

UNDER

THE COMMISSIONS OF INQUIRY ACT 1908

IN THE MATTER OF

**THE 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

**AN APPLICATION TO THE CANTERBURY
EARTHQUAKES ROYAL COMMISSION FOR
ORDER REQUIRING PROVISION OF
INFORMATION**

Hearing: 7 June 2012

**Appearances: W Palmer and K Paterson for Alan Reay Consultants Limited and
Dr Alan Reay
D M Lester for CompuSoft Engineering Limited
S J Mills QC, M N Zarifeh and M A J Elliott as Counsel Assisting the
Royal Commission**

Decision: 12 June 2012

**DECISION OF JUSTICE COOPER,
CHAIRPERSON**

[1] Alan Reay Consultants Limited (“ARCL”) and Dr Alan Reay, who is a principal of ARCL, have sought an order from the Royal Commission requiring that certain information be provided to them by Compusoft Engineering Limited (“Compusoft”). ARCL was the firm that designed the CTV building which collapsed catastrophically in the earthquake of 22 February 2011. Both ARCL and Dr Reay have the status of “affected parties” under the Royal Commission’s Practice Note 2 dated 2 April 2012.

[2] The Department of Building and Housing (“DBH”) has conducted an investigation of the causes of the collapse of the CTV building. The results of that investigation are set out in a report that was prepared by consultants to DBH, Hyland Fatigue + Earthquake Engineering Limited and StructureSmith Limited, as well as in the report of an Expert Panel that was appointed by DBH. The Terms of Reference required the Expert Panel, amongst other things, to monitor and review the approaches, investigations, data and outputs of the consultants and to review and approve the consultants’ report on the performance of the CTV building in the earthquake. Compusoft was engaged to assist the consultants by carrying out what is known as a non-linear time history analysis (“NTHA”) of the performance of the CTV building in the earthquake.

[3] The consultants concluded that the collapse of the building was the result of contributions of a number of factors. They included:

- Higher than expected horizontal ground motions.
- Exceptionally high vertical ground motions.
- Lack of ductile detailing of reinforcing steel in all columns.
- Low concrete strengths in critical columns.
- Interaction of perimeter columns with the spandrel panels.
- Separation of floor slabs from the north core.
- Accentuated lateral displacements of columns due to the asymmetry of the shear wall layout.
- Accentuated lateral displacements due to the influence of masonry walls on the west face.

- Limited robustness (tying together of the building) and redundancy (alternative load paths) which meant that the collapse was rapid and extensive.

The NTHA performed by CompuSoft was one of the bases on which those conclusions were reached.

[4] For its part, the Expert Panel concluded that the likely or possible contributors to the collapse of the CTV building were:

- The stronger than design-level ground shaking.
- The low displacement-drift capacity of the columns due to:
 - the low amounts of spiral reinforcing in the columns which resulted in sudden failure once concrete strain limits were reached
 - the large proportion of cover concrete, which would have substantially reduced the capacity of columns after crushing and spalling
 - significantly lower than expected concrete strength in some of the critical columns
 - the effects of vertical earthquake accelerations, probably increasing the axial load demand on the columns and reducing their capacity to sustain drift
 - loss of diaphragm connection to the north core at Lines D and E.
- The lack of sufficient separation between the perimeter columns and the spandrel panels which may have reduced the capacity of the columns to sustain the lateral building displacements.
- The plan irregularity of the earthquake-resisting elements which further increased the inter-storey drifts on the east and south faces.
- Increased displacement demands due to diaphragm (slab) separation from the north core.
- The plan and vertical irregularity produced by the influence of the masonry walls on the west face up to Level 4 which further amplified the torsional response and displacement demand.
- The limited robustness (tying together of the building) and redundancy (alternative load path) which meant that the collapse was rapid and extensive.

[5] It seems plain that those conclusions of the Expert Panel were also based in part on the findings of the Compusoft NTHA. Indeed it was the Expert Panel that wanted a NTHA in addition to the Elastic response Spectra Analysis (ERSA) that had been relied on by the consultants.

[6] The Royal Commission is to conduct a hearing for the purposes of its own investigation into the causes of collapse of the CTV building. That hearing is due to commence on Monday 25 June and it is expected to occupy about eight weeks. At the hearing the conclusions reached by the consultants and the Expert Panel will be fully contestable and the Commission will form its own views on the reasons for collapse of the building. It is plain, however, that as the designers of the building ARCL (and its principal Dr Reay) will have a vital interest in the relevant issues and in the outcome of the Commission's inquiry.

