Legrand Electric Limited
UK & Ireland

Creating a Cable Pathway through a Building
(BS9999:2017, BS EN 50575, BS7671:2018,

Presentation by

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One Company | Six Specialist Business Units

ASSISTED LIVING AND HEALTHCARE
- Aidcall
- Jontek
- tynetec

CABLE MANAGEMENT
- CABLOFIL
- Swifts
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- Electrak
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- green-i

WIRING DEVICES
- bticino

NUVO
- Vantage

THE GLOBAL SPECIALIST IN ELECTRICAL AND DIGITAL BUILDING INFRASTRUCTURES
Learning Objectives

As of the 1st January 2019, UK electrical installations standards will require the wiring systems within a building to be adequately supported against their premature collapse in the event of a fire.

Previously just a requirement of escape routes, the BS 7671:2018 IET Wiring Regulations 18th Edition provides a substantial update which will improve the electrical safety of buildings across the UK.

Sitting against the backdrop of the Dame Judith Hackitt Independent Review of Building Regulations and Fire Safety Final Report and the Construction Products Regulation, this session will provide guidance and recommendations to best specify Cable Containment Systems to maximise fire safety and explain how to create a cable pathway through a building.
Agenda

1. Standards Overview
2. Background (landscape, Hackitt report)
3. Fire safety in design, management & use
4. CPR Regulation
5. Escape routes / premature collapse
6. Electromagnetic Compatibility (EMC)
7. Telecommunications cabling
8. Cable Systems for life safety
9. Cable routing – bringing it all together
10. Summary
11. Further learning
12. Q&A
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## Standards Overview

<table>
<thead>
<tr>
<th>Standards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BS 9999:2017</strong></td>
<td>Fire safety in the design, management and use of buildings. Code of practice</td>
</tr>
<tr>
<td><strong>BS EN 50575:2014+A1:2016</strong></td>
<td>Power, control and communication cables. Cables for general applications in construction works subject to reaction to fire requirements</td>
</tr>
<tr>
<td><strong>BS 7671:2018</strong></td>
<td>Requirements for Electrical Installations. IET Wiring Regulations</td>
</tr>
<tr>
<td><strong>BS 8519:2010</strong></td>
<td>Selection and installation of fire-resistant power and control cable systems for life safety and fire-fighting applications. Code of practice</td>
</tr>
</tbody>
</table>
Agenda

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Background (landscape, Hackitt report)

1. Images of damaged buildings.
2. Images of fires.
3. Graph showing wood, cable tray, and gasoline quantities.
4. Image of a burning building from a distance.
Background (landscape, Hackitt report)

- **Windsor Tower, Madrid**
  - Electrical fire
  - No sprinkler system
  - No loss of life

- **Lakanal House, Camberwell**
  - Electrical fire
  - At risk building
  - Fire stopping removed
  - Loss of life

- **Shirley Towers, Southampton**
  - Electrical fire
  - Cables collapsed
  - Snagging
  - Loss of life

- **Grenfell Tower, London**
  - Electrical fire
  - At risk building
  - Fire stopping removed
  - Loss of life
Background (landscape, Hackitt report)


“not fit for purpose”
Background (landscape, Hackitt report)

Summary: responsibility for fire safety during the development application process in England

Since Grenfell there has been lots of attention on how fire risk is controlled when developers and others apply for permission for building or refurbishment. RTPI has put together this short briefing to clarify who is responsible for what in England.\(^{123}\)

The application process

Each development goes through several stages and consent regimes before it can be completed. This diagram highlights the main ones relevant to this discussion in a simplified form:

- Pre-application
- Planning application
- Planning conditions
- Building control
- Monitoring & enforcement

Decisions based on fire safety are mostly made at the **building control** stage.
Background (landscape, Hackitt report)

Chartered Association of Building Engineers (CABE) conference

“Value engineering” should be driven out of the construction industry as part of the root-and-branch reform of the sector following the Grenfell disaster, Dame Judith Hackitt

Value engineering is a phrase she would be “happy to never hear again”. “It is anything but value – it is cutting costs and quality”

https://www.pbctoday.co.uk/news/building-control-news/hackitt-calls-on-construction-industry-to-ditch-value-engineering/47794/?mc_cid=4faad514c8&mc_eid=2541392af2

