Construction Materials
Volume 168 Issue CM2
Editorial
Ceylan

Proceedings of the Institution of Civil Engineers
Construction Materials 168 April 2015 Issue CM2
Pages 47–48 http://dx.doi.org/10.1680/coma.2015.168.2.47

ice | proceedings

Editorial

Halil Ceylan PhD
Associate Professor, Department of Civil, Construction and Environmental Engineering; Director, Program for Sustainable Pavement Engineering and Research, Institute for Transportation, Iowa State University, Ames, IA, USA

This issue contains two briefings and three papers mostly focusing on the theme of sustainable construction materials. The first briefing paper by Badjatya *et al.* (2015) explores the possibility of replacing 100% potable water in cement concrete with textile dye waste water; a win–win scenario for both the concrete industry as well as the textile industry if the proposed solution actually works. This briefing paper is quite timely in addressing an important and multi-faceted sustainability issue: the amount of potable water available is fast depleting due to pollution of various water bodies; treating wastewater resulting from textile dyeing processes is not easy and has several environmental problems; the amount of potable water used in the production of concrete is quite significant. The preliminary study by Badjatya *et al.* (2015) concludes that the fresh and hardened properties of concrete made using potable water and textile dye wastewater are quite comparable, holding promise for future research.

Continuing with the sustainability theme, the second briefing paper by Senthil Kumar and Baskar (2015) presents results from an experimental investigation on the shear strength of concrete prepared with electronic waste (E-waste) as coarse aggregate. It is unfortunate that imported E-waste plastics are still being disposed of as landfill or incinerated in most developing countries due to a lack of adequate infrastructure to efficiently recycle and beneficially reuse them. Studies in the past have proposed the idea of using E-waste plastics, such as high-impact polystyrene (HIPS), acrylonitrile butadiene styrene and printed circuit boards, as partial replacement for aggregate in asphalt as well as cement mortar and concrete (Baron Colbert and You, 2012; Wang and Meyer, 2012). Building upon their own previous research on incorporating E-waste plastic as a coarse aggregate in concrete, Senthil Kumar and Baskar (2015) focus on the shear strength of concrete containing HIPS from computers and accessories as a partial replacement for coarse aggregate. The researchers conclude that the shear strength decreased with increase of HIPS aggregate and therefore they recommend the use of HIPS-modified concrete for use in non-structural elements.

The first paper by Sharma *et al.* (2015) presents a state-of-the-art review on engineered bamboo and its use in structural applications. Interest in the use of bamboo as a structural and construction material continues to grow in light of the environmental concerns associated with the utilization of rapidly depleting, non-renewable resources for construction of civil infrastructure. Despite its rapid growth and beneficial strength characteristics, the authors note that the use of bamboo as a construction material has been limited, mainly due to the inherent variability in its geometric and mechanical properties as well as lack of standardization. Engineered bamboo products aim to overcome these limitations. Their review focusses on two types of engineered bamboo, namely the bamboo scrimber and laminated bamboo. The authors conclude their review by noting that engineered bamboo products have aesthetic advantages over other materials and have mechanical properties that are comparable or exceed those of structural timber.

The second paper (Shaikh *et al.* 2015) discusses the effect of nano silica (NS) on the mechanical and durability properties of concrete containing recycled coarse aggregates (RCA). Many studies in the past have investigated and proposed the use of RCA resulting from concrete construction and demolition waste in concrete as well as in base/subbase layers. It is generally believed that RCA concrete possesses inferior mechanical and durability properties compared to conventional concrete incorporating natural or virgin aggregates, and that its range of substitution with natural aggregate within concrete should be restricted to a range of 20–30%, so as to have minimal impact on the overall concrete performance (Shaikh, 2013; Thomas *et al.*, 2013). In recent years, the incorporation of NS into RCA has been shown to compensate the loss in mechanical and durability properties of resulting concrete. Based on a series of experimental tests, the authors concluded that even the incorporation of 2% NS to concrete containing RCA can result in structural grade concrete with excellent mechanical and durability properties.

The final paper (Fairfield, 2015) investigates the cavitation erosion resistance of sewer pipe materials (plastics, clay and concrete) during high-pressure water jetting. The context for this research stems from the fact that the use of high-pressure water-jets to clean and unblock drains and sewer, as is typically done, results in damage. Thus, there is a need for the sewer pipe industry to establish a database of material properties for pipe-wall materials to be correlated with their high-pressure water-jet-induced cavitation erosion resistance which will help manufactures select appropriate materials for future piped systems. Farfield shows that the sewer pipe material properties that best correlated with jetting resistance include maximum service temperature, elastic modulus, surface roughness, density and thermal conductivity.

REFERENCES

Badjatya P, Bhadada R, Keshri M and Nanthagopalan P (2015) Briefing: Usage of textile dye waste water in concrete. *Proceedings of the Institution of Civil Engineers – Construction Materials* **168(2)**: 49–52, http://dx.doi.org/10.1680/coma.14.00050.

Baron Colbert W and You Z (2012) Properties of modified asphalt binders blended with electronic waste powders. *Journal of Materials in Civil Engineering* **24(10)**: 1261–1267.

Fairfield CA (2015) Cavitation erosion resistance of sewer pipe materials. *Proceedings of the Institution of Civil Engineers – Construction Materials* **168(2)**: 77–91, http://dx.doi.org/100.1680/coma.14.00004.

Senthil Kumar K and Baskar K (2015) Briefing: Shear strength of concrete with E-waste plastic. *Proceedings of the Institution of Civil Engineers – Construction Materials* **168(2)**: 53–56, http://dx.doi.org/10.1680/coma.14.00044.

Shaikh FUA (2013) A study on the existence of dividing strength in concrete containing recycled coarse aggregate. *Journal of Materials in Civil Engineering, ASCE* **26(4)**: 784–788.

Shaikh FUA, Odoh H and Than AB (2015) Effect of nano silica on properties of concretes containing recycled coarse aggregates. *Proceedings of the Institution of Civil Engineers – Construction Materials* **168(2)**: 68–76, http://dx.doi.org/10.1680/coma.14.00009.

Sharma B, Gatoo A, Maximilian B, Mulligan H and Ramage M (2015) Engineered bamboo: state of the art. *Proceedings of the Institution of Civil Engineers – Construction Materials* **168(2)**: 57–67, http://dx.doi.org/10.1680/coma.14.00020.

Thomas C, Setien J, Polanco JA, Alaejos P and de Juan MS (2013) Durability of recycled aggregate concrete. *Construction and Building Materials* **40**: 1054–1065.

Wang R and Meyer C (2012) Performance of cement mortar made with recycled high impact polystyrene. *Cement and Concrete Composites* **34(9)**: 975–981.