STATEMENT OF EVIDENCE OF PAUL KEENAN TONKIN IN RESPECT OF THE FORSYTH BARR HEARING

Personal Background

1. My full name is Paul Keenan Tonkin. I am a Construction Programmer and Planner with Woods Harris Consulting, a Christchurch firm. I am a resident of Christchurch.

2. I joined Woods Harris Consulting in 2006. Immediately prior to this I was for 32 years an employee of Fletcher Construction Ltd. During that time I held the positions of Site Manager, Project Manager and Construction Manager.

3. I was the Site Manager for the construction of the Forsyth Barr Building. In that role I was responsible for managing the construction of the building process on site. This included managing both the sub-contractors and Fletcher's own staff.

Purpose of Evidence.

4. I have been asked to give evidence in relation to the seismic gap in the stairs in the Forsyth Barr Building. This involves two particular issues.

5. First, the understanding I had at the time of what I now understand is the critical importance of a seismic gap and the extent to which the importance of this was addressed with me by the consulting engineers on the project, Holmes Consulting Group, and by the Christchurch City Council.

6. Second, the presence of the construction rubble polystyrene that I understand was found in some of the seismic gaps in the Forsyth Barr stairs during the course of inspections of the stairs following the 4 September 2010 earthquake and again following the 22 February 2011 earthquake. In relation to this issue I have been asked to give evidence about the inspections and other supervision carried out during construction to ensure that the seismic gap as built, provided the gap that was specified in the structural drawings.

The importance of the seismic gap

7. The critical importance of the seismic gap was never brought home to me at the time the Forsyth Barr Building was being built. It was shown on the drawings and I was, of course, aware of this, but I now realise I had an inadequate appreciation of its significance. Nothing was ever said to me about its critical role, by either the structural engineer on the job, Holmes Consulting Group, or by the Council.

8. To my knowledge no one from the Council came to the site during construction to specifically check the stairs and I would expect to know if this had happened. Any inspection of the seismic gap would have to have been before the sealant was put into the seismic gap and before the floor covering was installed over the landing and the seismic gap. I have no recollection of any specific inspection.

9. Looking back on this I think that one of the reasons for my lack of any particular thought about the seismic gap was that I never thought the building would move the amount it obviously did in September and February. We were building a battleship. It was a very strong building and all of us working on that job were well aware of this. The thought that the building might shake in an earthquake in a way that would make the seismic gap relevant never crossed my mind and was never, to my recollection, a matter of discussion with the construction team or with the Structural Engineers.

10. There has been a dramatic increase in quality control over the past 25 years. At Fletcher Construction Ltd this was driven consistently from the top down. There has been much more formalisation of quality control. Today on a job like Forsyth Barr Fletchers would have a written check list that would specifically include the seismic gap and the details that have to be checked. Someone would have the responsibility of signing this off as a completed activity. The details to be checked and signed off would include ensuring that the full width of the gap was maintained and that it contained no obstructions.

11. However, I can only speak for the culture at Fletchers. During my time there I considered it to be a leader in the push for ever greater quality control.

Obstruction of the seismic gap

12. The polystyrene that I understand has been found in the seismic gap would probably have been put in there as an edge to the formwork. The pre-cast stairs were put into place before the floor slab was poured. The polystyrene was used to create an edge up to which the concrete would be laid. While the polystyrene ought to have been removed once the concrete dried I strongly suspect that when the contractor who was responsible for putting the flexible sealant into the seismic gap came to do this he would have seen the polystyrene as an ideal base for his sealant. I suspect that what happened here is that the contractor probably cut of a strip from the top of the polystyrene and then the sealant would have been installed over the top of that and into the seismic gap, after which the polystyrene strip would not have been visible. The floor covering would then go down over the top of that.

13. I have been also asked to comment on the section in the Beca report of that appears to evidence an attempt to cut back the bottom end of one of the stair flights by using a concrete saw. I had no knowledge of this prior to being made aware of what is in the Beca report, but it seems clear that one of the pre-cast stair sections must have been over-length. The building itself was built to very tight tolerances because of the aluminium and glass panels that needed to be fitted to the outside of the building, so the issue would have been with the pre-cast stair section rather than the building tolerances being exceeded.

14. In the course of preparing my evidence I have been shown detail of the way in which the bottom of the stair was able to slide in the event of an earthquake. I understand that a concern is now being expressed about the limited tolerances for stair movement that this provides and the risk of the stair dropping of the edge of the seating channel. However, at the time I never had any concerns about the design we were working to. As I observed earlier in my evidence, we thought we were building a battleship.

15. What did cause me concern about the stairs at the time was that they were very lively. There was a lot of bounce in them. Initially this caused quite a lot of unease with the workmen on the site. As the workers ran down the steps for smoko the stairs would really bounce up and down.

16. In my experience the design of the stairs was unusual. They were quite narrow and they were cast as a single length. The amount of steel under the middle landing was relatively light. My previous experience had been that pre-cast concrete stairs were invariably in two sections rather than one. Because of the shorter span length they did not have the potential to be as flexible as these stairs were. I was also accustomed to a lot more steel being used to support the mid landing and this also made the stairs much more rigid.

The Beca conclusions

17. I have reviewed the Beca report on the collapse of the stairs. I do not believe that enough consideration has been given to the vertical "bounce" of the building and the impact this would have had on these stairs. It is well documented that vertical movement exceeded 1G. Based on my observation of how lively the stairs were and how they bounced when people ran down them it seems very likely that the vertical accelerations would have severely stressed these stairs, possibly to the point of failure. While I am not a structural engineer, no-one has given me a satisfactory explanation for the L 15-16 stair being the only one broken in half, with the top half left hanging by the reinforcing cast into L 16. To me this implies that the stair broke in the middle, with the lower half then able to free fall to the next stair and cause the "domino" effect that saw all of the stairs from that upper floor collapse to the ground.

Dated: 21 February 2012

Signed: .....

Paul Keenan Tonkin