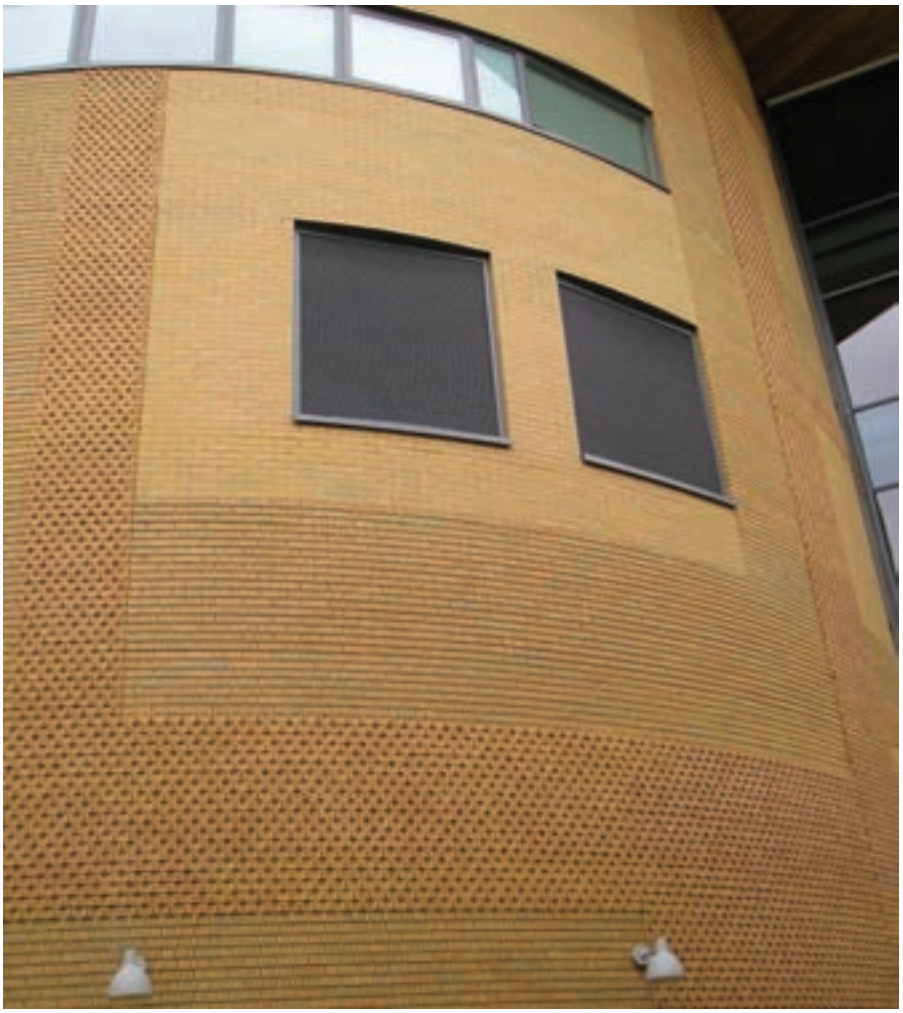
Raising stand

The introduction of new Eurocodes has been confusing to many manufacturers in the construction industry. Professor Geoff Edgell, Director and Principal Construction Consultant from CERAM, Stoke-on-Trent, outlines the changes and shortfalls.



On 31st March 2010 the British Standards Institution (BSI) withdrew the British Standards Codes of Practice for the design of masonry structures. These standards have been replaced by the Eurocode suite, which was published in 2005. From the perspective of the BSI and the UK Government, there appears to have been a smooth transition, however this is not the case.

The withdrawn codes are – BS 5628 Parts 1, 2 and 3 which cover the Use of Masonry as follows, Part 1: Structural use of unreinforced masonry, Part 2: Structural use of reinforced and pre-stressed masonry, and Part 3: Materials and components, design and workmanship.

These have been replaced by the following series of codes – BS EN 1996, Design of masonry structures; Part 1-1 General rules for reinforced and unreinforced masonry structures; Part 1-2: General rules – Structural fire design; Part 2: Design considerations, selection of materials and execution of masonry; and Part 3: Simplified calculation methods for unreinforced masonry structures.

