PU Europe FIRE HANDBOOK

THE ROLE OF FIRE SAFETY ENGINEERING

WHAT IS FIRE SAFETY ENGINEERING?

Fire Safety Engineering (FSE) has been defined as: "the application of scientific and engineering principles to the protection of people, property and the environment from fire" [1]. The key point here is that FSE takes a holistic approach to fire safety, rather than specifiers relying purely on complying with prescriptive regulatory requirements to achieve a particular level of fire safety. It also allows for the assessment of the fire performance of very complex buildings, where the standard methods do not provide the required answers, and the simulations may include sprinklers, smoke release or possible consequences of smouldering and even human behaviour during escape. It can also focus on the protection of property, which requires consideration of other factors than life safety.

Occupancy and use of a building have a significant impact on the risk of fire. The content strongly affects the likely rate of fire growth and the intensity of the fire; the impact is generally greater than of the building construction itself. Using the FSE approach takes these issues into account and looks for the most effective solution to manage the risks rather than a standard fire performance specification for all constructions which may not deal with the particular vulnerabilities of individual projects, or lead to the best option in terms of other building design considerations.

The FSE model approach uses proven methods but still allows room for innovation, and takes budget and other design constraints into consideration without compromising on levels of safety.

FSE has been applied to individual projects, mostly large and complex ones, however it can also be applied on a more general basis within a regulatory context.

FSE OPTIONS IN REGULATIONS

For many applications authorities in EU Member States recognize the benefits of performance and objective-based codes. This has also been enhanced by the need for increased flexibility in methods of designing cost-effective buildings and transportation vehicles, which use innovative construction materials and still maintain fire safety. Design approaches based on fire safety engineering principles respond to this need.

In several countries, such as the UK or Germany, approval of an insulation product is possible after

[1] BS 7974: *The Application of fire safety engineering principles to fire safety in buildings*, HMSO UK (January 2001)

PRECAUTIONS THAT COULD BE TAKEN TO REDUCE THE RISK OF FIRE INVOLVING BUILDING ENVELOPES

- "Do not store highly combustible materials against external façades or steel-faced composite panels or do not allow rubbish to collect against façades or panels.
- Have damaged walls or sealed joints repaired immediately and make sure that jointing compounds or gaskets used around the edges of panels are in good order.
- Check where openings have been made for doors, windows, ducts and cables to ensure that these have been sealed or closed with flashings and the inner core has not been exposed.
- Check that there has been no mechanical damage e.g. by mobile equipment such as fork lift trucks. Repair any damage that has occurred." [2]

proving adequate performance in a large scale standard test.

France allows the use of FSE principles in the regulatory guide for application of insulation in buildings for public access. When adequate performance is shown, approval can be granted and the field of application in public accessible buildings is defined.

An example in which an authority takes into account scenarios is the new UK Regulatory Reform Fire Safety Order 2005, effective since October 2006, which places a greater emphasis on fire prevention in non-domestic premises. A result of this piece of legislation is that a 'responsible person' must carry out a risk assessment of the premises. This fire risk assessment helps the responsible person to identify risks that can be removed or reduced and to decide the extent of the general precautions that should be taken to protect people against the fire risks that remain.

[2] *Insulated Panels, The Fire Safety Order (2005): Advice and guidance on insulated panels for responsible persons and enforcers implementing the Regulatory Reform (Fire Safety) Order 2005*, EPIC (February 2007), p. 14. N.B.: EPIC is the UK association of producers of factory-engineered steel faced composite panels. Brochure downloadable from: www.epic.uk.com

POSSIBILITY OF TRADE OFFS

Good building design weighs all of the different construction demands to find the optimum balance between safety and performance, functionality and aesthetics, cost and longevity. If the focus concentrates too heavily on a single aspect there is a danger of over-specification in some areas and neglect in others. The possibility of a 'trade off' helps to mitigate this, for example installing sprinklers as a fire safety measure could allow for a greater open internal space, or the specification of a thermally higher performing insulation in the walls and roof safely within the balance of risk.