



# BUILDING MATERIALS AND TECHNIQUES

**KOKKINOTRIMITHIA**

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- **KOKKINOTRIMITHIA AS SETTLEMENT**



Kokkinotrimithia is a rural town west of Nicosia, capital of Cyprus and 20 kilometers far from the city center. It has an area of 23 HA which is concentrated primarily in a point and grows irregularly and radially. For this feature we can recognize that the examples of traditional architecture are located in the center of the settlement.

In 2001 Kokkinotrimithia had 3093 inhabitants.

Access roads to Kokkinotrimithia consists of a system of radial communication that leads into the most primitive part of the settlement, where again we find a subnucleus with narrower streets and spontaneous formation, which have been designed by the empty spaces left by the residential buildings that were building and were forming different shapes of the blocks.



## Representative buildings still existing in the rural town.

The Vernacular buildings that we can still find are mostly inside the original nucleus of the settlement, except the cemetery (number 1) because of the use it is used to build in places far from residential areas but relatively close to the church more important. But due to the growth of the settlement, now it is in the new heart of the city.



We can also find two churches, which in the beginning can seem strange considering that it is such a small settlement, but the church located on the map as number 3, is smaller, more new, and with an auxiliary use. We can distinguish how the public spaces appear around them.

1. Cemetery | 2. Church | 3. Church | 4. Heart of the traditional settlement |

# • MATERIALS OF THE SETTLEMENT

**ADOBE:** made from sand, clay, water and some kind of fibrous or organic material (sticks, straw, manure...) and dry in the sun. It has to be easy to handle by one person. Normally the proportions are 1:2, and the most commons are 6x15x30, 10x30x60, 7x20x40.

The adobe is the constructive element used to form walls. Using this material we obtain thick walls which work at the same time as structure and as enclosure due to its weight. Using the proper constructive system it will provide us thermal inertia and acoustic isolation from the outside as being a porous material.

**CANE:** used as covering in floors. Placed braided in different ways over the timber beams to get a flat surface to start the next floor or the roof. Over the cane it can be placed some clay as isolation. It is very light and has a good resistance to traction as well as flexcompression.



**TIMBER:** used in doors, windows, lintels and also in beams and in forjados. The size of the constructions is strongly related with the length of the wood, because it is difficult to find long pieces of good quality.



**STONE:** used as a base to start the adobe wall or to build the whole wall. Also it's used as jambs to enclose doors and windows. Depending on the economic situation, it is used instead of adobe in walls. These stones can be from the mountains or from the rivers, depending on the area. It is combined the use of big stones with some smaller ones in order to fill in the holes in between.



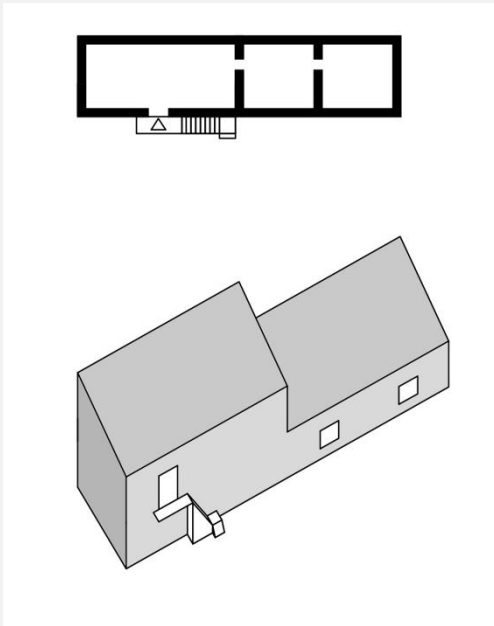


Traditional buildings in the settlement  
Different examples of houses in adobe  
when we can also see the use of stone in  
some cases. Depending on the economic  
situation of the family, they could afford the  
use of stone in the ground floor or in some  
parts of the house.

Some of this buildings have been  
rehabilitated, in some cases trying to keep  
the main character and the typology of the  
houses, and respecting the constructive  
systems that they used to use.

