

Under **THE COMMISSIONS OF INQUIRY ACT 1908**  
In the matter of the **CANTERBURY EARTHQUAKES ROYAL COMMISSION  
OF INQUIRY INTO THE COLLAPSE OF THE CTV  
BUILDING**

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**STATEMENT OF EVIDENCE OF ARTHUR EDWARD TYNDALL**

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**BRIEF OF EVIDENCE OF ARTHUR EDWARD TYNDALL**

1. My full name is Arthur Edward Tyndall. I reside in Christchurch. I am a structural engineer.
2. Insofar as my evidence can be considered expert evidence, in accordance with the requirements of Rule 9.43 of the High Court Rules, I confirm that I have read the Code of Conduct for expert witnesses and that my evidence complies with the Code's requirements.
3. Matters on which I express an opinion are within my field of expertise.
4. I am a Director of Tyndall Associates Limited, an engineering consultancy firm that I own. I am aged 78 and semi-retired but continue to practice as a structural engineer in Tyndall Associates Limited.

**Qualifications and experience**

5. I hold a Bachelor of Engineering (1957, University of New Zealand (Canterbury)).
6. I am a registered as an international professional engineer (IntPE) and a chartered professional engineer in New Zealand (CPENZ). I am a currently a Fellow of the Institution of Professional Engineers (FIPENZ).
7. After completing my qualifications, I commenced work as a structural engineer in 1957 with Spencer Hollings and Ferner, Consulting Engineers, Wellington. Around 12 years later, I began business on my own account in 1969, as A E Tyndall Consulting Engineers, Christchurch.
8. Based in Christchurch I have now practiced as a structural engineer on my own account for over 43 years. I hold 5 awards from ACENZ and IPENZ for structural excellence. Notable achievements over my career have included designing the structures used by the AJ Hackett bungy jumping operations and reporting and providing evidence to the Royal Commission of Inquiry into the 28 April 1995 Cave Creek tragedy as an in expert structural engineering after being engaged by the Minister of Conservation for that purpose. More recently I have been consulting to the coal mining industry in projects on the West Coast, on a 200m bungy jump, swing and flying fox in Sochi, Russia (for AJ Hackett) and on a gold mining project in Bolivia for L and M Mining.
9. I am a member of the Mountain Safety Council Snow and Avalanche Committee. I am currently working with a mechanical engineering lecturer at

the University of Canterbury's School of Engineering in developing an instrument to predict snow stability. This is at the stage of commercialisation.

### **Reasons for the timing of my evidence**

10. I happened to have a casual conversation with Dr Alan Reay during the week of 28 May 2012 when I discussed with him the issues that make up my evidence as set out below.
11. When I spoke to Dr Reay I was busy preparing for a trip to Vietnam leaving on 2 June. In the afternoon of Friday 1 June I spoke with Mr Palmer of Buddle Findlay by telephone and provided him with the information set out below in this statement of evidence. I was not able to view my written statement of evidence that Mr Palmer had prepared for me before leaving for Vietnam around 10am on Saturday 1 June, returning 10 June. I was not able to advance my evidence any further until I returned from Vietnam. On Monday 11 June I called Mr Palmer to discuss finalising of my evidence but needed my PA to assist me. In the event my PA was only available on Tuesday 12 June and with her assistance I was able to complete my evidence with Mr Palmer then. For practical reasons I was not able to approve and sign this statement of evidence until 13 June.

### **Inspection of the CTV Building for earthquake damage in the 1990s**

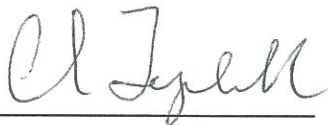
12. In the 1990s there were earthquakes felt in Christchurch. One of these was the June 1994 magnitude 6.7 "Arthurs Pass" earthquake. There were others. These earthquakes resulted in some commercial building owners in Christchurch checking their buildings for earthquake damage. The CTV Building was one such building.
13. In my capacity as a consulting structural engineer practising on my own account, I was engaged to undertake a post earthquake inspection to ascertain whether there had been any structural damage to the CTV Building. I duly inspected the CTV Building in the weeks following the earthquake event and provided a written report to the CTV Building owners.
14. Unfortunately all my records have been destroyed in the recent Canterbury earthquakes and I am not able to provide the Royal Commission with a copy of my report written in respect of the CTV Building inspection. Without my files being available to me, due to the time since I inspected the CTV Building, I also cannot be specific about which earthquake it was but I am in no doubt my inspection and report was done in the 1990s, most likely the mid

1990s. The June 1994 Arthurs Pass earthquake was the most significant earthquake event of this time in Canterbury and in all likelihood it was this event that triggered my engagement and the inspection I undertook.

15. Notwithstanding the absence of my files, I can remember aspects of my inspection that I believe may be relevant to the current inquiry. I set out below my recollections from the inspection and consideration of the CTV building that I undertook in the 1990s. In particular I note:
  - (a) There was cracking in the block-work in the entry foyer. This indicated to me that the building had experienced some twisting in the earthquake.
  - (b) This led me to investigate whether the building had in fact twisted in the earthquake causing column damage. I looked for evidence of twisting or other damage that might have been caused by the earthquake but could not find any. I recall looking above into the ceiling at the underside of the concrete slab and inspecting the joints, in particular, where the floor slabs met the columns. I would have done this on every floor in several places until I was satisfied that there was no twisting or other damage sufficient to cause a closure of the building.
  - (c) I recall looking at the western block wall and being impressed with the design engineer's efforts to reduce the stiffness in this wall (which was not one of the shear walls). There had been efforts to reduce the effect of the stiffness of the wall on the building structure in the direction of the wall itself, most notably in the construction joints between the wall and the building structure. I noticed the detailing and workmanship of the western wall was of a high quality. I concluded that the western wall was both well designed and well built.
  - (d) Overall I concluded that despite finding some cracking in the building, which I believed to have been caused by the earthquake, the building had not been damaged in such a way that materially changed its structural integrity. I concluded that the building remained safe to occupy. My report to the CTV Building owners contained this conclusion.
16. I do not recall doing any further work in relation to the CTV Building after my inspection and report in the 1990s.

17. I note that when I inspected the CTV Building in the 1990s there was no evidence of any of the high vertical accelerations experienced in the 22 February 2011 earthquake. I believe the New Zealand building code should be revised to take into account high vertical acceleration such as that experienced in that earthquake.

Dated this 13 day of June 2012



A handwritten signature in cursive script, appearing to read 'A E Tyndall', is written above a horizontal line.

A E Tyndall