

CLAY-LUMP CONSTRUCTION AND REPAIR

1. 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.
2. Clay tends to shrink when heated because the moisture content is reduced.
3. Walls made of clay offer little resistance to the passage of water vapour. Interstitial condensation is not a problem unless a barrier is introduced.
4. Forcing 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.
5. The strength of clay walls will vary with density and moisture content. At about 13% moisture content (dry weight) strength is reduced to about 0.1N/mm^2 (1 ton f/ft²).
6. Clay walls have an ultimate crushing strength of about 1.5mm (15 tons f/ft²) and a safe crushing strength of about 0.5N/mm^2 (5 tons f/ft²).
7. Thermal conductivity varies with density and with moisture content. See BRE Digest 108 "Standard U Values". Average density is about 1700kg/m^3 (1.3 tons/yd³) which gives a K value of about 0.6-0.8 W/m° K.
8. Density can be reduced by increasing the amount of straw in the mixture or by adding expanded clay balls or expanded polystyrene. ooo 333
9. 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.
10. The tendency of clay to shrink can be reduced by adding sharp sand or straw, crushed chalk or a mixture of any of these.
11. 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.
12. 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
13. 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
 - Barley straw is preferred, however, finely chopped wheat straw is supplied by P.M. & B.J. Gooderham 01 953 888263 in 220kg bales only.
 - Bagged chopped straw for stables in small bales is supplied to horse outfitters by Dixon Brothers 01 359 259341
 - Pet shops sell straw in smaller bales.

14. Renders should be laid on a metal armature fixed to the wall if there is any doubt about the suitability of the background.
15. Waterproof paints must be avoided on clay walls. Limewash or brushing tar should be used
16. Damp proof courses are beneficial where there is rising damp and a plinth.
17. 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 publishes a periodic newsletter.
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