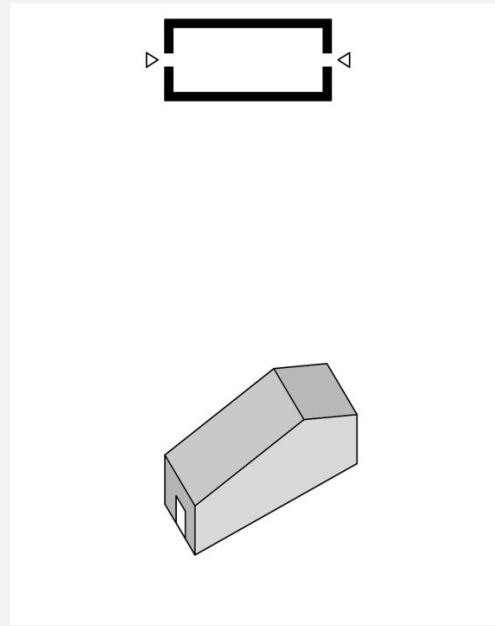


# • EXISTING TYPOLOGIES



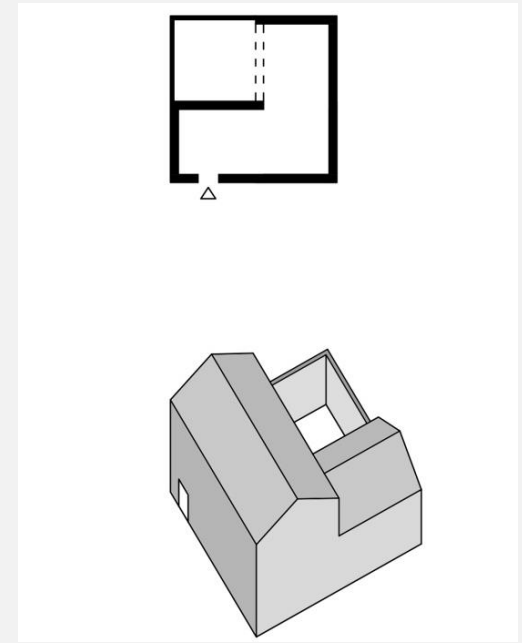
## **Typology 1**

Two storey housing with linear plant with two structural parallel walls. In these typologies is common to find the use of stone combined with adobe because the purchasing power of the people is high



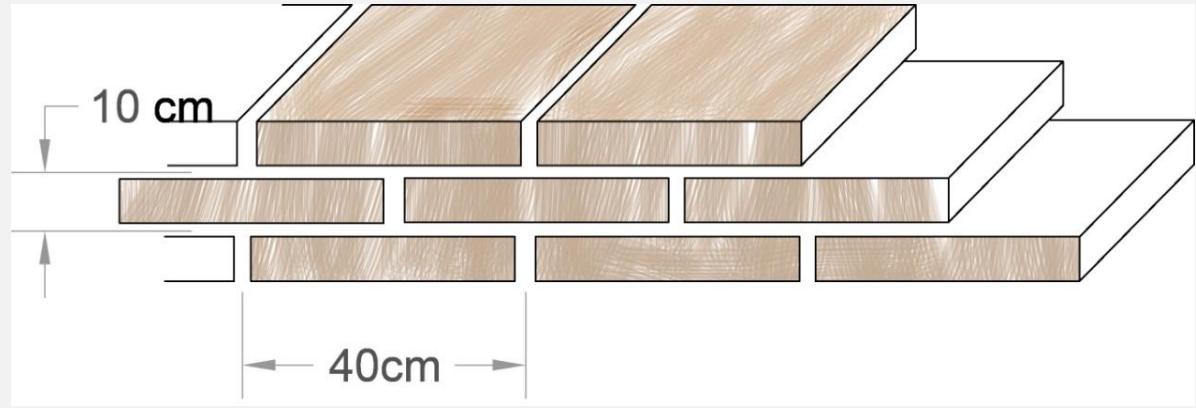
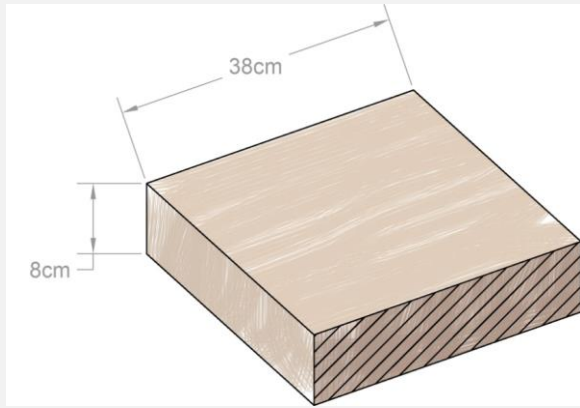
## **Typology 2**

The simplest example of building. One level with structural walls which give the shape to the roof pitch. Due to the purchasing power of the owners is common to find almost exclusively the use of adobe and wood.



## **Typology 3**

Two-storey residential building, more complex and non-linear in L shape, creating a courtyard and forming larger interior spaces. Using four parallel structural walls is required. The use of stone and adobe in structure is combined.



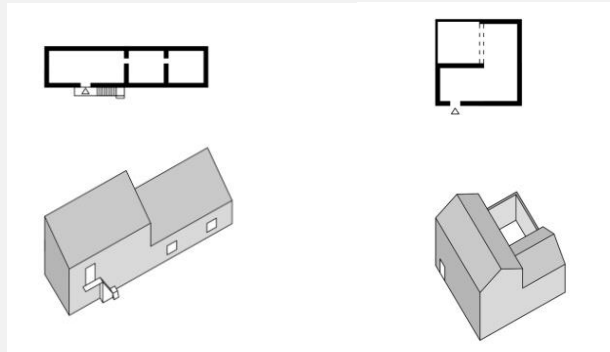
The main element in this kind of traditional construction is the adobe brick.

It can be found different sizes depending on the type of soil that can be found in the area or other features related to the settlement and culture determinant, for example the need to build thicker walls to get thermal inertia, or according to the type of housing that are intended to build, for example, the size of the holes, so the larger number of gaps, the larger block adobe will require wall and therefore more inertia.

The dimension of 8x38x38 fits nicely with the characteristics of settlement Kokkinotrimithia, as it provides the possibility of opening offers medium sized holes with some flexibility.

