

Mud housing technology can stage a comeback to solve the housing shortage in slums and colonies, and even housing schemes. Mud houses are easier to build, repair and maintain and are inexpensive. By using appropriate structural techniques and stabilization measures, mud buildings can be successful in almost all climates. Of course, there are many disadvantages associated with the use of mud. It has low strength, does not grip wood properly leading to gaps around doors and windows, and soaks up water causing cracks and leaks in roofs.



Mud is easily eroded by water which makes it difficult to use in areas with heavy rainfall. It is also susceptible to mechanical damage, making it easy for rodents to dig holes into mud walls. Mud houses are also easy prey for thief's and robbers. Yet, mud has its advantages like easy availability locally in many parts of the country, saving in cost and providing insulation which makes mud houses cooler in summer and warmer in winter.

Techniques to overcome disadvantages

Some one-third of the world population is said to live in mud houses. In rural areas in India, particularly in many small/medium towns of south India in majority of houses mud

has been used in construction in one way or the other. That is, in construction of walls, plastering, flooring, etc. scientists have developed several techniques to overcome some of the disadvantages of using mud as building material.



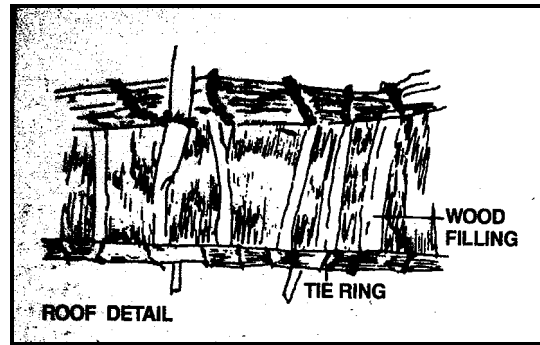
The central building research institute, Roorkee, has done lot of research and has developed a non-erodable water repellent mud plaster to make mud houses more durable. Researches have identified many stabilizing agents, such as lime, bitumen, rice husk cement to be used in mud construction to improve bearing strength.



Many state housing boards have built houses using soil cement blocks instead of burnt bricks. In many countries, especially African countries, materials such as cow dung, plant juices, extracts from boiled banana stems and bean pods are mixed with mud to make it water repellent. The national building organization, by way of research, has found that mud walls built with sun dried bricks or using rammed earth construction method perform better than those built with other techniques.

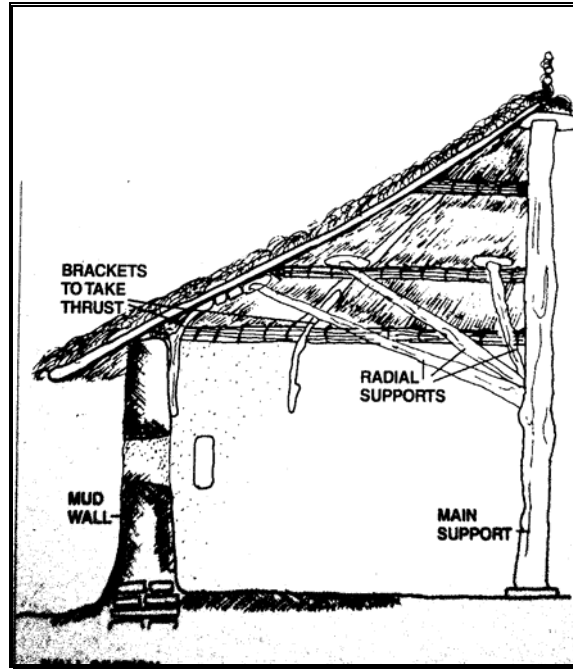
Construction methods

Many ways of building in mud have been evolved over the centuries, but two processes have established themselves as the most common and reliable: adobe and pise.