[7] Equally, there is a very strong public interest in ascertaining the reasons for the collapse of the structure and it need hardly be emphasised that the relatives and friends of the 115 persons who died in the collapse will be particularly interested in the Commission's report.

[8] In the course of preparation for the hearing it became apparent to counsel assisting the Commission that the results of Compusoft's NTHA would need to be considered in the Royal Commission's own investigation. Further, it appeared that ARCL and Dr Reay might be interested in challenging the methodology by which the NTHA had been performed. Persons with appropriate expertise had been employed to advise and give evidence on issues relevant to the NTHA as well as more generally on the performance of the CTV building. In an endeavour to limit matters of disagreement to those which were truly in dispute the Royal Commission made an order (the "Directions Order") on 18 May 2012 that the relevant expert witnesses confer, in a process to be facilitated by Professor Athol Carr, with authority to take the steps necessary to achieve the purposes of the order. Those purposes were set out in paragraph 4 of the Directions Order, which read as follows:

4. The purposes of the experts conferring are:
 - 4.1 To endeavour to reach agreement on the input data to be used to conduct a NTHA of the response of the CTV Building which provides the most reliable model of the response of the Building to the earthquakes at 4.35am on 4 September 2010 and 12.51pm on 22 February 2011.
 - 4.2 Where agreement cannot be reached on the inputs, to identify:
 - 4.2.1. The inputs which cannot be agreed.
 - 4.2.2. The reasons for the disagreement.

- 4.3 To produce NTHA results which provide the most reliable model of the response of the Building to the earthquakes at 4.35am on 4 September 2010 and 12.51pm on 22 February 2011, and which can then be analysed and interpreted. In this respect:
 - 4.3.1. Compusoft has already conducted a NTHA of the response of the CTB Building ("the Compusoft NTHA").
 - 4.3.2. The experts are to consider whether the Compusoft NTHA provides the most reliable model of the response of the Building to the earthquakes at 4.35am on 4 September 2010 and 12.51pm on 22 February 2011.
 - 4.3.3. If the experts cannot agree about whether the Compusoft NTHA provides the most reliable model, the experts are to identify the reasons for their disagreement.
- 4.4 If the experts do not reach agreement that the Compusoft NTHA provides the most reliable model of the response of the Building to the earthquakes at 4.35am on 4 September 2010 and 12.51pm on 22 February 2011, a further NTHA is to be carried out. In this case:
 - 4.4.1. The experts are to agree on the inputs to be used. If agreement is not reached, they are to identify their reasons for disagreement.
 - 4.4.2. If agreement is not reached, or in the opinion of the facilitator is not likely to be reached, the facilitator is to report to the Royal Commission on the areas of disagreement and their significance so that the Commission can consider whether any further orders are required.

[9] The process envisaged by the Directions Order is underway and Mr Palmer has confirmed in his submissions on the present matter that there is no reason why it should not continue in accordance with the Directions Order. It is relevant also to record that, as contemplated by clause 5 of the Directions, the Directions apply only to the NTHA input data and NTHA results, and not to any evidence relating to subsequent interpretation of those results, which remains a matter for individual witnesses to address.

[10] Participants in the process mandated by the Directions Order included Mr Ashley Smith, one of the authors of the DBH consultants' report, Messrs Davidson, Stuart and Bradley of Compusoft, and Professors Mander, Shepherd and Dr Brendan Bradley, consultants retained by ARCL.

[11] It had originally been proposed by ARCL that an employee of that firm, Mr Douglas Latham, should be one of the experts participating in the process envisaged by the Directions. Compusoft took exception to that on the basis that it did not wish to make information which it regarded as part of its intellectual property built up over many years, available to a potential commercial competitor (ARCL). In the Directions Order, this issue was resolved by requiring all input data used in the Compusoft NTHA to be made available to every other expert, and in a form suitable for use in an alternative model, whilst stipulating that the input data was confidential to the persons listed as experts in paragraph 2 of the

Order and that it must not be used by any of those experts for any purpose other than those described in the Directions. It was further provided that the information could be disclosed to any party's legal advisors, but that the advisors must not disclose it to their client, that the information must be returned to Compusoft following the conclusion of the CTV hearing, and that it must not be copied or retained.

[12] As can be seen the Directions Order envisaged that the experts would produce a joint report for the Royal Commission identifying the areas of agreement, and all areas of disagreement (including the reasons for the disagreement) and setting out the results of any further NTHAs that had been carried out during the conferral process.

[13] The experts were also required to comply with the Code of Conduct for expert witnesses set out in Schedule 4 of the High Court Rules. They were required to attempt to reach agreement, to exercise independent and professional judgment, and not to act on the instructions or directions of any person to withhold or avoid agreement. The report is required to be provided by 18 June 2012.

