The Use of Synthetic Lightweight Aggregates as a Component of Sustainable Designs

Christopher Swan[1]

[1] Department of Civil and Environmental Engineering, Tufts University, Medford, MA 02155

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ABSTRACT

Sustainable design principles attempt to utilize local materials in ways that reduce the impact of the proposed development so that it behaves more like a natural environment. With respect to site development, the goal is utilize construction materials made with high recycled content as well as to recycle waste construction materials. This paper presents the incorporation of synthetic lightweight aggregates (SLA) in pilot-scale studies of the use of sustainable design on a university campus. SLA is a coarse aggregate (greater than 0.15 inches particle size) composed of 80% fly ash and 20% recycled thermoplastic. Specifically, SLA was used as one of the components of an extensive green roof system and was incorporated in the design of pervious, replacement steps for an exterior stairway. As a part of the green roof system, the SLA served the role as the drainable substrate for plant growth. In the previous step design, the SLA provided a durable lightweight alternative to traditional sand and gravel. The results of the work indicate that SLA provides an alternative and appropriate, lightweight construction material that can be utilized in sustainable design concepts.

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