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Gazette

THE DEPARTMENT OF THE REGISTRAR, PEO

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The Discipline Committee of the Association of Professional Engineers of Ontario In The Matter of a Hearing Under the Professional Engineers Act, RS.O. 1990, Chapter P. 28.

And in the Matter of a Complaint Regarding the Conduct of

A Member

Of the Association of Professional Engineers of Ontario, and
The Holder of a Certificate of Authorization

Decision And Reasons

A panel of the Discipline Committee of the association met in the offices of the association on August 9, 1995, and March 19, 1996, to hear allegations of professional misconduct against Engineer A, (hereinafter referred to as "the practitioner"), and S Engineering, a Certificate of Authorization holder, (hereinafter referred to as "the holder").

Legal counsel appeared for the association, and for the practitioner and the holder.

The hearing arose as a result of the practitioner's involvement in a single-storey building located in northern Ontario ("the city").

At the beginning of the hearing, counsel for the association filed as an exhibit a Notice of Hearing, as well as an Agreed Statement of Facts.

The allegations of professional misconduct set out in

Appendix "A" to The Notice of Hearing filed at the commencement of the hearing are summarized as follows:

1. On or about September 23, 1991, the practitioner prepared and stamped structural drawings S1 to S4 for a permit to build a single-storey building.
2. On December 23, 1991, the services department of the city issued a foundation permit. The balance of the permit was issued on February 28, 1992.
3. The proposed building was a single-storey structure, having a floor area of approximately 3390 square metres. It consisted of an office, library, and general purpose room area of 36 x 24 metres, and an 81 x 21metre room wing, both framed with double pitched sloping wood roof trusses, supported by steel beams on wood columns, and by wood and stud interior walls. A mezzanine area of approximately 190 square metres adjacent to the general purpose room contained the mechanical and electrical equipment.
4. On or about May 1992, the contractor engaged an independent professional engineer (the consultant) at the request of the holder, after problems developed in the wood stud walls supporting the mechanical mezzanine. In reviewing the design drawings, the consultant found errors in the foundation design and, after preliminary investigation, found that modifications were required to approximately 50 column piers.
5. On June 10, 1992, the consultant issued a notice to the contractor, with sketches R43 to R46, to carry out the required modification to the column piers.
6. During the course of his investigation, the consultant noticed additional items requiring further review. He advised the holder of these additional concerns; however, neither the holder nor the practitioner responded to or reviewed the items of concern with the consultant.
7. On June 19, 1992, the city building department advised the holder that due to the magnitude of the structural changes being considered, the building department required that a full revised set of structural drawings be submitted to satisfy the Building Code Act. The building department further

advised its authorization would be required before proceeding with the revisions. The building department directed that the areas involved were not to be covered and/or enclosed until the situation was resolved.

8. A district school board (the board) engaged a structural engineering firm to review the structure. On June 1992, the building department advised the holder that the scope of the order not to cover included the entire floor slab.

9. On July 30,1992, the building was standing enclosed with exposed interior framing with the concrete slab not placed. The building structure stood partially completed until December 8, 1992. On December 8, 1992, the building department directed that until the results of further investigations were available, the covering of the interior roof and supporting structure areas of the vestibule and corridor areas would be prohibited under the Building Code Act. On December 11, 1992, the contractor advised the board that due to the lack of response to vital information from the holder, it was withdrawing from the project until such time as matters were resolved. The contractor further advised the board to secure and heat the building. On May 4, 1993, the holder issued tender documents for a completion contract for the building. The structural engineering firm engaged by the board carried out a general review of the structural work for compliance with revised structural drawings prepared by them, which were filed with the city.

10. An independent structural engineer engaged by PEO (the expert) examined structural drawings S1 to S4 stamped by the practitioner, the specifications originally submitted for the building permit, an additional information provided to the city. This information provided to the city. This information included 100 sheets of details of wood trusses and sheets 1 to 10 of the wood truss layout drawings. The expert did not conduct a detailed check of the structural design, but rather, he considered basic structural requirements that were critical to the design. He found that the documents originally submitted for a building permit failed to meet the requirements of the Ontario Building Code (hereinafter referred to as the "OBC") and its referenced design standards as follows:

a. The structural drawings, S1 to S4, provided no information on the basic design loading; on the affects of accumulation due to snow drifting; on lateral forces; on wind uplift forces; and on the loading criteria for some of the components to be designed and supplied by the contractor, including the roof and the mezzanine floor.

b. The interior column footings on lines 4 and % lack sufficient reinforcements to resist the soil pressure acting on their base pads. The minimum reinforcement required for the footing base was 0.74 sq. inches. The area of steel supplied was 0.48 sq. inches, which is 35% less that the required minimum.

c. No specific data on the design soil bearing pressure was given on the structural drawings, although the soils report included with the tender documents indicated the need for considerable care to be taken in the design and installation of the building's foundations.

