



FLOORS AND SCREEDS



Understanding the UK screed market and associated Standards

Andy Vincent of Cemfloor explains the differences between traditional and more innovative floor screeds, highlighting the importance of understanding their relative pros and cons and how UK Standards impact upon their usage.

A levelling floor screed would, to the uninitiated, appear to be a very simple thing. All that is required is for it to overlay the structural slab of a building and to provide a flat surface capable of receiving a floor finish. Why then are screeds such a notorious cause of expensive problems both during construction and in the later usage of buildings?

Many things complicate the specification and application of floor screeds. Many types of substrate floor will need to be accommodated, there will be a large variation in the required floor finishes and an even larger variation in the potential loadings and uses of the floor. The screed make-up will often have to incorporate other elements such as heating, damp-proof membranes and acoustic or thermal insulation.

With such diversity of requirement, there are huge variations in type of specification. Usually the most important thing to establish will be the required thickness, which will be influenced by many factors but particularly by whether the screed is applied directly to a solid slab or over some compressible materials (insulation). Once the thickness is

decided, the choice of screed materials will be narrowed to those that are appropriate for this thickness, but there will usually still be a large range of options. Factors such as drying time, suitability for floor finishes, thermal conductivity and many other aspects will then need to be considered.

In the UK, the clearest guide to specification and installation of floor screeds is BS 8204⁽¹⁾. This is a multipart Standard with Parts 1 and 7 applying to cementitious levelling screeds and pumpable self-smoothing screeds, respectively. Other parts consider more specialist screeds.

The main performance requirement is defined in BS 8204 as the ISCR (in-situ crushing resistance) as tested by the BRE screed tester. In essence, the depth of indentation made by repeated blows of the hammer defines the category of screed from 'A' to 'C', with A being suitable for the heaviest and C the lightest usage. Standards are also defined for deviation from datum and surface regularity.

BS EN 13813⁽²⁾, while less concerned with selection and use of screed materials, provides physical and performance requirements and

Above: Application of a semi-dry screed is a skilled and physically demanding task.

Top left: It is much easier working standing up, as with flowing screeds.



definitions for factory-produced materials. It is referenced in this context by BS 8204. In addition, a useful Standard reference is BS EN 13892⁽³⁾ which defines sampling and test methods.

Traditional screeds

The term 'traditional screed' refers to the method of laying by hand, but since almost all such screeds are composed of suitable sand with Portland cement and water, the terms 'traditional' and 'sand and cement' have become almost interchangeable.

Still accounting for about 80% of the market, sand-cement screeds have the advantage of being made from easily available and relatively cheap materials. Cement is used with sand at a ratio of three or four parts sand to one part cement. Water is added and thoroughly mixed such that the final consistency is semi-dry. This semi-dry material must then be levelled and physically compacted on the floor. Sand and cement screeds can be produced off-site and delivered ready to use or can be mixed on-site in mixers or combined mixer-pumps.

The combination of the skill required, and the great physical effort, means that the quality of the finished floor is very dependent on the ability of the screed layer. The degree of compaction achieved is extremely important in ensuring the quality of the finished floor. Needless to say, quality is not always of the highest calibre.



Inset: Checking the viscosity of a flowing screed.

Calcium sulfate screeds

There were products in the 1960s that were hand-applied but that were based on calcium sulfate. These were not successful as they showed no real advantage over sand and cement and were more expensive. Nowadays, when we cite 'calcium sulfate screed' (or gypsum screed or anhydrite screed), what we are referring to is a liquid-applied or pumpable screed.

Calcium sulfate has one fundamental advantage over cement as the basis of a liquid screed. As it sets and hardens, which is a process of crystallisation rather than hydration, it doesn't exhibit the same shrinkage as would a normal cementitious material. Since shrinkage causes cracking and curling and is a major cause of problems with screeds, this is a big advantage.

Pumpable screeds are almost always manufactured off-site and delivered ready to use: combined with lack of need for physical compaction on-site, this means that the quality of the finished floor is much more controlled.

Despite the obvious advantages of these screeds, the usage of them in the UK, while having grown considerably in recent years, has generally been very slow compared with

Above: It is difficult to apply semi-dry screed over underfloor heating.



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Flowing screeds are ideal for application over underfloor heating.



Flowing screeds make the task much easier over under floor heating. Note the levelling tripod to set the thickness.

“The latest generation of pumpable screeds are based on cement. Careful selection of the admixtures, fillers and aggregates used with Portland cement produces a very fluid mix that can be laid in a very similar fashion to any other pumpable screeds but with very minimal shrinkage.”

other European countries. There persists what might best be described as a distrust of the materials by some floor layers and specifiers. For the most part, this can be at least partly attributed to lack of understanding, but criticisms regarding drying times and compatibility with adhesives etc. seem to persist and this has certainly hampered the uptake of these materials in the UK.

Pumpable cement-based screeds

Very recently in the UK (though over ten years ago in other countries), there has been a development that may combine the best of both types of screed. It has always been an attractive proposition to produce a screed that flows like a calcium sulfate one but has other properties comparable to traditional screeds. The problem has always been that anything based on cement will tend to shrink as it hardens and dries. Superplasticisers can be used to help provide a fluid mix but it will still be necessary to have a high water content and this will tend to dramatically increase the shrinkage of the material as it hardens and dries.

Technology moves on. The latest generation of pumpable screeds are based on cement. Careful selection of the admixtures, fillers and aggregates used with Portland cement produces a very fluid mix that can be laid in a very similar fashion to any other pumpable screeds but with very minimal shrinkage. This next-generation technology has only recently

become available in the UK but is already gaining in reputation. It is more expensive but this higher cost is offset by the lower cost of preparing the surface ready for floor finishes (most other pumpable screeds require mechanical preparation). It must also be said that the industry just seems more comfortable with cement, in that they know that primers, adhesives, finishes etc are compatible with it.

Conclusion

All three of the above materials will, without doubt, be present in the UK marketplace for a very long time and yet it will be interesting to see the winners and losers in the race for market share. The biggest disadvantage that traditional screeds have may not be to do with the quality of the product at all but rather the health and safety concerns over the physical demands on the installer. In some countries, there are already constraints on their use because of this. As for the two types of flowing screed, since liquid screeds have over 60% of the market share in some other countries, the UK seems to have a lot of catching up to do. ■

References

1. British Standards Institution. BS 8204 series. *Screeds, bases and in situ floorings*. BSI, London (various dates).
2. British Standards Institution. BS EN 13813. *Screed material and floor screeds. Screed material. Properties and requirements*. BSI, London, 2002.
3. British Standards Institution. BS EN 13892. *Methods of test for screed materials*. BSI, London (various dates).