

**APEGGA**

The Association of  
Professional Engineers, Geologists  
and Geophysicists of Alberta

No. 03-001-FH

APEGGA  
DISCIPLINE COMMITTEE

DECISION

Date of Hearing: April 21, 2004  
Date of Decision: September 21, 2004

**IN THE MATTER OF** the Engineering, Geological and  
Geophysical Professions Act

- and -

**IN THE MATTER OF** the conduct of Sven E. Hage, P.Eng. and  
Jacobsen Hage Engineering, regarding structural design [REDACTED]  
[REDACTED] in St. Albert, Alberta.

Cite as: Hage, Sven E./Jacobsen Hage Engineering, No. 03-001-FH re: [REDACTED] St.  
Albert, Alberta

**DISCIPLINE COMMITTEE PANEL**

Bruce Alexander, P.Eng., Chair  
 Bill Hibbard, P.Eng.  
 Allan Doell, P.Eng.

Panel Counsel

Dwayne Chomyn, Neuman Thompson

**PARTIES**

APEGGA

Investigative Committee represented by Barry  
 Massing, Hendrickson Gower Massing Olivieri

Members

Sven E. Hage, P.Eng.  
 Jacobsen Hage Engineering

**BACKGROUND**

On February 28, 2003, the Discipline Committee received, from the Investigative Committee, the referral for a discipline hearing concerning Mr. Sven E. Hage, P.Eng. and Jacobsen Hage Engineering (the "Members"). The Discipline Committee responded and requested that the Investigative Committee provide particulars of the matters to be heard. The charges had not been received by the specified time, and the case was removed from the Discipline hearing list. On August 26, 2003, the Investigative Committee provided its charges and applied to have the matter put back on the list.

After obtaining the availability of all necessary parties, hearing dates of April 21 and 22, 2004 were set. On October 15, 2003, the Discipline Committee issued a formal notice of hearing and served copies on the Members and on the Investigative Committee (the "parties"). At the same time, the Discipline Committee, according to its standard process for disclosure of documents, requested that the parties provide, to the Panel and to each other, copies of documents on which they intended to rely at the hearing.

The Investigative Committee submitted its documents on October 20, 2004. The Discipline Committee again wrote to the Members on April 5, 2004 regarding production of documents. Neither Mr. Hage nor Jacobsen Hage Engineering responded or submitted documents. The Investigative Committee's submissions were provided to the Panel on April 14, 2004.

**THE HEARING**

The hearing was held and concluded before the Panel at the Association's offices in Edmonton on April 21, 2004. The Investigative Committee was represented by Mr. Massing. Neither Mr. Hage nor Jacobsen Hage Engineering were present or represented, Mr. Hage having forwarded a letter to the Investigative Committee by fax on April 2, 2004, stating that he would not be attending the hearing.

## CHARGES (ALLEGATIONS)

The Members faced three charges in relation to a [REDACTED] project in St. Albert, Alberta. The matters to be decided, as brought forward by the Investigative Committee, were:

1. "In or about June to September, 2001, you prepared design drawings for the above project, which design was deficient or inadequate, or both, in that:
  - a. The piles did not meet the minimum length requirements as required by the Geotechnical Report;
  - b. The reinforcing did not meet the requirements of the Geotechnical Report;
  - c. Some of the piles did not have sufficient capacity to carry the applied loads;
  - d. There was no indication on the drawing that a bond breaker was required on all piles as they pass through 6 meters of existing fill
  - e. The basement walls were under designed and below required capacity;
  - f. The structural floor slab had serious deflections and did not meet serviceability limit states;
  - g. The structural floor slab thickness was below Building Code requirements;
  - h. The 8 inch masonry wall was not sufficiently reinforced to withstand lateral wind loading;
  - i. Some of the structural steel roof components were over stressed."
2. "The drawings you prepared for the said project were deficient in that they lacked information in the following respects:
  - a. No dimensions or elevations were provided on the drawings to determine the basement wall height and pile cut-off under the walls;
  - b. There was no indication of the total roof dead load;
  - c. There was no note or indication that all piles must have a bond breaker through the fill layer."
3. "That your conduct in the foregoing respects constitutes unskilled practice of the profession of engineering, or unprofessional conduct, or both, and constitutes violation of the APEGGA Code of Ethics Rules of Conduct #1 and #4."

