

BUILDING A HOUSE - BETWEEN TRADITIONAL MATERIALS AND PATENTED ORGANIC MATERIALS

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Abstract

Ecological and patented a traditional or modern? These are the two options you have at your disposal a beneficiary when engaging in adventure called "dream house". As usually happens, in this case, opinions are divided, because in both cases there are advantages and disadvantages. To make the best decision regarding the construction of a house, it is necessary that each beneficiary to document thoroughly and choose the knowledgeable, the solution that best suits your needs and, not least Its budget. Other issues that need to be considered are the peculiarities of the land, which will be located in the building, usable area which will also architectural style they prefer beneficiary. Lately in our country this type of construction, wood, green, took a considerable boom, leaving behind traditional methods of building a house. It gained widespread Romanian real estate market demand for people to build or buy a house on wooden structure that is more resilient and sustainable and earthquakes. In this study we will present the positive and negative, of building a wooden house or a house brick.

Key words: brick, bearing structure, beams, loading technique, load-bearing walls, masonry, monolithic casting, wood

INTRODUCTION

In a decision should be known that a wooden house is cheaper, even with 50% against one brick, but that maintenance of wooden houses, in time, generate higher costs. Also, experience has shown designers and builders, that brick house is more lasting and withstand unexpected events such as fires, but is less friendly in terms of creating a thermal environment pleasant both in winter, cat and in the warm. The pros and cons adds that a wooden house is more flexible and has lower seismic risk, but a brick house is attacked by decay, ants and humidity. In addition to the arguments mentioned, must also be taken of the particularities of the land and the costs that can afford a beneficiary.

A wooden construction is clearly a good choice for those who want to move into a new home in record time, given that it runs Radic in a period of between one and three Monday. In addition, heat losses were calculated by the specialists as 30-40% lower than in brick houses [3]. As proof, wooden houses are

extremely popular in the Nordic countries, where effectively fight a cold. About they need to know they are very functional, because their inner space can easily be divided or changed, as have a light structure and therefore does not require too many supporting pillars [1]. Regarding benefits, also noted a fact: traditional wooden houses can be built on weak soil or sandy [8]. If no trump the latter failed to convince, we will say only that doctors considered "healthy" because wood is a 100% natural element, breathe, so it made dampness and condensation shelter.

MATERIALS AND METHODS

In the study, we used as materials, wood and brick, two of construction materials frequently used in execution of houses. As a research method we used comparative method, the advantages and disadvantages of each construction material. Comparison of the two construction materials, and present certain specific characteristics, helps in choosing the recipient of the construction material for the

implementation of your own home. The construction material, its quality, its usage and the costs of each construction material, are very important in the implementation of a house.

RESULTS AND DISCUSSIONS

A very important aspect of building a house is the choice of construction materials, both those related to the achievement of the resistance structure and finishes. Regarding the support structure which gives stability and strength of the entire construction, should the beneficiary, requiring manufacturers to use only approved and certified building materials, providing a guarantee of quality and work well done.

Wood house. Among the oldest green building include wood houses. They are made of wood in various types of structures (modular, logs, panels, etc.), better withstand earthquakes and foundations require much lower volume and cost.

Logs houses. They are made of two types of wood: Roundwood calibrated (ie the log is processed at the same size) and calibrated logs (the log has approximate dimensions). Log houses are massive, in fact, traditional houses made of rough wood processed manually [3]. These amounts generally on concrete foundations, but are made entirely of massive trunks of wood, previously untreated, but peeled. The entire building is made of logs and shaped by overlapping and joining their ends by plane manually, which ensures a very resistant structure of the house mechanically (and effective protection against seismic). Is inserted between the mating surfaces of mineral wool for thermal and sound insulation. Then the wood is treated to gain resistance against harmful microorganisms.

Laminated wood beams houses. They are made of wooden beams Glulam, namely: beams compact timber obtained by combining pieces of lumber in the first phase in the form of blades, which in turn are glued together in special conditions of temperature and pressure [6]. The advantage is that are more stable over time (not subject to specific deformation of solid wood) can have large sections and

lengths, and provide easy decorating the walls, exposing only regular wood surfaces.

Laminated wood framed home. The assembly of structural elements creates a network of beam-column where all parts are predimensioned and processed in the factory. Fixing the foundation wooden structure is made by special fixture which isolates total surface of the timber concrete [3]. They can be filled with large glass panels or insulated panels (sandwich).

