

**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 NGA  
WHARE I HORO I NGA RUWHENUA O WAITAHA**

**AND IN THE MATTER OF THE CTV BUILDING COLLAPSE**

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

**DATE OF HEARING: COMMENCING 25 JUNE 2012**

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**STATEMENT OF EVIDENCE OF PETER NICHOLS IN RESPECT OF THE CTV  
BUILDING**

1. My full name is Peter Nichols. I live in Christchurch. I retired at the end of 2003.

**Personal Background**

2. In 1965 I graduated from the University of Canterbury with a Bachelor of Engineering (Civil) degree. During the last two years of completion of my degree I worked on a part-time basis as a Staff Engineer for the New Zealand Railways Department.
3. From 1966 to 1970 I was employed as a structural engineer by New Zealand Forest Products Limited.
4. In 1970 I moved to Australia and took up a position as a structural engineer with David Hamilton and Associates in Melbourne.
5. In 1972 I returned to Christchurch and was employed by Manson Seaward Stanton and Meikle, a firm of architects and engineers, as a Senior Structural Engineer.
6. I left Manson Seaward Stanton and Meikle in 1978 and took up a position with the Christchurch City Council (**the Council**) as a Structural Checking Engineer. In 1981 I was appointed to the position of Deputy Buildings Engineer.
7. In 1984 I left the Christchurch City Council to take up the position of Borough Engineer with the Riccarton Borough Council. At that time Riccarton Borough Council was a separate local authority to the Christchurch City Council.
8. After the Riccarton Borough Council was amalgamated with other former Local Authorities to form the new Christchurch City Council on 1 November 1989, it was my perception that I was to be reappointed to my former position of Structural Checking Engineer, which I was reluctant to accept. Instead, I was seconded to the Property Unit of the new Christchurch City Council into the position of Special Projects Engineer.
9. After two years with the new Christchurch City Council I decided to become self-employed and formed my own consulting engineering practice. During that period I

designed primarily the structural elements of several hundred residential buildings as well as several dozen commercial and industrial buildings, all less than two storeys in height, plus a few residential subdivisions and earthwork projects. I continued that line of work until I retired at the end of 2003.

#### **Christchurch City Council - 1978 to 1984**

10. During the period from 1978 to 1984 when I held the position of Structural Checking Engineer with the Council, it was my responsibility to check the plans, specifications, calculations and other documents that were submitted in support of building permit applications. Where calculations had not been submitted, which was the usual case, I carried out my own limited computations on the principal structural elements depicted in the documents sufficiently to verify that they were appropriately sized and detailed for the specific function they were required to perform in the overall structure.
11. The Chief Buildings Engineer at the Council was Bryan Bluck and I reported directly to him. Bryan Bluck held a Civil Engineering degree and was a Registered Engineer with considerable experience in structural engineering. He had held that position for many years, certainly more than I am able to quantify, and was almost an institution in his own right. During the period I worked with Bryan, I was aware that his acknowledged expertise was being utilised by his periodic appointment as a committee representative responsible for the preparation of a number of New Zealand Standard Building Bylaw documents.
12. Bryan was not involved in the day to day structural checking of permit applications. His role was at a management level. However, if there was an issue with a particular design that was concerning me I would discuss it with Bryan to get a second opinion or direction.
13. In 1981 I was appointed Deputy Buildings Engineer. I was then second in charge to Bryan Bluck. Other engineers I recall working with in the Building Department were Bill Sissons, Tim Priddy and Geoff Ward.
14. In checking a structural design, my usual practice was to review the plans and identify critical points in the structure which could be isolated out for an independent check. I would do a series of manual computational analyses, as best as I could, as spot checks, to determine whether under the required imposed loadings on the overall

structure, the ballpark combinations of bending, shear, torsional, and axial stresses, as well as deflections, that were likely to occur at those critical points were within permissible Building Bylaw limits. The Council did not have computers available to the staff in our division at that time, so the analyses had to be carried out manually. The checking time available to process a project which may have taken several months to design and detail was limited to a few hours, or days perhaps for very large projects, which was somewhat inequitable given the magnitude of the task involved.

