

Workability versus rheology of lime based mortars?

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Abstract

Workability is a crucial issue for lime based mortars. Lime is thought to improve the consistency and the water retaining capacity when it is added to cement mortar. Pastes of lime hydrate behave differently from a cement paste or slurry, due to the presence of a higher amount of fine particle size, the larger specific surface and probably the different solid to liquid interaction. The rheology of lime suspensions and lime mortar has not been studied in detail until now, and establishing a link between the workability of a mortar when it is used on site and the fundamental rheological properties still seems hazardous.

After defining the materials and the concept of workability the existing standardized tests are discussed and their empirical nature is evidenced. Some relevant testing methods can be distilled from the multitude of available techniques from concrete technology. The more advanced “scientific” rheological laboratory equipment offers an equally wide range of measuring possibilities.

Recently published articles opened the discussion about the validity of the slump or flow test to measure yield stress directly. Different theoretical models have been proposed and compared to test results. Very often a rheological test based on vane geometry is used for the validation. Some preliminary tests on pastes have been carried out to compare the results of both methods, using a standardized vane test for clayey soil with an enlarged vane and three cylinder moulds for the slump tests. For the most concentrated mixtures, some squeeze tests between parallel plates are performed on cylindrical samples. The results are compared to existing models based on theory of plasticity. This preliminary test program is to be elaborated in a PhD. research that started recently.

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