## FINDINGS AND REASONS

With respect to each of the Investigative Committee's charges, the Panel finds as follows:

1. **In or about June to September, 2001, you prepared design drawings for the above project, which design was deficient or inadequate, or both, in that:**
  - 1.a. **The piles did not meet the minimum length requirements as required by the Geotechnical Report.**

With the exception of four P1 Piles, one at Grid C-1 and a cluster of three near Grid C-6, the piles satisfy the criteria of the Shelby report. In particular, the P1 and P2 piles under the basement walls were less than 12 meters in length but were more than 12 meters in depth.

Page 5 of the Shelby report recommends a minimum pile length of 12 meters. Near the bottom of page 11 the report reads "The building will be supported on cast-in-place concrete piles that extend approximately 12 meters below existing grade". A note in Section 6.4 "Findings" reads "The building should be supported on Cast-In-Place Concrete Piles extending approximately 12 meters below grade into the silt. These excerpts from the Shelby report, together with the testimony of [REDACTED], indicate that, with four exceptions, the criteria of the geotechnical report respecting minimal pile length have been met in the Hage design. The Panel is not satisfied that alone or in conjunction with all of the facts established in the case that non-compliance with the Shelby report in these four instances constitutes unskilled practice or unprofessional conduct, and we, therefore, dismiss this charge.

**1.b. The reinforcing did not meet the requirements of the Geotechnical Report;**

The Shelby report recommends that "the upper 10.0 meters of all piles should be reinforced to prevent adverse effects of seasonal frost penetration or moisture content variations". The length of reinforcement specified by Mr. Hage was 30 feet or 9.15 metres. The Panel deems this to be a minor deviation from the Shelby recommendations and is not, either alone or in conjunction with any other deficiencies, evidence of unskilled practice or unprofessional conduct. This charge is dismissed.

**1.c. Some of the piles did not have sufficient capacity to carry the applied loads;**

Mr. [REDACTED] indicated that the pile capacity was not significantly below the applied load but, because some piles had been installed prior to his involvement in the project, it was necessary to place additional piles at midpoints between existing piles. For example, along Gridline B, the overall length from Gridline 1 to Gridline 7 is 116 feet. Mr. Hage placed piles at one seventh of the overall length, or about 16.5 feet. The piles were installed before Mr. [REDACTED] became involved with the project. If the piles on Gridline B had not been installed, Mr. [REDACTED] would have added one pile in the line and changed the spacing to 14.5 feet (116/8). In the circumstances, he was forced to add seven piles, one between each of the existing piles. The Hage pile design is deemed marginal, not blatantly underdesigned and not, either alone or in conjunction with any other deficiencies in the design, evidence of unskilled practice or unprofessional conduct. This charge is dismissed.

**1.d. There was no indication on the drawings that a bond breaker was required on all piles as they pass through 6 meters of existing fill;**

The Shelby report recommends that "any portion of pile encountering fill soils must be provided with a double sleeve to counteract the effect of negative skin friction". This is a sufficiently unusual requirement that it should have been prominently displayed on the drawings. The only indication on the drawings is Note 11. on Drawing S-1 which states in part that "All recommendations, procedures and observations noted in the geotechnical report shall be considered to be part of this specification". The Panel considers this to be insufficient instruction to the Contractor.

The evidence of Ms. [REDACTED] suggests that Mr. Hage had not read the geotechnical report when he performed his foundation design. Unfortunately, Mr. Hage chose not to be present at the hearing to tell his side of the story. The Panel tends to believe the evidence of Ms. [REDACTED], and, on a balance of probabilities, we find that Mr. Hage did not read the geotechnical report. To design pile foundations on a difficult site such as this without first becoming familiar with the subsurface conditions is deemed unprofessional conduct.

**1.e. The basement walls were underdesigned and below required capacity;**

A basement wall thickness of six inches is probably less than most structural engineers would have selected. That does not necessarily make it wrong but it does require better than average precision on the part of the contractor in placing reinforcement to ensure the wall has the required strength. That is, there is not much room for error.

