

EARTH BUILDING

A Factsheet from Austin Energy's Green Building Program

Humans have been building homes from earth for thousands of years. For this reason, there are many beautiful examples of enduring techniques throughout the world. In fact, half of the world's population still lives in some type of earth shelter. There are as many kinds of earth buildings methods as there are variations in soil, climatic, and cultural conditions.

Technical innovations and some plain old "learning from past experience" is helping to bring earth building back into popular demand for the industrialized world. Increasingly, it is being recognized for its "green building" aspects. Earth is a non-toxic material and readily available - often directly from the site. The thermal mass of thick walls can lower heating and cooling needs, as well as provide sound insulation, structural integrity, good fire protection and natural beauty.

Before making a decision to build with earth, give careful consideration to the building site and its special characteristics. Different methods are more or less suited to different conditions. Earth can also be used for floors, ceilings, roofs, etc. Fortunately, many resources exist on the vast subject.

Definitions

Adobe - Mud bricks made with earth, straw and water, usually dried in the sun, and not oven baked. It is the most prevalent method and best with clayey soils.

Cobb - (or **Clay Lump**) Earth, sand and straw formed by hand into lumps and stacked in layers and dried in place. Though used much like adobe, curved forms are more easily achieved.

Geltaftan - (also called **Ceramic Houses**) Blocks made more or less like adobe, fired brick, or tile. Usually built in a dome shape and fired at very high temperatures from the inside out.

Rammed Earth - Moist earth is pounded into movable, two-sided, form work. It can be "tamped" by hand or machines. Roughly a 70% sand and 30% clay mix, often contains a small percentage of cement. Surface treatments, aggregates and pigments vary.

Straw – Clay - A mix of loose straw with a binder of clay slip for walls up to two feet thick, created with form work, usually with an overall timber frame structure.

Superadobe - Screened earth, sand, water, and sometimes small amounts of cement are mixed and stuffed by hand into very long sandbags. These are layered, usually coiled up, with barbed wire between. Exteriors can be stucco and interiors are often simple mud plasters.

Wattle and Daub - Probably the oldest technique. The daub, or mud plaster, is applied over a framework of twigs or wattle. Use is limited due to lack of thermal mass and weaker wall strength.

Others - **Mud-pile** or **Chineh** - simplest with few applications.
Pise de Terre - similar to Rammed Earth, best with sandy soils.
Tapial - a type of Rammed Earth with sea shells.

Websites

Sustainable Building Coalition - Austin Texas
<http://www.greenbuilder.com/sbc/>

California Institute of Earth Art and Architecture Institute (CalEarth) - Hesperia, California
www.calearth.org/

The Cob Cottage Company - Cottage Grove, Oregon
<http://www.deatech.com/cobcottage/>

Earthbuilding Foundation – Albuquerque, New Mexico
<http://www.earthbuilding.com/>

MATERIALS

Rammed Earth Works - Napa, California

<http://www.rammedearthworks.com/>

Society for the Protection of Ancient Buildings - London, England

<http://www.spab.org.uk/>

Southwest Solaradobe School - Bosque, New Mexico

<http://www.adobebuilder.com/>

Bibliography

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Architecture for the Poor: An Experiment in Rural Egypt. Hassan Fathy.

Building in Cob, Pise and Stabilized Earth. Ellis William and C. Eastwick-Field.

Build Your Home of Earth. G.E. Middleton.

Ceramic Houses: How to Build Your Own. Nader Khalili.

Chinese Earth Sheltered Dwellings: Indigenous Lessons for Modern Urban Design.

Gideon S. Golany.

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Early Architecture in New Mexico. Bambridge Bunting.

Earthbuilder's Encyclopedia. Southwest Solaradobe School.

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The Rammed Earth Experience. David Easton.

Spectacular Vernacular: The Adobe Tradition. Jean-Louis Bergeois.

Stone, Log and Earth Houses. Magnus Berglund.

Taos Adobes. Bambridge Bunting.

Underground Houses. Rob Roy.

Underground Space Design. John Carmody and Raymond Sterling.

Resources

Eco Earthwerks, Inc.

22123 Briarcliff Drive

Briarcliff, Texas 78669

(512) 422-8893 (mobile)

1-800-334-4406

Earthwerks30@hotmail.com

Steve Gerdes

1714 Summit View 8

Austin, Texas 78703

(512) 891-0679

sgerdes9d@aol.com