DEVELOPMENTS in CODES and STANDARDS

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Introduction

- BS 5950-8
- BS 9999 and BS 5588
- BS 7974
- BS 476
- BS EN 1363, 1364 and 1365
- Eurocode 1 Part 1.2
- Eurocodes 3 and 4 Parts 1.2
- Overview

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BS 5950-8

- BS 5950 Structural use of steelwork in building
  - BS 5950-8 Code of practice for fire resistant design
- Key factors
  - Section factor
  - Load ratio
- Moving towards fire parts of Eurocodes 3 and 4
  - Effective lengths of columns
  - Load combinations
  - Updated cross-references
- Recent research
  - Whole frame behaviour
  - Importance of beneficial details

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BS 9999 and BS 5588

- BS 5588 Fire precautions in the design, construction and use of buildings
  - BS 5588-0 Guide to fire safety codes of practice for particular premises/applications
  - BS 5588-10 Code of practice for shopping complexes
  - BS 5588-11 Code of practice for shops, offices, industrial, storage and other similar buildings
- BS 9999 Code of practice for fire safety in the design, construction and use of buildings
  - Means of escape in case of fire [FEDRA]
  - Construction [Arup Fire]
  - Access and facilities for fire fighting [in house]
  - Management of fire safety [BRE/FRS]

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BS 9999

- Influence of DD 240/BS 7974
- Hazard related to fuel load density
- Risk reduced for sprinklers
- Ventilation factor calibrated

BS 7974

- DD 240 Fire safety engineering in buildings
  - DD 240-1 Guide to the application of fire safety engineering principles
  - DD 240-2 Commentary on the equations given in Part 1
- BS 7974 Code of practice for the application of fire safety engineering to buildings
  - PD0 Guide to design framework and fire safety engineering procedures
  - PD1 Initiation and development of fire within the enclosure of origin
  - PD2 Spread of smoke and toxic gases within and beyond the enclosure of origin
  - PD3 Structural response and fire spread beyond the enclosure of origin
  - PD4 Detection of fire and activation of fire suppression systems
  - PD5 Fire service intervention
  - PD6 Evacuation
  - PD7 Risk assessment

BS 476

- BS 476 Fire tests on building materials and structures
  - BS 476-20 Method for determination of the fire resistance of elements of construction (general principles) 🕒 ISO 834
  - BS 476-21 Method for determination of the fire resistance of loadbearing elements of construction
  - BS 476-22 Method for determination of the fire resistance of non-loadbearing elements of construction
  - BS 476-23 Methods for determination of the contribution of components to the fire resistance of a structure
  - BS 476-32 Guide to full scale tests within buildings

BS EN 1363, 1364 and 1365

- BS EN 1363 Fire resistance tests
  - BS EN 1363-1 General Requirements 🕒 ISO 834-1
  - BS EN 1363-2 Alternative and additional procedures
  - DD ENV 1363-3 Verification of furnace performance
- BS EN 1364 Fire resistance test for non-loadbearing elements
- BS EN 1365 Fire resistance tests for load bearing elements
  - BS EN 1365-1 Walls
  - BS EN 1365-2 Floors and roofs
  - BS EN 1365-3 Beams
  - BS EN 1365-4 Columns
- The plate thermometer

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Construction Products Directive

- Resistance to fire
- fENs and hENs
- Comparison for products that are “deemed-to-satisfy” existing national regulations
- Transition period
- Effect of the plate thermometer
- New and regular periodic testing!
- Use of calculation methods to prove performance

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Eurocode 1 Part 1.2

- DD ENV 1991-2-2 will become BS EN 1991-1-2
- Actions on structures exposed to fire
- Fire is an “Accidental load”
- Issues raised in Conversion of ENV to EN
  - Combination factors
  - Fire modelling (eg Ozone)
  - Informative annex relating fire load densities to risk
- Regulatory interest
- Calculation methods lead away from prescriptive towards performance-related requirements

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Eurocodes 3 and 4 Parts 1.2

- DD ENV 1993-1-2 will become BS EN 1993-1-2
- DD ENV 1994-1-2 will become BS EN 1994-1-2
- Comments from users of the ENVs on the draft ENs
- Calibration of equations against experience
- Comparison of fire testing experience
- Use to declare conformity for Structural Metallic Construction Members under the CPD

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Overview

- Factor 30 - Inherent fire resistance of steel
  - 80% of buildings are rated 60 minutes or less
  - BS 5950-8 update (and EN 1993-1-2 soon)
  - SCI P-186 Design of Steel Framed Buildings without Applied Fire Protection
- Factor 60 - Whole-frame behaviour
  - “Cardington” brand unprotected secondary beams in steel frames with composite metal deck floors
  - SCI P-288 Fire Safety Design - A new approach to multi-storey steel framed buildings
- Factor 120 - Getting full benefit from sprinklers
  - “You don’t need sunblock when it’s raining”
  - AD ‘B’ (and BS 9999 soon)
  - DD 240 (and BS 7974 soon)

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Advances in structural fire engineering

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