

APPLICATION OF 2-DIMENSIONAL XRD FOR THE CHARACTERIZATION OF MICROSTRUCTURE OF SELF-LEVELING COMPOUNDS (SLC)

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The microstructure of hardened self-leveling compound (SLC) has a decisive influence on the final properties like surface strength as well as adhesion of the SLC to the substrate. Thereby, the development of the microstructure, especially the formation of ettringite, strongly depends on the properties of the used substrate for underground. By the application of a non-absorbent substrate, ettringite is evenly formed over the whole SLC from the bottom to the top. In contrast, the application on an absorbent substrate leads to a reduced content of ettringite in the top layer of the SLC. Consequently, surface strength of the SLC will also be reduced, because early strength is mainly attributed to ettringite.

For determination of the ettringite content in different areas from the bottom to the top of the SLC the 2-dimensional X-ray diffraction (GADDS) was used. The GADDS (Bruker) equipped with crossed Goebel mirrors primary X-ray optics enables the detection of the phase composition of the hydrating mortar in horizontal slices. Thus the vertical phase distribution could be analyzed in position-sensitive mode at different areas. For investigations of SLCs from the very early hydration stage up to a few hours, a custom-made *in-situ* sample holder was designed and constructed. This sample holder offers a smooth surface from the cross section of the SLC without any mechanical preparation. Additionally, it fits the requirements which allow us to work under *in-situ* conditions as well as in a manner conforming as closely as possible to the technical conditions. After preparation of the SLC the sample holder can be easily integrated into the diffractometer. Finally, these investigations have shown that the combination of GADDS with a custom-made *in-situ* sample holder provides the possibility to characterize the time-resolved microstructures of hydraulic-setting cements.