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Next generation IT infrastructures

Cabling Standards Update 2006

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At the beginning of each year it is common practice to look forward twelve months to see what we expect to happen and to consider how it will affect us. In this respect, cabling standards are no different to any other area of our lives. Cabling standards primarily affect three groups of people: component suppliers, installers and end-users. Changes that are good for one group are not always quite so good for the others - so it is useful to review the potential changes for 2006 and look at the effects of those changes on each sector of the industry.

….. status report 2005 …..

Before starting to look at 2006 we ought perhaps to summarise where we are now, at the end of 2005. There are three identifiable areas of standardisation for telecommunications cabling: design, installation and commissioning (inspection and testing). One other very important area - that of "operation" - is, for the purposes of this article, contained within "installation".

There are three recognised standards for the design of generic (or structured) telecommunications cabling: BS EN 50173-1, ISO/IEC 11801 and the ANSI/TIA/EIA-568-B series. Although the US standard is continually being added to by the publication of addenda (there are currently fifteen published addenda to the three parts of 568-B) there has been no real significant change since 2002 when all three documents were revised to include Category 6 components.

> *As a side issue, it is still amazing to hear people question the standardisation status of Category 7 - because the US standard does not contain Category 7 solutions, it is widely assumed that these solutions are not contained in published standards. On the contrary, Category 7 cabling (installed as Class F permanent links and channels) is fully specified in BS EN 50173-1 and ISO/IEC 11801 and has been since 2002.*

Such apparent stagnation in the design sector of cabling standards is not good news for suppliers – or installers for that matter – since once product standards are published there is inevitable downward pressure on prices both of the products and the installations.

Installation standards are not of great interest to the supplier groups but they are critical for installers and end-users. US installation standards are of no real relevance in this country where the only important standard is BS 6701:2004. BS 6701:2004 is a best seller because, for the first time, the requirements and responsibilities for both installers and their customers are clearly defined.

Standards covering the testing of twisted pair cabling generally progress in line with the requirements of the design standards. In the US, testing is built into the ANSI/TIA/EIA-568-B series while the BS EN 50173-1 and ISO/IEC 11801 standards refer to external standards BS EN 50346 and IEC 61935-1 respectively.

However, the existing methods referred to by the design standards for testing installed optical fibre cabling have been found wanting as installed links have become shorter and new types of test equipment (and connecting hardware) have been introduced. This is certainly one area of cabling which could be said to be unstable at present.

….. the year ahead …..

So that is where we are on 1st January 2006. What do we expect for the next twelve months? Despite what was said above about stagnation over the last three years, the coming year is going to flood the market with new standards, re-structured standards and amendments to those standards. Making sense of all of this is no mean feat even for an old hand like your author but here we go!

The most dramatic and immediate change (July 2006) will be to the BS EN 50173 series of documents. The existing document, BS EN 50173-1 will be divided into two parts. BS EN 50173-1 will remain but will be re-titled as "General requirements" and will contain all the elements that are common to a set of new parts. We will have BS EN 50173-2 (Offices), BS EN 50173-4 (Homes) and BS EN 50173-5 (Data Centres). So, for example, if you are designing a data centre it will be appropriate to reference BS EN 50173-5. Once these changes are made it will no longer be correct to reference EN 50173-1 since it becomes in effect a sub-part of the premises-specific documents.

Europe is not alone in specifying new premises-specific cabling standards: ISO/IEC 24702, covering the design of generic cabling for industrial premises, is expected to be published in Q2, 2006. This document contains the famous MICE classification of environments within which the cabling has to operate. As one of the first truly multi-regional activities, the MICE system is to be incorporated within the US industrial premises cabling standard (ANSI/TIA/EIA-1004) and is already part of the future BS EN 50173-1 discussed above - rendering the environmental classification applicable to all premises.

The multi-regional approach is continued in two other projects: firstly, a further part of the BS EN 50173 series, BS EN 50173-3 (Industrial) includes the cabling structures and components of ISO/IEC 24702 within the European standards system and will be published in 2006. Secondly, an international standard for data centre cabling (unnumbered as yet) is being built on the work of EN 50173-5 and will consider the cabling aspects of ANSI/TIA/EIA-942 (already published). This work will not be completed in 2006.

….. and now 10GBASE-T …..

So, there is a lot going on. However, all this work is largely being submerged by press attention, fuelled by supplier's PR agencies, on cabling in support of 10GBASE-T (10 Gigabit/s Ethernet over twisted pair). There is so much happening in this area that a clarification of the activities is very important - not only to avoid embarrassing confusion but also to avoid being wilfully misled by the various claims and counterclaims.

