

## GROUND OF SUN-DRIED BRICK CONSTRUCTION

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### Abstract

In my dissertation, for Students' Scientific Conference TDK in 2002, I examined the grounds of sun-dried brick construction with the help of University Professor Mária Széll, taking into consideration the lesson of high flood events recently, taught by River Tisza above all, but my statements can be extended to other regions endangered by floods in Hungary.

*Keywords:* environment friendly construction, building from sun-dried bricks, energy saving.

### 1. The Spreading of Adobe Construction

In dry-hot and temperate zone countries the sun-dried brick had been the most wide-spread building material throughout the centuries, and 1/3 of mankind is still living in such houses. In Hungary 1/4 of houses is made of loam, but many of them are said to be technically outdated. It does not mean that this kind of construction is bad. In spite of the fact that loam is rarely taken into account, it is a plastic material, it can be worked in easily.

Its advantages come from its simplicity and naturality, but it is reused acknowledged because it is cheap, has a low value, but it can be reused anytime.

In my dissertation I examined technical solutions and structural forms assuring that adobe houses meet the requirements of today.

### 2. The Biggest Enemy is Water

For meeting those requirements by adobe houses, it is necessary to get rid of the biggest enemy, water, which practically causes this technology's disadvantages. The harmful effect of water has drastically. The whole country was shaken by the damage of adobe houses during the flood of River Tisza a couple of years ago. This disaster called the attention to the fact that the insulation against water must be treated seriously.

As a result, the popularity of adobe houses has diminished, but its advantages are still significant. On the other hand this building technology and its applicable conditions must be revised, first of all the selection of the building scene and the

protection against water in order to provide the required safety. We must be aware of the physical, chemical and mechanical properties of adobe for using it without fear.

Laboratory analyses give proper answers to these questions for raw materials. It is practical to know how structures built from these materials behave, what advantages they have, which factors are for and against the use of sun-dried bricks, which one should be accepted or corrected, moderated.

### 3. Advantages and Disadvantages

The advantages of utilization of adobe walls come from its naturality. It is an environment friendly, local building material, can be found almost anywhere, so it can be exploited and built in at the construction site with manual force, therefore reducing the building and transporting expenses, the quantity of building energy and its harmful effects. Using of adobe gives favourable opportunities in architectural shaping.

Because of the thickness of adobe wall, it has a good sound insulation, gives pleasant comfort-feeling, mixing with filamentous material or mineral substances its insulating ability is increasable, because of its mass it keeps heat well, inner vapour can penetrate, but adobe walls can balance the internal humidity favourably by periodic storing, it is aired well.

In comparison with other building materials sun-dried bricks get back to nature without polluting the soil (*Picture 1*). It can be an important advantage, because nowadays it seems to be a significant problem where to put the remains of a demolished building.

The disadvantages are that the solidity may change depending on source and the way of building-in, especially in the case of using traditional technologies. So the load-bearing or rather field pattern walls are relatively thick, that increases the foundation expenses. Wall structures sensitive to moisture are not frost-resistant. Therefore walls should be sealed by impregnating moisture whether it is an external effect (rainfall, soil humidity, ground water) or internal (used water, technological water, piped water).

Adobe structures suffering a decrease in solidity by moisture must not be built in areas where floods and inland waters are present, in other regions sealing and correct baseboard forming are necessary.

### 4. Experience in Tropical Zone

Climatic conditions determine the way of using sun-dried bricks considerably. Because of its properties it is an ideal building material in tropical zone. As an example in the Southern states of the USA (Arisona, Nevada, New Mexico) adobe construction is known and used as mentioned in my previous essay. The Capital, cultural



*Picture 1.* Remains of demolished buildings are very great in our days



*Picture 2.* Example for collapsed loam house because of the floods of River Tisza

and touristic center of New Mexico, Santa Fe, with its typical architectural style gave name to the local adobe construction with special structural forms. The way of sealing is not so carefully done because of the desert climate. The favourable properties of adobe construction in tropical zone give usable information.

## 5. Flood Events

Hungary is not in a good position from the point of view of climate; adobe houses must be precisely protected against moisture.

Flood of River Tisza drew the attention to the vulnerability of these houses (*Picture 2*), but the general survey out in this paper does not question the existence of adobe construction, but raises the re-examination and correction of building regulations of the concerned settlements. Houses should not be erected in catchment areas.

## 6. The Rewriting of Application Orders

The positive ecological features of adobe construction require the rewriting of the application orders and building regulations with regard to moisture protection by applying proper foundation, insulation, appropriate eaves formation and building engineering. It can be established that earth and adobe construction – excluding the flood-danger regions – is still a suggested building method. However, its application calls for a more careful planning methodology and construction. Only materials with known solidity properties should be used, and continuous professional consulting should be provided in areas where adobe construction is recommended.

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