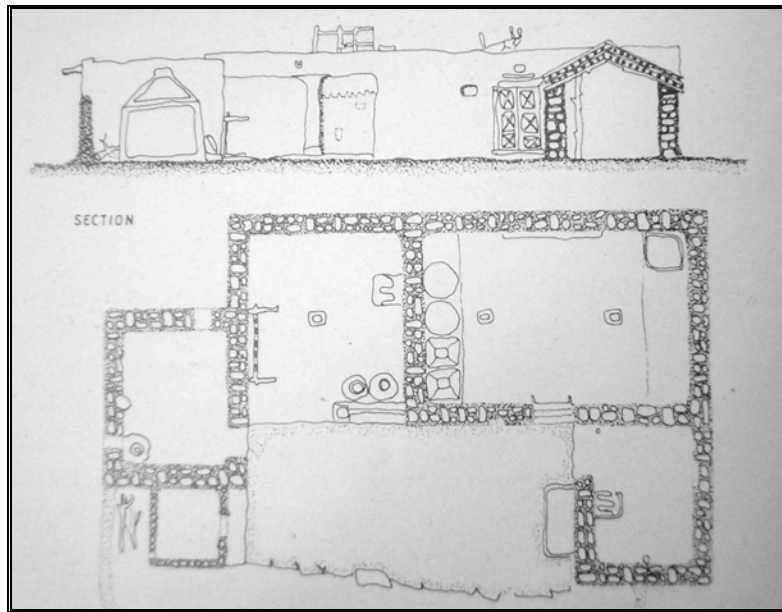


Adobe – a word of Arab origin later adopted in Spain and then in the Americas- is the name of a technique in which earth mixed with water and finely chopped straw is manually rammed into wooden bricks-moulds. These large bricks are then left to dry in the sun for several days, before being used to build walls, vaults and domes. Ways have recently been devised of accelerating and improving these production method-including mechanic or hydraulic manual presses. These adobes are nowadays often ‘stabilized’ by the addition of a little cement (3-4%) which greatly improves their resistance.

Pise or ‘rammed mud’, first appeared in France in 1562 and consists of mud compressed between parallel wooden plates that are removed to reveal a section of completed wall, generally 50 cm thick. The wooden boards are then set up further along so that work can begin on another section of wall. Traditionally the mud was compressed manually with heavy wooden hammers, but this can now be accomplished more easily and rapidly with pneumatic rammers. These improvements make is possible to use both adobe and pise on a large scale with the minimum of mechanization.



