

General advice for Mud Block

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- Extracts



Earth Construction in India

Earth has always been the most widely used material for building in India and is a part of its culture. Traditionally, mud wall construction varies enormously with topography, climatic conditions and needs of different regions. The common methods used for earth construction are cob, wattle and daub, rammed earth, adobe and cut blocks

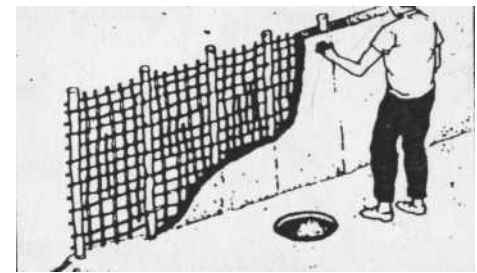


Rural House in Bihar, India



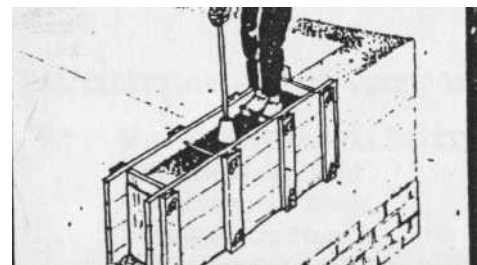
Cob, Walls:

Cobs are lumps of mud stacked one over the other to make walls, Raw earth is kneaded by foot to make a thick paste." Ash (as in Karnataka), powdered straw (as in Punjab and UP.) or cow dung is added to improve the consistency of the paste, lumps of which are then placed in horizontal layers to form walls. Such walls are, about 30-60 centimetres thick and are built in layers 20 to 35 cm high. The strength of the wall depends on the density achieved in preparation of mud.



Wattle and Daub:

This technique is found in Assam and other north-eastern states, north Karnataka, Maharashtra, Orissa and Andhra Pradesh. A layer of mud mixed with ash, straw or cowdung is plastered over a panel of woven bamboo or reed wattle which is held upright between a wooden or bamboo frame. Sometimes leaves of the date palm are tied together and plastered with mud to make a wall.



Rammed Earth Walls:

These walls are built in Himachal Pradesh and Ladakh. Moist earth mixed with small stones and straw is poured into a formwork of wooden planks and compacted to make layers of 60 to 90 cm height. This process is repeated till walls of desired height are reached. Doors and windows are fixed as construction progresses.

Building with Compressed Earth Blocks

Approximately 55% of all Indian homes still use raw earth for walls. However, with the onslaught of industrial materials and a shift in values there has been a steady decline in the understanding and use of earth as a building material. Earth is now thought of as a poor man's material because of disadvantages such as high maintenance and low durability. Its major limitations are:

- water penetration,
- erosion of walls at foundation level,
- attack by termites and pests,
- high maintenance requirements.

Care during construction and design of the structure can eliminate most of the problems that might arise out of building in earth.

Interestingly enough, the limited load bearing capacity of earth is not a handicap

for traditional builders. All traditional techniques are strong enough for the village builders requirements. It is clear that our country has a rich tradition in earth construction. Beautiful examples can be found all over India. Even today, earth is extensively used as building material. Among other benefits of using earth for construction are its thermal insulation value, easy availability, and beauty.



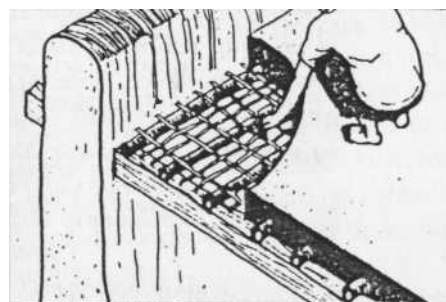
Sun-dried Mud Bricks or Adobe:

Hand moulded bricks are used to make masonry walls. They are made by casting puddled mud into a mould and drying in the sun. Mud bricks are easy to make and enable proper bonding of walls.



Cut Blocks:

