

Summary of Decisions of the Engineering New Zealand Disciplinary Committee in the matter of Mr Andrew Thompson and Mr James Knight

Background

These proceedings arose from a complaint made to Engineering New Zealand | Te Ao Rangahau (ENZ) by the Tauranga City Council about the conduct of three Chartered Professional Engineers (CPEng) and Chartered Members of Engineering New Zealand (CMEngNZ), each of whom were involved in the design or peer review of the design of the Harington Street Transport Hub (Transport Hub) in Tauranga in the period from 2017 to 2019.

One of the respondent engineers has exercised rights of appeal and those parts of the Disciplinary Committee's decisions as they relate to them, are not summarised here. Their name and identifying details will remain suppressed until further orders. Until that time, the written liability and penalty decisions in respect of the three respondents will not be published. A summary only, of the decisions as they relate to the two respondents who elected not to exercise their rights of appeal, follows.

Summary of relevant factual circumstances

In April 2017, the Tauranga City Council (**Council**) engaged a national engineering consultancy firm (**the firm**) to design the Transport Hub which was intended to be a 9 - level building to be used for car parking in central Tauranga.

Design documentation was submitted for consent on behalf of the Council in November 2017. A designer in the firm led the design of the foundations and superstructure of the Transport Hub and they signed a Producer Statement (PS1) confirming they had reasonable grounds to believe the design (**the Original Design**) complied with the New Zealand Building Code Clause B1: Structure (**the Building Code**). The lead designer had no further involvement in the project after November 2017.

The Transport Hub building was to be comprised of 7 levels above ground, with overall dimensions of 37.2m wide and 54.7m long, and two basement levels. The suspended floors effectively formed a continuous helix with level portions at each end of the building, half a floor height apart, and two sloping sections of floor (ramps) within the central portion of the floor plan.

In the design, the lateral (seismic) load resisting system comprised a mixed ductility system consisting of diagonal steel braces with ductile connecting pins (an Innovative Dissipative (INERD) pin bracing system), along with non-ductile ramps without separations (seismic movement joints). That is, the ramps were to be continuous ramps and as such would also attract lateral loads. This mixed ductility lateral load resisting

system was not identified in the accompanying Design Features Report. There was no reference in the Report to the effect of the continuous ramps or the mixed ductility nature of the lateral load resisting system, of the combination of the elastically responding ramps and the ductile steel bracing system.

The Original Design was peer reviewed by Mr James Knight, a director of independent structural engineering firm, Constructure Auckland Limited. Mr Knight identified several deficiencies during his peer review including with the analysis used for the design, the INERD system, including the nonlinear response of the structure, the design of the elastic responding ramps, and the transfer of forces from the INERD spring cross-bracing and elastic responding ramps. In March 2018, Mr Knight signed a Producer Statement 2 (PS2- Design Review) stating he had reasonable grounds to believe the building's design was compliant with the Building Code. The Council issued a Building Consent for the Transport Hub (in its Building Consent Authority role) in July 2018.

In March 2019 a further PS1-Design was signed by Mr Andrew Thompson, Technical Director at the firm which produced the Original Design. This PS1 was in respect of an amendment to Structural Design, relating to cranked foundation beams, retaining wall, cantilever slab and wall panels to entry. Mr Thompson had over 25 years' experience in structural engineering.

In late March 2019, following the twisting of a beam during a concrete pour, the firm carried out an internal review of the design. This identified concerns with assumptions made in the design about the effect of the continuous ramps on the seismic response of the building. A scheme was developed that was intended to rectify the inconsistency by creating ramp separations so that the ductile braced frames formed the single lateral load resisting system for the building described in the Original Design Features Report. Mr Thompson revised the Original Design to add seismic separations into the ramps (**the Revised Design**). The Revised Design was unusual in that it involved providing slots across most of the width of both ramps, while leaving the outside perimeter beams continuous across the separation. Mr Thompson issued a PS1 in respect of the Revised Design stating that it complied with the Building Code, on 31 May 2019.

Mr Knight was then engaged to peer review the Revised Design, with urgency. He did so, and in early June 2019 issued a PS2 (confirming that he believed on reasonable grounds that if constructed in accordance with the drawings and specifications he had reviewed) the building would comply with the Building Code. The Council granted Building Consent to these amendments.

In July 2019 the Council engaged Holmes Consulting Limited to undertake an independent high-level review of the building design. In mid-July 2019 Holmes issued a report that identified deficiencies as to features of the then current structural design. Holmes listed 39 defects relating to a significant number of building elements. While many of these related to common structural engineering design, the INERD brace system was not covered by the design statements cited within the Building Code and had not previously been used in New Zealand (or apparently elsewhere). As such, the

INERD braces were considered an Alternative Solution to the Building Code. This meant the designer was required to demonstrate the performance of the INERD system in terms of meeting the performance objectives of the Building Code, within the application for Building Consent.

In September 2019, construction on the Transport Hub was suspended for investigation of a remedial design solution.

