

Analysis of laboratory compaction methods of roller compacted concrete

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Abstract. Roller-Compacted Concrete (RCC) is an ordinary concrete poured and compacted with machines typically used for laying of asphalt road layers. One of the problems connected with this technology is preparation of representative samples in the laboratory. The aim of this work was to analyse two methods of preparation of RCC laboratory samples with bulk density as the comparative parameter. The first method used dynamic compaction by pneumatic hammer. The second method of compaction had a static character. The specimens were loaded by precisely defined force in laboratory loading machine to create the same conditions as during static rolling (in the Czech Republic, only static rolling is commonly used). Bulk densities obtained by the two compaction methods were compared with core drills extracted from real RCC structure. The results have shown that the samples produced by pneumatic hammer tend to overestimate the bulk density of the material. For both compaction methods, immediate bearing index test was performed to verify the quality of compaction. A fundamental difference between static and dynamic compaction was identified. In static compaction, initial resistance to penetration of the mandrel was higher, after exceeding certain limit the resistance was constant. This means that the samples were well compacted just on the surface. A specimen made by pneumatic hammer actively resisted throughout the test, the whole volume was uniformly compacted.