The reinforcement in the typical basement wall does not satisfy the lateral pressure resulting from the formula " $P = 9.4 D + 0.5 S$ " as presented in the Shelby report. The Panel believes that the value for 'D' should be 2.9 meters and the value for 'S' should be 6.0 kPa, the Alberta Building Code live load for light trucks and unloaded buses. On this basis, the typical wall is underdesigned.

The 'L' shaped dowels shown on Section 1/S-2 scale about 3'-4" on each leg. Drawing S-1, Main Floor Foundation Plan, shows the vertical leg to be only 2'-0" long which means it would project approximately 1'-6" down the outside face of the wall. In the absence of vertical bars on the exterior face, a horizontal crack would likely develop at the bottom of the dowels, caused by end rotation of the structural slab. This is deemed to be a poor detail which constitutes unskilled practice.

The basement wall on Gridline 7 is not laterally braced at Main Floor Elevation for a length of 12'-0", adjacent to the stair opening. The wall is not adequately reinforced to bridge the opening. A similar situation occurs at Gridline 1. This is a deficiency in design which is deemed to be unskilled practice.

**1.f. The structural floor slab had serious deflections and did not meet serviceability limit states;**

Mr. [REDACTED] calculations found the structural floor slab to be adequate for strength but it had serious deflections and did not meet serviceability limit states. He based his



deflection calculations on a live load of 6.0 kPa (125 psf) specified by the Alberta Building Code for light trucks and unloaded buses rather than 4.8 kPa (100 psf) used by Mr. Hage. But the choice of live load was not the only difference in the deflection calculations. Mr. [REDACTED] found the instantaneous dead load deflection to be 0.8" (20 mm). Using the "ADAPT RC Version 4.01" program, Mr. Hage found the simple span dead load deflection to be only 3.4 mm (Tab 9). This is much too low when compared to the live load deflection. The creep deflection, which is a multiple of dead load deflection, is also substantially underestimated in the computer printout.

The Panel finds that the slab design is not in accordance with the Alberta Building Code respecting serviceability limit states. We deem this to be evidence of unskilled practice.

**1.g. The structural floor slab thickness was below Building Code requirements;**

For one-way slabs, CSA A23.3 provides minimum thicknesses below which deflections must be computed. They are  $L/20$  for Simply Supported Spans,  $L/24$  for Spans with One End Continuous and  $L/28$  for Spans with Both Ends Continuous. The structural slab in question has a thickness of 8" and a span of 17'-6", so the span/depth ratio is about 26. The slab between Gridlines A and B is partially restrained at both ends but cannot be termed "continuous". Continuity at Gridline 'B' is provided by the grade slab which is connected to the structural slab with 15M x 10'-0" at 8" Top bars. Continuity at Gridline A cannot be relied upon as the wall would simply crack at the bottom of the dowels and relieve any negative moment from the slab.

The code permits slab thickness to be less than the limits specified above if deflections are computed and found to be acceptable. Mr. Hage did compute deflections, albeit incorrectly and concluded they were acceptable. The Panel finds that Charge 1.f. above covers the issue of slab thickness as well as serviceability. If slab thickness is increased, serviceability would improve. There is no additional evidence of unskilled practice contained in this charge and it is dismissed.

**1.h. The 8 inch masonry wall was not sufficiently reinforced to withstand lateral wind loading;**

The evidence before the Panel is not very clear on this issue. The complainant, Mr. [REDACTED], stated that the masonry wall is under reinforced for wind loads. Mr. [REDACTED] calculations have not been presented to the Panel.

Mr. Hage analyzed the masonry wall with "Masonry LSD 95" software using 10M bars at 800 mm and a wind pressure of 0.4 kPa (8.3 psf). He found the design to be adequate. Dr. [REDACTED] checked the design using 15M bars at 800 mm and a wind pressure of 0.4 kPa. He also found the Hage design to be adequate. The drawings indicate the reinforcement to be 10M @ 32" centres, which is equivalent to 10M @ 813 mm, near enough to 800 mm.

The Summary of Design Review, appended to the Investigative Panel Report under the heading "Masonry Walls" states, "I obtained a pressure of 13.5 psf or 0.65 kPa using this approach. With this wind loading it is very likely that the masonry wall will not have the capacity required".

