

# Use of adobe in cyprus

[Environment](#), [Water](#)



## What is Adobe?

### Production, Application & A ; Features

Adobe is a composite edifice stuff made with dirt and straws. Needed sum of H<sub>2</sub>O is added to dirty and straws which is traditionally crushed and squeezed by pes, to blend the stuffs making clay. In some parts, droppings is used alternatively of straws. Straws are used to adhere the bricks together. It besides allow the bricks to dry every bit. Some experiments show that utilizing straws in adobe bricks make them more immune for clefts. Dung is chiefly used to avoid insects.

The mixture is so casted into wooden frames ( normally 30cm ten 45cmx 6cm ) . It is compressed within the wooden frames to forestall the spreads, doing it heavy and strong. Excess clay is glanced off the frames to do a level surface for the bricks. Wooden frames are removed and adobe bricks are left to dry in a level surface, under the Sun for a few yearss.

It is a low-priced and easy to do stuff which was widely used all around the universe extensively in Egypt, Sudan, Middle East and Asia Minor. As it is an earth stuff, it is suited for semi-arid climes where summers are hot and dry and winters cold and wet. It has a high thermal mass which is defined as the ability of the stuff to absorb heat. It helps to stabilise the inside temperature of the edifices.

Main natural stuffs of adobe can easy be found locally. Soil types and colorss depends on the vicinity and that is the chief ground to see different coloured adobe edifices in different countries.

Load bearing walls made from adobe bricks are normally 45-50cm broad. Minimal breadth should not be less than 30 centimeter. Adobe walls carry their own weight into foundations so there is no demand for other structures to transport the burden of the walls. Normally, 80-100 centimeter high rock walls are built as a base for the adobe walls to forestall the effect of land humidity on adobe bricks.

As there are not any other constructions to transport the adobe walls, land is dug for the termss. The deepness of the excavated country depends on the local features of the land and the frost degree of the dirt. The misguided apparatus of the foundations might do clefts on the walls.

Courses of adobe bricks are lined horizontally and binded together with clay howitzer to organize the adobe walls. Mud plaster which is a breathable stuff that can let the wet of the adobe walls to vaporize ; is used to stick on the first bed of the adobe walls. Fine grained straws are added where straw fibres increase adhering and to obtain a smooth surface. Mud plaster is a lasting stuff but the concluding coating of the wall is made by sticking calcium hydroxide based paste which is a water-repellent stuff to protect the structural feature of the adobe.

As it is an earth stuff, one-year fix is recommended. Worn surfaces are replaced by clay howitzer and plastered once more. This procedure is normally carried out during fall.

In adobe houses, the breadth of the edifices do not transcend 4m ( 13ft ) by and large. The infinities are largely rectangular and in some instances they

might be square shaped. It is recommended to construct maximal two floors with adobe.

Ceiling beams which were normally wood, are placed parallel to the short side of the rectangle with 30-40cm intervals. For these beams, cypress tree was normally used in Cyprus. Bushes or reeds were placed above the beams or in some instances reeds in the signifier of mats might be used if available. On top of this bed, 20-25 centimeter midst clay is casted and compressed by a rock roller. This type of roofs need one-year fix, which normally carried out in fall. If the roof is build with a incline, tiles are used to cover the clay bed. This will cut down the scratch of the clay and reduces the demand for care.

### Use of Adobe in Cyprus

Adobe is a common edifice stuff in Cyprus from early ages. Building stuffs might change in different parts, such as Kyrenia and Paphos ( which are coastal parts of the island ) rock was used to construct shelters. In the fields and foothills, adobe was widely used. The usage of the stuffs depended on the regional handiness and climatic factors.

As adobe is an insulating stuff, bulk of the houses were build utilizing adobe. Mesaoria vale which is located between Kyrenia Mountains in the North and Trodos Mountains in the sou'-west of the island, is an aluvial field where most of the adobe edifices can be seen. Reports on dirt studies in Cyprus shows that there are chiefly two types of dirt in the island. One is ' deep soils' which can be found in fields and 2nd one is ' shallow soils' which can be found in mountain and semi mountain countries.

' Deep soil' consequences show that % 60 of the dirt in fields is clay. Large sum of the field lands is calcareus with Ca carbonate content up to % 40-60. Limestone is a sedimentary stone which includes high degrees of Ca carbonate. Limestone is processed in different phases to bring forth calcium hydroxide.

Including insularity characteristics of adobe, suited ingredients can be found locally around the island which are dirt with high clay content, and limestone to bring forth calcium hydroxide. Adobe bricks are dried under Sun where limestone and roof tiles are baked in local furnaces by utilizing wood or fuel. This makes adobe a sustainable and natural stuff. Limestone was besides used to construct patio walls.

Nicosia is located in the Mesaoria vale where adobe edifices can widely be seen. After the declaration of independency of the island in 1960, concrete edifices started to lift over the island. Nowadays, little sums of Earth edifices are built around Cyprus.

Cyprus is hot and dry during summer where the demand for airing is extremely demanded inside the edifices. Privacy was an of import factor on determining the traditional house design of Cyprus where Windowss were built above oculus degree to maintain the privateness. Windows on adobe walls were made by puting wooden headers on top of the gaps to back up the bricks above.

Terra rossa dirt is present in some countries of Mesaoria field which is a ruddy brown dirt. Colour of adobe bricks might change in different parts of the island.

Partition walls inside the edifices were normally built with light timber-framing filled with rubble or plaster. As adobe is a heavy stuff, it was used to construct the external walls merely.

#### Testing adobe samples from the Davies House

I scratched a really small sum of adobe from the external wall of the Davies House. It was easy crumbled into little pieces chiefly because of the low strenght of the wall. My chief purpose to prove these samples is to happen out and specify the ingredients of the adobe used in this peculiar edifice. My purpose was besides to happen out the age of the stuff if possible.

