment on whether the Forsyth Barr Building's stairs as originally designed and constructed complied with earthquake risk and other legal and best practice requirements that were current at that time.

In particular, HCG is asked to comment on the detail on page 45 of the BECA report which is described as superior to that which was used.

Response

Design and Construction

- 5 The building was designed and constructed in 1988. It was designed to predecessor standards of the current Building code, comprising principally NZS4203:1984, the loadings Standard, and NZS3101:1982, the Concrete design standard.
- 6 HCG was instructed by Colliers Property Management, on behalf of the building owner, to carry out a Post-Earthquake Assessment of the building on or around 12 October, 2010. At that time, the building capacity pre-earthquake was considered to have a capacity in excess of 67% of the code levels of the day, based on a simple comparison of the loading standard at the time of design to AS/NZS1170.5, the then-current loading Standard.
- 7 HCG's Post Earthquake Assessment and Repair Report dated 29 November 2010 is attached. The Report sets out the repairs that HCG considered were required to the building as a result of damage sustained during the Darfield earthquake on 4 September 2010 and as reviewed by HCG.
- 8 Beca Carter Hollings and Ferner Limited ('**Beca**') has been commissioned by the Department of Building and Housing to undertake an investigation into the collapse of the stairs. In a report dated 26 September 2011, Beca find that the stairs met the requirements of the day. Having considered Beca's report, I generally agree with its conclusions.

Page 45 of the Beca report

The Stair Detail:

- 9 The detail referred to at Page 45 of the Beca report is a detail that was developed many years after the original design and construction of the Forsyth Barr Building. It was not available, or used, at the time of the original design of the building. HCG asked Beca to clarify this point in its report prior to its publication but it appears Beca elected not to. The Beca report states that this detail 'should be encouraged as an alternative in **new** construction' (my emphasis). I note further that this detail has typically been used by HCG since approximately the early 1990's. Prior to that, the detail used in the Forsyth Barr Building represented standard industry practice, as I recall it.

HCG's Assessment and Repair Report following the 4 September 2010 earthquake

- 10 HCG is asked to comment on the circumstances of HCG's inspection and report following the 4 September 2010 earthquake, including 'the apparent failure to inspect the building's stairs'.

Response

Extent of Instructions received

- 11 HCG was instructed by Michael Connolly of Colliers Property Management on behalf of 764 Colombo St Limited, to complete a structural review of the Forsyth Barr Building following the Darfield Earthquake that struck on 4 September 2010. Instructions were received from Michael Connolly in an email of 12 October, 2010. A copy of the email and the attached HCG proposal dated 8 October (unsigned) is attached.
- 12 There was no specific mention of the stairs in HCG's proposal.
- 13 The only written instructions I can identify which make specific reference to the stairs are as contained in emails to HCG from Michael Connolly of Colliers Property Management dated 12 October 2010 and 4 November 2010, as attached.

- 14 Mr Connolly's first email, identified as 'Item 1' on the attached copy, is timed at 9.58am on 12 October 2010. The email was addressed to me. The email reads:
- Please proceed with this report asap. Andy Christian of Pace has done a survey of the building so can advise on some areas of concern. I want to be sure the stairs are ok and fixed correctly. Please note some cracks were covered by the plasterer and these need to be double checked and probably filled correctly.*
- 15 HCG was unable to start the review of the building immediately following receipt of instructions from Michael Connolly because of competing work demands.
- 16 HCG seconded in a Project Engineer, Mark Sturges, from an associated company in Australia who was tasked with conducting the review. Mr Sturges arrived in New Zealand on 31 October 2010.
- 17 On 1 November 2010, Mr Sturges and I met with Andy Christian of Pace Project Management on site and walked through the building.
- 18 I recall discussing the proposed repair work with, I believe, Andy Christian. The repair work being undertaken in the stairs at the time consisted of repairs to the gib board linings, required primarily in order to restore the integrity of the fire protection. As these repairs were to non-structural elements, the consensus was that there was no specific structural review requirement of priority in relation to the stairs. My understanding at the time was that the work to the stairs had been instructed by, or with the knowledge of, the engineers previously involved with the building.
- 19 In light of this, in my briefing to Mark Sturges, I recommended that he concentrate initially on the primary structure which would then inform us of any need for a more detailed review of the secondary structural elements and fixings, dependent upon the extent of obvious damage and evidence of excessive displacement.
- 20 I sent an email to Michael Connolly at 4.37pm on 3 November 2010 as a brief update following the on-site inspection which took place on

1 November 2010. A copy of this email is attached and identified as 'Item 2'.

- 21 Michael Connolly responded by email at 7.48am on 4 November 2010. His email read:

Thanks for this. I have a concern about the apparent "drop" in the stairs. I assume your report will cover this and the best way to repair.