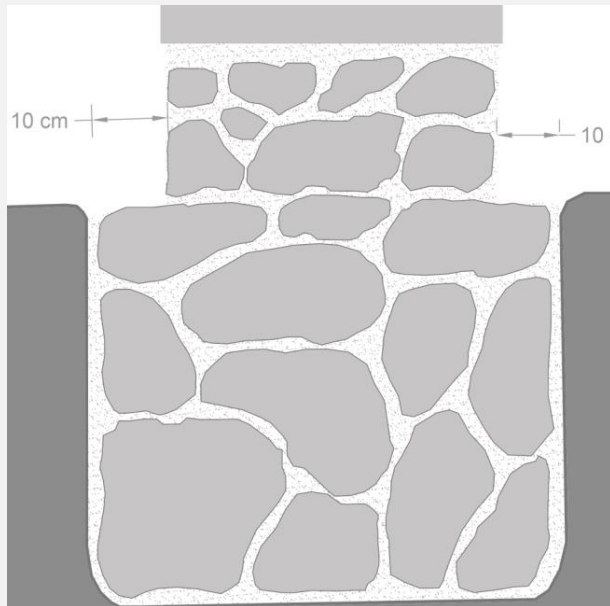
Using this module, easily walls are build where the dimensions between bricks are 40 cm, which fit to all typologies.

# • CONSTRUCTIVE DETAILS



Foundation detail, plinth and adobe wall: 50cm thickness foundation. In the housing typologies of middle class the wall starts with stones that can be found in the area, hence the color and the characteristic shape and are placed with clay.

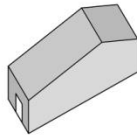
This part of the wall works as a base and then it continues with adobe, more economical and easy to work.



These details can be found in typologies 1 and 3.

The stone provides durability, as the encounter with the ground is often a difficult point of the building, as this is where rainwater accumulates and where the entire load is transmitted to the foundation.



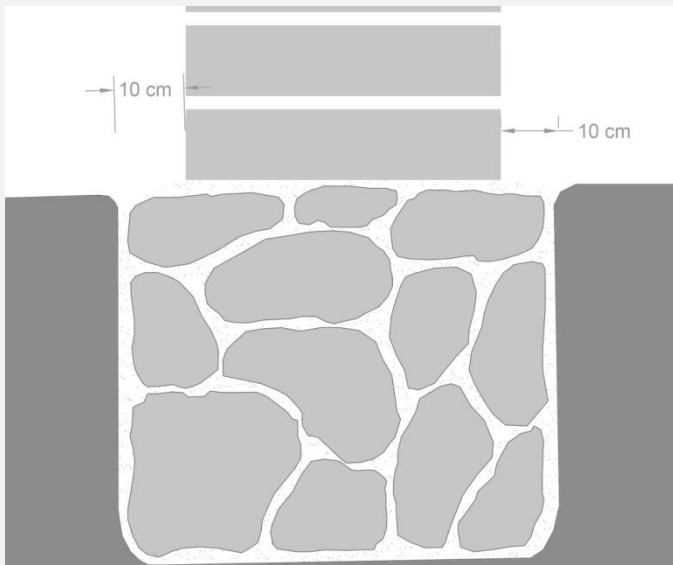


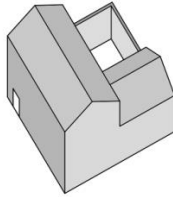
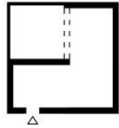
Foundation detail and floor encounter.

We can find this kind of detail in the buildings with the characteristics of the type 2 which belong to lower purchasing power so they economize the material as far as possible.

A foundation stone of the area is made (in some rare cases, you can even find adobe foundations) and the adobe wall is started directly from the ground.

The problems this detail can cause are due to accumulations of rain water, although adobe may have a good behavior facing water, does not resist continuing accumulations since dilute the material.



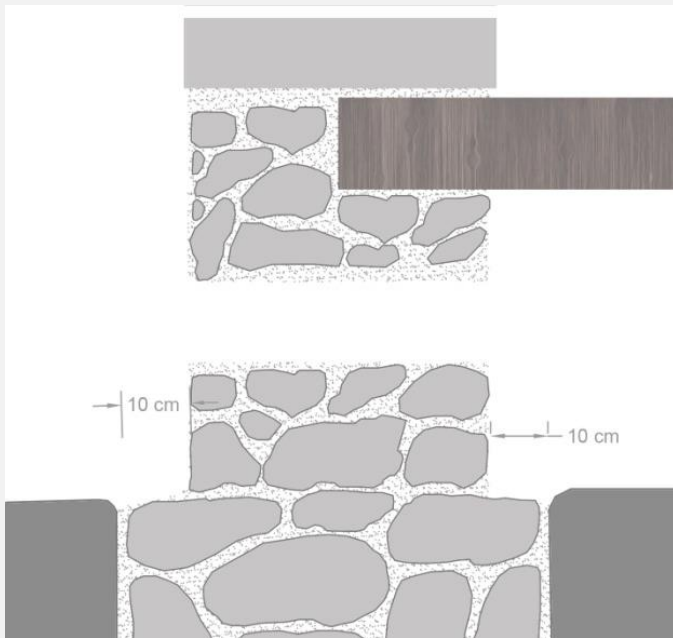


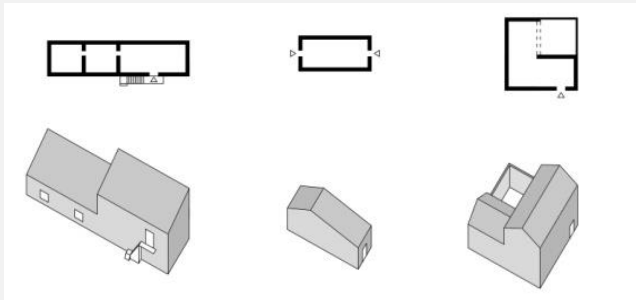
Foundation and enclosure wall detail corresponding to the type 3.