In order to bring clarity across the industry in Europe, the Construction Products Directive introduced the concept of harmonised European Standards. These standards aimed to provide a level playing field for manufacturers and to ensure that buildings met the essential requirements of the Directive.
It became illegal to place products on the European market that were not manufactured to these new Standards. Consequently, from the 1 April 2010, there has been the presumption that if products complied with the requirements of the harmonised standards, such as the building being mechanically safe and the products stable in-use, and they were used in buildings that had been designed and constructed to BS EN 1996, they would meet the requirements of the directive. There is an example of a harmonised

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Standard in the clay sector, the product standard for clay masonry units, BS EN 771-1, was established as a result of the introduction of the Construction Products Directive. This has been the only standard in use since 2006, when BS 3291 was withdrawn, with the supporting test methods in the BS EN 772 series.

The UK building system is controlled to meet the requirements of our building regulations, and although these do not yet refer to BS EN 1996, UK building control officers have been advised that calculations to BS EN 1996 is an acceptable means of satisfying the regulations.

This, however, is not the whole story, BS EN 1996 is unusable without the National Annex to each part, as it is the Annexes that inform the designer of the National Determined Parameters (NDPs) which should be used in association with the standards. These values, that are specific to each country, control the level of safety through the partial safety factors and the values of material properties. Previously they were provided in National Codes and are now available as national databases in the National Annexes.

Replacement problem

Although studies prior to the publication of Eurocode 6 suggest that equivalent solutions might be available under both approaches, there now appear to be some doubt. Comparisons between designs to the new and old systems continue to be made and debate will continue on this issue, especially at the 8th International Masonry Conference in Dresden, Germany, in July. Hopefully, accommodations will be found to ensure that advances and not retreats in terms of masonry economy can be found.

Another issue is that the Eurocode often does not cover the ground in as much detail as the now withdrawn codes. This is especially true of BS 5628 Part 3, which is now superseded by BS EN 1996-2 – as this code aims to cover a broad range of construction traditions, the corresponding comprehensive piece of guidance would be a large document. So, for example, detailed guidance on how to exclude water from traditional cavity construction in the UK or how to lay highly vertically perforated blocks in Germany or highly horizontally perforated units in Spain is found to be incomplete.

Such guidance on a national basis is permitted as Non Conflicting Complimentary Information (NCCI), which can be referenced in the approved document to the Building Regulations. However, this is, as yet, unavailable. Guidance that collects together all of the omissions needed on a national basis is being produced by consultants. This is unlikely to be available until 2011.

Blocking progress

Another problem is the inhibition of development. Examples are the use of porotherm blocks and of bond beams in masonry construction. Porotherm blocks are the highly perforated units bonded together with a thin joint mortar in the bed joints, but with empty yet interlocking, head joints. In order that these could be used in the UK while BS 5628 was still current, CERAM produced a technical report and design guide. The aim was to extend the guidance available in the UK, on the uses of such blockwork, in order to produce a comparable level of safety, as seen with other masonry materials, thereby complying with the building regulations. BS 5628 will continue to be accepted as a means of satisfying the Building Regulations for years to come and consequently the CERAM guide will also remain current for some time. In due course, a second edition will be published to supplement the limited guidance in BS EN 1996.

In conjunction with consultation of engineers and the system inventors, CERAM has also produced a design guide based upon testing for the bond beam system for concrete blockwork. This is important as no change to BS EN 1996 will be made until 2015, and the opportunity to introduce a new design method, using the usual code approach, is unavailable. It will, in any case, be much more difficult after that date as any new material would need to be accepted by all 28 member states.

Overall, despite the long gestation period, there is still a way to go in developing the Eurocode. As with Standards work, it is often the manufacturers that take a keen interest and practising designers take little. However, the change in code approach will draw designers in and more anomalies will appear. The quest to retain economy and advance it to cover all national practices adequately and to accommodate innovation is going to become more difficult.

Coming as it does, on the back of a recession, it is difficult to see how the Eurocode can retain priority, but it must. I only hope practising professionals will take up the challenge and offer input to the process in a constructive way.

Further information

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