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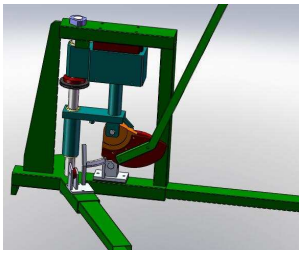
le Università in rete per le nuove sfide dello sviluppo

III Congresso scientifico CUCS
Torino, 19-21 Settembre 2013



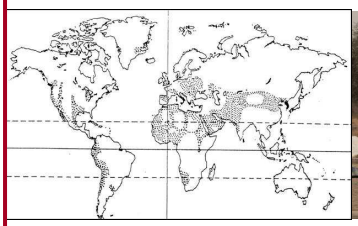
FLOAT-RAM: A NEW HUMAN POWERED PRESS FOR EARTH BLOCKS

Carlo Ferraresi, Walter Franco, Giuseppe Quaglia
Politecnico di Torino
Dept. of Mechanical and Aerospace Engineering DIMEAS

Abstract The Float-Ram is a novel kind of human-powered press for raw earth blocks. It is able to provide very high performance, while maintaining a limited cost, due to some technical characteristics like:
•the adoption of a ***floating mould***, which provides a bi-directional pressing action in simple way;
•***Optimized kinematic structure***, based on a cam-roller transmission system;
•***General mechanical simplicity***, since the node of all kinematic pairs is constituted by a single shaft.
Therefore the Float-Ram can be considered as an important media for the diffusion of high-quality raw earth building in developing Countries.

Building with raw earth

Blocks made of pressed and stabilized earth play a strategic role in self-building experiences of low-cost houses, as concerns improvement of housing condition for people in developing Countries, while respecting the environment and local cultures. One of the advantages of such building technique is that the production of blocks and the construction of the house can be carried out in the same place by means of a low-cost and no energy consuming human-powered press.

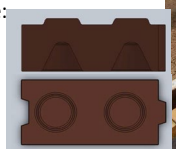


Distribution of raw earth building technique in the World

The *Argentina project*, led by Gloria Pasero.

Using a human-powered press

Production of raw earth blocks (adobes) with a human-powered press provides advantages like:
•Better earth compaction
•Constant and calibrated block geometry
•Quick and simple house building
•Non use of non renewable energy

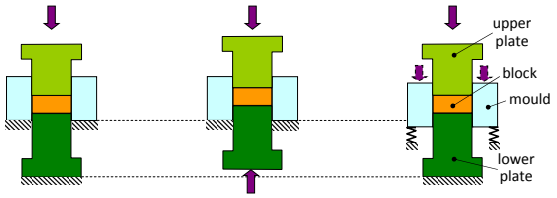


Type of press

In the World today there is a large spread of very simple and cheap presses, which are able to produce earth adobes of rather limited quality. This is mainly due to a poor level of the kinematic and functional design, as well as to the *mono-directional pressing action*.

The quality and mechanical properties of the adobe are greatly improved by adopting a *bi-directional pressing action*, i.e. by presses able to compress at the same time both the top and the bottom face of the block. Few presses of this kind are available on the market, but they are typically mechanically complex, and then expensive and difficult to use.

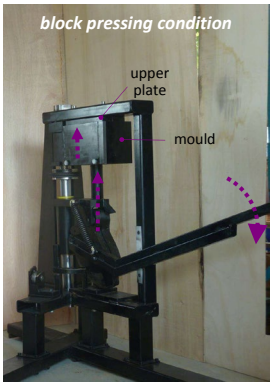
The main characteristic of the Float-Ram is the employment of the *floating mould*, that permits to produce uniform blocks moving only one plate and using a freely translating mould.



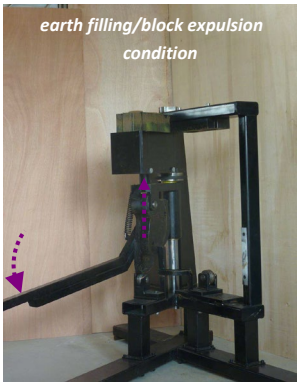
The Float-Ram adopts the concept of the floating mould, the process of block forming develops in 4 phases, switching between two different conditions of the machine:
(a)earth filling/block expulsion;
(b)block pressing.

1. earth filling

2. changing condition



3. Pressing



4. expelling the block

the "*Mattone*" block