In each of the three regional areas, i.e. international, European and US, there are two parallel activities. The first is the production of technical reports which detail the requirements for existing (legacy) twisted-pair cabling channel to support 10GBASE-T as defined by IEEE. The three technical reports (ISO/IEC TR 24750, CLC TR 50173-99-1 and TIA/EIA-TSB-155) define channel transmission characteristics - the most important of which are the new alien noise parameters ANEXT and AELFEXT. Should the installation fail to meet these requirements the technical reports also include possible mitigation techniques to overcome these alien noise problems. The problem with this approach is that as we cannot at the moment measure alien noise performance in an installed permanent link or channel, we will not know whether or not we have a transmission problem until the channel is created by which time it really is too late to do anything about it.

The reader may at this point say to him or herself "what is the point of the technical report?" The relative value of the technical reports is highlighted by the second activity within each of the three regional standards groups – the specification of new cabling components, links and channels which automatically support 10GBASE-T and BEYOND. To cover these developments, amendments are now being written to ISO/IEC 11801 and the new EN 50173-1:2006 while in TIA/EIA are producing addendum 10 of ANSI/TIA/EIA-568-B-2.

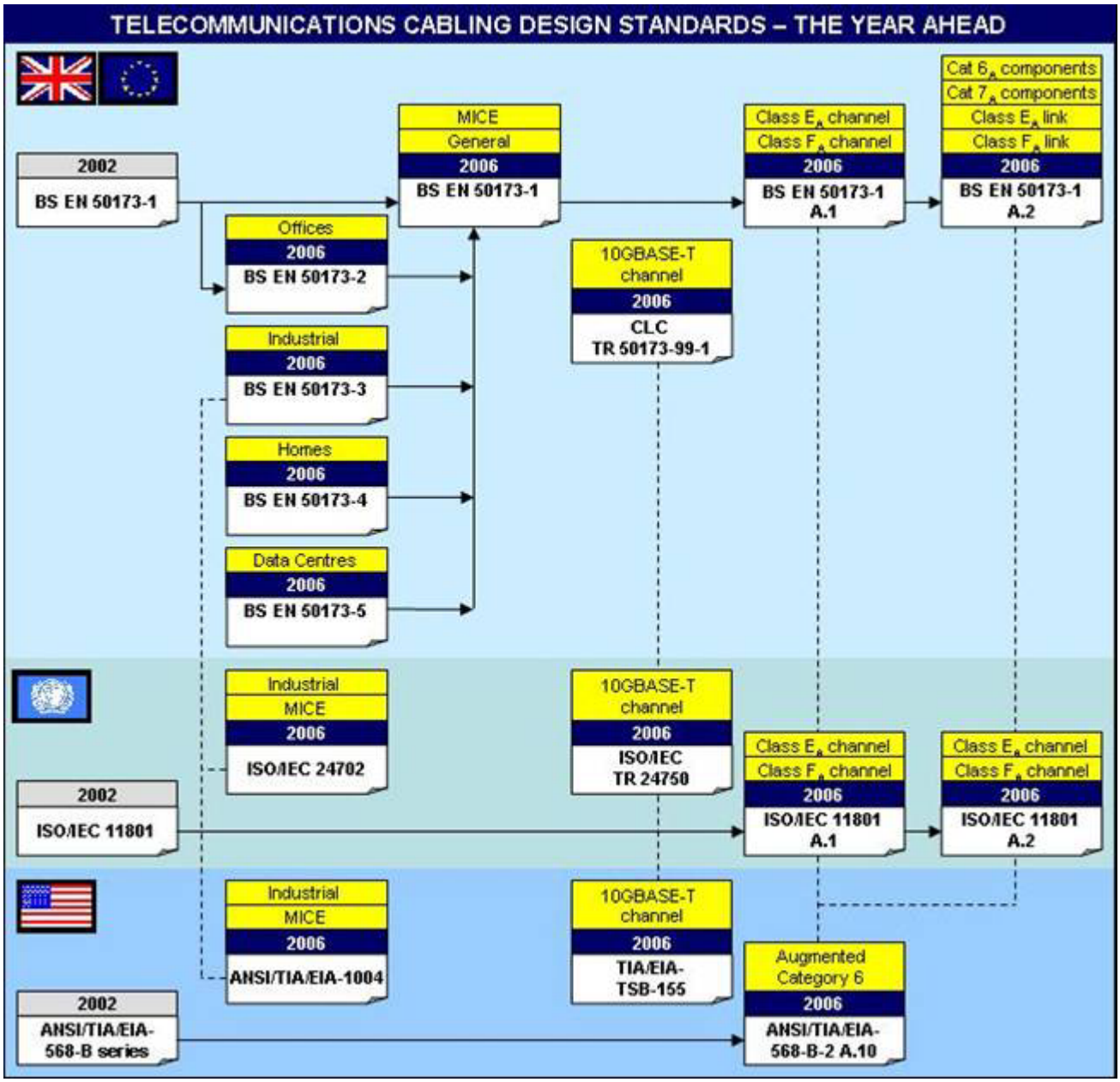
Before looking at the detail of these amendments, it should be immediately obvious that the specification of new components and installed cabling requirements which are BEYOND those of the three technical reports allows the creation of new market opportunities. Some cynics would say that the relative pointlessness of the 10GBASE-T technical reports is purposely designed to strengthen the apparent value of the contents of the three amendments.