Groups of more expensive houses, two storey and with a non-linear organization.

In these cases not only the foundation and the top of the wall are built in stone, but it continues to the second floor, using the strength of the stone to support beams that will support the slab, the stairs leading to the second floor, and the possibility of a balcony.

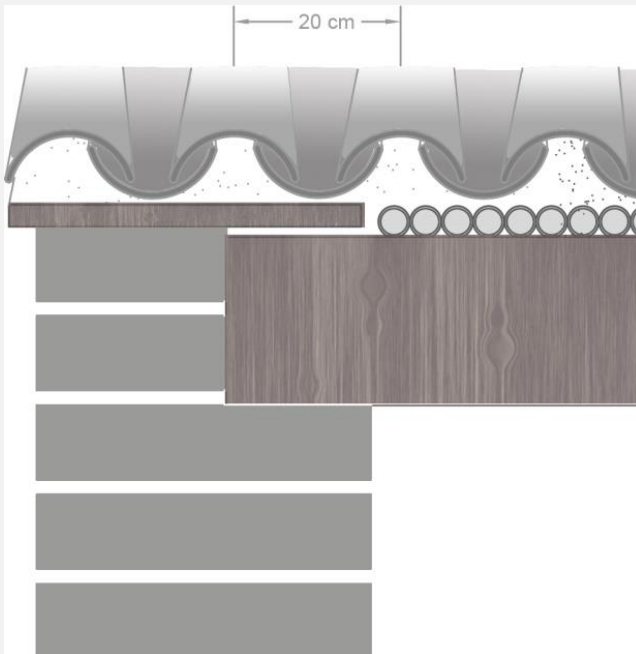
On the second floor the wall is built with adobe, the most characteristic material, lighter and easier to work with.

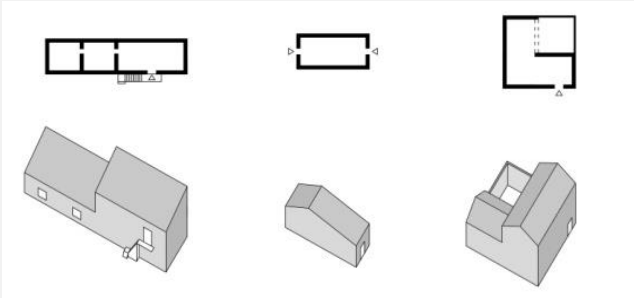




Roof detail common in all the typologies. It is one of the most characteristic details in this kind of constructions, as it combines several groups of materials. Adobe walls, where the roof and the different layers to make it waterproof rest.

1. Adobe wall with a board on the top.
2. Timber beams perpendicular to the wall of dimensions up to 3.5 m.
4. Layer of braided cane workings as a cover and as a support for the next layer.
5. Clay layer, which gives cohesion to the whole system.
6. Tiles as a finish forming the pitch.

