

RESEARCH ON THE CHARACTERISTICS OF WOOD USED IN TOURIST CONSTRUCTIONS AND ARRANGEMENTS

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Abstract

In this paper we try to highlight the characteristics and conditions of use of wood in the construction of buildings and tourist facilities.

Wood is an organic, vegetable material and has a wide range of uses in construction, from strength elements to furniture and decorative pieces.

Tourism is considered a very important area in the sustainable development of each region, investments in this area being a priority of the community, thus forecasting an increase in the pressure exerted by tourism for the coming years.

The economic importance of tourism is reflected by the permanent and significant increase of the contribution to the gross domestic product of Romania, estimating a tripling of the value from 2005 to 2026.

Deforestation in Romania is an economic process that has manifested itself since ancient times, being one of the main resources of the populations that have developed in the current space of Romania.

Wood, being a renewable resource, is ideal for supporting and developing individuals, human civilization in general, being used as energy raw material, building material, tools, weapons, paper, furniture, etc.

In the current context of major climate change, with a major effect on the environment (long-term effects already being felt throughout the planet), it is imperative to take radical measures on environmental safety, with regard to the exploitation of wood by massive uncontrolled deforestation.

Key words: wood, characteristics, constructions and tourist arrangements

INTRODUCTION

As a result of the development of tourism, there is the problem of respecting the balance between tourist demand and its absorption capacity by the environment. If green areas (forests, parks and nature reserves), beaches, zoos, water mirrors and even cultural centers, historical and architectural monuments are exceeded in terms of maximum visiting capacity, the tourist quality may be affected.

All products that contribute to the execution of a construction are generically called "construction materials".

The knowledge of the physical-mechanical and chemical characteristics, as well as of the behavior of the construction materials to various destructive actions to which they are subjected during operation,

offers the possibility to choose correctly the materials necessary for the execution of different construction elements.

The timber results from cutting to certain dimensions and then from processing into certain shapes of tree trunks and sometimes, of thick branches, as well as their roots.

Due to its great spread in nature, as well as the possibility to be easily obtained and processed, wood is used in all kinds of constructions, both in the final wooden ones (wooden houses, wooden bridges, rural constructions), and in buildings in which other construction materials predominate (brick, concrete, stone or metals) wood occupies an important place in the manufacture of scaffolding, formwork, beams, decking and carpentry of doors and windows.

MATERIAL AND METHOD

The research was based on the identification in the literature, of the possibilities of using

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wood in tourist constructions and arrangements. During the documentation, some assessments made by construction specialists regarding the wood assortments used in construction were compared.

The importance of the appropriate choice of construction materials for the creation of ecological spaces was studied.

A major component of green building is "healthy" building materials.

"They can negatively or positively influence our lives. Just like two violins, one made of wood, the other made of plastic, which have a totally different sound, so the climate in our home depends on what building materials we use. Asbestos is just one example of how unhealthy and dangerous building materials can be. Therefore, every builder must understand that it is necessary to return to healthy building materials".

RESULTS AND DISCUSSION

Despite the popular perception, in Romania the forests and the total wood mass increased, not decreased, respectively from 1.4 billion cubic meters of wood mass in 1986 to 2.2 billion cubic meters in 2016, from 6.4 million hectares in 1990 to 6.9 million hectares in 2016.

"There are several ways to cut wood. For example, there are shaved cuts (a certain slope is cut at once) and successive cuts (by thinning). Both options must be done in such a way as to allow the forest to regenerate. The thinning variant is healthier for nature, because the animals still find shelter and food - even if the forest recovers anyway in both types of cutting. If there was a direction to be given in terms of cuts, I think that would be one of the most important: to cut more by thinning than by shaving. But this is probably less economically efficient and I don't know if the same amount of wood can be removed from the forests by thinning, compared to shaved cuttings.

It should be mentioned that for over 50 years Romania has not changed en masse the regime of forested lands (in popular terms deforestation), most of the deforestation on the current territory of Romania took place in the nineteenth century, early twentieth century-century, when due to the demographic explosion and the successive ownership of the peasantry, the agricultural area increased to the

detriment of forested areas, exponentially with population growth and economic growth, Romania being until the second half of the twentieth century a predominantly agrarian state in full demographic expansion.