Houses self-supporting (sandwich). This type of structural frame houses independent, role being taken over by prefabricated bearing walls. Assembly is done with screws. Besides the resistance structure includes wall sandwich insulation layer, vapor barrier, facilities and routes within and outside layers of finish. You can choose any type of finish as in standard construction. Among the advantages can be mentioned: high resistance to earthquakes, a wide variety of shapes and sizes, lower execution costs.

Wooden houses presents a number of advantages observable. The production cost is lower than the housing made of other materials. Then, no air conditioning is not too costly, given that a well-insulated wooden house proves to be sufficiently cool in summer and warm enough in winter. All this leads to reduced consumption of fuel and energy, emission of pollutants is therefore diminished.

A wooden house is cheaper, sometimes by almost half, but maintenance is demanding her time [4]. A brick house is more durable and resistant to fire, but it is colder in winter and warmer in summer than in a wooden house. A wooden house is more flexible and less dangerous in case of earthquake, but a brick house is attacked by caries, overrun by ants etc. [4].

The advantages of wooden houses:

- **Are cheaper by 30-40% than those of brick;** materials used are cheaper and their degree of industrialization that can be prefabricated to a greater extent and cause the price to be lower;
- **Runs fast in a month,** more than three months;
- **Are flexible and lightweight,** and are not dangerous in case of earthquake;

- **Good thermal insulation** is colder in summer and winter warmer; Heat losses were calculated by experts as 30-40% lower than brick houses; Nordic people prefer this technology, which demonstrates that they are effective in fighting very low temperatures; Norwegian and Swedish houses are made as sandwich method;

- **Inner space can easily be divided or modified**; the house light, does not require too many pillars, making the inner space to be easily modeled. not demanding in terms of terrain type that can be placed; being lightweight wooden houses can be built and poor or sandy land, facilities can be hidden in walls; walls being prefabricated and wooden houses were built usually by type projects could be envisaged route cable wires or utility lines.

(When buying a property looks over which it emphasizes is the presence of utilities. It refers to running water, gas, electricity, Internet, cable TV and access to the sewage system of a house or possibility to make the connection to these services for a particular field.).

The wood used to construct the houses would have to meet some technical conditions of use are not complied with by all manufacturers and all companies providing building materials:

- the wood comes from the provider you have a few weeks left to dry

-wood insert, then in special ovens for drying, electronically controlled kilns where wood is until you reach the optimal humidity of 14-16%.

-gives wood is planned on all sides in this phase and you see all hidden defects. Through this process, the wood loses 26% by volume and is the size of 15 × 4.5 cm.

- the wood is cut to the size of the project and numbered and then to be able to easily build panels the size of the project.

-the wood is completely submerged in the bath where the substance of treatment against insects and fungi.

The joints should use special fasteners, galvanized and approved items bearing the CE marking. Obviously, the cost of these engaging elements are 3 times more expensive

than classical nails, staples and which are also used in other parts of the builders.

Unfortunately, in our country, do not meet the standards and rules of construction for homes made of wood.

The construction of wooden houses using material and technical and execution standards already approved in more developed countries, the price is about 400 € /mp + VAT.

The houses made of wood, various structures and forms can be achieved and cellar, garage. Foundation such a home is like a classic, all concrete and reinforced concrete reinforcement. The cost of foundations in a wooden house, is about 50 € /mp.

Finally, foreigners say they are healthier. Wood is a natural, environmentally friendly; In a masonry house may appear damp, condensation. It is said that a wooden house "breathe" and does not suffer from the vapors.

Disadvantages of wooden houses:

- **"Live" less than brick**; builders view that the life of a house of wooden panels is 20-30% shorter than the one of brick, however, there are wooden churches and old houses built of wood massive, who resisted while more than palaces built of stone in the cities;

- **Does not ensure a perfect sound-proofing**;

- **Maintenance time is painstaking and demands money**; at an interval of five to six years should be checked carefully and make any necessary repairs; In addition, all elements of structural and nonstructural wood should be treated against insects and whether or log paneling on the outside, they should be varnished;

- **Cannot be too high**; a wooden house should not have more than two floors, because at a height greater stability is shaky house.