In June 2020 (around four months after the Council had complained to ENZ about the conduct of the respondents) the Council abandoned the completion of the Transport Hub due to the significant costs that had by then been incurred and the substantial costs that would be associated with remediation. The Council later sold the building and section at a loss. This outcome of the project was not relevant to the liability of the engineers involved.

Decisions in respect of Mr Andrew Thompson CPEng, CMEngNZ

Mr Thompson admitted that he performed engineering services in relation to the Revised Design in a negligent manner in that:

- The Revised Design did not achieve full decoupling of the ramps from the INERD bracing system as the ramps retained a connection between floors, with a spiralling elastic load path present through the ramp connections at the perimeter beams. The complexity of this unusual arrangement was not adequately considered in the analysis and calculations completed for the Revised Design and did not address the non-linear response of the mixed ductility system proposed.
- Mr Thompson's design and detailing included readily identifiable errors, including the creation of the ramp separations using connections that had insufficient capacity to support the gravity loads. These eccentricities exceeded the capacity of the mechanisms available to resist the eccentric moment. The amendments incorporating the partial separation of the ramps proposed by Mr Thompson did not comply with the Building Code. Given these deficiencies, Mr Thompson should not have issued a PS1.
- The alterations Mr Thompson made to the ramp beam connections crossing the separation plane created a weakness that in an earthquake, may have led to local failure of the ramps.

Mr Thompson accepted responsibility for his conduct at an early stage and apologised.

The Disciplinary Committee made findings against Mr Thompson in relation to his performance of engineering services in relation to the Revised Design as follows:

- The gravity of Mr Thompson's admitted negligence, including his failure to give consideration to the design consequences of the incorporation of seismic separation provisions in the ramps, and the effects of the primary lateral load resisting elements of the Transport Hub, was such that it could reasonably be

concluded there has been a serious lack of competence demonstrated by Thompson in his preparation of the Revised Design.

- Mr Thompson's subsequent issuing of a PS1 was closely linked to the lack of care he applied in the Revised Design. No competent Chartered Professional Engineer would have certified the Revised Design as having complied with the Building Code.
- Mr Thompson's conduct had also involved him breaching ENZ Rules and aspects of the ENZ Code of Ethical Conduct.

In terms of penalty, the Disciplinary Committee considered that:

- These were significant findings to be made against a Chartered Professional Engineer with over 30 years' experience.
- Changing another engineer's design should have put Mr Thompson on high alert not to rely on that engineer's approach.
- Mr Thompson incompetently designed the ramp separations, which was a separate matter to the Original Design. Mr Thompson accepted that his work environment at the time of the Transport Hub work, and his workload and pressure, did not excuse his conduct.
- These matters needed to be balanced against the relatively confined nature of Mr Thompson's conduct.
- Mr Thompson has reflected on the underlying causes of his breaches and has addressed them. He has made changes to the way he practises, removed from his practice the risk factors that contributed to the circumstances of the complaint, and put structures in place to prevent a repeat.
- Mr Thompson had a previously unblemished record, and he has the support of his fellow Directors at his current engineering practice (Envelope).
- The risk of a recurrence of the breaches the Disciplinary Committee reviewed was significantly lowered by these factors.
- Mr Thompson does not present an ongoing risk to the public.

The Disciplinary Committee decided it could step back from the starting point of suspension of registration and imposed orders of censure and a fine of \$4,500 under the CPEng Act. The censure was imposed as a means of expressing the Disciplinary Committee's disapproval of Mr Thompson's conduct and to highlight that his conduct was unacceptable on the part of an experienced Chartered Professional Engineer. The fine was imposed for general and specific deterrence purposes. Mr Thompson was also censured under the relevant ENZ Rules to mark the Disciplinary Committee's disapproval of his conduct and to ensure that public trust in ENZ as a membership body is maintained, as well as the value associated with Chartered Membership status.

Mr Thompson was also ordered to pay \$20,000 as a contribution to the costs incurred by the Registration Authority and ENZ associated with the investigation of the complaint and the arising disciplinary proceedings.

Mr Thompson's application for permanent name suppression was declined. The Disciplinary Committee was not satisfied that the private interests Mr Thompson relied on in support of his application were sufficiently strong to outweigh the public interest in him being named now that adverse disciplinary findings have been made against him. The Disciplinary Committee considered that the public interest in Mr Thompson being named still exists notwithstanding the passage of time since the events in question and that he no longer presents as a risk to the public.

Decisions in respect of Mr James Knight CPEng, CMEngNZ

The Disciplinary Committee found that Mr Knight was acting within his area of competency when he peer reviewed the Original Design generally, and in relation to the INERD system specifically, and when he peer reviewed the Revised Design.

Prior to the hearing, Mr Knight admitted that his peer review of the Revised Design involved the incompetent performance of engineering services and he took full responsibility for his failures.

