FIRE PROTECTION

Fire protection regulations in Australia are moving away from deemed-to-comply prescriptions toward more flexible engineered solutions. The article below outlines the reasons behind this move. Also included in this feature are a profile of a flourishing smoke detector company in Melbourne and a report on the new fire protection system installed by BHP after a massive fire late last year.

More flexible codes on the way

by Tim Kannegieter

When the new Building Code of Australia (BCA) was formally adopted in NSW on 1 January 1993 it marked the first step in the reform of fire protection regulations from restrictive deemed-to-comply prescriptions to more flexible engineered solutions. At the beginning of each section of the fire safety regulations there is now an "objective" stating what that part is aiming to achieve.

This will make it much easier for builders using engineered fire safety solutions to gain approval from local authorities. At present any protection system in a building which does not comply with the prescriptive fire safety regulations of the building code must be approved by the relevant state authorities such as the Board of Referees in Victoria or the Land and Environment Court in NSW. In the past confusion over what the objectives of the regulations were made it much more difficult to get this approval.

Rick Foster . . . around 22% of the total cost of a commercial building is spent on fire protection

The new BCA has been adopted by all states of Australia except Tasmania. Given that around 70% of the BCA is related to fire safety regulations the changes are a significant step in a process which began in 1989 with the establishment of a Building Regulation Review Task Force by the Special Premiers Conference of that year. One of the task force's main briefs was to review technical regulations affecting building and to recommend changes which would speed the process of microeconomic reform.

At the time of its establishment, the Warren Centre at the University of Sydney was just concluding a project on Fire Safety and Engineering. It has established that "substantial cost savings" were possible by moving away from the "highly legalistic, regulatory environment" which controlled fire protection systems in buildings and introducing design flexibility which considered a wide range of possible fire-safety systems.

The task force recognised the benefits of reforming the fire regulations and funded some more work which established the framework on which new fire safety standards would be based.

Next month a new research program called the Fire Regulation Reform Program, mainly funded by the Australian Uniform Building Regulation Coordination Council (AUBRCC) which publishes the BCA, will commence and continue this initial work.

AUBRCC has brought together a number of industry associations, such as the Building Owners and Managers Association, the National Association of Forest Industries, and research bodies like the CSIRO and Victorian University Of Technology.

One aim of the program is to reform existing regulations based on the latest knowledge of fire engineering and to provide greater flexibility, while still operating on a prescriptive basis. The second aim is to develop a National Fire Safety Systems Code which will eventually form the basis of an Australian standard for engineered solutions. The program is scheduled to run for five years.

Eventually it is anticipated that the BCA will incorporate alternative paths for complying installations. A builder will be able to choose between the deemed-to-comply prescriptive regulations or meet a standard based on engineered solutions. This is because in the traditional "cottage building industry" catering to smaller buildings, it is likely that the builders will prefer to stick to the prescribed regulations. The standard can be used for larger or more complex structures where significant savings justify the engineering approach. It will also be appropriate for facilities such as tunnels and airport terminals which do not fit into one class of buildings in the BCA.

The research manager of fire technology at the CSIRO Division of Building, Construction and Engineering, Stephen Grubits, said the code was being based on the new understanding of fire phenomena and their effect on buildings which has resulted from a surge in fire safety research around the world in the last decade.

"This is a very complex area by engineering standards and as such it has lagged behind in the development of engineering solutions compared to areas such as structural engineering and concrete.

"Also, there has always been a lack of statistical data on which to base our models. If we want to evaluate risk we need data on the probability of fires in various building types and the effect of fires on building and occupants. Recent research is providing us with a growing body of knowledge we can now draw upon."

The reforms were needed, he said, because the fire regulations of the BCA were based on the judgment of experts and on lessons learned from disasters, but lacked a solid scientific or engineering basis.

In recent years the CSIRO has released software which can now be used by engineers in designing new systems.

In 1991 it released a package called FIRECALC, a series of 24 fire modelling, fire analysis and egress modelling programs compiled by the National Bureau of Standards in

the US and the CSIRO. This allows engineers to evaluate the likely performance of various fire safety system components and to engineer fire safety solutions.

However, Grubits warned that like many other engineering software applications, the engineer still has to exercise professional judgment in setting up models and using the results.

Much of the CSIRO's current work is in validation and examining the scope of applications for the software. For example, many of the programs were developed using small rooms as models. But to be useful the software must be expanded to deal with large atriums and oddly shaped rooms.

One company which is making use of the new fire software applications is Eagle Consulting Group. According to a director of the group, Rick Foster, around 22% of the total cost of the average commercial building is directly attributed to the need for fire protection.

For example, he said, the structure of a typical commercial building accounts for around 48% of the cost, and around 27% of this is directly related to fire protection features such as fire escape stairs, fire rated doors and walls. Additional costs arise from fire aspects of mechanical services, electrical services, transportation, and hydraulics.

Foster said that by using engineered solutions for fire protection, this cost can be substantially reduced.

"If a building incorporates an early warning smoke detection system and is properly engineered for fire safety, the use of fire modelling and egress software can lead to a system which provides the same level of protection as a deemed-to-comply installation but at less cost.

"The first thing we do with any installation is use our computer algorithms to assess what level of protection a deemed-to-comply installation provides. We then ensure that our engineered solution provides equal protection."

Fire safety programs which Eagle uses include Firecalc, Evacnet, Hyena and Hazard 1. Evacnet is a evacuation modelling and analysis program, Hyena a hydraulic analysis program, and Hazard a fire safety analysis program used to evaluate the impact of fire on occupants.

Foster approves of the moves to develop a fire safety standard for engineered solutions as it will decrease a company's exposure to liability.

"Currently if a building protected according to deemed-to-comply regulations burns down it is regarded as an unfortunate accident. However, if a building burns down which was protected by an engineered solution, then the engineers can be accused of not carrying out the calculations correctly.

"With the standard in place our liability will be substantially reduced." ❑