15. On a few occasions I requested the structural engineer who was responsible for a major design to provide full structural computations. If the building was a complex structure it could be daunting to do your own independent analysis from first principles and would take far more time to carry out adequately than we had available to us, given the throughput of building permit applications that we were required to process. It was far more expeditious to ask for a copy of the original computations, look at the assumptions, scope, and design approach that had been made by the structural designer, and then follow the mathematical analysis that had been carried out as far as was necessary in order to verify that the requirements of the related Bylaws had been adequately complied with.
16. With experience I began to develop an intuitive familiarity for different building designs including their scale and details, and for the various structural elements which they contained. Most designs were quite conventional and required minimal assessment due to their conformity, others were innovative or contained unfamiliar features and it would be those that I would feel the need to enquire into further.
17. I recall my six years at the Christchurch City Council as a fairly demanding period. There were a lot of building permits coming into the Council and there was a great deal of pressure to get permits through and buildings up. Full working drawings were lodged with the building permit application, but the Council resources allocated to analysing the drawings were limited. As a general rule it was considered that the responsibility for the structural design lay with the structural engineer who had prepared the detailed design. If the design engineer certified the adequacy of the design, by way of a formal Design Certificate, then this certification was usually relied on and a building permit would be issued. I cannot recall any occasion during the period when I held the position of Structural Checking Engineer, where a peer review by an independent structural engineer was considered to be necessary. However, I

understand that such practice became the norm in later years, presumably under the influence of a new head-of-department.

### **The CTV Building**

18. I did not have any involvement in considering the building permit application structural drawings or calculations that were submitted for the CTV Building, as I was then working for the Riccarton Borough Council. At that time Bryan Bluck was still the Buildings Engineer and I understood that his Deputy was Graeme Tapper.
19. Although I was with the Riccarton Borough Council I became aware through the engineers' grapevine that a new building in Christchurch had been the subject of some contention in the issuing of a building permit. In particular I heard that Graeme Tapper and Bryan Bluck had been involved in another of their fairly regular fracas, this time concerning assessment of the structural design content of the proposed new building. I heard it had been particularly trenchant on this occasion. This is the building that is now known as the CTV Building.
20. I did not know Graeme Tapper well. We were acquaintances, but we never worked together. However I knew that he was a very forthright person who held strong views and could be hard to move from those views. He could be quite argumentative and had the reputation of being a cantankerous person to deal with if you disagreed with him.
21. I was curious to know what the issue was with this building. As a result, one day when I was in the central City I took the opportunity to have a close up look at the project. I was standing on the footpath outside the then Farmers Department store on the south side of Cashel Street. The CTV Building was then under construction directly opposite.
22. I had not previously seen the structural drawings for the building. I have seen them for the first time in the course of preparing my evidence.
23. At that stage the structural skeleton to the building, up to about the fourth floor level had been constructed. External cladding had not been installed and the bare bones or the structural elements of the building were clearly visible. By its appearance I felt intuitively that it was a building that departed from the norm. In my perception, the

structure superficially appeared to be inadequate and seemed to be pushing the limits. In short I was astonished that a building like that could comply with the Code because it appeared to lack sufficient structural elements. I was unsure how its lateral stability was achieved. The reason I say this is that the columns looked very minimal in size. As I recall they were circular in cross-section. I also remember that the floor slabs were integrated directly into the columns without the presence of supporting structural elements such as beams. I thought the columns must be subject to extremely high levels of stress at their conjunctions with the slabs. I also noted 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. The presence of such a structural element in that location would in my opinion have been the conventional expectation.

24. I had been standing there observing the construction of the building for about ten minutes when Bryan Bluck came up to me. I assumed he was taking his usual midday constitutional walk, as that was his habit when I had worked with him. We greeted each other and exchanged the usual pleasantries. I then commented that I had been studying the building under construction across the road and I was trying to get my head around how its structural mechanism worked, because it was not a system I was familiar with and in my opinion it superficially appeared to lack substance.
25. I specifically referred to the lack of any apparent substantive lateral load restraint system in the south wall vertical plane, which I intuitively felt should have been present.
26. Bryan's response was that when he first saw the concept depicted on the plans he had shared my concerns. He agreed with me that it still gave that superficial appearance as the construction proceeded. I recall him telling me that the building design incorporated a novel technological approach and that he initially had misgivings about aspects of the design. Bryan assured me that he had carried out due diligence and had been convinced by Alan Reay that his reservations were unfounded. I remember that Bryan mentioned Alan Reay specifically. At that point our discussion ended and we went our separate ways.
27. I know from having worked for Bryan that whenever he or his staff held some concern about a particular building permit application, his standard practice was to invite the

designer or designers to meet with him in his office to discuss in detail the design methods used, including any assumptions made, and to convince him directly that the specific structural design incorporated in the project complied in all respects with the provisions of the Building Bylaws.

