PRESS RELEASE

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NEW STANDARDS CLEAR UP SUDS UNCERTAINTY AND PROVIDE A TOOLSET OF SOLUTIONS

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With increasing weather extremes, such as autumn's excessive rainfall, surface water management and SuDS (sustainable drainage systems) in particular, have become even more important and higher profile.

For each planning application, even for smaller developments, a plan for surface water management now has to be submitted. However, even though there are more and more SuDS schemes in place it could be argued that the acceptability of a design is largely at the discretion of a particular engineer, planner or Lead Local Flood Authority.

Achievable SuDS

In order to support the planning application CIRIA'S SuDS Manual (C753: 2015) provides excellent guidance on the design of SuDS to achieve the 'four pillars' – quantity, quality, amenity, biodiversity – but achieving all four may not be feasible on a specific site. However, in the current climate (no pun intended) a plan to achieve the control of volume, flow rate and quality of water being discharged from a site may be the primary concern for the planner.

Equally, infiltration of surface water may not be possible for reasons of geology or ground contamination, leading to attenuation. C753 recognises this and includes underground attenuation systems, also known as geocellular systems, as legitimate SuDS components.

The other issue with SuDS has been who takes responsibility for the ongoing maintenance. In England, local authorities have really only considered adoption of those in public open spaces. Whilst commercial developments have often been quite happy to retain the ownership and maintenance of their own SuDS, this has left a large number of mainly residential developments in a sort of limbo – does the developer retain ownership, contract a third party maintenance company or transfer the ownership to a residents' management group?

With the publication of Ofwat's 'Sector Guidance in Relation to the Adoption of Sewerage Assets by Sewerage Companies in England' water and sewerage companies in England will be able to adopt some SuDS components. This is expected to encourage the implementation of SuDS by providing an alternative route for adoption and maintenance.

New and evolving standards for geocellular design

The CIRIA 2016 report C737 'Structural and geotechnical design of modular geocellular drainage systems' gives guidance on the calculation of the loads on 'tanks'. The 2018 BPF Pipes Group 'Guide to Designing Geocellular Drainage Systems to CIRIA Report C737' supplements this by providing a worked example for designers to do the structural calculations based on parts of C737[1].

What has been missing, until now, is how a manufacturer can demonstrate the performance of their system, in particular the long-term strength over the typical 50-year design life. The strength of a plastic material changes with time, due to creep, and the resistance to structural loads will decrease. The reassurance that the long-term strength of the system is higher than the structural loads is key to avoiding system failure. The loads acting on 'tanks' are compressive so the normal tensile tests commonly used for polymeric material are not applicable. The strength of a 'box' is a combination of material, design (geometry) and stability of production process and so tests need to be carried out on the 'box' and not just on the material alone.

In supporting the development of a cohesive approach to SuDS specification the BPF Pipes Group has been directly involved in the production of three new European Standards, which came out on 21 August 2019 after eight years' work.

- EN 17150 gives a standard method for testing the short-term compressive strength of plastic boxes;
- EN 17151 gives a test method for long-term testing using creep rupture;
- EN 17152-1 is the product standard giving the characteristics needed to measure and control, for example long-term and short-term strength.

The final element is the assessment of conformity and third party certification. Work is ongoing on other standards, covering for example, assessment of conformity and audits. In the meantime, British Board of Agrément (BBA) certification gives the designer confirmation that the product has been made and tested in conformance with the new standards and that the values for the short- and long-term strengths are as the manufacturer declares.

The BBA protocol for geocellular systems certification not only covers the product itself and the manufacturing quality plan, but incorporates sample calculations based on the BPF Pipes Group Guidance to C737 (see it at https://www.bpfpipesgroup.com/support-downloads/guidance-notes/) that will allow designers to have confidence that the product will perform as expected under given conditions.

The geocellular toolset

The elements described now work together. Calculation of loads can be made according to C737 and BPF Pipes Group guidance. Resistance to the calculated loads can be demonstrated through the new standards and assured by BBA certification. Designers now have an effective and more complete toolset at their fingertips to help them ensure that the underground attenuation elements of SuDS systems are correct and purpose-built.

Dr David Smoker is the Chair of the BPF Pipes Group's SuDS and Surface Water Working Group and has worked in the supply chain side of the water industry for over 35 years. He is Technical Director at ACO Technologies where he champions developments in surface water management and environmental issues. He has a BSc Hons in Chemistry, an MSc in Polymer Technology and a PHD in Polymer Rheology.