

TECH SPEC

CLAY LUMP  
WATTLE AND DAUB



*East Anglia Earth Buildings Group*

## CLAY LUMP - GENERAL PRINCIPLES

Clay with which clay-lump buildings in East Anglia are made is a Marl containing up to about 20% clay. This chalky boulder clay also contains chalk, sand and gravel.

Clay tends to shrink when dried because the moisture content is reduced.

Walls made of clay offer little resistance to the passage of water vapour. Interstitial condensation is not a problem unless a barrier is introduced.

Applying cement renders on to clay-lump walls by using a metal armature fixed to the wall results in the render cracking which lets water in and condensation to form on the back of the render. This moisture is drawn to the base of the wall where it can accumulate in the clay, causing failure.

The strength of clay walls will vary with density and moisture content. At about 13% moisture content (dry weight) strength is reduced to about  $0.1\text{N/mm}^2$  (1 ton f/ft<sup>2</sup>).

Clay walls have an ultimate crushing strength of about 1.5mm (15 tons f/ft<sup>2</sup>) and a safe crushing strength of about  $0.5\text{N/mm}^2$  (5 tons f/ft<sup>2</sup>).

Thermal conductivity varies with density and with moisture content. See BRE Digest 108 "Standard U Values". Average density is about  $1700\text{kg/m}^3$  (1.3 tons/yd<sup>3</sup>) which gives a K value of about 0.6-0.8 W/m° K.

Density can be reduced by increasing the amount of straw in the mixture or by adding expanded clay balls or expanded polystyrene.

All repairs to clay walls can be divided between "patch" and "cut out". Wet Clay shrinks as it dries and this shrinkage governs the size of a patch repair. Defects which are too large to be patched will have to be cut out and new or second hand clay-lumps fitted in.

The tendency of clay to shrink can be reduced by adding sharp sand or straw, crushed chalk or a mixture of any of these.

Mortar is usually the same clay as the clay-lump from which the larger stones have been removed or a lime mortar not stronger than 1:3 lime:sharp sand. The clay-lumps are better with lime if they are damp.

Clay-lumps for repairs can be made with clay salvaged from the works with more straw added and are made in a bottomless box-mould which is removed immediately.

A mixture of clay for render which has been successful is: 6 parts clay: 6 parts sharp sand: 2-4 parts straw chopped 50mm long.

New clay lump is becoming commercially available. Barley straw is preferred, however, finely chopped wheat straw is supplied by P.M. & B.J.Gooderham 01 953 888263 in 220kg bales only.

# EARTHA

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Bagged chopped straw for stables in small bales, 140 litre (17kg), is supplied to horse outfitters by Dixon Brothers 01359 259341.

Pet shops sell straw in smaller bales.

Suitable renders of lime or clay can be laid on a metal armature fixed to the wall if there is any doubt about the suitability of the background. Otherwise, direct rendering is possible.

Waterproof paints must be avoided on clay walls. Limewash or brushing tar should be used.

Damp proof courses should not be required where there is a plinth.

### **Advice regarding the repair and treatment of clay walls is available from a number of organisations:**

The County and District Councils' Conservation Officers can usually give advice. This applies to: **Norfolk, Suffolk, Essex, Cambridgeshire, Hertfordshire, Bedfordshire, Northamptonshire, Lincolnshire and Leicestershire.**

The ICOMOS (International Committee on Monuments and Sites) U.K. Earth Structures Committee collates the work of the local organisations and is our formal contact with the international committee.

**The Chairman is Linda Watson, 01 752 233608**

The Devon Earth Building Association (DEBA) publishes leaflets and gives demonstrations and advice.

**Contact Larry Keefe 01 626 864826**

The East Midlands Earth Structures Society (EMESS) is based in Lincolnshire.

**Contact: John Hurd 01 507 480626**

The East Anglian Earth Buildings Group (EARTHA) organises demonstrations and practical days and provides information on its website: **[www.eartha.org.uk](http://www.eartha.org.uk)**

**Contact: Dirk Bouwens 01 953 601701**

The Hampshire Group is not formally organised.

**Contact: Gordon Pearson 01 962 847923**

The Harborough and Daventry Earth Society is based in Leicestershire.

**Contact: Rosalind Willatts 01 858 821147**

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## EAST ANGLIAN WATTLE & DAUB

Wattle and daub panels may contain more archaeological information than the timber—frame. Where possible in repair, the panels should be refixed or the daub should be reconstituted and reused.

### WATTLE

Any hardwood sticks that are straight can be used. Hazel, which is coppiced for thatchers is the most readily available. Willow and ash are easy to find in hedges and woodland.

Sticks should be 15—50 millimetres diameter and are better used fresh.

The horizontal sticks are called ledgers and are cleft or round and are either nailed to the outside face of the frame or sprung into pockets cut into the sides of the studs. If the walls are to be rendered on expanded metal lath then standard treated roofing batten can be fixed at 450 to 750 apart.

Split sweet chestnut may be better for between the studs.

The vertical sticks, the wattles, are cut to suit the height of the panels and are tied to the ledgers with any sort of string. Plastic baler twine indicates that the work is modern. The string is tied at one end of the ledger and wound round it so as to secure one wattle with each turn. It is tied at the other end of the ledger and can wind round one or more studs before being tied off if the wall is to be rendered.

Wattles should be spaced so an open hand will pass between them or so the spaces are the same width as the thickness of the wattles.

### DAUB

Chalky—boulder clay subsoil is suitable and is easier to handle if it has been exposed to frost after it was dug.

Salvaged: clay—lump: shuttered clay walls, and clay renders as well as old daub can be broken up and reconstituted and used as the daub.

Basic daub is made of (by volume):

- 4—5 parts clay or salvaged material
- 1 part chopped straw
- 1 part cow muck (optional, it reduces the amount of water to mix required)

### TIPS

Mixing with a pan mill is sometimes possible and may be an advantage on larger sites but they do make a mess.

Make mixing easier by adding extra water which can be taken up when the straw is added or the mixture is left over night. Nail loose panels of existing daub back to the frame.

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## JOIN EARTHA

As an EARTHA member, you will be added to the mailing list and receive details of events by post or email. Subscription to the EARTHA mailing list is by a single payment of £10 for individuals and £20 for organisations. If you would like a membership form, please email us at: [info@eartha.org.uk](mailto:info@eartha.org.uk) or telephone 01 953 601 701

Or you can get a membership form online at [www.eartha.org.uk](http://www.eartha.org.uk)

EARTHA, Ivy Green, London Road, Wymondham, Norfolk, NR18 9JD

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