Decisions based on fire safety are mostly made at the building control stage.
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Fire safety in Design, Management and Use

BS 9999 is designed as a coordinated package covering the four main areas that influence fire safety measures:

- Fire safety management
- The provisions of means of escape
- The structural protection of escape facilities and the structural stability of the building in the event of a fire
- The provision of access and facilities for fire-fighting

The primary objective of the standard is to ensure that a reasonable standard of life safety can be achieved in the event of fire in the building

The revised standard provides good practice guidelines to safeguard the lives of building occupants and fire-fighters. BS 9999 provides recommendations and guidance on the provision of measures to control or mitigate the effects of fire
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CPR Regulation

Construction Products Regulation (CPR) and cables

• CPR covers the way products are placed on the market

• Statement issued by BCA in July 2016 concerning cables and CPR

• From 1st July 2017 it will be obligatory for cables to:
  • Be accompanied by a DoP
  • Have CE marking

• Requirement relates to the Reaction to Fire performance of the cables

Cable classification for ‘reaction to fire’

<table>
<thead>
<tr>
<th>Euroclass</th>
<th>Classification criteria</th>
<th>Additional criteria</th>
<th>AVCP system (Assessment and Verification of Consistency of Performance)</th>
</tr>
</thead>
</table>
| A<sub>ca</sub> | EN ISO 1716 Gross heat of combustion | | “1”, including:  
- initial type-testing and continuous surveillance  
- Audit & testing of samples by 3rd party certification body  
Factory production controls by manufacturer |
| B1<sub>ca</sub> | EN 50267-2-3 | Smoke production (s1a, s1b, s2, s3) EN 50267-2-3  
Acidity (a1, a2, a3) EN 50267-2-3  
Flaming droplets (d0, d1, d2) EN 50399 | |
| B2<sub>ca</sub> | EN 50267-2-3 | | |
| C<sub>ca</sub> | EN 60332-1-2 Flame propagation | | |
| D<sub>ca</sub> | EN 60332-1-2 Flame propagation | | |
| E<sub>ca</sub> | EN 60332-1-2 Flame propagation | | |
| F<sub>ca</sub> | EN 60332-1-2 Flame propagation | | “4”, initial type-testing and factory production controls by manufacturer |

The table contains the classification of cables according to test requirements of the CPR Regulation and the correlation between the cable classification and the most representative installation rooms.
• Aca cables are practically impossible to burn
• B1ca cables are combustible but very little flame spread or heat release (optional tests available)
• These classes will be very uncommon due to materials, demand, availability and cost

• These classes also measure smoke density, acidity of gases and burning droplets
• Costs increase for these tests with some level of audit or periodic retesting
• Optional tests available
  • **Cca becoming the ‘go to’ standard selection**

• Probably the most common classes
• These tests do not measure heat release, toxic fumes or smoke
• Eca is the least expensive test, made by a Notified Body
• Fca test can be made by a factory or a lab
CPR Regulation

CPR: the key facts

• EU Regulation 305/2011: harmonised conditions for the marketing of construction products

• CPR extension (A1:2017) for Power, Control and Communications Cables

• Requirement relates to the Reaction to Fire performance of the cable but not where they can be used

• These cables are designated with a ‘class’ known as a EuroClass

• These cables are supported by a DoP and are CE marked

• Cable Management Systems are not within the scope of the CPR

• Circuit integrity cables are not (yet?) within the scope of the CPR
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In 1882, the Society of Telegraph Engineers and Electricians, later to become the Institution of Electrical Engineers (IEE – now part of the IET), published the original

‘Rules and regulations for the prevention of fire risks arising from electric lighting.’