Brick house. As it was reminded the wooden houses, a brick house is quite expensive (more expensive than one made of wood even 50 percent), it requires no maintenance expenses as high as those of wood.

Also, a house brick cope better with unexpected events such as fires, but is less efficient in terms of creating an environment so pleasant heat in winter and in the warm.

These buildings can be improved in terms of heat through systems engineering construction

(creating an air vertically between two layers of masonry, which prevents the transfer of energy between inside and outside). In addition, these homes can benefit from a classic insulation system.

Brick houses are durable, resisting for more years than those made from other materials (eg wood), but it is not recommended to be built on weak soil or sand. It should be noted that a house of brick is higher seismic risk and is less flexible, but is not affected by moisture or by pests [5].

If you want a large house with several floors, a brick home is a good choice because, if built correctly, no problems of stability.

The resistance structure must cope with its own weight of the house, and seismic forces, weather and vibrations. It takes its own weight plus the payload capacity (people and furniture) through floors and beams, walls and columns and send that through the foundation, a pass on the ground [2].

Depending on your budget, the architecture desired and, not least, personal taste, Framework, a case can be made either of reinforced concrete frames or frames of wood or wooden wall, or the supporting walls of brick.

In Romania, the most used system is the monolithic reinforced concrete frames. This is made up of a network of horizontal elements (beams) and vertical (columns) monolithic reinforced concrete slabs stiffened by horizontal reinforced concrete.

Concrete is the cheapest building material resistance and, unlike wood or metal, does not require special treatment (flame retardant or antiseptic). In addition, preparation and application made easy work directly on site without requiring any additional equipment. One disadvantage is prolonged attain full capacity of the port.

Fittings, those steel rods embedded in concrete, plays a pivotal role in taking the efforts that occur during an earthquake, increasing in strength and gives it elasticity needed to cope with shocks [3].

For residential buildings, single-family or duplex, you can choose any type of structural frame: reinforced concrete frames structure with wooden frames or wooden walls, the

structure of the supporting walls of brick (the panels of masonry are framed reinforced concrete little poles and belts), etc.

There are many structural variants from which to choose:

- ***Brick structure houses the bearing*** (full brick or brick goals); - Houses concrete structure: columns and beams;

- ***Monolithic structure houses:*** pour reinforced concrete walls (hence the novelty of those modules that make up the future of expanded polystyrene wall, which lay the rebar and the concrete is poured)

- ***Wooden structure wood:*** pillars and beams (the floors are all wooden beams or concrete slabs may be);

- ***Metal structure houses:*** pillars and beams.

The combinations may occur if structures on pillars and beams and have exterior walls of: brick, hollow brick, concrete, sandwich panels, panels of corrugated sheets, panels of wood or PVC, prefabricated and bulkheads in: brick, hollow brick, concrete, drywall boards.

What is important especially structure and the material it is made it? depending on what you want to have spaces in new home (openings, glass surfaces, number of levels, whether or not a basement), architect and structural engineer will recommend a certain type of structure.

Each structure has restrictions. Here are a few to get an idea about what discussed:

In a supporting structure of brick house you cannot have large openings - up to 2.5 m, whether we speak of an empty window, door or living space. You cannot "forget" a wall between the living and dining unless you reduce the total area. And if you want more levels should thickened walls in order to have stability and strength. If the structure of columns and beams is the most flexible, so I showed above and can be combinations.

In terms of timber frame house, standardized models that bring our demands should be resized to seismicity. Do not ignore the fact that Romania is in a seismically active area, with a threshold value below that of Japan and the west coast of the United States, this is being reflected in a series of conditioning manufacturer.

Thus, *a structure of reinforced concrete*

pillars and beams appropriately sized reinforcement combines the flexibility of reinforced concrete with compressive strength of concrete [7]. A wood frame house cannot withstand the same loads and mechanical stresses as one of the concrete structure unless resizes or use structural columns and beams of wood. Every choice and change can bring added cost, everything is done strictly related to space travel home.

