Soxhlet Extraction Determination of Composition of Synthetic Soils

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Abstract

Synthetic soils are gradually replacing natural soils, e.g., sandy loams, in various types of sport and recreational surfaces, including horseracing tracks. Synthetic soils are made of a mixture of sand, binder (e.g., wax and polymer), fibers and rubber chips, which optimize the mechanical and hydraulic properties of natural soils so that they drain faster after rains, decrease risks of sport injuries, and improve sport performances. Synthetic surfaces are in early stages of development and often do not behave as intended mainly due to uncontrollable variation in composition. Until now, there was no laboratory procedure to determine the composition of these mixtures. Hereafter a laboratory method is proposed to determine the composition of synthetic soils, including (1) water content; (2) polymeric binder content; and (3) fiber and filler content. The main laboratory procedure uses Soxhlet extraction to determine binder content, and a solvent, e.g., Toluene, to dissolve the binder and separate it from other constituents. The Soxhlet extraction procedure was successfully applied to all tested types of synthetic soils in horseracing tracks.