The first ever regulations book – a four page document with 21 Rules and Regulations
Chapter 42
Protection against thermal effects
Cable management in escape routes and areas prone to fire

**Regulation 422.2** – Conditions for evacuation in an emergency
**Regulation 422.2.1** has been redrafted. (Escape routes)

Chapter 42
Protection against thermal effects
Cable management in escape routes and areas prone to fire

**Regulation 422.3** – Locations with risk of fire due to the nature of processed or stored materials

Chapter 52
Selection & erection of wiring systems

**Section 521** – Types of wiring system
**Regulation 521.10** – Installation of cables
**Regulation 521.10.202** – Wiring systems shall be supported such that they are not liable to premature collapse in the event of a fire
**THIS IS A SIGNIFICANT CHANGE**
**Section 527** – Wiring systems to minimise the spread of fire
Cable management in escape routes and areas prone to fire

**Regulation 422.2** – Conditions for evacuation in an emergency

**Regulation 422.2.1** has been redrafted. (Escape routes)
Chapter 42 – Protection against thermal effects

Regulation 422.2 – Conditions for evacuation in an emergency

- Regulation 422.2.1 has been redrafted. (Escape routes)
- A note has been added stating that cables need to satisfy the requirements of the Construction Products Regulations for their reaction to fire and making reference to Appendix 2, item 17.
- Requirements have been included for cables supplying safety circuits.

- Cables must not encroach on escape routes unless they meet the relevant part of BS EN 60332-3 series and achieve at least 60% light transmittance in accordance with BS EN 61034-2. Cables completely contained in i or ii do not have to meet BS EN 60332 series.
- Cables in escape routes shall be as short as practicable.

- Cables encroaching on escape routes shall not be installed within arms reach unless they are provided with mechanical protection against damage likely to occur during an evacuation.
- Where used cable management systems shall be one (or more) of the following:
  ii. Cable trunking & ducting systems classified as non-flame propagating according to BS EN 50085
  iii. Cable tray & ladder systems classified as non-flame propagating according to BS EN 61537
  iv. Powertrack systems according to BS EN 61534 (all powertrack must be non-flame propagating)
Chapter 42 – Protection against thermal effects

Part 2 – Definitions (17\textsuperscript{th} edition)

- Escape route - Path to follow for access to a safe area in the event of an emergency.

\textit{Note:}- This definition is unchanged from the current 17\textsuperscript{th} Edition.
Chapter 42
Protection against thermal effects

Cable management in escape routes and areas prone to fire

**Regulation 422.3** – Locations with risk of fire due to the nature of processed or stored materials
Chapter 42 – Protection against thermal effects

**Regulation 422.3** – Locations with risk of fire due to the nature of processed or stored materials

- **Regulation 422.3.4** a cable shall meet as a minimum BS EN 60332-1-2.
- A cable not completely embedded in non-combustible material such as plaster or concrete or is not otherwise protected from fire shall as a minimum meet the requirement of BS EN 60332-2-1.
- Where used cable management systems:
  1. Cable trunking & ducting systems **shall** satisfy the test under fire conditions in the appropriate part of BS EN 50085.
  2. Cable tray & ladder systems **shall** satisfy the test under fire conditions in BS EN 61537
  3. Powertrack systems **shall** satisfy the resistance to flame propagation specified in the appropriate part of BS EN 61534.
- Wiring systems shall be selected and installed to minimize the propagation of flame (CPR).
- The note to this regulation advises that the risk of flame propagation can be high where cables are bunched or installed in long vertical runs.
As of the 1st January 2019, UK electrical installation standards will require wiring systems within buildings to be **adequately supported against their premature collapse** in the event of a fire.

Previously just a requirement of escape routes, the BS 7671:2018 IET Wiring Regulations 18th Edition is a **substantial update** which will improve the electrical safety of buildings across the UK.

**Chapter 52**
Selection & erection of wiring systems

- **Section 521** – Types of wiring system
- **Regulation 521.10** – Installation of cables
- **Regulation 521.10.202** – Wiring systems shall be supported such that they are not liable to premature collapse in the event of a fire
  
  **THIS IS A SIGNIFICANT CHANGE**
- **Section 527** – Wiring systems to minimise the spread of fire
Chapter 52 – Selection and erection of wiring systems

- **Regulation 521.10.202** – Wiring systems shall be supported such that they are not liable to premature collapse in the event of a fire.

- **521.10.202 replaces 521.11.201.** It is a significant change as it applies to cables throughout the installation not just escape routes as previously.