According to a European inventory in 2005, there were about 218,000 ha of virgin forests in Romania, representing 2/3 of the total virgin forests in Europe.

In the countries of the Carpathian Mountains, 90% of Europe's virgin forests have been preserved, while in the Alps only 0.4%.

Forests with special protection functions (where no commercial felling is carried out) represent 33% of the forest area, respectively approximately 9% of Romania's area.

All construction materials must be manufactured or processed in the immediate vicinity, so that transport routes as short as possible are required. When manufacturing construction material, it would be good to consume as little energy as possible, because the more a raw material is modified, the more energy is needed (Table 1).

The manufacturing must result in as few harmful impurities as possible that are harmful to the environment ambient. These harmful impurities increase as the energy required for manufacturing increases.

The use of high-value building materials (eg aluminum for window frames) is not only an unnecessary consumption of raw materials and energy, but the question arises as to whether such materials are really needed in the construction of a house, because most functions (strength, insulation) can be better executed with less expensive materials. After use, it must not emit any gas, dust or radiation.

Today, over 90% of our time is spent indoors. Therefore, it goes without saying that the construction should not use materials that negatively influence the climate in the room.

Of course, it is not building materials such as clay (clay), lime and wood that have led to allergies and environmental diseases. The loading of the atmosphere in our homes with harmful substances starts mostly from synthetic products, being known to us the damages caused by polychlorinated biphenyls (PCBs), lindane and asbestos.

Table 1 Comparison of primary energy demand in the conventional building module or with natural building materials Source: (www.cceg.ro- processing)

Nr.	Construction element	With conventional building materials / With natural building materials	Required energy Kwh/m ²
1.	Exterior wall	Limestone brick, cladding masonry	250
		Wood	175 (70 %)
2.	Interior wall	Limestone brick	100
		Wood, cork	75 (75 %)
3.	Beams, floors	Steel	550
		Wood	8 (1,5 %)
4.	Roof	Tile	4
		Reed	0,4 (10 %)
5.	Window frames	Plastic material	250
		Wood	10 (4 %)
6.	Flooring	Plastic material	25
		Stone, wood	7 (28 %)
7.	Floor mat	Synthetic material	25
		Wool and cotton	3 (12 %)
8.	Interior wall finish	Plasterboard, plasterboard, wallpaper	10
		Wood, plaster with plaster, lime	2 (20 %)

Modern wood processing technologies have allowed the extension of the field of use from softwoods (fir, spruce) and hardwoods (beech, acacia) to all wood species, including poplar and willow.

The use of wood in constructions and tourist arrangements is justified by a series of advantages, but there is also a limitation of

the field of use determined by some disadvantages.

It often has defects such as: falling nodes, cracks, insect holes, areas of alteration, etc.

Apparent density is a property that depends on the essence and humidity of the wood (Table 2 and 3), directly influencing its mechanical strength.

Table 2 Variation of the apparent density of wood depending on the species and humidity (after Leonte C., 2017)

Species	Bulk density (kg/m ³) for wood :		
	Green	With 15% water	Dry
Fir	1000	450	410
Spruce	740	480	430
Pine	700	520	490
Oak	1100	740	650
Beech	1010	750	690
Ash	920	760	680
Acacia	880	750	730
Linden	740	460	490

Table 3 Mechanical strengths of wood for humidity between 15 and 18% (Drăghicescu and all.)

Species	Compression along the fibers (daN/cm ²)	Sag (daN/cm ²)	Stretching (daN/cm ²)	Compression perpendicular on fibers (daN/cm ²)
Oak	130	130	90	30
Spruce	100	100	70	15

Wood is a good thermal, electrical and sound insulator in the latter field, wood being associated with glass wool and mineral wool.

Defects can be: shape defects (abnormal taper, curvature, etc.), structural defects

(twisted fiber, tangled fiber, etc.), knots, cracks, holes, galleries, colors, alterations and more.