The advantages of brick houses:

- ***They are more durable***, have a longer life than a house of wood; resistance structure of the house is stronger, while requiring repair walls, but less than a house of wood;
- ***Can support any type of roof***, including tiles; tile material is considered "hard", which must be supported by a strong house with a durable structure; even if it seems an antiquated method, the tile has many advantages: it takes time, it is good insulator and is resistant to rain;
- ***Allow a very wide range of finishes***; the walls inside and outside, can be painted with lime or washable paint or wallpaper can be painted or covered with plasterboard and wood paneling;
- ***Are resistant to pests, insects and rodents***, without the need for special treatments, do not need more maintenance work in the current time; is painting the walls over two to three years, repair a chipped corner of the house that was over ten years, throwing a dash of lime on exterior walls over 15 years. All these are nothing compared to doping and chemicals every five years;
- ***Are better silencing***; in other words, it provides greater privacy of the home, interior space;
- ***Can be constructed by traditional methods with cheap labor***; almost every man knows how to do a brick wall and do not know yet, can learn quickly, running only on a worker such work.
- ***Can be built as high***; house in the project do not have height restrictions due to the chosen material; homes may have only one level, but five-six floors or blocks can turn into skyscrapers, they have a resistance structure of reinforced concrete.

Disadvantages brick houses: take a long time

for execution, the interior cannot be changed easily, because the resistance structure, are "cold" and require more power or heating fuel, earthquake fall faster than wood . The cost of these houses is higher than wooden ones.

CONCLUSIONS

Regarding the implementation of a wooden house, building firms which respects the material runs constructively with European standards and the constructive method used is quality standards. Engaging elements of the wood, are very important for the stability and durability of timber frame houses. For this reason the companies working for foreign beneficiaries, the quality of these elements do not give up, even if the manufacturing cost is higher and execution.

The price of a wooden building can only be determined on a project basis. In the absence of any project cost estimate can only be approximate due to several factors such as:

- real geometry of the structure can cause higher or lower consumption of construction materials, workmanship material additional or different losses;
- cannot be considered exact degree of finish desired by the customer nor the quality of construction materials, factors that are extremely significant because of the great diversity of building materials market.

The place where the building will be located by influencing its price needs insulation, noise resistance requirements or different mechanical stresses (earthquakes, winds, snow etc).

In general US house prices by type of wood is 60-70% of the brick houses.

In France, as in other European countries, there are standards, rules and regulations in respect of the implementation of wood falls. Such builders and manufacturers of building materials must meet all these standards and regulations.

Unfortunately, in our country, did not engage anyone to regulate rules and standards for the execution of a wooden house. Likewise, for companies producing materials and wooden construction elements, there is a standard of

quality in this area.

In our country, we can build a wooden house, under any circumstances, even if executed in own or with a company. Only working for foreign firms comply with the rules and standards but the costs are higher.

On the other hand, brick homes remain the most cherished of Romanian, as the Europeans. Each year, according to statistics, in Europe, more than two million new buildings for housing are constructed of brick, which represents 60% of all new housing. The most ardent supporters of this way of building houses are Latins, particularly Italians and Spaniards, who rarely They make a house of different materials. Brick homes are built with more weight, take more time, but they have a longer life.

REFERENCES

- [1]Bia, C., Ille, V., Sun, M.V., 1983, Strength of materials and elasticity theory, Didactic and Pedagogic Publishing House, Bucharest
- [2]Honțuș Adelaida Cristina, 2005, Agrotouristic Building, Publishing CERES, Bucharest
- [3]Honțuș Adelaida Cristina, 2014, Agrotouristic Building - the Second edition revised and enlarged, CERES Publishing, Bucharest
- [4]Honțuș Adelaida Cristina, 2014, New trends of achievement of ecological lightweight wooden material, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, Vol. 14, Issue 4
- [5]Honțuș Adelaida Cristina, 2014, Comparative study on the choice of building materials for constructing a house, Scientific Papers Series Management , Economic Engineering in Agriculture and Rural Development, Vol. 14, Issue 4
- [6]Stan Daniel, 2004, Building and Environment, Matrix Rom Publishing House, Bucharest
- [7]Suman, R., Ghibu, M., N. Gheorghiu, Oană, C., Oțel, A., 1988, Modern technologies in construction, Technical Publishing House, Bucharest
- [8]Șerban Liliana, 1998, , Building Materials, Matrix Rom Publishing House, Bucharest
- [9]STAS 3451-73. Statics, dynamics and stability of structures
- [10]STAS 1963-73. Strength of Materials. Terminology and symbols
- [11] The Law. 10/1995 on construction quality
- [12]Normative P100-2006. Seismic design code. Design provisions for buildings