

Procedure for Impact Testing of Fused Recycled Glass

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Abstract : Recycled glass material is made from 100% recycled bottle glass and consumes less energy than re-melt technology. It also uses no additives in the manufacturing process allowing the recycled glass material, in principal, to go back to the recycling stream after end-of-use, contributing to the circular economy with a low ecological impact. The aim of this paper is to investigate the procedure for testing the recycled glass material for impact resistance, so it can be applied to pavements and other surfaces which are at risk of impact during service. A review of different impact test procedures for construction materials was undertaken, comparing methodologies and international standards applied to other materials such as natural stone, ceramics and glass. A drop weight impact testing machine was designed and manufactured in-house to perform these tests. As a case study, samples of the recycled glass material were manufactured with two different thicknesses and tested. The impact energy was calculated theoretically, obtaining results with 5 and 10 J. The results on the material were subsequently discussed. Improvements on the procedure can be made using high speed video technology to calculate velocity just before and immediately after the impact to know the absorbed energy. The initial results obtained in this procedure were positive although repeatability needs to be developed to obtain a correlation of results and finally be able to validate the procedure. The experiment with samples showed the practicality of this procedure and application to the recycled glass material impact testing although further research needs to be developed.

Keywords : construction materials, drop weight impact, impact testing, recycled glass

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