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Test research on cement slurry diffusion feature of penetration grouting and its influence factors in sand and gravel layer

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Abstract: Grouting plays an increasingly important role in the sand and gravel layer water projects and other constructions. However, grouting theory research falls far behind engineering requirements. So slurry diffusion character and diffusion radius need to be further studied. Tests, which adopts methods to heat the water mixing the cement and to insert sensors, are designed to study the diffusion process of the cement slurry. Through the design of orthogonal tests, factors porosity e, water cement ratio m and grout pressure p, which affect the diffusion radius of cement slurry, were studied. Test result indicates that the relationship between time t and diffusion radius R in the diffusion process is a cubic function, which is inagreement with Magg formula. Researches also indicate that water cement ratio plays even more prominent role in slurry diffusion, compared with porosity and grout pressure. The test work provides useful exploration in sand and gravel grouting.

Key words: sand and gravel layer; grouting; slurry diffusion; orthogonal tests; research