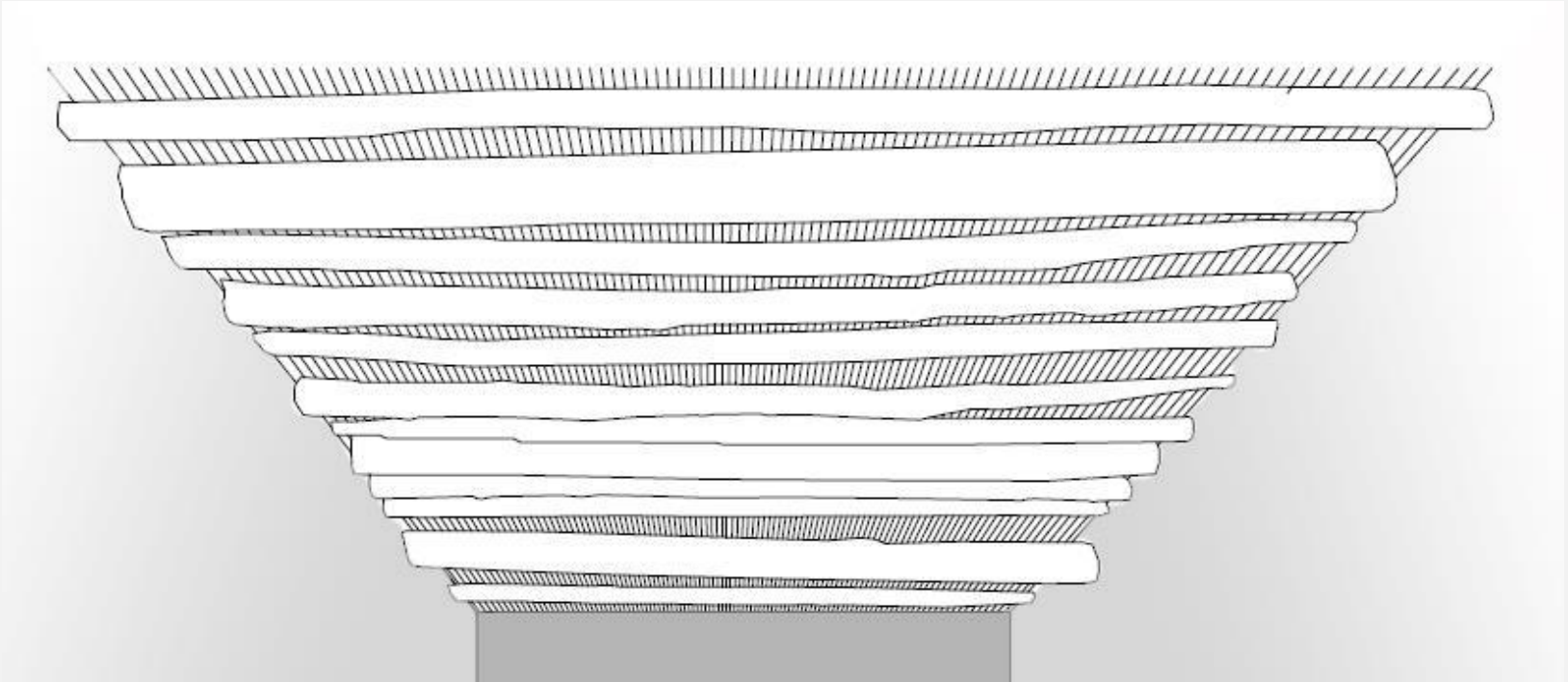


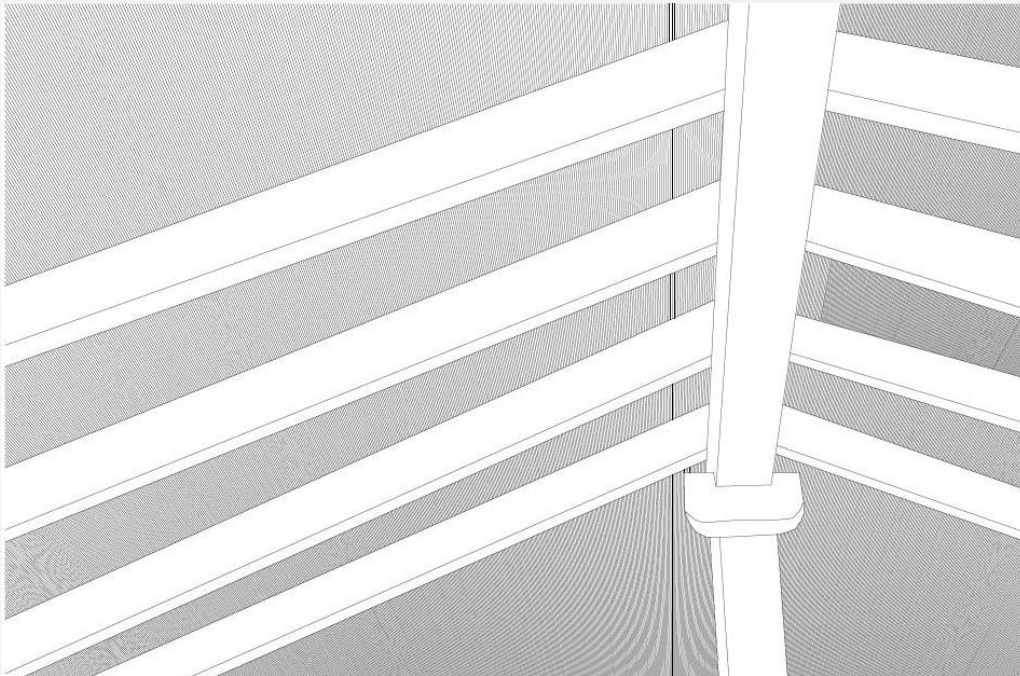
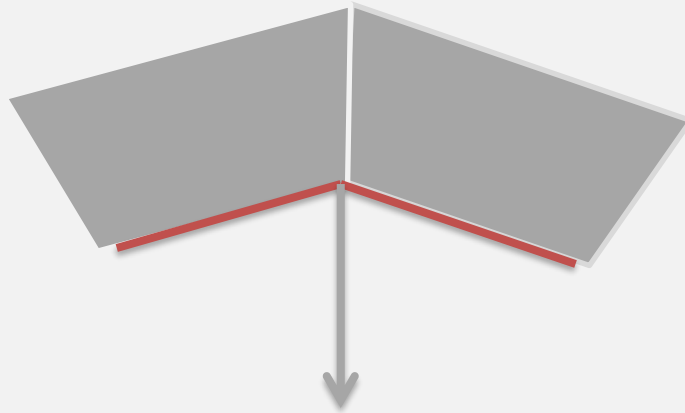
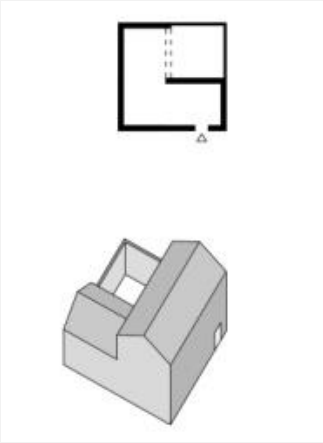


Interior perspective seeing the roof slab

The roof constructive detail gives a characteristic appearance of traditional architecture Kokkinotrimithia, leave the raw wood beams and exposed to visible slope giving an irregular aspect that can distinguish up to the second layer of the building system they use.