- Several notes to the regulation:
  - Wiring systems hanging across access or egress routes may hinder evacuation & firefighting activities.
  - Cables installed in or on steel cable containment systems are deemed to meet the requirements of this regulation.
  - This regulation precludes, for example, the use of non-metallic cable clips or cable ties as a sole means of support where cables are clipped directly to exposed surfaces or suspended under cable tray and the use of non-metallic cable trunking as the sole means of support of the cables therein.
  - Suitably spaced steel or copper clips, saddles, or ties are examples that will meet the requirements of this regulation or metallic systems.
Chapter 52 – Selection and erection of wiring systems

17th Edition

Designated escape route indicated with rigorous cabling requirement

Less rigorous cabling requirement in zones 1 - 7
Chapter 52 – Selection and erection of wiring systems

Designated escape route no longer operational due to fire situation

Zones 1, 2 & 5 are out of commission

Possibility of fire spreading

17th Edition
Chapter 52 – Selection and erection of wiring systems

17th Edition

Alternative route for egress of building

Cabling requirement not as rigorous as the escape route

Potential danger for people both exiting AND entering due to premature collapse of cabling system
Chapter 52 – Selection and erection of wiring systems

Designated escape route indicated with rigorous cabling requirement

(refer back to Chapter 42: Regulations 422.2 & 422.3) – rules still apply to escape routes
Chapter 52 – Selection and erection of wiring systems

Designated escape route indicated with rigorous cabling requirement

(refer back to Chapter 42: Regulations 422.2 & 422.3)

SIGNIFICANT CHANGE

Cables to be adequately supported against their premature collapse in the event of a fire throughout the installation
Chapter 52 – Selection and erection of wiring systems

**SIGNIFICANT CHANGE**

Cables in zones 1 – 7 are adequately supported against their premature collapse in the event of a fire, along with those in the escape routes.

**Alternative route for egress of building**

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18th Edition
Chapter 52 – Selection and erection of wiring systems

18th Edition

Alternative route for egress of building

SIGNIFICANT CHANGE
In extreme cases where ALL exits are blocked, emergency services may create an escape route

This is recognised in the 18th Edition where all areas are now adequately supported against their premature collapse
Chapter 52 – Selection and erection of wiring systems

Section 527 Wiring systems to minimize the spread of fire

- **Regulation 527.1.1** – the risk of spread of fire shall be minimized by selection of appropriate materials and erection in accordance with 527.

- **Regulation 527.1.2** – A wiring system shall be installed so that the general building structural performance and fire safety are not reduced.

- **Regulation 527.1.5** – Products having the necessary resistance to flame propagation specified in BS EN 61386 series, the appropriate part of BS EN 50085 series, BS EN 61439-6, BS EN 61534 series, BS EN 61537 or BS EN 60570 may be installed without special precautions.
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Electromagnetic Compatibility (EMC)

Cable management and the measures against Electromagnetic Disturbance

Section 444 – Measures against Electromagnetic Disturbance

Section A444.4* – Design guidelines for segregation of circuits

Table A444.1* - Minimum Separation distances where cable intended for information technology are used

* Informative Annex - provides additional information intended to assist the understanding or use of the document.
Electromagnetic Compatibility (EMC)

Source \Rightarrow Coupling \Rightarrow Victim

Source = \begin{align*}
\text{Images of various electronic devices}
\end{align*}

Victim = \begin{align*}
\text{Images of a lightning storm, an electrical tower, and an Internet of Things icon}
\end{align*}
Electromagnetic Compatibility (EMC)

The **EN 50174-2** standard specifies how far cables must be kept apart. This depends on the type of cable used, the number of cables and the type of containment.

To help mitigate EMC, there are some basic principles...
Informative Annex A444.4 – Design guidelines for segregation of circuits

1) Where both the specification of the information technology cable and its intended application is known, the requirements of BS EN 50174-2 and BS EN50174-3 are appropriate.

BS EN 50174 series contains requirements for the installation of information technology cables for a range of information technology, broadcast and command and control applications.

