

New guidance for steel beams

Bill Parlor, Technical Officer, Association for Specialist Fire Protection, discusses recent developments in the fire protection of steel beams with web openings



Beams that contain openings, whether created within a rolled section or during fabrication, need to be considered totally differently than solid beams when considering their fire protection requirements.

Structural failure of such beams may be very different than normal beams and it is up to the designer to provide the limiting temperature for any section design taking account the nature of the critical stresses.

Guidance on the appropriate product performance testing and the procedure for determining the appropriate thickness of any product designed to provide the required fire protection to these types of beam is detailed in the ASFP publication *'Fire Protection For Structural Steel In Buildings'* (the so called 'Yellow Book'). However, in the case of intumescent coatings the current guidance is limited to beams with circular openings.

Some steel beam manufacturers already have

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proprietary software that can reliably provide the necessary information for beams with other shaped openings. Without such data, the manufacturers of intumescent coatings cannot specify the required product thickness for beams with non-circular openings.

The current position is as follows:

- Beams with circular openings: May be protected by any intumescent product that has undertaken the ASFP Protocol for beams



containing circular openings

- Beams with elongated circular openings: May be protected as with circular openings, provided a Limiting Temperature is available from the beam fabricator or the Structural Engineer for the project
- Beams with opening other than the above: The ASFP and the SCI have recently agreed to develop a protocol for evaluating the performance of intumescent coatings used to fire protect beams with rectangular and other shaped web openings. But it could take at least a year to complete this development and to allow manufacturers to conduct the necessary test and assessment work.

In the meantime, it is recommended that, unless the appropriate critical design

data is available for a specific beam design, the following guidance is used: Product performance data obtained from the 'ASFP Yellow Book' testing and assessment protocol for beams containing circular openings may be used as a basis of providing fire protection to beams with non-circular openings assuming that the critical design temperature of the steel beam does not exceed 450°C.

It will be up to the designer to decide whether this limiting temperature is adequate for all modes of structural failure at the fire limit state.

CONCLUSIONS

Many may be asking themselves what might happen in a court of law if they are held responsible for a fire. The court will want to know about the decision making process that took place, the level of knowledge

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at the time, and the steps taken to comply with the law. Perhaps, more than anything else, the court will be interested in the extent to which long term public safety may have been compromised by short term commercial gain.

More detailed information is available in ASFP Technical Guidance Note 009 which can be downloaded free of charge at www.asfp.org.uk