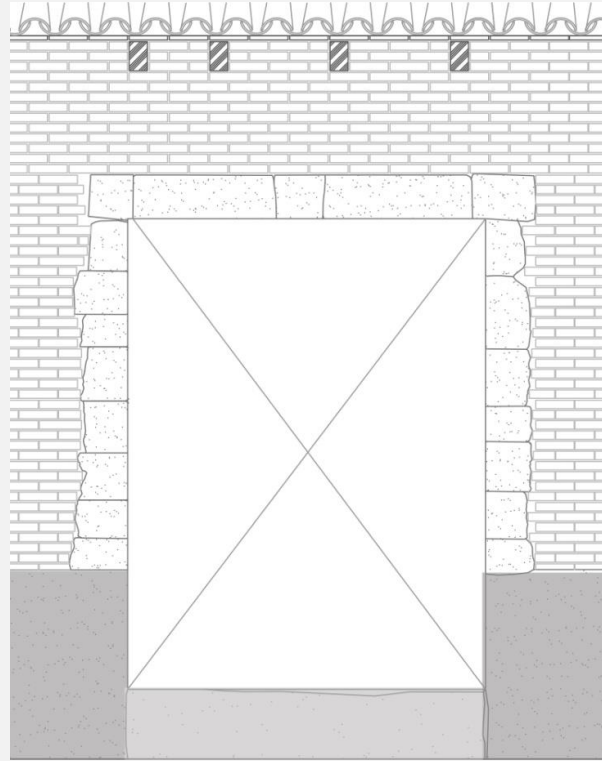
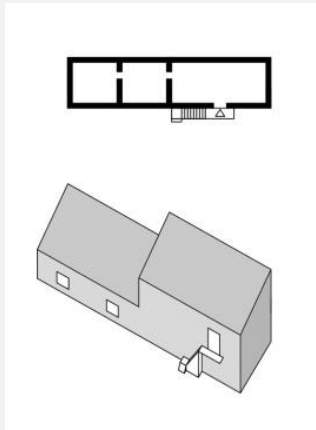
It is not necessary nothing else because the tiles, clay and cane make the system waterproof if it is built properly.





In the case of the type similar to three dwellings, the distance between load-bearing walls may be greater than the beams that support the roof, for that reason a foothold need not form a truss, solve the load distribution a central pillar on which the ridge beam abuts. Thus wider and airy without the need to build a third wall spaces are obtained central charge.





Detail of cross lintel and the door, you can see how the stone plate set archilla provably appears directly on the adobe

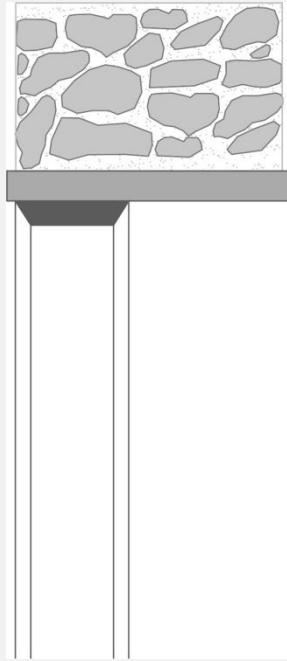
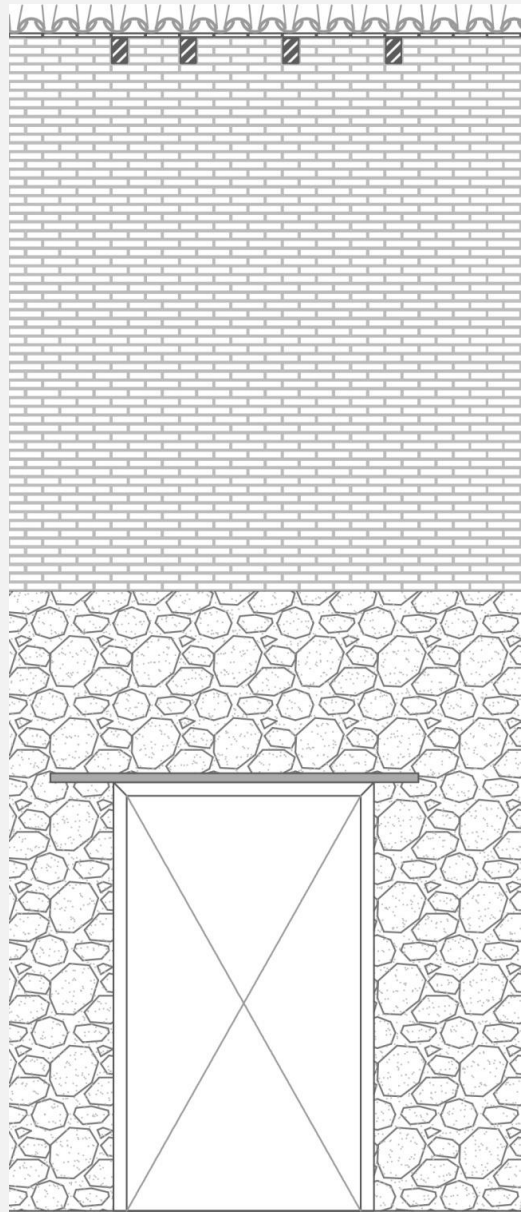
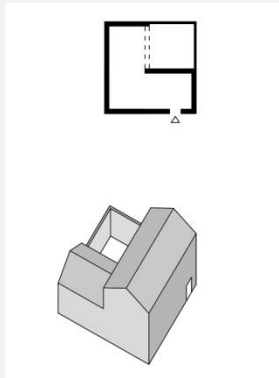
Detail of through. Minutia door in the case of the type 2.

In this type of construction system combines, Stone, Wood, and Adobe.

The use of stone lintel functions as false, only as an aesthetic work as the thickness of these stones is not greater than 5 cm. Possibly to give a characteristic building in east particular aspect as may be algún type of trade.

