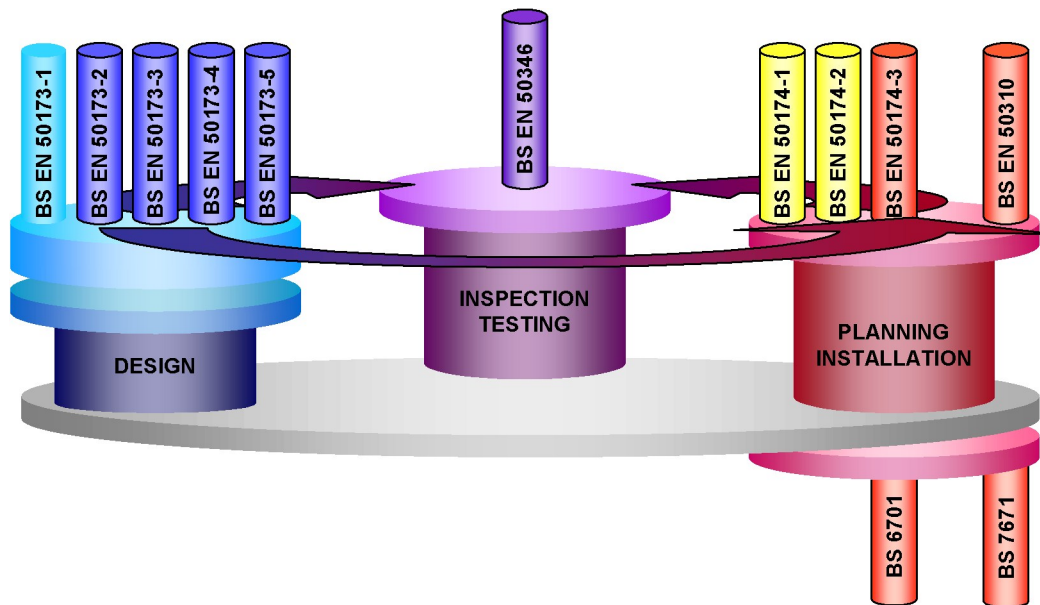


#### A VIRTUOUS CIRCLE



© 2008 e-Ready Building Limited

The figure above, courtesy of e-Ready Building Limited, shows very clearly the way in which British Standards now support the implementation of telecommunications cabling infrastructure from design, planning to installation, inspection and testing. This “virtuous circle” within which each of the standards are linked to others is the responsibility of BSI Technical Committee TCT/7 of which the FIA is a participating member.

The European standards are the most comprehensive cabling standards produced by any of recognised standards bodies - while TIA, the North American standards body, produces design standards slightly more quickly than CENELEC, the relevant European standards body, their coverage of installation planning and quality assurance aspects is relatively weak. Similarly, while being technically equivalent to the European standards, the equivalent International design standards suffer from a lack of structure and the installation standards are at an early stage of development although both aspects will improve over the next few years.

**This Newsletter provides information about the status and contents of each of the documents and explains how they are intended to be used.**

### FIBREOPTIC INDUSTRY ASSOCIATION

*The FIA is a Company Limited by Guarantee*

#### Management Council\*

Paul Bateson - Chairman  
*(Optical Test and Calibration Ltd.)*  
Lee Funnell - Vice Chairman  
*(The Siemon Company)*  
John Marson - Commercial Director  
*(Twistnet Communications Ltd.)*  
Mike Gilmore - Technical Director and Treasurer  
*(The Cabling Partnership  
e-Ready Building Limited)*

