

Mechanics and Form of Rammed Earth Construction

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EXECUTIVE SUMMARY

Rammed earth is an ancient building technique used in many regions of the world. However, it is generally regarded as an untried building technology in the United States. Due to the low embodied energy of the material and diminished processing and transportation costs, rammed earth offers an economical and sustainable alternative to concrete. *Mechanics and Form of Rammed Earth* used funding from the BSA and other sources to conduct a three phase investigation of rammed earth as a viable building technique for New England in light of its clear environmental advantages.

The project occurred in three phases: the first phase consisted of a literature review and site visits to Europe and the Southwestern United States to ascertain state of traditional and contemporary rammed earth practice. In the second stage we performed material testing in the geotechnical laboratory at MIT. During the final stage we constructed a full-scale prototype rammed earth wall on the campus of MIT during the summer of 2005.

Building the prototype wall rammed earth at MIT demonstrates that the method is appropriate to New England. The use of marine clay, a consistent material source abundant in the region, mixed with commercially-available, locally produced aggregates allows strengths and standardization of the material without the addition of Portland cement. The method contains great promise because it offers predictable performance without the use of energy-intensive materials. The design and fabrication of a combination soil mixing and placing apparatus is the next logical phase for rammed earth research.