

European standardisation of new and innovative cements

Proposed by the Materials Standing Committee of The Concrete Society, Bill Price of Tarmac Cement (and chair of B/516: Cement) and Chris Clear of MPA-BRMCA (and chair of B/517: Concrete) examine the standardisation of new cements.

The emergence of new and innovative cements, often with low-carbon characteristics, is increasing at a significant rate according to media reports. In practice, very few of the materials or products reported are being made available to concrete product manufacturers or ready-mixed concrete producers in sufficient quantities for either detailed assessment or trial use.

The current European product Standard for common cements BS EN 197-1⁽¹⁾ covers a range of cements based on Portland cement clinker with one or more other main constituents in a defined range of compositions. In addition, there are performance requirements for strength and volume stability, where the limits set are based on the historic performance of the cement types covered by the Standard. For the potentially wider range of innovative cements, such as alkali-activated binders – sometimes called ‘geopolymers’, there

may not be any quantitative compositional requirements. In addition, any performance requirements may have to be based on modified or non-standard tests where their applicability may need verification. For these reasons, it is not always possible to assess an innovative cement against the standardised requirements of established common cements such as those covered by EN 197-1.

There are also a number of proprietary cements both available and widely used that are not covered by any British or European Standard. These materials are often sold on the basis of specific performance attributes, such as very rapid strength gain or superior resistance to particular aggressive chemicals, and where compliance with a Standard is considered unnecessary. For other products, the lack of a suitable Standard is perceived as a barrier to their wider use. The EU has publicly highlighted, ‘The essential contribution which standardisation can make towards developing innovation and

competitiveness, by facilitating access to markets, enabling interoperability between new and existing products services and processes, enhancing protection of users, giving customers confidence in innovation and disseminating research results’. A bit of a mouthful but it is clear that the EU sees standardisation as essential for supporting innovation, while protecting and providing information to the user.

Standardisation

Standardisation of any new product is often a key step to facilitate the wider exploitation, and conformity to a Standard gives both specifiers and users added confidence. Without suitable Standards in place, there is a risk that fitness for use will need to be demonstrated on a case-by-case basis, with consequent replication of effort and delays in exploitation.

While it is important that standardisation is not seen as a barrier to the exploitation of



Figure 1: The hierarchy of standardisation.

new cement types, it is also important that a consistent approach to standardisation is adopted for all types of 'cement' intended for use in construction. In some circumstances, a European Technical Assessment (ETA) may be a more appropriate route than a full EN product Standard but the remainder of this article deals with EN standardisation.

Recognising this, the CEN technical committee for cement and building limes (TC 51) is producing a technical report containing guidelines to support the future standardisation of new cement types. This document, which will be published as a CEN Technical Report, looks at three categories of new cements:

- Cements produced from a new combination of the constituents already covered by EN 197-1 (described as 'well tried and traditional').
- Cements that essentially correspond to cement types already covered by an EN Standard but with the addition of one or more new constituents.
- Cements differing substantially from those cement types defined in existing Standards, possibly based on totally new physicochemical principles. Typically, these would not contain Portland cement clinker in any appreciable amount.

Draft

In the draft report, the process of standardisation is anticipated to start with an application to the CEN technical committee prior to establishing a 'new work item' for standardisation in the CEN process. This should be supported by a technical dossier. The proposed CEN technical report describes the information that should be included in the dossier, particularly that information demonstrating the fitness for use of the cement in its intended applications. In most cases, this will also include test data demonstrating the engineering performance and durability characteristics of the candidate new cement, as well as the environmental aspects and possible health and safety impact (including possible registration in accordance with REACH). Although many of the suggested test procedures have been developed for use with Portland-type cements, provision is made for the use of alternative test methods where these are more appropriate for a novel type of cement.

The CEN technical committee would evaluate the dossier on a case-by-case basis, taking into account the intended use(s) of the product. Once satisfied of fitness for purpose, the formal drafting of a product Standard would begin.

It is appreciated that this process would

appear to be somewhat lengthy, particularly to innovators and entrepreneurs, but while standardisation can be fast-tracked up to a point (and the EU is implementing various ways in which this can be facilitated), it cannot be simply a rubber stamping process. A 'bad' rushed Standard will inevitably lead to disputes and confusion when it is applied in practice.

Manufacturers of novel cements are encouraged to engage with the standardisation process as early as possible. Without this, there is a risk of too many 'false starts' and duplication of effort, leading to feelings of frustration for all the parties involved.

The CEN Technical Report (provisionally numbered FprCEN/TR 16912) should be published in early 2016 and would be required reading for producers of new and innovative cement types. Understanding the guidelines under which the CEN technical committee would evaluate such products should help to minimise the time taken to produce a product Standard and encourage the early adoption of new cements. ■

Reference:

1. BRITISH STANDARDS INSTITUTION, BS EN 197-1. *Cement. Composition, specifications and conformity criteria for common cements*. BSI, London, 2011.