d. Detail 1 on drawing S1 shows steel corridor beams bearing on top of the round timber columns, and held in place by lag screws through the column and grain. The wood trusses which bear on top of the steel beam are not shown. A 38 x 140 nailer is shown on top of the beam, but the drawing does not indicate positive means to transmit the lateral forces and possibly uplift forces from the trusses to the wood column.

e. The lateral resistance to wind forces acting on the classroom wing must be provided by the partitions between rooms. The structural drawings do not show these partitions as permanent parts of the structure, nor do they indicate any footing beneath the floor slab at their locations. The resisting partitions should be designed as permanent parts of the bracing system and shown on the structural drawings.

f. Drawing S4, section 1, shows steel-to-wood connections schematically, but no loads are given. It is generally considered good structural design practice to specify that all structural bolted connections through heavy sawn timber members should be checked after timber has dried out to its surface humidity condition, and related shrinkage has taken place.

By reason of the facts aforesaid, the Notice of Hearing alleged that the practitioner and the holder were guilty of professional misconduct as defined in Section 28(2)(b) of the Professional Engineers Act, R.S.O. 1990, Chapter P. 28.

The sections of Regulation 941 made under the said Act relevant to this misconduct are:

- **Section 72 (2)(a): Negligence-As defined at Section 72 (1): "In this Section, 'negligence' means an act or omission in the carrying out of the work of a practitioner that constitutes a failure to maintain the standards that a reasonable and prudent practitioner would maintain in the Circumstances";**
- **Section 72(2)(b): "failure to make reasonable provision for the safeguarding of life, health or property of a person who may be affected by the work for which the**

practitioner is responsible";

- **Section 72(2)(d): "failure to make responsible provision for complying with applicable statutes, regulations, standards, codes by-laws and rules in connection with work being undertaken by or under the responsibility of the practitioner";**
- **Section 72(2)(h): "undertaking work the practitioner is not competent to perform by virtue of the practitioner's training and experience", and**
- **Section 72(2)(j): "conduct or an act relevant to the practice of professional engineering that, having regard to all the circumstances, would reasonably be regarded by the engineering profession as disgraceful, dishonorable or unprofessional. "**

The Agreed Statement of Facts provided for agreement to all allegations contained in the Notice of Hearing, with the exception of items numbered 6,8, and 9.

An agreed brief of documents was filed at the Hearing on August 9, 1995, including a report from the expert which set out the deficiencies in the drawings prepared by the practitioner. In the expert's opinion, the drawings failed to meet the standards expected of a reasonable and prudent practitioner in that the practitioner did not analyze lateral forces, nor design the building to resist them; did not give loading criteria to the contractor who was to design and supply some of the components; gave no definition of materials to be used; did not provide appropriate information for all loads; gave no indication of the lateral load resisting system; and gave no indication of the need for provision to resist wind uplift forces. Further, the foundation plan did not indicate the soil-bearing values and the framing plans did not give sizes of all members or any of the forces needed for the preparation of shop and detail drawings.

No evidence was called on August 9, 1995, but a guilty plea was entered by both defendants with respect to Section 72(2)(a), (b), (d) and (j), of Regulation 941. The defendants' plea on Section 72(2)(j) was submitted with respect to unprofessional conduct only.

The Committee accepted the defendants' guilty plea. Penalty was suspended pending a practice inspection for the purpose of ensuring that the standards of practice of the practitioner, personally, or in his capacity as the engineer of record for the holder, would be deemed to be in accordance with generally accepted practice; such practice inspection to be paid for by the holder.

The panel of the Discipline Committee reconvened on March 19, 1996, to hear evidence with respect to the practice inspection. Mr. P of Mr. P and Associates, was called by the association and his report of the practice inspection was filed as an exhibit. Mr. P testified that he reviewed six of the practitioner' projects between 1990 and 1995.

The projects were selected on the basis of structural framing systems, use of building, and year of design of the project. He testified that this provided a cross-section of the type of practice he was instructed to review and, at the same time, allowed him to be able to report on the practitioner's development as a practicing professional engineer.

Mr. P testified that on an earlier project, on which the practitioner had been involved in the design of temporary shoring, he had failed to perform testing to verify the capacity of the slabs; had failed to perform analysis for lateral stability; and the drawings lacked sufficient information with respect to allowable loads. Mr. P was concerned about the safety of the structure and was surprised that the practitioner allowed it to stay open without further analysis, review and remedial work.

For this project, the structural specifications followed a standard format and all the required information was provided for.

Mr. P reported and stated in his evidence that the field review was very good, and the field review reports were numerous and informative on more recent projects on which the practitioner provided structural engineering services. Mr. P found that the engineering services were very professional and contained significantly more detail than in earlier projects and showed evidence of the improvements by the practitioner.

Mr. P stated in his report and testified that the holder had not established any of their own guidelines for a complete and organized structural analysis of projects and that calculations tended to be disorganized and information was difficult to locate and follow. He discovered during the course of his inspection that the practitioner had been the sole engineer with the holder since his employment and there was no one in the office with whom he could discuss design problems, alternate systems and remedies. Mr. P reported that as a result of discussions with the practitioner, he satisfied himself that the practitioner appeared to have a good comprehension of structural theory.

