Glow in the Dark Concrete: Assessing the Effectiveness of Different Surface Treatments Incorporating Strontium Aluminate in Regards to Visible Luminescence Emission and Resistance to Abrasion

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The purpose of this experimentation is to determine whether photo luminescent concrete coatings (containing strontium aluminate) will be effective as a building material by testing the resistivity to road abrasion and the visible luminescence emitted after appropriate charge time. The researchers create 6 samples on cinder blocks: 1 control, 1 curing compound with 1:1 ratio of powder to liquid, 1 sample curing compound with 2:1 ratio, 1 sample epoxy with large granules strontium aluminate, 1 sample with sealant compound with powder strontium aluminate additive, one sample with cement with large granules additive strontium aluminate. The appropriate surface treatments were applied and left to set for 48 hours. Using a color analyzer, the researchers measured the RGB pixels emitted as seen through high quality photographs to determine luminescence. Mass abrasion tests were administered 3 times per sample for 2 minutes each and mass loss was recorded after each abrasive test. T-tests and ANOVA tests were conducted to determine statistical significance on the inferential level. The sample with the sealant application proved to be the most effective method of strontium aluminate because the results were statistically significant, and it had the most luminescence and close to the least amount of mass loss than other statistically significant samples. The epoxy sample had the strongest luminescence with an average green value of 133.7 and an average blue value of 113.3. The 1:2 ratio curing compound sample had the lowest average mass loss from the abrasion test with 0.57 grams, but neither of these samples were statistically significant in regards to luminosity.

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