

## **Moisture transfer and strength development during construction of rammed earth walls**



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### **Abstract**

A number of rammed earth projects having been constructed in the last years in Germany testifies to the high level of interest in this material in modern architecture of our country. Rammed earth has been “rediscovered” because of its unique materiality, fascinating and individual aesthetic of the surfaces particularly by young architects. In connection with the construction of two rammed earth projects realised in Thuringia in 2003/4 arose some questions concerning the processes of moisture transfer and strength development during construction. The design values of compressive strengths for rammed earth walls documented in standards are applied to dry material. But when is a new built rammed earth wall dry in its core? The process of drying decides the process of strength development of the wall.

There are only very raw estimations of drying times of rammed earth walls documented in standards. The German “Lehmbau Regeln” recommend 4 – 6 month for a 40cm rammed earth wall. But some wall sections of the above mentioned projects had a thickness of 1,70 m. So it arose the idea to develop a test program for investigating of the problem of drying in dependence of the strength development in rammed earth walls.

The paper presents first results of a laboratory program trying to approach to this very complex problem. A series of test specimens were produced and the unconfined compressive strength after different drying times were determined varying from 7 to 90 days. The moisture content of the test specimens also was varied: at OMC (Proctor test), lower and higher OMC.

An appropriated mechanical model for strength development in rammed earth does not exist. It seems to be clear that the strength development of rammed earth takes much longer time as concrete. In opposite to concrete for determining of unconfined compressive strength of rammed earth there are not international unified testing procedures. Further investigations are necessary.