CRoMiE

Confidential Reporting on Matters in Engineering

Newsletter No 1, June 2008

INTRODUCTION

The Institution of Professional Engineers New Zealand (IPENZ) has received a number of fire engineering reports that highlight concerns with the fire engineering design process. Concerns raised are:

- Incomplete reports that lack documentation to show compliance.
- Poor engineering and judgement.
- When an analysis is done, it is of a low standard where the method of analysis is misapplied and inapplicable.

Assessment of the reports shows that there appears to be a general lack of understanding of the design process and how to provide design documentation that will demonstrate compliance with the building code.

A number of reports used an incorrect methodology in the analysis of the fire design. This included fire evacuation plans that were unsuitable, some of which included manual identification of the beginning of a fire. Most reports were unable to demonstrate that the proposed situation is able to provide safe evacuation of occupants prior to the onset of untenable conditions. This should be able to be done using suitably validated models.

Some fire scenarios presented in the fire reports covered a variation in the location of the fire and also changes in ventilation characteristics. However, no sensitivity analysis was performed with respect to other critical factors such as fire size or soot yield.

In addition to these reports, various organisations involved in regulating and representing fire engineering in New Zealand had raised concerns with IPENZ that the standard of professional fire engineering in New Zealand is variable and that a higher degree of consistency is required.

In the light of these concerns IPENZ initiated a taskforce to review the professional state of overall fire engineering in New Zealand. The taskforce's report identified that fire engineering is similar to any other engineering discipline in that it compares design action with design capacity. It also identified that in developing a fire engineering design, the engineer has to apply the same rigorous approach as that used in any other engineering discipline. The report noted that the output of a fire engineering design needs to be documented in a similar manner to designs of other disciplines involved in building design and construction, and observed that currently these requirements are neglected.

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FIRE ENGINEERING DESIGN AND DOCUMENTATION

To demonstrate compliance with the building code a fire engineer may use acceptable solution C/AS1 or a specific fire engineering design. Irrespective of the method used, the design has to be properly and fully documented on drawings, in specifications and by calculations, as in other building design disciplines.

Section 49 (1) of the Building Act 2004 states:

"A building consent authority must grant a building consent if it is satisfied on reasonable grounds that the provisions of the building code would be met of the building work were properly completed in accordance with the plans and specifications that accompanied the application."

Acceptable Solution C/AS1 in Section 1.3 gives a recommended design sequence which, if followed correctly, will require documentation as set out above.

Where specific fire engineering design is used, New Zealand has adopted the International Fire Engineering Guidelines (IFEG) approach. The Department of Building and Housing collaborated with the Australian Building Controls Board, the Canadian Codes Centre of the National Research Council of Canada, and the United States International Codes Council, in preparing the IFEG.

Part 0	Introduction	Provides background information and guidance that is integral to understanding the entire guidelines within the New Zealand context.
Part 1	Process	Describes the process by which fire engineering is typically undertaken.
Part 2	Methodologies	Describes a selection of methodologies that may be used in undertaking the fire engineering process.
Part 3	Data	Provides a selection of data that may be used in applying the Part 2 methodologies or other chosen methodologies.

If the IFEG process is applied properly the resulting design will be fully documented on drawings, in specifications and by calculations.

The construction industry, through the Construction Industry Council, identified the need for complete and proper documentation and in 2005 published guidelines on design documentation. The guidelines include fire engineering, recognising that fire engineering has to be documented and co-ordinated in the same manner as other disciplines.

The Department of Building and Housing notes in its publication *Building Act 2004: Information for designers, builders and specialist trades* that detailed plans are required at the

consent stage. It also states construction must be to the plans, and that code compliance will be assessed against the plans attached to the approved consent.

Thus we have the Building Act, which requires designs to be articulated on drawings and in specifications, the design process – using either the acceptable solution or a specific design – which requires the same plus calculations, and the construction industry, which requires fire engineering designs to be articulated on drawings and in specifications.

SUMMARY

To address the concerns expressed by IPENZ in the taskforce report and by various organisations involved in the design, construction and regulation of buildings, fire engineers have to lift their game and provide a level of documentation (drawings, specifications and calculations) commensurate with those produced by other construction engineering disciplines.

Fire engineers carrying out peer reviews have an obligation to assess whether or not the fire engineering design documentation meets the level required. If it does not then they must advise the party for whom they are working (typically a building consent authority) that this is the case and that therefore the documentation cannot be reviewed.

Fire engineers must show that they are an equal partner in the building design and construction process by meeting their obligations through proper and adequate design documentation.

How to Report

Report forms can be downloaded from:
www.ipenz.org.nz/ipenz/practicesupport/CROMiE/

Post reports to:
Confidential Report
IPENZ
PO Box 12 241
Wellington 6144

Report forms cannot be completed online or emailed as these are not considered to be secure methods.