Mr. [REDACTED] calculations dated Nov 29/02 (Tab 27.j) suggest a design pressure of 0.85 kPa or 17.7 psf. His calculations dated Feb. 3/03 (Tab 27.m) suggest a design pressure of 0.648 kPa or about 13.5 psf. Mr. [REDACTED] did not check the design of the wall because he is not comfortable performing masonry design. Mr. [REDACTED] found in his calculation dated 17/6/01 (Tab 29) that design wind pressure should be taken as 30 psf due to the presence of large openings, namely the overhead doors. His E-mail to [REDACTED] [REDACTED] dated June 20, 2002 (Tab 31) indicates that the wall must be deemed unstable according to the ABC and would require pilasters at 12' centres.

The design wind pressure varies from a low of 8.3 psf to a high of 30 psf depending on whose engineering judgment is used. The wall with 10M @ 32" has not been analyzed for 13.5 psf or 17.7 psf wind pressure but the interaction curve provided by Mr. Hage shows that the resisting moment is approximately two times the factored moment when the pressure is taken as 0.4 kPa or 8.3 psf. It is not clear to the panel that the wall, as detailed, is incapable of carrying 13.5 psf.

A wall should be designed for the algebraic sum of exterior and interior pressures, both of which are specified in the Alberta Building Code. How Mr. Hage can justify the use of 0.4 kPa as a design wind pressure is a mystery to the Panel. It does not appear to be in accordance with the code. But the question before the Panel is whether or not the wall, as detailed on the drawings, is adequate to resist the wind pressure, not how Mr. Hage arrived at it.

There is not sufficient evidence before the Panel to convince us that the wall, as detailed on the drawings, is not adequate to sustain the wind load specified in the code. No finding is made in this regard and Charge 1.h. is dismissed.

**1.i. Some of the structural steel roof components were overstressed.**

The roof dead load was not specified on the drawings. Mr. Hage used a dead load of 1.0 kPa in his computer design. Mr. [REDACTED] found that this should be 1.25 kPa (26 psf). Mr. [REDACTED] had used 37 psf in one calculation and 30 psf in another for roof dead load. The steel beam on Gridline C between Grid 4 and 5 was found by Mr. [REDACTED] and Mr. [REDACTED] to be overstressed. Whether this was solely due to differences in dead load is not known, but the issue is deemed to be relatively minor and does not constitute unskilled practice or unprofessional conduct. This charge is dismissed.

**2. The drawings you prepared for the said project were deficient in that they lacked information in the following respects:**



**2.a. No dimensions or elevations were provided on the drawings to determine the basement wall height and pile cut-off under the walls;**

While this is true, it is deemed to be a minor oversight. The Contractor could readily find this information from the Architectural drawings. This charge is not deemed to be evidence of unskilled practice or unprofessional conduct and is hereby dismissed.

**2.b. There was no indication of the total roof dead load;**

This is true. Dead and live loads are required by Alberta Building Code to be shown on the drawings. Without this information, the roof joist fabricator does not have sufficient information for joist design. The Panel finds that while this omission on the drawings contravenes the Alberta Building Code, it is not evidence of unskilled practice. This charge is dismissed.

**2.c. There was no note or indication that all piles must have a bond breaker through the fill layer.**

This matter was covered under Charge 1.d. The Panel has nothing further to say about it.

**3. That your conduct in the foregoing respects constitutes unskilled practice of the profession of engineering, or unprofessional conduct, or both, and constitutes violation of the APEGGA Code of Ethics Rules of Conduct #1 and #4.**

Rule 1 states: *Professional engineers, geologists and geophysicists shall have proper regard in all their work for the safety and welfare of all persons and for the physical environment affected by their work.*

Rule 4 states: *Professional engineers, geologists and geophysicists shall act for their clients or employers as faithful agents or trustees and shall always act independently and with fairness and justice to all parties.*

As noted in the foregoing, the Panel finds elements of both unskilled practice and unprofessional conduct contained in the charges. In all cases, they are considered to be a violation of APEGGA Code of Ethics Rule of Conduct #1. We could find no violation of Rule #4.