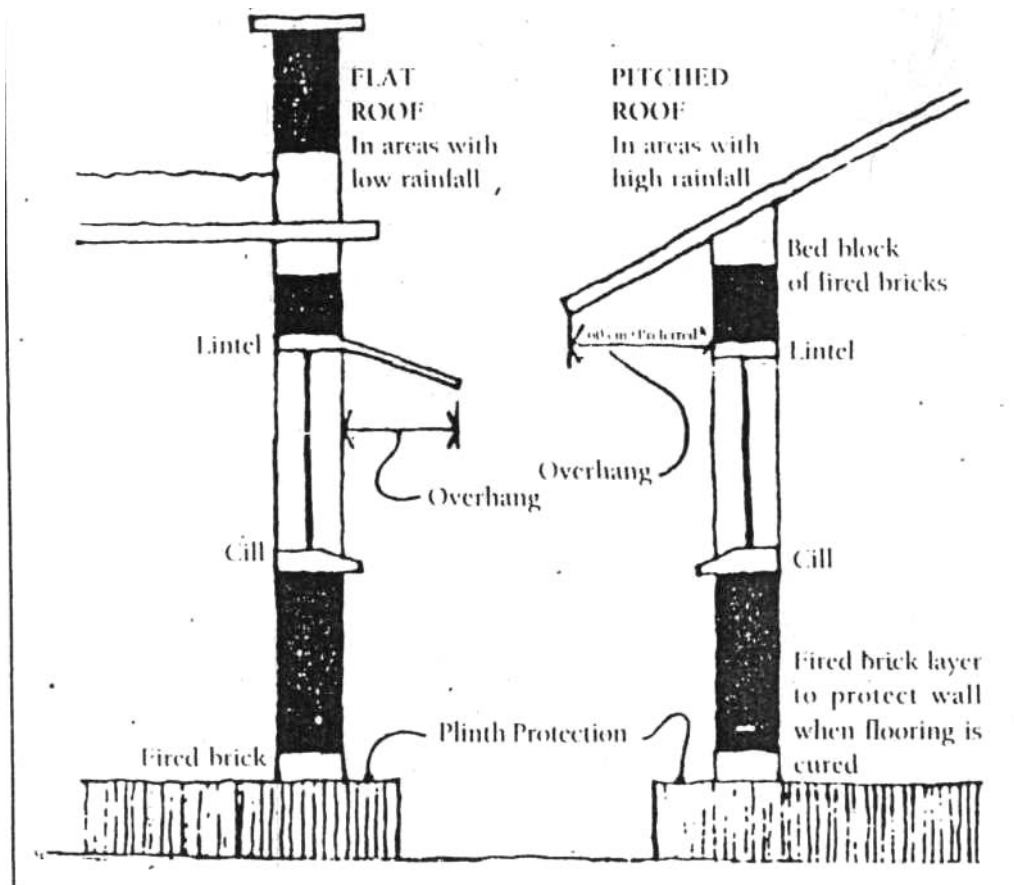
In parts of Karnataka and Kerala where good lateritic soil is available, blocks are cut out of the earth and used directly to make walls.



Earth Roofs:

These roofs are common only in areas where rainfall is less than about 65 cm per year. Compacted earth is used to cover a supporting platform of wooden planks, reeds, bamboo matting, stone slabs or fired clay tiles. It needs continuous care and plastering with an emulsion of mud and cowdung. Such flat roofs are common in Ladakh, Punjab, Himachal Pradesh, Uttar Pradesh, Madhya Pradesh, Rajasthan and central Maharashtra.

Improving Earth Structures



Building with Compressed Earth Blocks

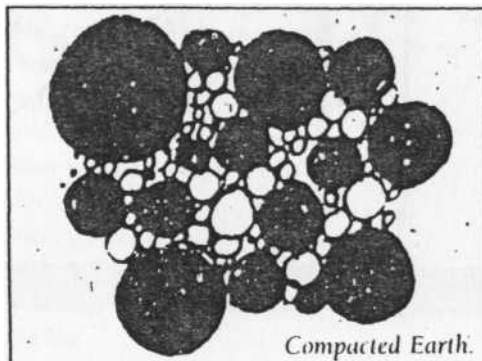
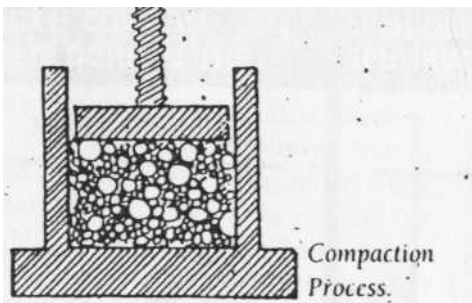
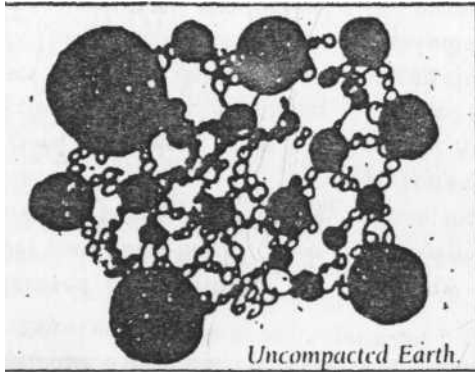
There are a number of simple ways in which traditional earth structures can be improved. The following general principles are important to keep in mind:

- a strong foundation with sufficient plinth height;
- protection of walls from capillary rise of water;
- sufficient roof overhang to protect walls from direct exposure to rain;
- avoiding use of soils with high clay content that crack upon drying;
- good wall finish;
- selection of free draining and non-swelling land for construction.

Earth shelters can also be improved by improving the properties of wall components. The most common and easy to use walling component is a mud brick, which has many advantages:

- a brick is usable as a structurally stable component of a wall;
- the manufacturing process is employment generating and low energy consuming;
- it can be used in composite construction techniques with burnt bricks;
- it has higher compressive strengths than directly shaped earth forms;
- it gives greater control and more efficiency in architectural design.

The Compressed Earth Block



In spite of their usefulness traditional handmade mud bricks have three drawbacks:

- thick walls are required to support the roof because of their limited load bearing capacity;
- they have high absorption rates of water;
- they take a long time to dry.

The Compressed Earth Block overcomes all these limitations by an increase in block density through compaction using a mechanical press. The water content in soil is low for compaction as compared to the puddled clay required for mud blocks made by hand. This reduces the drying time of the block and ensures much greater dimensional stability. A block::

- has higher density which varies between 1.8 and 2.0 gm/cu.cm. This gives it a load bearing capacity of at least 18 kg/sqm and improved water resistance,
- 'is low cost;
- is easy to manufacture locally by small groups of people;
- is low in energy consumption because no fuel is burnt for brick making or transportation;'
- can use soil available at site;
- has smooth surfaces.

With these advantages a compressed earth block can easily be used for

Building with Compressed Earth Blocks