28. In my experience, by participation in perhaps two or three of them, these meetings could last up to a whole day and on some occasions involved the attendance of up to three or four people from the structural designer's office who had been intimately involved in the project. The details of the design would be discussed item by item and if Bryan was not satisfied he would require the designer to provide further details at a subsequent meeting.
29. It was Bryan's practice when he was finally satisfied, to require the designer, as a qualified professional engineer, to issue a specifically worded and signed Design Certificate accepting responsibility for the key parameters of the design. Bryan believed that he, on the Council's behalf, was entitled to rely upon the expertise of a qualified professional engineer for assurance that his specific design met the required standard, and if that was obtained to his satisfaction, there was no reason to withhold the permit.
30. I retained a copy of a guidelines document Bryan Bluck issued to the structural checking engineer staff at the Council during the time I worked with him [BUI.MAD249.0267.1]. All of the engineering staff were required to comply with these guidelines when assessing whether building permit applications complied with the Building Bylaws. The third item in the list advises staff to rely on what is referred to as the "Professional Designer" when that designer is prepared to certify that the design complies with NZS 1900 Chapter 8.
31. Peer review of a particular design by external consultants was never considered to be necessary or an option at the time I was working with Bryan.

#### **Tapper letter of 27 August 1986**

32. In the course of preparing my evidence I have been shown a letter written to Alan Reay Consultants by Graeme Tapper dated 27 August 1986. I have also been shown for the first time the structural drawings for the CTV building dated August 1986. My attention has been drawn to Drawings 15 and 16, which are referred to in

Graeme Tapper's letter. These show the details of the connections between the floor diaphragms and the shear walls.

33. I am astonished by the weak appearance of these connections. They appear to rely on nothing more than a single layer of 664 steel mesh and D12 slab tie starter bars at 400 centres. This is the sort of connection I would expect to see for a house, to connect the floor slab onto the foundation, rather than a multi-level commercial building. The only real difference is that for a house the D12s would be at 600 centres. I am not surprised that Graeme Tapper was concerned. It jumps out of the page at you when you have some experience looking at structural drawings.
34. In my opinion Graeme Tapper was very thorough in his assessment of the building permit application documents for the CTV building, based on the scale of the items listed in his letter and adopting a no-nonsense tone which indicated that he felt strongly about them. There also appeared to be an unusually large number of important details omitted in the drawings, which he had meticulously listed. In my time at the Council I never had to deal with a recognised consulting engineer in such a fashion. It was usually more in the form of an amicable dialogue between professional peers, with the matters of concern being of far less magnitude and significance
35. I find it hard to believe that Bryan Bluck would not have been consulted by Graeme Tapper at the time his letter was written, given the scale of the matters he is referring to. That would certainly have been the case during my time at the Council.

### **Alan Reay**

36. I have had relatively few dealings with Alan Reay over the years. In my experience if you agreed with Alan Reay about a design he would be fine to deal with. However, if you did not agree with him, or challenged him about an aspect of the design, he had a tendency to go over the head of the "ordinary engineer" and speak to Bryan Bluck directly. It was implicit that he believed when he was dealing with mere Council engineering staff that his doctorate qualification conferred greater significance to his viewpoints.



**David Harding**

37. I am advised that David Harding was employed by Alan Reay at the time the CTV Building was designed and was involved in the design process. I did not know David Harding well, but I do recall him being less dogmatic than Alan Reay, although still assertive. I regarded him as a very competent engineer whose design work I considered to be characterised with elegant simplicity, practicality, and economic construction.

Signed:  .....  
Peter Nichol

Date: 27/03/2012 .....

Guidelines for Structural Checking Engineer staff of the Christchurch City Council, to be applied in the assessment of structural compliance of BPA's with the provisions of the Building Bylaws.

1. All Applicants are legally entitled to be issued with an approved Building Permit provided that all relevant criteria in their particular application comply with the Building Bylaw provisions.
2. Do not attempt to rewrite the Bylaws, but administer them as they are written, or apply them as they may be interpreted in the context of each specific application. If ambiguity exists, then determine the intent of any applicable Bylaws and apply their provisions in the context of that intent.
3. You are entitled to rely upon the recognized expertise of a Professional Designer who is prepared to certify under his signature that a specific design for a conventional or innovative structure (or detail), complies in all respects with the intent of the provisions of NZS 1900 Chapter 8.
4. Do not amend the BPA drawings in any way (in order to expedite the permit process), as to do so could compromise the responsibility for the specific design which otherwise fully belongs to the Professional Designer.



B C BLUCK  
BUILDINGS ENGINEER