[14] It is clear from Mr Palmer's submissions on 7 June that ARCL did not agree with the exclusion of Mr Latham from the list of experts directed to confer. The present application, however, does not seek to alter the Directions by including him in that list. Indeed, Mr Palmer submitted that it would now be too late for ARCL staff to make any meaningful contribution to the NTHA expert panel process. Rather, it is sought that Compusoft be ordered to provide to ARCL and Dr Reay:

"SAP 2000 models used in the NTHA (.s2k text file)"

[15] I set out the precise terms of the order sought because they illustrate the issue in dispute. Compusoft maintains its objection to the provision of that information, which would involve providing the relevant information "in digital format". The reasons for this stance are set out in an affidavit sworn by Barry John Davidson, a principal of Compusoft on 5 June 2012. In that affidavit, Mr Davidson states that SAP 2000 is one of many structural engineering software packages that are commercially available and able to be used for the purposes of an NTHA. He asserts that Compusoft engineering staff are experts in the use of SAP 2000. That expertise reflects his own research experience over some 30 years, together with a close relationship with the developers and distributors of the software, including the original author, Professor Wilson. He notes that developing models using SAP 2000 and providing solutions for other structural engineering companies is one of Compusoft's main sources of income. He notes that Compusoft is known for its expertise in analysing structures. He records that Compusoft does not wish to disclose the s2k SAP

2000 input file to ARCL and Dr Reay in digital form, although it has done so to the experts retained by ARCL in accordance with the Royal Commission's directions. Compusoft has also provided all inputs describing the SAP 2000 model to ARCL, with the exception that the s2k input file was in a controlled "pdf" format, as opposed to the digital format.

[16] The reasons for Compusoft's opposition to provision of the information in digital format to ARCL and Dr Reay are further addressed at paragraphs 11-15 of Mr Davidson's affidavit, as follows:

11. Compusoft claim that their company's commercial advantage is that they are able to develop complex structural models, such as the one developed for the CTV building, using SAP2000 and in doing so have contributed some intellectual property.
12. Compusoft claim that by providing the S2k file in digital format to ARCL it will enable them to rapidly learn modelling skills that have taken Compusoft years to develop. The handing over of a "worked example" of how to convert a large amount of structural engineering information into complex model is at the heart of Compusoft's objection. In practical terms from having access sought, ARCL would be able to "reverse engineer" from our inputs the processes we have developed to discover how we have arrived at the model. It is the process that we have developed over many years that we wish to protect.
13. Compusoft claim that if ARCL staff already had these skills, that is, they were "experts" in using SAP2000, they would have been able to create the CTV model from what they have already been supplied with – indeed doing so would be a better test of our conclusions than simply reviewing our model for the reasons I give below.
14. Compusoft claim that Confidentiality undertakings are not applicable as ARCL staff cannot "unlearn" what they will learn from this information.
15. Compusoft Engineering claim that the release of the "S2K" file in digital format to ARCL will provide ARCL a commercial advantage in later projects.

[17] Mr Palmer submits that there is intense public interest in ascertaining the reasons for the collapse of the CTV building, and that the circumstances justify a thorough testing of the expert evidence to be presented. Mr Palmer further submits that the "most highly weighted rationale" for providing access to the information in question should be the needs of the Royal Commission, and the disadvantages and potential limitations caused by the Commission not having all the relevant and best available information. These considerations, he argues, strongly favour the release of the data sought by ARCL. However, the effect of the Directions Order was to deny to ARCL information that its staff would be able to use to provide helpful expert evidence to the Royal Commission, from which the Commission would benefit. Mr Palmer asserted that while the experts nominated in the Directions Order would be considering Compusoft's NTHA modelling, that consideration would not be "comprehensive".

[18] On the basis that Compusoft has been prepared to provide the NTHA input data to ARCL in a non-digital format, Mr Palmer invited the Commission to infer that Compusoft did not want ARCL to run the NTHA model in a timely fashion. He contended that the most neutral conclusion is that the Commission would be denied information that might potentially be of assistance to it. More unfavourably, he suggested that Compusoft wished to avoid any form of review outside of the expert NTHA panel. In the circumstances, the rationale for withholding the NTHA was “overwhelmed by the public interest in having it made available”.