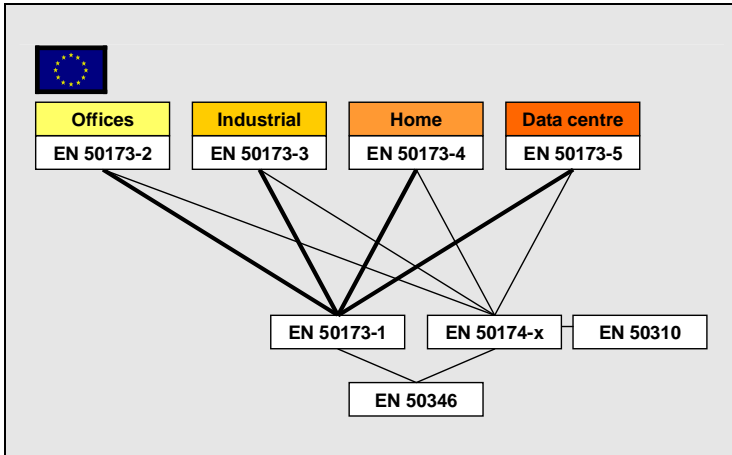
#### Industry Sector Directors\*

Paul Bateson - Test & Measurement  
John Colton - Training  
*(Lucid Optical Services Ltd.)*  
Lee Funnell - Qualifications  
Ken Jones - Installation  
*(EDS Systems (North Wales) Ltd.)*  
Phil Whitehead - Cross-media promotion  
*(ACCL)*  
Simon Comben - MoD Liaison  
*(J Brand Ltd.)*  
Alan Bullen - Infrastructure  
*(Lynx Networks plc)*

\* as at 1<sup>st</sup> February 2011

**Design**

EN 50173 was first published in the UK as BS EN 50173 1995 and was revised as BS EN 50173-1 in 2002. These standards defined requirements and recommendations for the design of generic cabling in office premises. In 2007, a significant restructure of the European standards was undertaken and EN 50173-2:2007 replaced EN 50173-1 and is entitled "Information technology - Generic cabling systems - Office premises". In addition, three other standards were published - BS EN 50173-3, BS EN 50173-4 and BS EN 50173-5 covering generic cabling in industrial premises, home and data centres respectively.



However, BS EN 50173-1 has not disappeared. Instead, BS EN 50173-1:2007 contains the requirements and recommendations that are common to the premises-specific standards. These common elements include backbone cabling structures, channel and link transmission performance for balanced, coaxial and optical fibre cabling together with component specifications - i.e. cables, connectors and cords. It also includes the MICE (mechanical, ingress protection, chemical and climatic, electromagnetic) environmental classification which is applied to all types of premises.

The premises-specific standards specify which of the elements of EN 50173-1 are applicable for a particular cabling structure. For example, plastic optical fibre cabling and associated components are only referenced from EN 50173-3 - while coaxial cabling and its components are only referenced from EN 50173-4.

A change in the structure of the standards also heralded a change in the way they are intended to be read and applied by premises owners, their appointed representatives (for example, consultants) and installers. BS EN 50173-1 is no longer the primary standard and it contains no routes to conformance. It is now essentially a reference book which is called up from the premises-specific documents.

The modified structure ensures that no premises-specific standard references any other - but all them reference BS EN 50173-1. This makes updating the standards very simple indeed.

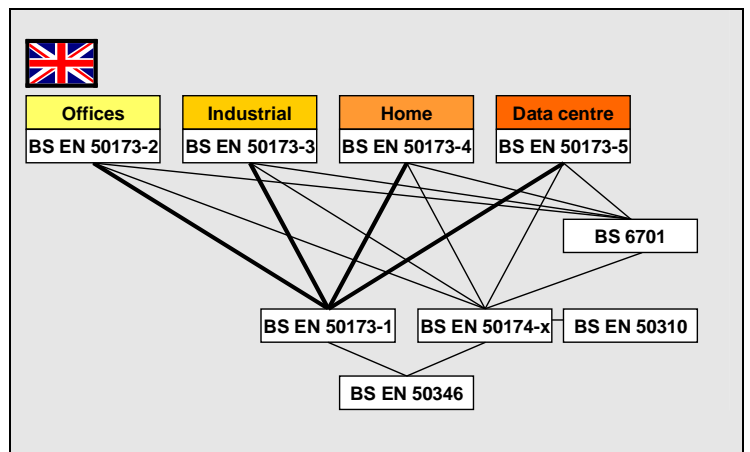
BS EN 50173-1:2007 contains balanced cabling channels and link performance specifications up to and including Class F. In order to support these channels, components are specified up to Category 7. Amendment 1 of BS EN 50173-1, approved Q2, 2009, contains channels and link performance specifications for Class E<sub>A</sub> and F<sub>A</sub>. Amendment 2 of BS EN 50173-1 containing component specifications of Categories 6<sub>A</sub> and 7<sub>A</sub> has been ratified but will be consolidated into a new edition: designated EN 50173-1:2011 and published as BS EN 50173-1 in Q2, 2011.