2) Where the specification...is NOT available, then the cable separation distance between the power and information technology cables should be a minimum of 200mm free air

This distance can be reduced if a screened power cable, metallic barrier, or containment system is used as described in table A444.1

Key points

- Onus is on the installation designer
- Minimum distance in free air: 200mm
- Ways to reduce distance: screened power cable, metallic barrier or containment system (must be metallic)
- Plastic barrier or plastic containment would be considered as free air and therefore 200mm
## Chapter 44 – Measures against Electromagnetic Disturbance

### Table A444.1 – Summary of minimum separation distances where the specification and/or the intended application of the information technology is **not** available

<table>
<thead>
<tr>
<th>Containment applied to the mains cabling</th>
<th>No containment open metallic containment A&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Perforated open metallic containment B&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Solid metallic containment C&lt;sup&gt;3&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>200mm</td>
<td>150mm</td>
<td>Note 4</td>
<td></td>
</tr>
</tbody>
</table>

**Important Point**

Reductions only apply to METALLIC SYSTEMS

Anything else is classed as an open system

- **Steel Wire (mesh/basket) systems**

- **Cable Tray systems, or Standard Distribution / Perimeter Cable Trunking systems**

**Note 1**: Screening performance (DC-100MHz) equivalent to welded mesh steel basket of mesh size 50mm x 100mm (Excluding ladders). This screening performance is also achieved with steel tray (duct without cover) of less than 1mm wall thickness and more than 20% equally distributed perforated area. No part of the cable within the containment should be less than 10mm below the top of the barrier.

**Note 2**: Screening performance (DC-100MHz) equivalent to steel tray (duct without cover) of 1mm wall thickness and no more than 20% equally distributed perforated area. This screening performance is also achieved with screened power cables that do not meet the performance defined in note 1. No part of the cable within the containment should be less than 10mm below the top of the barrier.

**Note 3**: Screening performance (DC-100MHz) equivalent to a fully enclosed steel containment system having a minimum wall thickness of 1.5mm. Separation specified is in addition to that provided by any divider/barrier.

**Note 4**: No physical separation other than that provided by the containment.
Chapter 44 – Measures against Electromagnetic Disturbance

**Question...**

- Can PVC Trunking be used?
  - Yes if the segregation is 200mm or greater
  - Yes if using screened power and data cables

**But, remember the regulation precluding non-metallic clips, ties and systems!!!**
(Regulation 521.10.202 )

**Solution...**

- Metal Containment
  - Cable Tray: Perforated or Wire Mesh (and divider)
  - Cable Trunking
  - Perimeter Cable Trunking
  - Conduit systems
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Foreword – Information about this document

- **BS 6701:2016** (full revision of BS 6701) was published to support BS EN 50174-1:2009+A2:2014, BS EN 50174-2:2009+A2:2014 and BS EN 50174-3:2013. It should be read in conjunction with the BS EN 50174 series of standards.

- Key changes in this amendment are related to the implementation of the Construction Products Regulation for Reaction to Fire of cables.

- This amendment applies the existing general requirements of BS 7671 for cables in evacuation routes to all “permanently installed” telecommunications cables and translates those requirements into the terminology of the Construction Products Regulation.

- The use of space in modern buildings tends to change with time and it is increasingly difficult to predict which spaces will become evacuation routes. With a cabling system having a design life exceeding 15 years the common sense approach is to assume everywhere is, or could become, an evacuation route and cable accordingly.

1 Scope

- This British Standard specifies requirements for the installation, operation, administration and maintenance of telecommunications equipment and telecommunications cabling, other than cabling specified in BS EN 50174

4 Requirements for owners of premises housing telecommunications systems

- 4.1.3 Fire performance of telecommunications cables

New installations and the refurbishment or extension of existing installations shall conform to 5.1.3.1 which specifies the “reaction to fire” performance of cables within buildings and other structures.

*NOTE* Attention is drawn to the Construction Products Regulation
5 Requirements for installers of telecommunications equipment and telecommunications cabling

• 5.1.3.1 Fire performance of telecommunications cables

For new installations and the refurbishment or extension of existing installations, cables installed in the spaces bounded by the external fire barriers of buildings and other structures shall meet the following requirements:

a) installation cables (as defined in Clause 3) shall, as a minimum, meet the requirements of EuroClass Cca-s1b,d2,a2, in accordance with BS EN 13501-6; and

b) all other telecommunications cables shall, as a minimum, either:
   1) meet the requirements of EuroClass Eca, in accordance with BS EN 13501-6; or
   2) meet the recommended requirements of BS EN 60332-1-2.
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BS 8519:2010 – Code of Practice

BS 8519:2010

• Cross references BS 7671
• Effective from 28\textsuperscript{th} February 2010
• Supersedes BS 7346-6:2005
• Inclusion of...systems for life safety

Section 15 – Cable installation practice

*The resistance to fire of the cable containment system...should be at least equivalent to the survival time required for the cable*

Section 16 – Cable support systems

*Failure to observe the design criteria will result in premature collapse of the cable containment system and the circuit failure of the cables being supported*
15 Cable installation practice

Where practicable, the fire-resistant route should be arranged to be one of the upper tiers of the coordinated high level services.