In the US, ANSI/TIA/EIA-568-B-2.10 will specify "augmented Category 6" components, permanent links and channels. In Europe and internationally, the amendments to EN 50173-1 and ISO/IEC 11801 will also ultimately specify Category 6_A components together with Class E_A links and channels that are specified to 500 MHz. However, these documents will also contain specifications for Category 7_A components and Class F_A links and channels specified to 1000 MHz.

The decision has been taken not to remove any of the existing specifications so we will have, for components, Category 5:2002, Category 6, Category 6_A, Category 7 and Category 7_A. For installed cabling we will have Class D:2002, Class E, Class E_A, Class F and Class F_A. It is an interesting observation to point out that each Category and Class has to be a super-set of the lower Categories and Classes and therefore the existing Category 7/Class F already meets the requirements of Category 6_A/Class E_A. This is an unusual situation in that most new developments have gone beyond all the existing specifications but in this case Category 6_A/Class E_A actually fits between two existing definitions. Of course this is not true in the United States as they have no Category 7/Class F specifications.

In terms of the time to market for these amendments we may remember the three year delay that was involved for Category 6 component specifications to ensure interoperability and backwards compatibility. In view of this the US objective of components and links specifications as well as channels seems somewhat ambitious in the short term. Internationally and in Europe the first amendment will concentrate on the channels only and these amendments will be published in 2006 (with further amendments addressing the components and links). This is good news for suppliers as it allows them to sell "channel" solutions which will no doubt invoke strict cable, connector and cord procurement rules.

Detractors have already said that if you want an “open” component-based cabling system meeting Class E_A the solution is simple and no delay is required: buy Category 7/Class F.



….. BS 6701:2004 moves into Europe …..

BS 6701:2004 has been a best seller because it clearly defines the requirements and responsibilities for both installers and their customers. It is also useful because it automatically mandates the use of other standards such as the BS EN 50174 series. The coming year will see dramatic changes to BS EN 50174-1 and BS EN 50174-2 largely driven by the success of BS 6701.

BS EN 50174-1 is being rewritten in the same format as BS 6701:2004 and is being enhanced to include all types of telecommunications cabling and also specific requirements for administration systems. A similar process is underway for EN 50174-2 which will also include Annexes for each of the premises types within the EN 50173 series.

….. testing, testing …..

In 2002, the UK Fibreoptic Industry Association announced that conventional test methods for installed optical fibre required modification to address the emergence of new types of optical power measurement equipment with fixed connection systems and the use of duplex connecting hardware. The FIA produced Technical Support Documents defining alternative test procedures and these proposals have led to the revision of ISO/IEC 14763-3, moving from a technical report to a full standard and which is expected to be published in Q2, 2006. This revision also includes

significant changes to the specification of test cords and need to control, in the case of multimode optical fibre, the modal power distribution at the point of connection to the cabling under test. If installers adopt the full set of demands they will see huge increases in both measurement accuracy and repeatability - both of which are of importance as the lengths being measured, and therefore the limits applied to the measurement, continue to fall.

A revision to BS EN 50346, also to be published in 2006, will make reference to this ISO/IEC work and will also include a series of specifications for XML output for test results from both optical fibre and balanced cabling test equipment allowing all results, independent of the test equipment used, to be viewed using browsers such a Internet Explorer.

Standards are a bit like buses ….. you wait for ages then lots all come at once

The coming year will see the publication of more cabling-related standards, amendments and revisions than ever before. Making sense of them and identifying their separate roles will not always be easy so keep this article to act as a guide to the next twelve months.

Biography

As the Technical and Standards Director of the UK Fibreoptic Industry Association, Mike is heavily involved in the development of training and competence standards for the fibre installation industry and sets down policy in this area. In addition he chairs the audit and arbitration committees for the FIA. His book "Fibre optic cabling; theory design and installation practice" published in 1991 remains a reference for both experts and entrants into this field.

In the UK, Mike is Chairman of TCT/7, the BSI technical committee responsible for the three panels on telecommunication cabling. He also chairs two of these panels (TCT7/-/1 and TCT7/-/3). TCT7/-/1 acts to assist development of European and international standards for telecommunications cabling. TCT7/-/3 manages the implementation of European standards and others in the UK.

At the European level Mike is Convenor of CENELEC TC215 Working Group 1, the group that controls the development of European standards for the design and installation of telecommunications cabling. In the international arena Mike is Convenor of ISO/IEC JTC1 SC25 WG3 IPTG, a standards committee working on generic cabling for industrial premises (ISO/IEC 24702).

Mike is a regular speaker at seminars and conferences in all five continents. He has provided the keynote address and opening presentation in many conferences in the UK, Germany and the Netherlands. His seminars, providing regular updates on the progression of cabling standards are particularly well attended and are operating in the UK and continental Europe.