

# Development of self-compacting concretes for slip-form paving

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Until now the construction of concrete pavements using slip-form paving requires a fresh concrete with low- or no-slump. In order to eliminate the entrapped air and to reach a paving concrete with a homogeneous structure, the fresh concrete has to be compacted. An under-compaction leads to a reduction in compressive and flexural strength from 4 to 6% for each 1% of entrapped air that was not eliminated. In the same way, a localized over-compaction results in segregation around the vibrator lines. This leads to a decrease in the compressive and flexural strength by ca. 10%.

The main goal of this research project is the development of a new type of concrete: a self-compacting concrete (SCC) that can be applied in the slip-form paving process. By use of SCC in the paving process the compaction and its negative effects can be eliminated. The new concrete has to show a very different rheological behaviour within a short time. On one hand it has to exhibit a high flowability after mixing that leads to self-compaction and elimination of entrapped air, on the other hand, it has to develop sufficient green strength in the resting state to ensure that the concrete can hold its shape in plastic state without any framework once the paver has passed. For this purpose and with regard to the intended balance between high flowability and high green strength within few minutes, the thixotropic properties of the concretes as well as the interaction between concrete admixtures (e.g. thixotropic agents, silicates and starch-based admixtures) and additives (e.g. silica fume and metakaolin) has to be analyzed.