**NOTE 1** When coordinating the route for the fire-resistant cables, it needs to be recognized that some of the other services, such as pipes ducts, busbars and other cable routes, are likely not to be designed to maintain their integrity under fire conditions and could collapse during a fire. The result of the collapse could be the overloading of the fire-resistant cable containment system, which itself could then fail.

16 Cable support systems

The support system should have a fire survival time equal to that of the cables it supports and for the same defined fire conditions.

When sizing the support brackets for containment routes, which are intended to support fire-resistant cables in a fire condition and where the circuits are to maintain their integrity for a pre-determined period, the drop rods and hangers should be sized to take into account the fact that the tensile strength of steel will be significantly reduced in a fire situation.

**NOTE** Failure to observe the design criteria will result in premature collapse of the cable containment system and the circuit failure of the cables being supported.

The cross-sectional area of the drop rods should be determined in accordance with Annex E.
BS 8519:2010 – Code of Practice

Annex E (normative) Methodology for determining the cross-sectional area of drop rods

COMMENTARY ON ANNEX E
This methodology is based on the guidance outlined in BS 476-24 (ISO 6944). The purpose of these standards is to measure the ability of ductwork systems to resist the spread of fire from one fire compartment to another without the aid of dampers. The standards refer to a complete ductwork installation and therefore include joints, supports and the fire stopping through the furnace wall.
The cross-sectional area of the drop rods should be calculated using the following formula:

\[
A = \frac{(W \times L_h + W_T \times L_h + W_b \times L_b + W_f \times h) \times 9.81}{2 \times \varepsilon_{\text{max}}}
\]

Product Selector

<table>
<thead>
<tr>
<th>Type of Prysmian FP Cable used</th>
<th>FP100®</th>
<th>FP PLUS™</th>
<th>FP400®</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of Cores</td>
<td>Single Core</td>
<td>Two Core</td>
<td>Three Core</td>
</tr>
<tr>
<td>Cross sectional area</td>
<td>mm²</td>
<td>mm²</td>
<td>mm²</td>
</tr>
<tr>
<td>Weight of cables per metre</td>
<td>0.9 g/m</td>
<td>0.9 g/m</td>
<td>0.9 g/m</td>
</tr>
<tr>
<td>No. of cables</td>
<td>25</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Weight of cables per metre</td>
<td>102 kg/m</td>
<td>3 kg/m</td>
<td>9 kg/m</td>
</tr>
<tr>
<td>Containment</td>
<td>Wire Mesh</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight of containment per metre</td>
<td>9.51 g/m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height of drop rod in Metres</td>
<td>2.5 m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Threaded Rod part number</td>
<td>TR06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length of bearer in Metres (width of stirrup)</td>
<td>0.2 m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distance between hanger supports (Span)</td>
<td>2.3 m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight of bearers per metre</td>
<td>2.6 kg/m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum allowable tensile stress (Fire Duration)</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

\[
84.18 = \frac{(102 \times 2.3 + 9.51 \times 2.3 + 2.6 \times 0.2 + 0.18 \times 2.5 \times 9.81)}{2 \times 1h}
\]

\[
10.35 = \frac{84.18}{2}
\]

Threaded Rod size = TR06, TR10, TR12
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10. Summary
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Cable routing – bringing it all together

- BS 9999
- BS 7671
- BS 8519
- BS EN 50575
- BS 6701
- BS EN 50174 series

BS 9999

BS 8519

BS EN 50575

BS 7671

BS 6701

BS EN 50174 series

BS 7671

+ CPR

(BS EN 50174)

BS 9999

BS 6701

BS 8519

+ CPR

(BS EN 50174)
Cable routing – bringing it all together

- Zone 1 (server room)
- Zone 2 (bedroom)
- Zone 3 (classroom)
- Zone 4 (meeting room)
- Zone 5 (retail unit)
- Zone 6 (store room)
- Zone 7 (resident’s room)

- Offices
- Apartment
- School
- Hospital
- Multi-dwelling
Cable routing – bringing it all together

Previously...
- Cables laid in ceiling voids
- Cables crossing escape routes
- Plastic containment
- BS 9999
- BS 7671
- BS 8519
Chapter 52 – Selection and erection of wiring systems

Now...