The real gap lintel supports the weight of the wall is a wood board, as in the rest of the buildings.

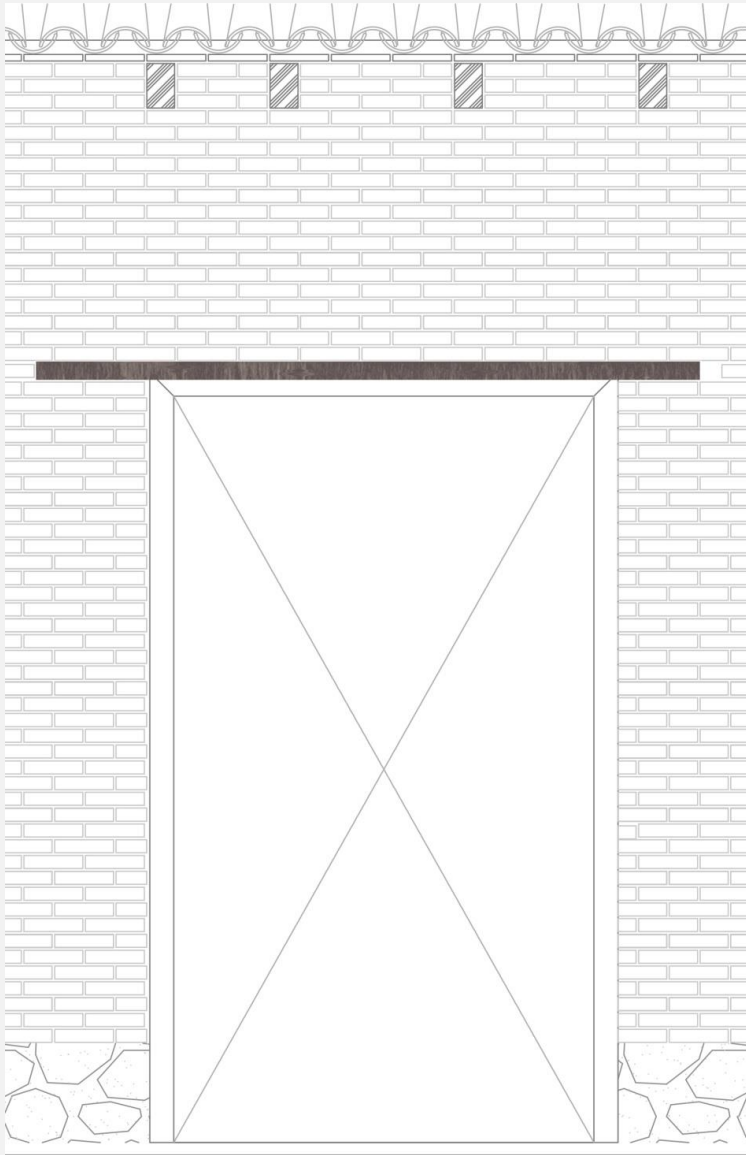
The gap opens onto the street with a stone step between 25 and 30 cm to the solution gap between the inside and the outside, preventing water from entering the interior of the building.



This is a type of detail that solves the doorway in buildings belonging to the type 3 houses of two related plants with high purchasing power, two-story homes in which a stone enclosure appears on the first floor .

In this case the wall rests on a stone lintel madera on the sub-frame is anchored. Just as in the previous case, the slope of the street and inside the house with a stone stair between the pre hollow door is solved.





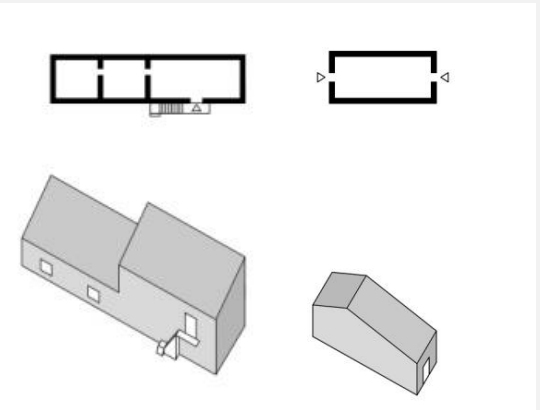
A third type of gap can commonly appear in types 1 and 2.