[19] Mr Palmer also argued that, given the affected party status of ARCL and Dr Reay, they were effectively being denied the ability to independently verify the appropriateness of the inputs used by Compusoft on which important conclusions in the DBH investigation had been reached. If the information sought were made available to them, ARCL staff could independently verify and comment on the NTHA conclusions and they might then be able to provide additional evidence commenting on the validity of the assumptions used by Compusoft for its inputs, the appropriateness of the conclusions drawn and on the overall collapse scenarios that have been postulated as a result of the DBH investigation. Mr Palmer argued that considerations of natural justice dictated that both ARCL and Dr Reay should have the opportunity to undertake their own review of the analyses as they see fit.

[20] Mr Palmer submitted also that commercial sensitivity should not be considered sufficient as a ground for withholding the relevant material. He referred to Section 69 of the Evidence Act 2006, and its requirement that a direction that information not be disclosed in a proceeding may only be made where the public interest in the disclosure of the information in the proceeding is outweighed by the public interest in preventing harm (of the kind described in subsection (2)), or maintaining activities that contribute to or rely on the free flow of information. Mr Palmer noted that an order preventing disclosure can only be made after a Judge has had regard to a number of considerations stated in Section 69(3) of the Act.

[21] Mr Palmer’s essential submission was that there was no real commercial sensitivity at stake and that in any event, the considerations favouring disclosure to ARCL and Dr Reay of the information sought must outweigh any claim to confidentiality in the material. The first part of that proposition was reliant on affidavits sworn by Mr Latham on 5 and 6 June 2012. In the former, Mr Latham notes that as part of ARCL’s preparation he has been reviewing the NTHA analyses carried out by Compusoft, but claims that he has been unable to do so because he has been denied access to the input models used by Compusoft. Mr Latham deposed that:

17. The information provided in the DBH reports is not sufficient to describe the NTHA and ERSA inputs and assumptions in the detail required. The outputs and subsequent findings of the DBH report are unable to be utilised unless the complete set of inputs and assumptions used are known. The quantity of inputs and assumptions is immense. For example, when modelling the geometry of a wall, even though the dimensions of the wall might be known and well defined, the wall is modelled with a number of smaller elements called finite elements. A rectangle could be modelled as one large rectangle or divided into four smaller rectangles. This is called meshing and can affect the outputs of the model. There are many other examples where inputs that appear to be well defined actually depend significantly on how they are modelled and what assumptions have been made.
18. I have read the statements of evidence of Ashley Smith and Derek Bradley filed with the Royal Commission. Those statements provide more information about the inputs CompuSoft has used in carrying out the NTHA and ERSA analyses than appears in the DBH report. However, this information is still insufficient to allow me to fully understand and review all the inputs used in the analyses.
19. There are many required inputs into the NTHA and ERSA models that are simply not disclosed or are ambiguously stated in the DBH report, the CompuSoft evidence and/or Ashley Smith's evidence. Those omissions and ambiguities mean that neither I, nor anyone else, can replicate the analyses undertaken. It is also not possible for anyone to verify whether all the inputs used in the analyses have been appropriately selected or whether the outputs and conclusions reached by CompuSoft are reliable.
20. Ultimately, the only way the inputs and assumptions used for the DBH reports can be provided in a complete form is by providing the full model input files so that the inputs used can be reviewed in full.
21. If given access to the NTHA and ERSA input files, I would be able to review the inputs used by CompuSoft (and the authors of the DBH reports) and test the validity of their assumptions. We could also modify some of these assumptions on a principled basis and assess the outcome.

The references in the quoted paragraphs to ERSA inputs are not relevant for present purposes, because the relevant input files have been made available to ARCL.

[22] Mr Latham went on to note that any errors made in the inputs could cause an entirely different outcome, and to record ARCL's desire to scrutinise the decisions made "for accuracy and validity". Mr Latham also noted that ARCL has purchased and holds a current licence to use the SAP 2000 software programme.

[23] Mr Latham swore a second affidavit, in reply to Dr Davidson's affidavit. In it, Mr Latham says that the process of converting the relevant structural engineering information into a complex model inevitably involves making subjective decisions and assumptions. He states that "it is these decisions and assumptions that ARCL wishes to review and can only do so in full by reviewing the model." He states that ARCL was "most interested" in being able to "scrutinise the inputs for relevance and accuracy."

[24] Despite Mr Palmer's submission that there was no real commercial sensitivity at stake, I have no reason to doubt Dr Davidson's evidence that CompuSoft has developed a particular

methodology for converting significant amounts of engineering information into models of building performance, which are then able to be used with the SAP 2000 software. I accept that the methodology is commercially valuable to Compusoft. Further, they have used the methodology in this case. It is not an insignificant matter to require such information to be made available to a potential competitor even if provision of the information were made subject to obligations not to use the understandings about the methodology in other cases. In this respect, I accept the inherent logic of Dr Davidson's stance that it would not be possible for Mr Latham to "unlearn" the understandings that might have been developed.