They are due to the way of growth, the action of microorganisms, physical agents and negatively influence the mechanical strength of wood.

When choosing wood protection products and technologies, the conditions and place of use must be taken into account, respectively the greater or lesser risk of biodegradation during the period of operation of the construction. Also, certain specific requirements imposed by the beneficiary will be taken into account depending on the destination of the construction (ensuring fireproof protection, maintaining the natural color of the wood, etc.).

To treat wood indoors, the following conditions must be met:

- not to change the color of the wood, in order to be colored and lacquered according to the beneficiary's wish;
- not to modify the physical structure of the wood;
- the product is not toxic to humans or domestic animals;
- the product is easy to use (put into operation);
- the product should be cheap.

The protection of wood used inside buildings for interior design refers to the wood used for interior design: paneling, exposed beams and pillars, interior stairs, parquet, where there is virtually no risk of degradation by biocidal agents.

However, attacks of wood-eating insects that existed in the wood before its introduction into the work can be reported, which were not noticed when sorting the wood material. The insect attack can also come from other neighboring constructions.

Oak wood has high mechanical strength, high durability over time (over a hundred years compared to several decades for softwoods). Recommended for:

- luxurious finishes (paneling);
- floors subject to a high degree of wear;
- steps to interior stairs (figure 1 and 2);



Fig. 1. Interior wooden stairs
Source: Personal foto

Integral wooden structures are recommended for the construction of holiday homes and hunting lodges.



Fig. 2. Room with softwood interior walls
Source: Personal foto

The hunting lodges are tourist reception structures, of low capacity, located in rich areas with hunting background, which provide accommodation conditions and additional services specific to the activity.

Their location can be in any mountainous, hilly, plain, meadow or delta area where there is hunting ground.

Some differentiation is made only depending on the type of game.

The wood is also recommended for tourist refuges and alpine refuges which are tourist reception structures, located in isolated and hard to reach places in the mountain area, usually at high altitudes, with a low capacity and a minimum degree of comfort. They are not classified.

The hunting restaurant is a gastronomic unit specialized in the production and serving of game dishes (rabbit, deer, wild boar, bear, geese, wild ducks, etc.), having by arrangement, endowment and presentation of staff specific, particular elements.

Tourist cabins are tourist reception structures, of relatively low capacity, operating in independent buildings where we meet wood as a building material, with specific architecture, which provides accommodation, food and other specific services, necessary for tourists hiking or resting in areas mountains, nature reserves, near spas or other tourist attractions.

The wooden structure rises on a platform which in turn rests on a plinth and foundations, which can be made of stone and concrete or natural stone.

Inside, the structure is partially apparent, the closing of the ceiling between the beams and the interior finishing of the walls are made with plywood boards, simple or profiled, lacquered with colorless varnish.

The floor can be made of floors or parquet and the exterior closures with cabinets. You can also use cladding with folded boards or sections with wooden trunks. The finish is provided with varnishes and paints. For thermal insulation, mineral wool can be used, protected inwards by an aluminum foil, as a vapor barrier.

In the case of these integral wooden constructions, light shingles such as shingles and shingles are recommended, and as ways to limit the contraction of wood due to hygroscopicity, smaller pieces or naturally dried wood can be used.

In order to avoid rot, it is considered the observance of the rules for sorting the healthy wood material, for storage and storage, for the superficial or deep impregnation with antiseptic, fungicidal substances.

Various ways of ventilation waterproofing will also be used which have the effect of removing moisture.

The wood can be used for fences, garden furniture, exterior walls, exterior ornamental cladding

The particular case of structural panels based on OSB, chipboard, plywood and

expanded polymer core PUR and EPS will follow the same protection principles as for solid wood (depth or surface methods), adding in addition the need to improve the combustion characteristics of core by adding flame retardants to the casting of the respective polymers. Also noteworthy are the properties derived from the chemical composition and structure of polymers, as sterile environments from a biological point of view and impermeable to moisture.