For optical fibre, BS EN 50173-1:2007 contains the optical fibre channels and link performance specifications for all the premises-specific standards including those for plastic and hard clad plastic optical fibre used in the industrial premises standard. Amendment 2 of BS EN 50173-1 contains requirements for Category OM4 cabled optical fibre.

BS EN 50173-2, -3, -4 and -5 have also been amended in parallel with Amendment 2 of BS EN 50173-1 in order to reference the new Classes and Categories. These have been published in Q1 and Q2, 2011.

For generic cabling, the "virtuous circle" of inter-related standards began with the re-structure of the premises-specific standards and the way they referenced each other. However, each of the premises-specific standards makes the EN 50174 series of standards normative.

For example, if a tender requires the design to be in accordance with BS EN 50173-2 then compliance with BS EN 50174 series standards is required - automatically, requiring no additional specification by the client. Moreover, the UK implementation of the premises-specific EN 50173 standards, i.e. BS EN 50173-x, require the additional application of BS 6701 as shown on the right. This circular referencing is intentional, creating an unbroken ring of standardisation covering the design and implementation process.



**Installation specification, planning and practice**

BS EN 50174-2 and BS EN 50174-3 specify requirements and recommendations for installation planning and practices inside and outside building respectively. BS EN 50174-1 defines requirements and recommendations for the development of installation specifications and the associated quality assurance aspects. The installation planning requirements and recommendations of BS EN 50174-2 and BS EN 50174-3, as appropriate, are intended to be used by the premises owners and/or their appointed representatives (e.g. consultants) in conjunction with the installation specification contents of BS EN 50174-1. The installation planning and practices requirements and recommendations of BS EN 50174-2 and BS EN 50174-3 are intended for the installer of the cabling infrastructure.

EN 50174-1 and EN 50174-2 were first published as British Standards in 2000 and BS EN 50174-3 was released in 2003. BS 6701, then a Code of Practice, had to be revised, as an automatic process, due to the publication of the BS ENs since they contained duplicate and, in some cases, conflicting information. BS 6701:2004 resulted from this process. As discussed below, BS 6701 applies to all installations of telecommunications cabling and is referenced from BS 7671, the Wiring Regulations. BS 6701 requires compliance with the BS EN 50174 series.

The structure of the revised BS 6701 was warmly welcomed by the CENELEC experts and they immediately began a revision of EN 50174-1 and EN 50174-2 in the same format and the same scope i.e. all telecommunications cabling. This work was completed in 2008 and BS EN 50174-1 and BS EN 50174-2 were published in Q2, 2009. These documents are a significant advance on their predecessors and the requirements and recommendations are clearly differentiated. BS 6701 itself was updated to reflect the new EN 50174 standards and is now dated 2010.

Amendment 1 of BS EN 50174-1 has been published in Q1, 2011 but the changes are minor and predominantly result in further simplification of requirements and recommendations. Amendment 1 of EN 50174-2 is also to be published in Q1, 2011. The main content of the amendment is the addition of two premises-specific clauses covering homes and data centres and substantial changes to the existing premises-specific clause covering offices.

BS EN 50174-1:2009		EN 50174-2:2009	
	Introduction		Introduction
1	Scope	1	Scope
	Conformance		Conformance
2	Normative references	2	Normative references
3	Terms, definitions and abbreviations	3	Terms, definitions and abbreviations
4	Requirements for specifying installations of information technology cabling	4	Requirements for planning installations of information technology cabling
5	Requirements for installers of information technology cabling	5	Requirements for the installation of information technology cabling
6	Infrastructure complexity	6	Segregation of metallic information technology cabling and mains power cabling
A	Minimum requirements for technical specifications and quality plans	7	Electricity distribution systems and lightning protection
B	Polarity maintenance: connecting hardware for multiple optical fibres	8	Office (commercial) premises
C	Terminating cables on terminating blocks in distributors	9	Industrial premises
D	Compatibility between transmission systems (balanced and unbalanced) sharing the same cable sheath within information technology cabling	10	Homes
		11	Data centres
		A	EMC and protection
		B	Application of responsibilities

BS 6701 is the referenced from BS 7671 as the primary telecommunications installation standard. As such it is applied wherever the IEE Wiring Regulations are implemented. BS 6701 covers more than cabling - it also addresses equipment - and extends the application of BS EN 50174 series standards to equipment.

