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Durability and Early-Age Behavior of Sprayed Concrete with an Expansion Admixture

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Abstract : Sprayed concrete is a way to spray a concrete using a machinery with high air pressure. There are insufficient studies on the durability and early-age behavior of sprayed concrete using high quality expansion agent. A series of an experiment were executed with 5 varying expansion agent replacement rates, while all the other conditions were kept constant, including cement binder content and water-cement ratio. The tests includes early-age shrinkage test, rapid chloride permeability test, and image analysis of air void structure. The early-age expansion test with the variation of expansion agent show that the expansion strain increases as the ratio of expansion agent increases. The rapid chloride permeability test shows that it decrease as the expansion agent increase. Therefore, expansion agent affects into the rapid chloride permeability in a better way. As expansion agent content increased, spacing factor slightly decreased while specific surface kept relatively stable. As a results, the optimum ratio of expansion agent would be selected between 7 % and 11%.

Keywords : sprayed concrete, durability, early-age behavior, expansion admixture
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