

COURT OF INQUIRY

James K Mah PEng, faced six charges of incompetence, negligence or unprofessional conduct at an Inquiry on January 13 and 14, 1992. Mr Mah pled guilty to five charges concerning faulty seismic design in 5 buildings. In the sixth charge, Mr Mah pled guilty to submitting a letter of assurance certifying the structural design for a project complied with applicable codes when, in fact, the design had not been completed. The Discipline Panel ordered that Mr Mah's membership be revoked and that he pay his own costs and reasonable costs of the Association estimated to be \$32,000.

**In the Matter of the Engineers and Geoscientists Act
RSBC 1979, Chapter 109 as amended**

— and —

In the Matter of James K Mah PEng

Judgment

A Discipline Committee Panel of the Association of Professional Engineers and Geoscientists of the Province of British Columbia, under the authority of the Engineers and Geoscientists Act, RSBC 1979, Chapter 109, as amended, held an inquiry on January 13 and 14, 1992 to examine alleged contraventions of the Engineers and Geoscientists Act and of the Bylaws and Code of Ethics of the Association, by James K Mah PEng.

The six charges against Mr Mah were as follows:

That he demonstrated incompetence, negligence or unprofessional conduct in that he failed to guard against conditions that were dangerous or threatening to life, limb or property on work for which he was responsible for the following building projects:

Charge 1: In his design of a two-storey commercial building in the City of Vancouver, his File GP-36.

Charge 2: In his design of a high-rise building in the City of New Westminster, his File BG-06.

Charge 3: In his design of a high-rise building in the City of New Westminster, his File BG-02.

Charge 5: In his design of a high-rise building in the City of New Westminster, British Columbia, his File BG-03.

Charge 6: In his design of a high-rise building in the City of New Westminster, British Columbia, his File BG-04.

Charge 4 was as follows:

That he demonstrated incompetence, negligence or unprofessional conduct in that he signed and sealed a letter of assurance to the Building Inspector of the City of New Westminster, dated January 23, 1990, for a residential/office/retail complex at 301-321 - 6th Street, in the City of New Westminster, when in fact a structural design of the subject building had not yet been completed.

Mr Mah was not present at the Inquiry but was represented by Mr David Butcher as legal counsel. Mr Butcher entered a plea of guilty for all six charges on behalf of Mr Mah.

After due consideration of the evidence, the Panel ordered:

1. That the membership of Mr James K Mah PEng be revoked, effective immediately, and that no application for re-admission to membership be considered before 24 months, and further,

2. That Mr James K Mah PEng be ordered to pay his own costs and the reasonable costs of the Association incidental to the investigation and Inquiry, which are estimated to be about \$32,000 which amount is due within 12 months of this Order.

Mr. Kerry Short, assisted by Mrs Lynda Sum, acted as legal counsel for the Association. Two expert witnesses were called by the Association.

Facts in the Case

The facts listed below are based on an agreed statement of facts, documents submitted by the Association and testimony by two witnesses who had reviewed the designs by James K Mah PEng. Mr Mah was not present to answer questions.

Mr J K Mah PEng was at all material times a principal of JKM Engineering. All six charges relate to buildings designed or to be designed by the firm, either directly or under the supervision of J K Mah.

Except for Charge No 4, which related to a breach of ethics, all charges had a common theme of significant design errors. It is not practical to detail all these errors in this brief summary. However, the reviewers identified recurring errors among the buildings reviewed which could be classified into four common categories as follows:

1. A weakness in the basic understanding of seismic design and, possibly, of punching shear. The seismic design problem was characterized by too much strength in the nominally ductile walls which resulted in the foundations being weaker than the hinge point.

2. An improper understanding of, or failure to apply carefully, the basic principles of engineering in the step between the computer and the drawing board. Sophisticated computer models were used for analysis but the results were misunderstood or improperly translated into detailing in the drawings.

3. An apparent office procedure which allowed engineering design to be carried out by draftsmen without being checked by a professional engineer. For example, a reason given for reinforcing steel in excess of Code maximums was that the steel had been inserted by the draftsman based on his interpretation of the Code.

4. Drawings issued for construction were incomplete or difficult to read, generally with respect to reinforcing details, with some evidence of reliance being placed on the omissions being identified and corrected during construction.

The following are examples of some of the significant problems:

Charge No 1. This was a small two-storey commercial building with two adjacent sides being concrete block walls and the other two reinforced concrete columns. The nature of the walls would have caused the building to twist under earthquake side loading. In the opinion of one of the expert witnesses, the column deflections would have been 40 to 60 times greater than calculated by Mr Mah. These high deflections coupled with a poorly designed joint between the columns and the flat plate floor resulted in a high probability of a punching shear failure.