The next step for CENELEC is the revision of EN 50174-3 which address planning and installation practices outside buildings. This revision will adopt the same approach as for EN 50174-2, involving a full review of the existing text and the inclusion of new material that specifically addresses core and access networks as well as the cabling on campus premises. Publication of this as a British Standard is expected in Q3, 2012.

**Equipotential bonding**

BS EN 50310:2010 has undergone a similar type of radical re-write that EN 50174-1/-2 were subject to in 2009. The purpose of BS EN 50310 specifies the requirements for bonding of earthing systems in order to provide the best electromagnetic environment for information technology equipment. The latest edition, published in 2010, includes a hierarchical approach which will allow compliance to the standard - independent of the type of electrical earthing system installed in the building. This is critical since EN 50174-1 and EN 50174-2 now require conformance with EN 50310.

One of the most unclear aspects of cabling installation has surrounded the requirements or recommendations for the functional earthing of cabinets, rack and frames. The UK version of EN 50310, i.e. BS EN 50310, points directly to BS 6701:2010 which now contains an unambiguous statement of requirement.

### **Inspection and testing**

BS EN 50346 is the primary testing and inspection standard in support of EN 50173 series standards but also contains additional test methods for other parameters not included in EN 50173 standards. It makes reference to IEC 61935-1 for balanced cabling and ISO/IEC 14763-3 for optical fibre cabling. The standardisation of optical fibre cabling testing is handled in a separate FIA topic specific Newsletter.

### **Linkages to electrical installation standards**

In the UK, BS 7671 is the national implementation of a European standard terms a Harmonisation Document. The difference between an EN and an HD is that an EN is automatically accepted and published by all EU members - without change - whereas an HD is the basis for national standards which are written in such a way that do not conflict with the HD.

HD 60364-4-444 has been approved and is reflected in clause 444 of BS 7671 (included in the amendment of BS 7671 to be published in July 2011). It contains consistent requirements and recommendations to EN 50174-2 and EN 50310, written from the perspective of the electrical installer.

### **Bibliography:**

- BS 6701:1998; *Code of Practice for Installation of apparatus intended for connection to certain telecommunications systems*  
BS 6701:2010; *Telecommunications equipment and telecommunications cabling - Specification for installation, operation and maintenance*  
BS 7671:2008; *IEE Wiring Regulations, 17<sup>th</sup> edition*  
BS 8492: 2009; *Telecommunications equipment and telecommunications cabling - Code of practice for fire performance and protection*  
ISO/IEC 14763-3:2006 + A1:2009; *Information technology. Implementation and operation of customer premises cabling. Testing of optical fibre cabling*  
BS EN 50173-1:2007+A1:2009+A2:2011; *Information technology - Generic cabling systems - General requirements*  
BS EN 50173-2:2007+A1:2010; *Information technology - Generic cabling systems - Office premises*  
BS EN 50173-3:2007+A1:2010; *Information technology - Generic cabling systems - Industrial premises*  
BS EN 50173-5:2007+A1:2010; *Information technology - Generic cabling systems - Data centres*  
BS EN 50174-1:2009+A1:2011; *Information technology - Cabling installation - Part 1: Installation specification and quality assurance*  
BS EN 50174-2:2009+A1:2011; *Information technology - Cabling installation - Part 2: Installation planning and practices inside buildings*  
BS EN 50174-3:2003; *Information technology - Cabling installation - Part 3: Installation planning and practices outside buildings*  
BS EN 50310: 2010; *Application of equipotential bonding and earthing in buildings with information technology equipment*  
BS EN 50346; *Information technology - Cabling Installation - Testing of installed cabling*  
BS EN 61935-1; *Testing of balanced communication cabling in accordance with standards series EN 50173. Installed cabling*