British Standards and the new Eurocodes: A fresh breeze or choppy waters?

In this bulletin we discuss:

- The implementation of the new Eurocodes
- Their impact on the construction industry
- Their interaction with existing standards
- Their effect on design obligations

We are all familiar with the fact that the construction industry has a plethora of British Standards as its disposal, and that British Standards are often used a benchmark when monitoring industry standards generally.

"Put at its simplest, a standard is an agreed, repeatable way of doing something. It is a published document that contains a technical specification or other precise criteria designed to be used consistently as a rule, guideline, or definition."

The sentiment of the above quote from BSI Group is clearly to produce a set of documents that anyone in the relevant field can understand and follow. In doing so this creates a consistent, precise approach to the myriad of practical tasks to which a British Standard can be applied.

Although British Standards do not themselves carry any legal authority, legislation and private contracts will often require adherence to them. In many cases therefore the failure to adhere to a British Standard may result in a breach of contract or statutory duty which, in turn, could lead to a dispute. In any event a British Standard provides a benchmark in many cases for what is acceptable and what is not acceptable.

However, now that we are part of a bigger family, Britain, along with the rest of the EU member states is obliged to ensure that standards are consistent on a European level, rather than simply a national level. Article 85 of the Treaty of Rome prohibits any practices which "limit or control [sic] technical development" or "apply dissimilar conditions to equivalent transactions with other trading parties thereby placing them at a disadvantage."

The European Commission decided that national technical standards were contrary to these principles, and the general goal to create a single European economy. Enter the Eurocodes. On 1 April 2010 BSI withdrew 57 British Standards and replaced them with 10 new Eurocodes:

- Eurocode 0 – Basis of Structural Design
- Eurocode 1 – Actions on structures
- Eurocode 2 – Design of concrete structures
- Eurocode 3 – Design of steel structures
- Eurocode 4 – Design of composite and steel structures
- Eurocode 5 – Design of timber structures
- Eurocode 6 – Design of masonry structures
- Eurocode 7 – Geotechnical design
- Eurocode 8 – Design of structures for earthquake resistance
- Eurocode 9 – Design or aluminium structures

Looking at the scope of the above Eurocodes it is perhaps unsurprising that their arrival has been described as "the most wide-ranging change to codification of civil and structural design ever experienced". Under the Public Contracts Regulations 1991 most public projects will be required to use these new design standards. Although the withdrawn British standards may still be used for private projects, and will meet building regulation requirements, they will not be maintained.

It has been suggested therefore that design offices across the country should be in a state of radical change investing in new software, new textbooks and training in order to competently
take on new work that requires adherence with the Eurocodes. However it has been reported that only 29 per cent of civil engineering organisations are prepared for the introduction of the codes, whereas 58 per cent of the Institution of Civil Engineers rate the codes as important or very important to their work of the work of their organisation. Without wanting to read too much into these figures, there certainly appears to be a potential knowledge gap, with only around half of the engineers who are likely to use the codes ready to do so.

The reported reluctance to embrace the codes may partly be down to the investment required to bring a workforce up to speed. The ICE estimate a cost of £16,000 per engineer would be sufficient to purchase the appropriate software and training courses, although it has been suggested that a figure close to £30,000 would be more accurate. The introduction of the codes during a recession may mean some firms simply cannot afford this expenditure, or it has fallen well down the list of investment priorities.

Aside from the cost of whole-heartedly embracing the codes, commentators have also cast doubt over the content of the codes themselves. Complaints from the engineering community can be summarised as follows:

**Ease of Use**

It seems from a practical point of view that the codes are not published in a ready to use format. Each Eurocode part comes with a national annex. An engineer may be required to refer to two, or more, Eurocode parts and the national annexes to each in order to design a structure. The end result being a maze of documents which one has to cross refer to. It has also been suggested that there are contradictions between the documents which make it very difficult to establish what the correct "Eurocode" approach actually is.

**Language**

As one might expect, there is an element of "Eurospeak" to the codes. This is not uncommon in 11 documents originating from the EU legislature, but this may cause problems when words which have a settled professional meaning are being substituted. Cited examples include use of the word "executed" instead of "constructed" and "sustain" instead of "withstand". In short the Eurocodes do not use a recognisable "technical English", and apparently attempt to “replace this with a new language” which includes the use of unfamiliar mathematical symbols.