First phase in the research lab was to look at the samples under a microscope. A little sum from the sample was taken and placed on a faux pas. Soil and straw atoms were clearly seen but it was difficult to place the stuffs clearly. As they were assorted and largely binded with each other, I need to divide the ingredients.

The manner of dividing the composite stuff is to blend the coveted sum of sample with H<sub>2</sub>O and leave it for one twenty-four hours. By this manner, dense and heavy stuffs which are dirt atoms in this instance will drop ; where the light stuffs will drift on the liquid which are the straws that has lower denseness than H<sub>2</sub>O which makes them float.

One-half of the adobe sample is grained by utilizing a cock. A all right grained pulverization was obtained. 5gr of the pulverization was weighted by a sensitive weighting graduated table. It was put inside a glass beaker and 200ml of distilled H<sub>2</sub>O added to the sample. The mixture was stirred manually for a few proceedingss and so placed on the magnetic scaremonger hot plate. The characteristic of this hot plate is that it has a magnetic field and if a magnet is placed inside the solution, the magnet will do a round spin and stir it. A magnet was put inside the solution and left to stir and heat for about 15 proceedingss. I used a thermometer to mensurate the temperature of the solution and around 42° , closed the hot plate. By stirring and warming, I achieved a well-mixed solution. After a few proceedingss, I covered the beaker with a level glass dish and go forth it for a dark.

Through research I found out that calcium hydroxide was used to stick on the adobe walls. There are some grounds on the walls of the Davies House but to turn out that, I used hydrochloric acid. Lime is a stuff that contains calcium carbonate. The reaction of hydrochloric acid or any acerb with Ca carbonate will stop up with bring forth C dioxide which can be seen by bare oculus as air bubbles.

In order to turn out that calcium hydroxide was used in Davies House, I put a small sum of adobe pulverization in a trial tubing. Couple of beads of hydrochloric acid is adequate to see the air bubbles. As a consequence, reaction of the acid with the adobe sample is positive which proves that calcium hydroxide was used in this edifice. It besides raises another inquiry

that if the type of dirt in Mesaoria contains % 40-60 Ca carbonate, does the reaction with the acid is because of the type of dirt used in adobe bricks?

The mixture was left for a dark. Dense and heavy and indissoluble stuffs sink at the underside of the beaker, where light 1s float on the H<sub>2</sub>O. Water is non clear which can be defined that some of the dirt was dissolved in H<sub>2</sub>O. A filter paper was placed inside a funnel and an empty glass beaker was placed below. In order to roll up the natation stuffs, I poured the H<sub>2</sub>O into the funnel easy without upsetting the underside. It was difficult to roll up all of the drifting stuff so I used a metal spatula to roll up the staying from the mixture. The H<sub>2</sub>O was filtered from the funnel, go forthing the straw atoms on the filter paper. Straws were collected from the filter paper and was put together with the 1s that were collected manually inside a porcelain crucible. I left them dry in the room temperature for 15 proceedingss and set them in the oven for 35-40 proceedingss. They were dried wholly and ready to burden.

I changed the filter paper and poured the staying H<sub>2</sub>O into the funnel. Some of the indissoluble stuffs remained at the underside of the beaker so I collected them by the aid of the metal spatula and set indoors another porcelain crucible. Water was filtered after 2 hours from the funnel and I collected the stuffs from the filter paper and put them inside the crucible. Same procedure was made to dry the stuffs. I let them dry in room temperature for a piece and set them in oven for 40-45 proceedingss.

Consequences



I weighted the obtained stuffs individually by utilizing a reasonable weight graduated table.

Insoluble Materials ( dirt, pebbles ) : 4. 56gr (  $W_{a,?}$  )

Floating Materials ( straws ) : 0. 06gr (  $W_{a,,}$  )

Exact sum of the whole sample was 5. 04 gr. The expression below will give the per centums of the stuffs in the sample.

$W_{a,??} \text{ Total Weight} \times 100 = \% ..$

$W_{a,,?} \text{ Total Weight} \times 100 = \% ..$

Insoluble Materials ( dirt, pebbles ) : % 90. 48

Floating Materials ( straws ) : % 1. 19

As the H<sub>2</sub>O was non clear after go forthing the solution for a dark, it is defined that there are soluble stuffs in the mixture. So if soluble stuffs are  $W_{a,?}$  ;

$W_{a,?} + W_{a,,} + W_{a,?} = 5. 04 \text{ gr}$

$W_{a,?} = 0. 42\text{gr}$

$W_{a,?} = \% 8. 33$

Experiment shows that most of the adobe stuff is dirt. Straws were used to beef up the binding of the bricks. The sum of straws in 5gr is 0. 06gr which is

really few. As the edifice is old and ignored, straw atoms might hold been disapeared or decayed within the dirt through clip.

Original ingredients of the adobe is soil, straws and H<sub>2</sub>O. In order to turn out that the detached stuffs from my sample is straws, they need to be identified under a microscope. They are most likely straws but there is a possibility that they might be timber.

Timber and wooden stuffs are identified under a microscope by looking at the layout of the cells. Wood are chiefly classified in two groups which are soft and difficult forests but the layout of their cells are similar. If horizontal beams of cells are seen under a microscope, it is a wooden construction.

Following measure of placing the straw atoms will be to look under a microscope after cutting really thin subdivisions of the pieces. One manner of thinking the age of the wood is to place the fungus formations within the stuff. The dimensions of the fungus might mention to its age. This can be done by utilizing a microscope but merely if the detached atoms are timber/wood but non straw.

FiguresStraws under the microscope:

Dirt atoms under microscope:

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