Roof detail



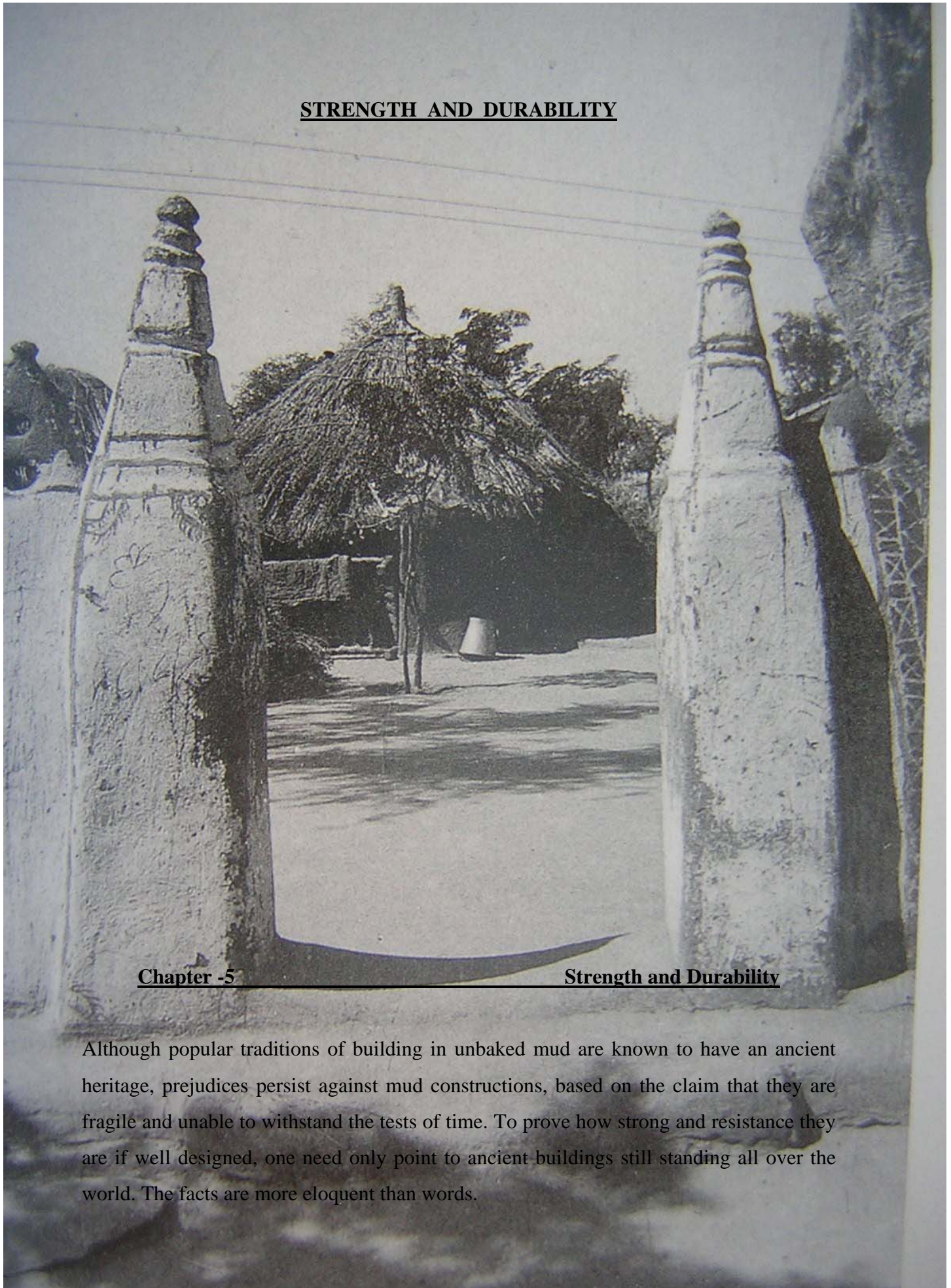
Heavy stress on yes of mud

Low cost housing in India, especially in mega cities and metropolitan cities, mud has been considered as a sheer unimaginative drudgery. But some individual architects have

inspired to pursue untiringly the mud construction technology. As far back as January 1975, during the proceedings of the meeting of expert group on national urbanization policy held in New Delhi, romesh thapr laid stress on use of mud in construction and raised a storm in the gathering comprising engineers, architects and town planners. Since then, the concept has progressed



STRENGTH AND DURABILITY



Chapter -5

Strength and Durability

Although popular traditions of building in unbaked mud are known to have an ancient heritage, prejudices persist against mud constructions, based on the claim that they are fragile and unable to withstand the tests of time. To prove how strong and resistance they are if well designed, one need only point to ancient buildings still standing all over the world. The facts are more eloquent than words.



Stability

In Asia, long stretches of the Great Wall of China begun in the 3rd century B.C. are composed principally of mud. In North Africa, similarly, the fortified walls of the largest and most beautiful imperial cities in morocco –Rabat, Marrakech, Fes and Meknes- were created in raw mud beginning in the 12th century. Various examples are to be found in Europe, including the famous Alhambra begun in the 13th century in Granada in Spain, the center of Milton Abbas built in 1773 in Dorset, England, numerous castles and churches of the 13th century built in the dauphine and burgundy regions of France, and the center of the town of Weisberg, built in the 19th century near Frankfurt in Germany. In America, the centers of cities founded during the period of Spanish domination beginning in the 16th century often contain buildings of raw mud. There are many examples of churches and monasteries constructed in adobe in the 17th and 18th centuries. These buildings all testify, mud in its own way, to the durability of the material of which they are built: unbaked mud.



unbaked mud

Variety of forms

Unbaked mud is a simple and obvious building material, not least since it constitutes 74 percent of the world's crust. With it, societies throughout the world have produced an extraordinary range of architectural languages, each eloquently proclaiming the cultural characteristics of its users. The spirit of place and community is fully expressed in these buildings, whose subtle variations are adapted to specific social and economic, geographical and climatic environments.

The intelligence and virtuosity of these traditions, however, have been brutally obscured and despised for over half a century. Influential voices called for over half a century. Influential voices called for 'progress at any price', which they claimed was embodied in the 'International Style' of architecture. By promoting this for all peoples in all climes, they ruthlessly ignored and erased regional traditions and ushered in an era of contempt for traditional expertise and of cultural amnesia. These traditions, however, constitute a

heritage which we must now rediscover: not just out of nostalgia, but in order to recreate a living synthesis between the wisdom of the past and the knowledge of the future.



Recent research

The building center at Sarai kale khan promotes mud technology. Mud bricks and concrete blocks are hollowed for lightness and economy without sacrificing strength. Shells are pre-cast in shapes that provide more strength, even with the thinnest possible membranes. Packing carton lining is glued together in honeycomb patterns. Even egg crates are used, strengthened by immersion. The building centre makes 'ram lochan tile' named after a mason in the centre. The tile is economically produced with use of mud and it can be built on site eliminating transportation cost. Flash is used in walls and roofing.

REGIONAL CONTEXT