**Depiction of a decimal**

Those who studied mathematics in school will find that it is second nature to use a dot (.) to indicate a decimal. However in most other European countries it is customary to use a comma (,).

From a legal perspective, it is the substantive differences between British Standards and the Eurocodes which are perhaps more interesting. The best example of a fundamental change appears to be within Eurocode 7 – Geotechnical design. As other commentators have pointed out, every structure requires foundations and therefore requires some geotechnical design input. Beal describes Eurocode 7 in no uncertain terms as "a complete change from past practice, with a new complex system of partial factors replacing the traditional global safety factors of geotechnical design".

There is clearly the potential for the Eurocodes to impose a completely new approach to design practice. There introduction would appear to go far beyond a general standardisation of terms, and some would go so far as to argue they are looking to implement radical change to what the industry would normally refer to as "best practice".

Designers should therefore be wary of their obligations. The most commonly accepted approach under a British standard may no longer be deemed compliant with Eurocode practice. The key is for designers to be sure of their contracted obligations. If a contract says designs must be Eurocode compliant, they must be – simple right? Well apparently not. Provisions with in
the new Eurocodes are split up into “Principle Rules” and “Application Rules”. Principle Rules are mandatory and must be followed for designs to be in anyway Eurocode compliant. Application rules, although not compulsory, are the generally recognised path to compliance with the Principle Rules. It is noted that although alternative methods to complying with the Principle Rules are acceptable, a design which departs from use of the Application Rules cannot claim to be wholly compliant with the Eurocodes. The result of this seems to be that you can be fully compliant or partially compliant with the codes. Designers will therefore have to carefully consider their contract terms to understand to what degree they may be obliged to adhere to the Eurocodes.

It is perhaps alarmist however to suggest that these blurred lines of what is “compliant” or not will result in a surge in disputes over the extent of design obligations. Where a contract expressly states the requisite standard, be it British Standard, Eurocode or any other recognised standard which complies with overriding building regulations, the scope for argument over what a designer should have adhered to is significantly reduced.

The greater risk would appear to be to more with more general terms, where no standard or code is specified. For example it is not uncommon to see clauses attempting to set out the common law position specifying that designer to act “with reasonable skill and care and in accordance with best industry practice”. The well-known case of Bolam v Friern Hospital Management Committee [1957] 2 All ER 118 laid down the applicable test for the standard of care for professionals. Although Bolam dealt with medical negligence, the test has been upheld by the House of Lords and is the appropriate test to use in professional liability cases. In summary the applicable standard is one of reasonable skill and care that one would expect from a reasonably competent professional. In Bolam, it was held that a doctor did not necessarily fall short of this standard if he conformed to a practice accepted as proper by some responsible members of his profession even if other members would have taken a different view.

Therefore while all the time there is a significant body of professional opinion that a British Standard is acceptable, it is unlikely that a designer would be found to have acted without reasonable skill and care in choosing to abide by a British Standard as opposed to a Eurocode. Design engineers should nevertheless consider that the replaced British standards are likely to become more and more outdated because of updates and maintenance that Eurocodes will benefit from.

In addition, it is also possible that a professional appointment may contain both a clause requiring works to be performed with reasonable skill and care (i.e. in line with Bolam above) together with a clause requiring adherence to the relevant British and European standards (i.e. the Eurocodes). In light of the foregoing discussion, the inclusion of both these clauses could initiate a contractual conflict between the two sets of standards and confusion over the requisite standard of the professional's performance thereunder.

Conclusion

In summary, since 1 April 2010 there now appear to be two strands of documents available to the design engineer. The replaced British Standards, which will not be maintained or updated, but may still be specified in construction contracts, and will continue to be acceptable in terms of Building Regulations. There is also the Eurocodes: employing different terminology; different mathematical symbols; and a two tier system of complicity– applicable to public projects and any private contracts where specified. Suddenly this all seems along way from anything "standard", "consistent" or "precise".

It is not inconceivable that they will, in time, become the recognised standards, as the British Standards they have now replaced once were. In reality, whether you love or hate the Eurocodes, as more public projects require adherence to them, being able to use and apply them may become a professional and commercial necessity for design engineers and the rest of the construction industry.
Finally, there is an apparent lack of awareness of the existence and introduction of the Eurocodes. Hopefully this article provides a brief insight and will prompt the readers to consider these changes further.

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1 H Gulvanessian “Eurocodes: the new British standards for structural design” Civil Engineering 163, February 2010

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