[25] Mr Latham himself claims expertise in the same processes. There has of course been nothing to prevent him utilising his knowledge and expertise in the development of a rival model which might have illustrated the performance of the CTV building and led to conclusions which are different from those which were the result of the operation of the Compusoft model.

[26] More importantly, however, the Directions Order envisaged that the experts nominated would endeavour to reach agreement on the input data to be used to conduct the NTHA and if agreement could not be reached, to identify the inputs which could not be agreed, and the reasons for that. Furthermore, the experts were directed to produce NTHA results which provide the most reliable model of the response of the building in the earthquakes of 4 September and 22 February. This is intended to result in exactly the principled modification of input assumptions that Mr Latham sought in his affidavit. Mr Palmer, as noted above, asserted in argument that while the experts nominated in the Directions Order would be considering Compusoft's model, the consideration of it would not be "comprehensive". However, I would expect the process carried out under the Directions Order would be focused on the more important building elements that need to be considered.

[27] I accept Mr Latham's evidence that the quantity of inputs and assumptions used for the purposes of the model will have been extensive. The example he gave was of modelling the geometry of a wall, dividing it into a number of smaller "finite elements" for that purpose and the choices needing to be made to do so. Those choices would affect the output of the model. What I do not understand is why the independent experts retained by ARCL and Dr Reay would not be able to ascertain and concentrate on those parts of the inputs which they considered likely to be of most significance in analysing the performance of the building. In that respect, there has been no evidence to suggest that they would not be able to do so, and they have, in accordance with the Directions Order, access to the relevant Compusoft inputs in a digital format.

[28] What appears to be on offer is the possibility that, given the ability to do so, Mr Latham would be able to go through the complete input data and that, having done so, he might be able to find some incorrect or at least questionable assumptions that have been made by Compusoft which would have affected the outcome of the model. I accept it is possible that there could be disagreement over some of the assumptions made. This seems an inevitable consequence of the NTHA process and the numerous judgements that it involves. But no example has been given of a possibly significant mistaken assumption or error of methodology which would not be able to be ascertained by the experts working pursuant to the Directions Order in its current form. In the circumstances I have been given no basis on which I could conclude that the process envisaged by the Directions Order will not be effective to bring the relevant evidence about the NTHA analysis before the Royal Commission at the hearing. If ARCL and Dr Reay are aware of particular issues that cannot be dealt with by the expert panel then they are invited to bring them to the attention of the Royal Commission, but at the moment the argument is speculative and lacks sufficient substance to overcome the countervailing considerations. In all the circumstances I do not consider there is any unfairness in restricting the information to the experts identified in the Directions Order.

[29] I am of course mindful of the strong interest that ARCL and Dr Reay have in the evidence to be presented at the forthcoming hearing into the reasons for the collapse of the CTV building, and in the results of the Royal Commission's deliberations. I have also to take into account the position of Compusoft, and the public interest in ensuring that the processes of the Royal Commission are not such as might deter the provision of relevant expert evidence on this or future occasions. I am not prepared to infer that Compusoft are endeavouring to avoid scrutiny of its methodologies, and the assumptions made in the modelling process, as Mr Palmer invited me to do. Their submission to scrutiny under the Direction Order process is inconsistent with that. I accept, of course, that as Mr Palmer put it, the overriding consideration should be to ensure that the Royal Commission has all the relevant information before it. The conclusion expressed in the preceding paragraph means that there is no reason to suppose that will not be the case as a result of the process required by the Directions Order.

[30] Given my conclusion that there is a significant element of commercial sensitivity at stake, I have not been persuaded that there are proper grounds for requiring disclosure of the relevant information in digital format beyond the expert witnesses who are named in the Directions Order.

[31] I note for completeness that, assuming for the sake of argument (but not deciding) that s 69 of the Evidence Act applies to the proceedings of the Royal Commission, I do not consider it controls the outcome here. Its provisions relate to confidential information, whereas the present issue relates rather to commercially sensitive information to which a Court would have power to restrict access in its inherent jurisdiction, balancing the relevant competing interests. In any event, the discretions set out in s 69 are broad enough to justify refusal of the order sought.

[32] I add that this is not a case where there has been an order that information not be disclosed at all in the proceeding. Rather, the Directions Order restricts access to some of the information in digital form, and even then allows its provision in that form to the relevant experts. There could be no suggestion that the information could not be used for the purpose of giving relevant evidence to the Royal Commission.

[33] For these reasons, the application by ARCL and Dr Reay is dismissed.