

**UNDER**

**THE COMMISSIONS OF INQUIRY ACT 1908**

**IN THE MATTER OF**

**ROYAL COMMISSION OF INQUIRY INTO BUILDING  
FAILURE CAUSED BY CANTERBURY EARTHQUAKES**

**KOMIHANA A TE KARAUNA HEI TIROTIRO I NGĀ  
WHARE I HORO I NGĀ RŪWHENUA O WAITAHA**

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**SECOND STATEMENT OF EVIDENCE OF PETER NICHOLS IN RELATION TO THE  
CTV BUILDING**

**HEARING BEGINNING: 25 JUNE 2012**

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1. My full name is Peter Nichols. I live in Christchurch. I retired at the end of 2003.
2. I have previously provided a Statement of Evidence to the Royal Commission (**WIT.NICHOLS.001**). The purpose of my Second Statement of Evidence is to provide additional information about my role as a Council Structural Checking Engineer and the approach of structural engineers to the design of columns in shear wall structures. I also make further observations about my visit to the CTV building while it was under construction.
3. Since preparing my First Statement of Evidence I have taken the opportunity to review more thoroughly, in my own time, a complete set of structural drawings and this has assisted me with the further observations I make in this my Second Statement.

#### **Structural Checking Process**

4. At paragraph 15 of my First Statement of Evidence (**WIT.NICHOLS.0001.4**), I note that on a few occasions in my role as a Structural Checking Engineer I requested the engineer who was responsible for the design to provide full structural computations to the Council. Although I refer to a "few occasions" in my evidence, this was my usual practice for building permit applications for multi storey or complex buildings, which it needs to be stated were not frequently encountered. For these buildings, it would have been a major commitment of both time and resources to carry out a full structural check starting from first principles. It was a great deal more efficient to request the computations from the design engineer and to carry out a thorough check on them.
5. For all building permit applications, I would also carry out a preliminary check of the plans to look for any other issues or areas of concern. It was not possible to review all of the building elements in the plans. I would generally look at the maximum stress areas in the primary structural elements and consider whether they appeared to have been appropriately sized and detailed. If any issues were identified, I would ask the design engineer for more details about these at the same time as requesting the computations.

6. I have reviewed the letter from Graeme Tapper to Alan Reay Consulting dated 27 August 1986 in relation to the CTV building (**BUI.MAD249.0141.14**). It appears to me that he has carried out a similar preliminary review of the plans to that which I have described.
7. When I had received the computations from the design engineer, I would review these to check that all the important structural components had been included. I would also check the mathematical approach taken by the design engineer, confirm that the correct dimensions, material properties and formulas had been used and consider whether all of the significant elements in the calculations were correct. I would be looking for any obvious errors or omissions, rather than reviewing every number in the computations.
8. I am aware that one of the issues the Royal Commission will be considering is whether the columns in the CTV building should have been designed for seismic loading. It is my recollection that, at the time the CTV building was designed, it was accepted that where adequate shear walls were included to provide the required lateral restraint to the structure, the columns could be designed for gravity loads only, with the proviso that the shearwall disposition was sufficiently symmetrical to ensure an equitable distribution of lateral loadings between them.

#### **The CTV Building – Visit During Construction**

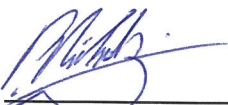
9. At paragraphs 23 – 26 of my First Statement of Evidence (**WIT.NICHOLS.0001.5 – 6**), I refer to a visit I made to the 249 Madras Street site while the CTV building was under construction, and I make some observations about my opinion of the building at the time.
10. I would firstly make the point that my observations of the building were made from the opposite side of Cashel Street to the construction site, which was surrounded with a security fence, so I could not make a close observation of the building.
11. At paragraph 23 of my First Statement of Evidence (**WIT.NICHOLS.00015**), I suggest that the floor slabs were integrated directly into the columns, without the presence of supporting structural elements such as beams. From my vantage point across the road, the columns appeared to be integrated into a

thickened edge of the floor slab. However, having now reviewed the structural drawings in more detail, I understand that structural supporting beams would have been present. So what I thought was the edge of the floor slab must in fact have been the encastre beams, although they appeared to be quite slender.

12. I also say at paragraph 23 of my First Statement of Evidence that the building appeared to lack any lateral load restraint system in the vertical plane of the south wall, in the form of a shear wall, structural framing or cross bracing. Again, having now reviewed the drawings in more detail, I understand the building included a slender south shear wall. I wonder now whether this shear wall was built after I visited the building, because I do not remember it being apparent at the time I visited the site.
13. I comment in paragraph 23 about being astonished that a building like that could comply with the Code because it appeared to lack sufficient structural elements; that the structure superficially appeared to be inadequate and pushing the limits; and that I was unsure how it's lateral stability was achieved. I now consider that my judgement on the day was impromptu and largely uninformed, given the brief duration of my visit and that I had not reviewed the plans at the time. However, in my opinion the overall structure did contain sufficient unconventional aspects for it to attract the close scrutiny that it apparently did in the structural checking process, with the arousal of some dissent among the participants involved in the checking process.

Dated: 13/06/2012

Signed by:



Name: Peter Nichols