• Cables supported against premature collapse
• Metal containment or metal clips etc...
• Cables REACTION to fire

• BS 9999
• BS EN 50575
• BS 7671
• BS 6701
• BS 8519
  +
• BS EN 50174
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Summary

Wiring systems must be **adequately supported against their premature collapse** in the event of a fire.

Previously just a requirement of escape routes.

This is a substantial update which will **improve the safety** of buildings.

Current landscape and regulatory environment form **lessons to be learnt**.

**Specifying** Cable Containment Systems to **maximise fire safety** is crucial.

Familiarisation with the **18th Edition** will help to **ensure correct products are specified**.
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Further Learning

BS 9999:2017
Fire safety in the design, management and use of buildings. Code of practice

Power, control and communication cables. Cables for general applications in construction works subject to reaction to fire requirements

BS 7671:2018
Requirements for Electrical Installations. IET Wiring Regulations

BS 6701:2016+A1:2017
Telecommunications equipment and telecommunications cabling. Specification for installation, operation and maintenance.

BS 8519:2010
Selection and installation of fire-resistant power and control cable systems for life safety and fire-fighting applications. Code of practice

BS EN 50174 Part 1, 2 & 3
Installation technology. Cabling installation
Part 1 – Specification and quality, Part 2 – Installation...inside, Part 3 – Installation...outside
<table>
<thead>
<tr>
<th>Standard Number</th>
<th>(Short) bsi Title</th>
<th>Slide Number</th>
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<tbody>
<tr>
<td>BS EN 13501-6</td>
<td>Fire classification of construction products and building elements</td>
<td>45</td>
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<tr>
<td>BS EN 50085 series</td>
<td>Cable trunking and cable ducting systems for electrical installations</td>
<td>21,24,34</td>
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<td>BS EN 50174 series</td>
<td>Information technology. Cabling installation</td>
<td>6,38,39,43,52,57</td>
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<tr>
<td>BS EN 60332-1-2</td>
<td>Tests on electric and optical fibre cables under fire conditions</td>
<td>15,24,45</td>
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<td>BS EN 60332-3</td>
<td>Tests on electric and optical fibre cables under fire conditions</td>
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<tr>
<td>BS EN 60332-2-1</td>
<td>Tests on electric and optical fibre cables under fire conditions</td>
<td>24</td>
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<tr>
<td>BS EN 60570</td>
<td>Electrical supply track systems for luminaires</td>
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<td>BS EN 61034-2</td>
<td>Measurement of smoke density of cables burning under defined conditions</td>
<td>21</td>
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<tr>
<td>BS EN 61386 series</td>
<td>Conduit systems for cable management</td>
<td>34</td>
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<tr>
<td>BS EN 61439-6</td>
<td>Low-voltage switchgear and controlgear assemblies</td>
<td>34</td>
</tr>
<tr>
<td>BS EN 61534 series</td>
<td>Powertrack systems</td>
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<tr>
<td>BS EN 61537</td>
<td>Cable management. Cable tray systems and cable ladder systems</td>
<td>21,24,34</td>
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<tr>
<td>BS 6701:2016+A1:2017</td>
<td>Telecommunications equipment and telecommunications cabling</td>
<td>6,42,43,52,57</td>
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<td>BS 7671:2018</td>
<td>Requirements for Electrical Installations. IET Wiring Regulations</td>
<td>3,6,18,35,43,52,57</td>
</tr>
<tr>
<td>BS 8492:2016+A1:2017 *</td>
<td>Telecommunications equipment and telecommunications cabling</td>
<td>44</td>
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<tr>
<td>BS 8519:2010 *</td>
<td>Selection and installation of fire-resistant power and control cable systems for life safety and fire-fighting applications</td>
<td>6,46,47,52,57</td>
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<td>BS 9999:2018 *</td>
<td>Fire safety in the design, management and use of buildings</td>
<td>6,11,12,52,57</td>
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