A copy of this email is attached and identified as 'Item 3'.

- 22 As far as I can recall, this email only came to my attention sometime after it was initially sent. It seems that it must have been overlooked in the many emails I was receiving daily at the time, noting that I was out of the office on site for much of the day during that period.

- 23 However, I recall that in discussions (either with Michael Connolly or with Andy Christian) sometime after the date of the email, 'the drop' as referred to in the email was discussed. I wished to ascertain the nature of the possible movement prior to further review. I understood from that discussion that 'the drop' was a sag in the mid span of the stairs, although it was not clear over what timeframe this sag may have actually occurred.

- 24 In light of my discussions with Andy Christian and/or Michael Connolly, as explained above, I did not consider the sag in the stairs to be of immediate concern as the sag had no bearing on what may have happened at the point of support; and there was no sign of significant lateral drift of the primary structure that might have alerted HCG to significant concern.

- 25 I understand that Andy Christian intended to have the vinyl lifted in the stairs in order to allow HCG to complete further inspections. I understand that these works had been scheduled shortly prior to 22 February 2011, to be carried out in early March 2011.

- 26 Most of HCG's verbal instructions were relayed through Andy Christian, although HCG was in regular discussion with Michael Connolly in regard

to a number of buildings and that there may, accordingly, have been periodic discussion with Michael Connolly in relation to the Forsyth Barr Building also.

Assessments and Recommendations in relation to the stairs

- 27 In light of the discussions held with Andy Christian and/or Michael Connolly, as identified above, the HCG Post-Earthquake Assessment and Repair Report dated 29 November 2010 did not provide any assessment or recommendations in relation to the stairs. This Report was seen as a 'live' document which would be amended as work proceeded. The email that accompanied the report stated:

As noted near the start of the report, this is a 'live' document, which on completion of all work can be finalised as a full summary to the owner of the damage, the repairs and the final outcome for the building. So it may go through further iterations once all work is complete.

- 28 The report was intended as a draft document, released in order to allow Pace Project Management to proceed with the further repair work specified in the report. The stairs were not specifically mentioned but this was of no consequence to the other work required.

Notes or photographs

- 29 HCG has no notes or photographs available in relation to the stairs. If there were any handwritten notes regarding the stairs, these may have been lost as HCG's former office was abandoned after the 22 February 2011 earthquake. HCG has been unable to locate any notes stored in its electronic archive.

Reports

- 30 HCG 's Post-earthquake Assessment and Repair Report dated 29 November 2010 is attached. Informal discussions regarding the report took place but HCG has no further specific records about these discussions.

Inspections by other parties

- 31 HCG is not specifically aware of any inspection of the stairs being carried out by any other person except those identified in the report prepared by Beca Carter Hollings & Ferner Limited (**Beca**), who were instructed to investigate the collapse of the Forsyth Barr Building stairs for the Department of Building & Housing.
- 32 Beca's report confirms that a level 1 rapid assessment was undertaken on 5 September 2010 which resulted in the building being initially placarded red (unsafe).
- 33 This was later revised by the level 2 assessment undertaken by Beca on 5 September 2010, first to yellow (restricted access) and, on 6 September 2010, following further investigation of the stairs (breaking open the timber framed bulk heads under the flight with the most apparent movement and checking the seating of the lower landings - which indicated no significant movement) and propping of a vehicle ramp in the podium, to green (inspected).
- 34 The Level 2 Seismic Assessment report of 6 September (not supplied to HCG) discusses the 40mm drop as flexural cracking at mid-span of the stair, concluding that:

...Although the deformations in that stairs are significant, we believe that the stairs still contain sufficient capacity for normal use.

Date: 28 November 2011

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Henry John Hare