He found on the practice inspection that there had been a marked improvement in the structural design aspects of the holder's practice over the past three years and that the most recent structural drawings being prepared by the practitioner and the holder

were generally acceptable.

In order for the holder and the practitioner to effectively continue providing services to the public under their Certificate of Authorization, Mr. P suggested the following:

1. The Certificate of Authorization holder set up office guidelines and design procedures for engineering works. These guidelines should be reviewed by a third party.
2. The Certificate of Authorization holder should avail itself of the latest PEO publications regarding normal practice and procedures as set out in the Terms of Reference for this review.
3. The Certificate of Authorization holder update its library to include the most current editions of applicable Codes, Standards and Regulations.
4. The Certificate of Authorization holder and the practitioner seek independent engineering advice on projects at the preliminary design stage.
5. The Certificate of Authorization holder have all final engineering design and documents independently reviewed for some time into the future.
6. The Certificate of Authorization holder contract out to engineers more "expert," any work that is not within the realm of its competency, or cannot be satisfactorily completed within the client's desired time frame.
7. That a review of the engineering on the larger projects undertaken by the holder in the past five years, particularly for lateral stability, overturning, eccentric loading, torsional loading and snow load buildup, be carried out.

The practitioner and the representative of the holder both testified. The practitioner testified with respect to the structure that required temporary shoring that when the existing building was initially reviewed, the owners were uncertain as to its future use. The reports submitted by the practitioner recommended that the building not continue to be used as an assembly occupancy until its structure could be repaired. The representative of the holder outlined his recommendations for such repairs and provided the owners with an estimate of the cost.

He testified that given the uncertain future of the building, the owner declined to carry out the scheme of permanent repairs and asked for a scheme of temporary repair. The practitioner proposed a line of beams and columns down the middle of the floor to temporarily shore the second floor pre-cast slabs.

The practitioner acknowledged that he should have been more insistent in pursuing the permanent repair of this structure after the one-year temporary repair, or in the absence of permanent repairs.

The practitioner and the holder's representative testified that guidelines and design procedures had been set up by the firm for engineering works. They testified that in a response to Mr. P's report they had availed themselves of the latest PEO publications regarding normal practice and procedures, and had updated their library to include the most current editions of Codes and Standards and Regulations.

Both the practitioner and the holder testified that it has been their practice for the past several years to obtain independent engineering advice at the preliminary design stage and that this would be continued, as is the practice for large or complex projects to be independently reviewed.

Joint submissions were made with respect to penalty and after hearing submissions, the Committee retired to consider penalty.

By virtue of the power vested in it by Section 28 of the Professional Engineers Act, the Committee ordered that:

i. The practitioner and the Certificate of Authorization holder be reprimanded, and their licence and Certificate of Authorization, respectively, be suspended for a period of six months, the suspension to be suspended provided that the terms and conditions hereinafter referred to are complied with.

ii. Any structural engineering performed by the practitioner and sealed by the practitioner shall be reviewed by another professional engineer acceptable to the Registrar for a period of 12 months from the date of this Order. That engineer to report to the Registrar his/her acceptance of the work performed by the practitioner. In the event that the practitioner is not employed by the Certificate of Authorization holder, the work of any other engineer employed by the holder must be reviewed by a professional engineer independent of the Certificate of Authorization holder, and acceptable to the Registrar, for a period of 12 months from the date of this Order. That engineer will report to the Registrar, advising of his/her acceptance of the work performed by the Certificate of Authorization holder.

iii. The Certificate of Authorization holder, as well as any holder of a Certificate of Authorization for which the practitioner is the responsible engineer, be ordered to do the following within three months of the date of this Order to the satisfaction of the Registrar:

a. set-up office guidelines and design procedures for engineering works;

b. avail itself of the latest PEO publications regarding normal practice and procedures as set out in the Terms of Reference of the practice inspection;

c. update their library to include the most current editions of Codes, Standards and

Regulations;
d. submit a report to the Registrar which contains a listing of projects undertaken by the holder since August 1991, and reports on lateral stability, overturning, eccentric loading, torsional loading and snow load build-up. The report should be prepared by an engineer acceptable to the Registrar and may be performed by Mr. C, who has been reviewing the work of the practitioner for the past several years.
iv. The matter be published in the official journal of the association without names or project identifiers.
The right to appeal the Decision of the Committee was waived by the practitioner, and by the representative of the holder on behalf of the holder, and the reprimand was duly administered.

Dated at Toronto, this 17th day of October 1996.
C. Bruce Ross, P.Eng., Chair For and on Behalf of the Committee:
A.J. Bate, P .Eng.
W.K. Bilanski, P.Eng.
A. Johns, P .Eng.
B. Ross, P.Eng.