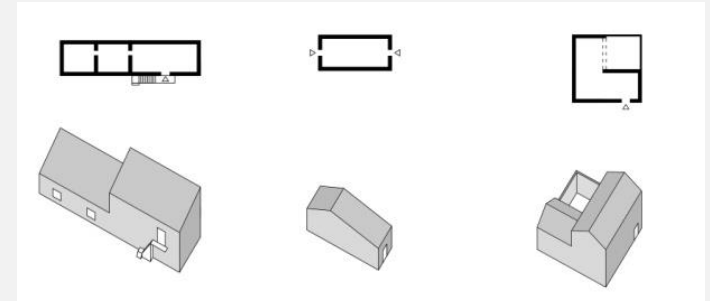
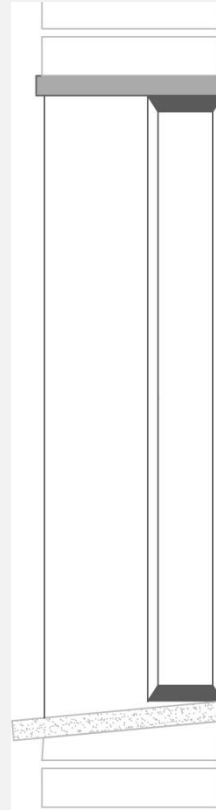
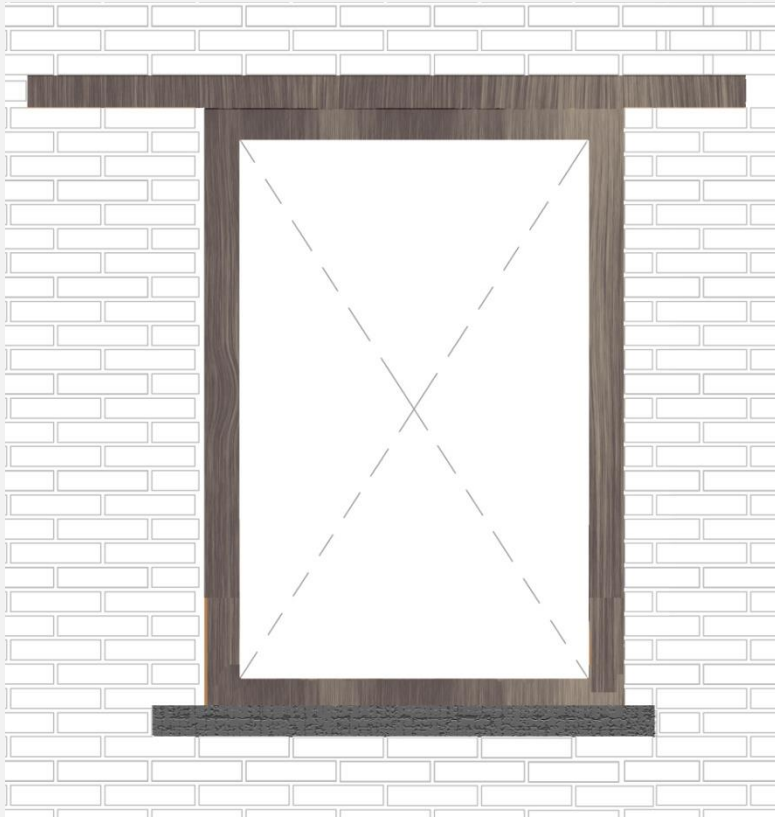
This construction detail is similar to the previous system.

Using a wooden lintel for the formation of the adobe wall. The gaps that may be introducing this new geometry and interrupt module adobe wall are filled with clay to prevent cavities that can make weaker wall or water can collect.

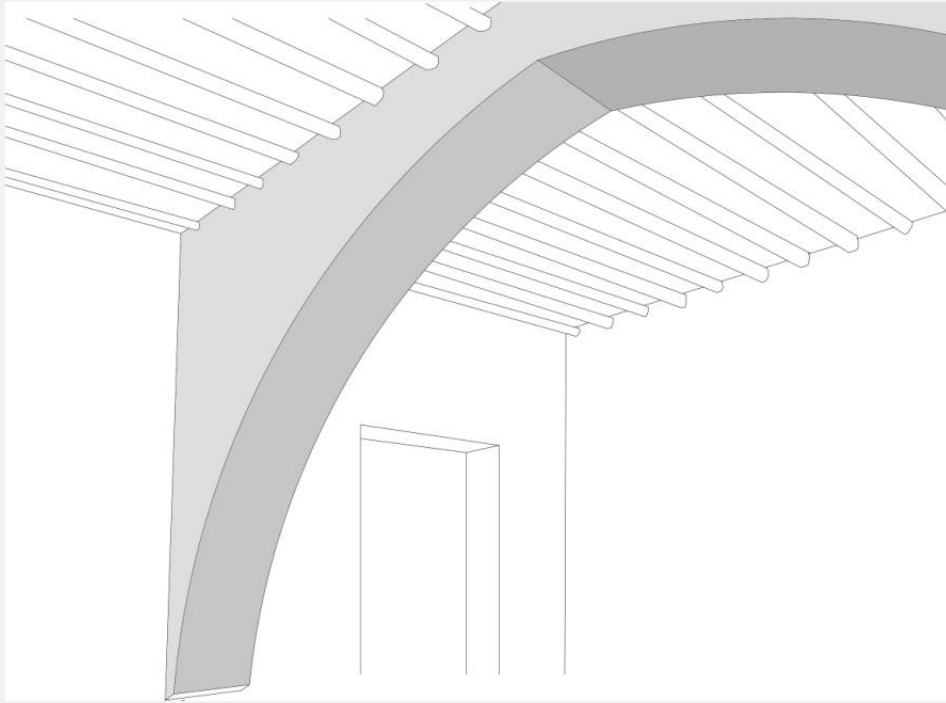
The wooden frame of the door in the wall inico stone is in this case also the voids will be filled with clay.

Again you use the step stone to fix the gap appears.





This detail is common to all types, which is characteristic of building with adobe. It also combined the use of wood and stone on the wall of adobe, using each line with the characteristics of the material. Again the timber is used as threshold, and there is the need of a gutter, so that the stone, a less porous material is used.



In buildings that belong to the third type of typologies interior space is not organized in a linear fashion, which is why there is the need for a new form, Arch. This solves constructive element counteracts loads and when the walls are load balancing perpendicular structure.

These arches are built with specific pieces of stone called segments with a trapezoidal shape to get the bow.

The top and center piece is called "key".

This geometry ensures that all pieces of stone work to compression, which is how this material works best.

