

Module title: Green Building **Module code:** L22108 **Level:** 5
Assessment technique: Written report
Weighting: 20% Units : 3

Title: “Cob building technique”

Rationale: This assignment aims to meet all of the learning outcomes covering in units 3

Each student will research on of the following natural building techniques :
Strawbale, Cordwood, Hemplime, Rammed Earth, Cob, Poroton.

The student should adress all of the following issues in the factsheet. Students may add additional sheets if limited by space. Also available in electronic format ask tutor.

Description of technique:

Composition:

Cob is the result of mixing Sub Soil, Clay, Sand and Stones, Straw and Water.

To mix the mortar, use a Nylon sheet to mix the subsoil with the other elements.

Proportion of the mix should be as follows:

10-20% clay (particle size<0.002mm)

10-20% silt (particle size 0.002mm to 0.06)

25-30% fine & coarse sand (particle size 0.06mm to 2 mm)

30-40% well graded stone / gravel (particle size 2mm to 60mm)

Use your feet to mix the mortar and roll it by lifting one of the sides of the nylon sheet and folding it until the mortar is rolled as a sausage.

To build with it use your hands to apply the mortar and it can be tossed from one person to another.

To build walls use large straw fibres but shortest in plaster mix.

Lift a course of 2 feet and leave drying for a period of 1 week (in good weather).

It takes around 3 month to build the walls of a two story house in the summer of England in normal conditions.

Stone-facing can be used for the base of the walls as insulation to maintain the rain water away from the cob wall.

It is recommended to do periodical repairs in the roof, as this spreads weights on the top parts of the walls, causing cracks at the corners of the building.

It is not recommended to use cement as a render, as it is not a breathable material and can cause the collapse of the building.

*Sustainability for use in Ireland
Climate, insulation value, etc.*

Requirements for the Part L in Ireland, U-Values:

To achieve same U-values of the timber frame or of a cavity concrete wall insulated (see table 1 from Part L 2008), you need to build a wall of at least 900mm (3 inch thick). The cons is that the footprint of the building increases, compared with that of other materials, but is a worthy inversion in quality building.

Climate:

Despite the common believe that dampness and humidity and rain of Irish climate could easily damage the cob, empiric examples shows that cob is an excellent natural insulation and waterproof, if you leave the material breathing and drying normally. Again the use of lime putty based render, or lime-sand plasters, is the best way to maintain the cob dry. The cob has the property of absorbing moisture and releasing it when the air dries. However it is not recommended to expose cob to long periods of dampness.

The sentence "good boots and a good hat" means that you should 1) protect the cob walls by building roof overhangs and rain gutters, 2) elevate the walls with a stone course foundation and 3) protect the wall with stone facing.

Suitability: Material is taken from the area surrounded and does not need to be processed in any artificial way, so it's carbon free and also 100% renewable. Lime is taken from the quarries or imported and is the only component that it's not entirely environmentally friendly.

Reference:

"Conservation of Clay and Chalk Buildings", Gordon T. Pearson
Kevin McCabe, Cob building specialist 2008,
<http://www.buildsomethingbeautiful.com/index.php>

*Why it can be considered an environmentally low impact form of construction.
Embodied carbon, impact on eco systems, end of life waste etc.*

Cob is a higher labour cost than other materials, but the cost could be reduced using machineries like tractors to mix the mortar. Also in the past people use cows or bulls to mix the mortar. Time cost and human labour is now more expensive.

Impact in the environment and human life is minimal, as the cob absorbs moisture, so it is more healthy than other materials.

Another positive element for human life is that with cob you can obtain curvilinear spaces and have the property moulded in many ways. The well being is also positively affected by the geometrical surroundings which produce different sensations on the human being: curvilinear spaces make the space more comfortable and friendly for living, inviting us to relax rather than stressing.

Cob doesn't embody carbon, except for the lime render, which is a minimal component. Also render can be done with clay plaster.

What aspects can be considered not environmentally freindly

Cob does not have really any aspect which could be considered non environmentally friendly. Only aspect is the cost of labour and the time that imply to dry out. Other negative aspect is the complying with the building regulations as it is not a technique that is included or regulated specifically.

Some examples of Construction in Ireland. If no examples in Ireland provide international examples.

Two houses in Cloughjordan:

The first is a two storey house, circular plan shaped, that is built entirely in cob. It has an internal timber structure that supports the stairs and second floor. The roof is not placed yet, but will be built in timber too, may be with grass insulation on top of it.

The thickness of the walls is significantly wide (800 mm) to support the 6 metres wall and the roof itself.

The second one is a two storey house build in timber frame that is filled with wood insulation and rendered with cob mix. Is a sort of timber-cob combo. In this case cob is not main element but still one of the primary components. This house was also build by the owners (family with children)

Additional comments:

Cob has a long history and is found in many cultures, but primarily in British and Irish constructions. It's also similar to adobe and daub or rammed hearth. Similar techniques are also used in Arabic countries where the weather is completely opposite but the thermal mass is much more appreciated in those countries.

It also important to remark the importance to be part of the building process with cob: this allows people to create and cooperate in the activity of building and therefore increasing and improving the sense of inclusion in a community, as well as giving a basic sense of satisfaction as it's a process of creativity release for the human being.