Charge No 2. This was a 14-storey residential tower. Column reinforcing steel was as much as double the code allowable. The walls had too much zone steel. Very serious punching shear design deficiencies occur throughout the transfer slab at roof deck level. Special integrity reinforcing as required by the Code was not shown on the drawings.

Charge No 3. This was an 18-storey residential tower. Cases of both too much and too little reinforcing steel were evident and the ductile "hinge" was stronger than the subgrade structure.

Charge No 4. Mr Mah signed and sealed a letter which stated, in part, "The undersigned hereby gives assurance that the design of the building conforms to all of the structural requirements of Part 4 (or Part 9 as applicable) of the current British Columbia Building Code." This letter was submitted with an application for a building permit in order to meet a deadline. At the time of the submission the building had not yet been designed.

Charge No 5. This was a 12-storey residential tower. Seismic design problems were similar to those in Charges No 2 and No 3. There was a major deficiency in transferring wall loads through a shear wall. Comments from the reviewer were that

"the wall will fail". A retaining wall had the reinforcement steel on the wrong side.

Charge No 6. This was a 12-storey residential tower. This also contained similar seismic design deficiencies as found in Charges 2, 3 and 5. A dapped beam detail was seriously flawed and would have resulted in horizontal splitting. Many other essential connection details were missing or poorly designed. A transfer slab was capable of carrying only 25% of its supported load in shear. There were many minor Code deficiencies.

Reasons for Judgment

There was no question in the minds of the Panel that the errors made in the preparation of designs for the five buildings which were the subject of Charges 1, 2, 3, 5, 6 were serious errors. Although some of the many points raised by the reviewing engineers could be considered minor or subject to individual interpretation, some of the design errors were so basic that the Panel had to consider the probability that Mr Mah either:

- a. did not have a clear grasp of the principles of structural design; or
- b. he was careless in the extreme.

After due consideration, the Panel resolved to revoke the membership of Mr J K Mah PEng, for the following reasons:

1. Mr Mah had twice previously been the subject of inquiries by the Association. The first was in 1985 for three building designs which exhibited very similar design errors to those in the current Charges 1, 2, 3, 5, 6. Mr Mah pled guilty to those charges and was suspended from the practice of engineering for nine months.

2. In 1989 Mr Mah was convicted of using another engineer's design drawings and reproducing them over his own title block without permission of the other engineer.

3. The 1985 sentence of nine months was mitigated by the fact that Mr Mah had pled guilty, expressed contrition, and said he had undertaken revisions to his business practice to guarantee that no future dereliction of responsibility would recur.

4. It was apparent to the Panel that Mr Mah had not learned from the previous discipline. Similar mistakes including design errors of a basic nature, such as failing to design for punching shear, were repeated in the series of buildings which were the subject of the current inquiry.

5. In structural design, safety of the public must be paramount. The Panel had no confidence that a further or longer suspension this time would improve the quality of engineering any more than it did the first time.

6. Although no injury or loss of life occurred as a result of the design errors, the potential of a major collapse existed had the buildings been built as designed without subsequent modifications. Another suspension would send a message to the membership and the public that the Association does not take this kind of problem seriously.

7. With respect to Charge No 4, this was similar in nature to the 1989 conviction in that it exhibits a lack of commitment to the Code of Ethics of the Association.

Dated at the City of Vancouver, in the Province of British Columbia, the 3rd day of February, 1992.

The Association of Professional
Engineers and Geoscientists of the
Province of British Columbia
Discipline Committee Panel:
F E Peters PEng — Chair
L T Jory PEng
J W Hogan PEng

Comments of the Panel

Engineers do make mistakes from time to time and a good engineer learns from his/her mistakes to become a better engineer. As long as the public can be protected, the Asso-

ciation normally attempts to salvage an engineer's career by imposing a sentence which would further such learning. In this case, given the failure of the member to learn from his previous discipline, the Panel felt that it would not be possible to ensure protection of the public if Mr Mah were to be left the right to practise after serving a suspension.

Mr Mah submitted his resignation on the last working day before the Inquiry. He may have done this on the assumption that he could thereby avoid an Inquiry. If so, this is an erroneous belief. A tendered resignation must be considered and approved by Council before it is accepted. Furthermore, Section 24 of the Act defines a member as "a former member" for purposes of the disciplinary process. It must be understood by all members that resignation is not an escape route to avoid the penalty for a breach of the Act, Bylaws or Code of Ethics.

It appeared to the panel that deficiencies in seismic design are being reported all too frequently. This is a matter that should be addressed by the Association, the Universities and the practitioners.

Engineers also need to be reminded that the use of clever computer programs does not guarantee good design. In structural engineering, programs which model forces in a structure produce output which needs to be carefully translated into detailed design by experienced engineers who understand the limitations of the model and the complications of structural design.