The Disciplinary Committee made findings in respect of Mr Knight's performance of engineering services in peer reviewing both the Original Design and the Revised Design. There were deficiencies in both of his peer reviews. The Disciplinary Committee found those deficiencies were attributable to his approach to regulatory peer reviews. His approach was to identify issues and accept the designer's response as evidence those issues had been addressed. The Disciplinary Committee considered this demonstrated Mr Knight's lack of understanding of his professional obligations when undertaking a regulatory peer review of this kind. Mr Knight's lack of understanding was not limited to his interpretation of practice guidance. The Disciplinary Committee considered that Mr Knight's evidence that a peer reviewer is only obliged to check some, not all of a design, and industry standards mean that peer reviewers were entitled to trust original designers to remedy defects without seeking confirmation they had been addressed, further indicated that Mr Knight lacked appreciation of his professional obligations.

In relation to Mr Knight's peer review of the Original Design the Disciplinary Committee found:

- Mr Knight identified several valid compliance issues with the Original Design, but he did not properly follow them through to a conclusion. These were in relation to ramp reinforcing, vertical loads, and collector beam connections.
- Mr Knight failed to identify a number of issues with the Original Design which would have been readily identifiable to a reasonably competent peer reviewer. These were in relation to limitations of the INERD system, the foundations, the stairs, and reliance on 2D modelling (2D non-linear pushover analysis). This failure to identify issues demonstrated a serious lack of care on Mr Knight's part and was negligence.

- As Mr Knight's approach to peer review did not involve proper verification of the designer's response, a PS2 should not have been issued stating that the Original Design complied with the Building Code. This demonstrated a serious lack of competence which included a deficit in skills in terms of Mr Knight understanding his professional obligations when issuing a PS2. This gave rise to a finding that Mr Knight had performed engineering services in an incompetent manner.

Mr Knight admitted that his review of the Revised Design and the issuing of a PS2 was performed in an incompetent manner, and the Disciplinary Committee found that:

- It ought to have been very apparent to Mr Knight during his peer review that the Revised Design was seriously flawed. Given his prior knowledge that the original designer intended for the ramps in the Original Design to be continuous, and the change in design philosophy in the Revised Design, he should have identified and raised these issues during his peer review.
- Mr Knight should have confirmed the adequate provision of torsional support for the slotted connections of the ramp beams which were unlikely to support gravity loads due to the large eccentricities involved, being an issue he had raised during his peer review.
- Mr Knight's peer review ought to have identified durability issues associated with the concrete slabs and site-retrofitted steel work.
- This conduct involved very serious departures from accepted standards and the performance of engineering services in an incompetent manner.
- As with the Original Design, it was incumbent on Mr Knight to verify the responses he received to the issues he had identified with the Revised Design before he issued a PS2. This required him to make further enquiries until he reached the point of being satisfied with the responses that he received and that the issues he had raised had been rectified, rather than simply accepted the response of others. The fact that Mr Knight was under time pressure to complete his review and sign a PS2 did not lessen these obligations. This conduct was a serious departure from accepted standards and also gave rise to a finding of incompetent performance of engineering services.

In respect of both peer reviews, there were corresponding breaches of the ENZ Rules.

Mr Knight accepted the Disciplinary Committee's findings of incompetence in relation to his peer review of the Original Design and that he may not have identified all issues in his peer review of that design.

The Disciplinary Committee adopted a starting point of suspension of registration, taking into account that the liability findings were serious but confined to the competency of two regulatory peer review that Mr Knight undertook. The Committee took into account its concerns about the extent to which Mr Knight's evidence indicated he lacked appreciation as to his professional obligations when conducting a regulatory peer review. Also considered were the steps Mr Knight had taken in terms of

professional development and upskilling since the conduct in question, and that he had now demonstrated he has real insight into this conduct and its underlying causes.

The Disciplinary Committee accepted Mr Knight's evidence about the steps he has taken to fully inform himself of the requirements of a regulatory peer review and the need to fully close out and resolve queries to his satisfaction before he signs a PS2. The Disciplinary Committee also took into account Mr Knight's previous unblemished record. The Committee concluded that the risk of recurrence was significantly reduced to the point where it could reasonably be said that Mr Knight no longer presents as a significant risk to the public in any other structural engineering work he may undertake for his firm (Constructure).

The Disciplinary Committee imposed orders of suspension of registration for a period of three months, a fine of \$2000, and censure, pursuant to the CPEng Act. Under the relevant ENZ Rules, the Disciplinary Committee made an order of censure (to mark out Mr Knight's conduct as unacceptable for a Chartered Member). An additional order was made to enable ENZ to assess Mr Knight's continuing suitability for Chartered Membership, namely, an order that within six months, he must submit to ENZ a minimum of 4 of his peer reviews of his recent or current work, of work he had himself peer reviewed, to enable his current competency to carry out regulatory reviews to be assessed to ENZ's reasonable satisfaction.

Mr Knight was also ordered to pay costs in the sum of \$40,000.

Mr Knight did not seek permanent name suppression.