## **ORDERS**

On May 28, 2004, the Discipline Committee Panel's written findings and reasons were issued to the Members and to the Investigative Committee. In its letter, the Panel indicated that it would receive written submissions from the parties on the matter of the orders to be made.

The Panel received two submissions dated June 11 and June 14, 2004 from Mr. Massing on behalf of the Investigative Committee. Neither Mr. Hage nor any member of Jacobsen Hage



Engineering took the trouble to attend the hearing or to respond to the Panel's request for submissions respecting orders.

In his first submission, Mr. Massing indicated that Mr. Hage is currently under an interim suspension on another matter, ordered by the Investigative Committee.

The Panel subsequently requested the Director of Professional Practice (the Director) to provide information on the costs associated with the hearing. The Director wrote to the parties on July 29, 2004 indicating the costs that his office had determined and noting that he would provide a copy of that letter to the Panel on August 13, 2004 along with any comments either party wished to make.

In response, Mr. Hage offered some commentary on the hearing by way of two letters dated August 11 and 16, 2004. The Panel received the Investigative Committee's response to those letters on August 31, 2004.

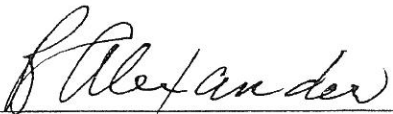
Considering all of the evidence presented to date the Panel orders as follows:

1. Mr. Sven E. Hage and Jacobsen Hage Engineering Ltd. shall be reprimanded for unskilled practice and unprofessional conduct.
2. Jabcobsen Hage Engineering shall permit periodic inspections by a senior engineer, authorized by the Discipline Committee, on the following terms:
  - a) The periodic inspections shall be conducted at approximately three-month intervals;
  - b) The period during which the inspections are conducted shall be two years, unless otherwise ordered by this Panel, beginning on the date of this decision;
  - c) Each periodic inspection will take no more than 20 hours to complete;
  - d) The cost of such inspections shall be paid by Jacobsen Hage Engineering.
3. Mr. Hage shall permit periodic inspections by a senior engineer, authorized by the Discipline Committee, on the following terms:
  - a) The periodic inspections shall be conducted at approximately three-month intervals;
  - b) The period during which the inspections are conducted shall be two years, unless otherwise ordered by this Panel, beginning on the date that the suspension of Mr. Hage's registration is removed;
  - c) Some or all of the periodic inspections of Mr. Hage's practice may be carried out as part of the inspections of Jacobsen Hage Engineering's practice in the event Mr. Hage's suspension is removed prior to the completion of the inspections of Jacobsen Hage Engineering;

- d) Each periodic inspection will take no more than 20 hours to complete;
  - e) The cost of such inspections shall be paid by Mr. Hage or Jacobsen Hage Engineering.
4. Mr. Hage may be required to pass a particular course of study or satisfy the Discipline Committee as to his competence in the field of structural engineering based on the results of any or all of the periodic inspections, and the Discipline Committee reserves jurisdiction to issue such a specific directive.
  5. Costs of the hearing shall be paid to APEGGA as follows:
    - a) Jacobsen Hage Engineering shall pay, within 60 days of the date this decision is served on it, costs in the amount of \$1,271.04, being 12.5% of the costs of the hearing.
    - b) Mr. Hage shall pay, within 60 days of the date this decision is served on him, costs in the amount of \$1,271.04, being 12.5% of the costs of the hearing.
  6. If Jacobsen Hage Engineering fails to comply with Orders 2 or 5(a) to the satisfaction of the Discipline committee, its Permit to Practice shall be revoked until it complies with those orders.
  7. If Mr. Hage fails to comply with Orders 3 or 5(b) to the satisfaction of the Discipline Committee, his registration with APEGGA shall be suspended until he complies with those orders.

Costs are assigned on the basis that, of the twelve charges, nine were dismissed and three (25%) resulted in findings of either unprofessional conduct or unskilled practice. Taken together, Jacobsen Hage Engineering and Mr. Hage are assigned 25% of the hearing costs.

DATED this 21<sup>st</sup> day of September, 2004 at Edmonton, Alberta.



Bruce Alexander, P.Eng.  
Chair, Discipline Hearing Panel