To solve the low fire resistance of wood, several fire protection measures are used by impregnating the wooden parts before use with various flame retardants.

The existence of numerous mountain tourist routs entails the need to find places to stop or even stay overnight for tourists who cross the respective lands. The sheepfolds located near these mountain trails built of wood can be capitalized by including them in tourist circuits, where in addition to accommodation tourists are offered the opportunity to taste traditional products and participate in specific activities, becoming a new tourist structure.

If the sheepfold is accepted as a new tourist structure, we must keep in mind that it could function without problems at the level of a tourist refuge.

The modernization of these traditional sheepfolds must be done to correspond to the hygiene and organization of internal flows so that the products obtained by processing milk can be certified, registered and sold on the free market under the conditions imposed by U.E. norms. in the field of traditional products.

It is very important to mention that the modernization must not be done chaotically, aiming only to reach the parameters that guarantee the certification and registration of the traditional products obtained in a sheepfold.

Under these conditions, CEFIDEC (Training and Innovation Center for Development in the Carpathians), Vatra Dornei tried from an architectural point of view to maintain as rustic an image as possible, both on the outside and inside it.

Depending on the location, the submission of a classification and approval process, such a structure could be introduced in the tourist circuits. Due to the fact that this

type of tourist structure is not found in the national legislation, the specialists from „C.E.F.I.D.E.C. Vatra Dornei ”, propose its assimilation with the tourist cabins or with the hunting and fishing cabins in order to be classified and homologated.

Based on what currently exists in the legislation, tourist sheepfolds could be classified as follows:

- sheepfolds located in easily accessible places (altitude below 1000 m);
- sheepfolds located in hard to reach places (mountain ridge areas and hard to reach)

The classification of tourist sheepfolds may depend on the number of beds / room, with the possibility of being framed by one or two flowers.

The modernized sheepfold could solve both the problem of hygiene and food security, as well as the accommodation of tourists during the summer period, and in some areas even during the winter.

The tourist sheepfold can represent a major interest, due to the offer of accommodation services, meals and the possibility to participate in some specific activities within the sheepfold, both for those who organize the activity and for the tourism in those areas.

Under these conditions, the tourist sheepfold can be viable, being able to ensure the comfort and safety of tourists even in the alpine hollows at altitudes of over 1000 meters.

CONCLUSION

Modern wood processing technologies have allowed the extension of the field of use from softwoods (fir, spruce) and hardwoods (beech, acacia) to all wood species, including poplar and willow.

The use of wood in construction and tourist facilities is justified by a number of advantages due to easy processing, assembly and handling.

Relatively long pieces can be obtained from wood for some construction elements, this ensuring a proper thermal and sound insulation.

Wood has a relatively short service life compared to other metal, masonry or concrete constructions.

The wooden construction structure rises on a platform which in turn rests on a plinth and foundations, which can be made of stone and concrete or natural stone.

Inside, the structure is partially apparent, the closing of the ceiling between the beams and the interior finishing of the walls are made with plywood boards, simple or profiled, lacquered with colorless varnish.

The floor can be made of floors or parquet and the exterior closures with cabinets.

The finish is provided with varnishes and paints. For thermal insulation, mineral wool can be used, protected inwards by an aluminum foil, as a vapor barrier.

In the case of these integral wooden constructions, light roofs such as shingles, shingles, etc. are recommended.

As a way to limit the contraction of wood due to hygroscopicity, smaller pieces or naturally dried wood can be used.

The avoidance of rot has in view the observance of the rules of sorting the healthy wood material, of storage and storage, for the superficial or deep impregnation with antiseptic, fungicidal substances.

Moisture removal can be done by various ways of waterproofing and ventilation.

To solve the low fire resistance of wood, several fire protection measures are used by impregnating the wooden parts before use with various flame retardants.

More and more harmful materials will appear in the future if we do not prevent and return to healthier and more natural building materials.

After use, the building materials can be safely returned to the environment.

Raw materials and high consumption of materials will force us in the future to give more and more importance to raw materials and reuse of materials.

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