

WOOD IN THE URBAN ENVIRONMENT IN ALBANIA

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Abstract: Several cities in the country have experienced the rapidly-growing period for more than two decades. New technologies are playing an important role in the green building performance encouraging new architects, engineers and investors in choosing ecological materials. Referring to the European Commission and building codes, recent regulations of local plans for various municipalities emphasize in particular the environmental improvements in urban areas, especially areas with cultural heritage. The scope of this study is to highlight the wood applications as a green material for the construction/restoration phase in residential buildings, dwellings, interior spaces, façades and multifunctional buildings in the urban environment.

Keywords: Ecological materials, Local plans, Environmental improvements, Urban area

1. Introduction

The wood applications have played an important role in establishing the urban architecture in the cities represented in this paper. Timber has been chosen for many reasons in the urban spaces. At the beginning the selection was made as an economic solution. Engineers used to project buildings with wood because it was easier for the construction phase. Analyzing the usage of wood in the urban environment three are the periods that can be distinguished:

- a) building constructions in wood before '90;
- b) building constructions in wood after 2001;
- c) restoration of urban centers and building facades from 2013 till nowadays.

The period before the '90 experienced the applications of wood in a high percentage referring of the whole construction. The roof construction and shelters were in timber (*Fig. 1*). In order to strengthen the shelter, but at the same time to create a typical facade design, engineers and architects used to apply vertical elements in wood (*Fig. 1*) [1].



Fig. 1. Wood in roof construction and shelters in Shkodra and Gjirokastra

The exterior walls were realized in a combined construction of masonry with clay mortar+wooden panels applied in two techniques, which consisted in combinations of the above mentioned elements as well as small stones or wood panels. Wood beams were used in longitudinal and transverse links to reinforce resistance to earthquakes. The type of wood used in adobe dwellings was the oak. Balconies and verandas used to create an assembly that evaluated wood (*Fig. 2*) [2]. This facade has changed during the restoration phases by adding more interior spaces and increasing the total volume of the building [3].

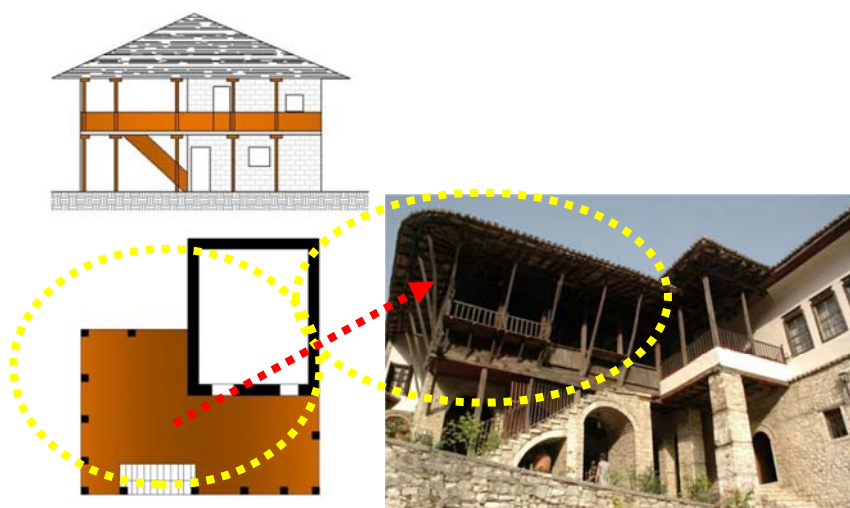


Fig. 2. Wood in balconies in Berat-before and after reconstruction phases

Due to the geographical position residential buildings in Berat were characterized for a horizontal development where wood dominates the building facades, especially in wooden frame windows, 119 ranch shutters and wooden doors (*Fig. 3*). Dwellings were organized in two or three levels and due to the sloping ground were developed with unilateral ventilation. Due to this fact the city of Berat is named the 'City of windows'. There are 108 monuments of culture in the city of Berat where Mangalem neighborhood represents a unique architectural complex (*Fig. 3*).

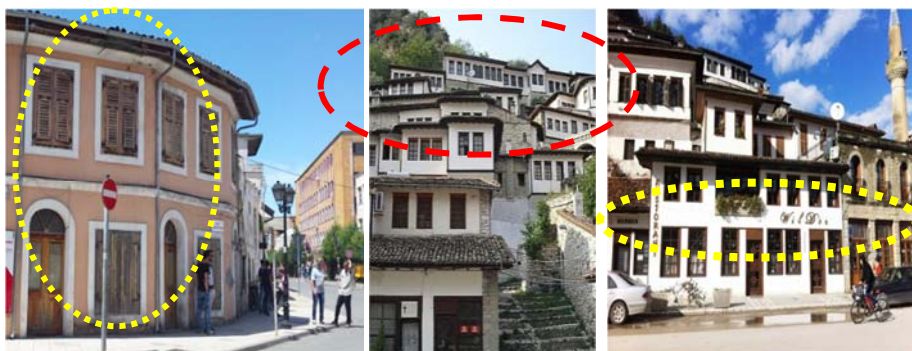


Fig. 3. Wooden frame windows and wooden doors in Shkodra and Berat

Another aspect of wood applications was the interior part of the building. Wood was applied as a finish material in floors and ceilings until the '90s (*Fig. 4*).

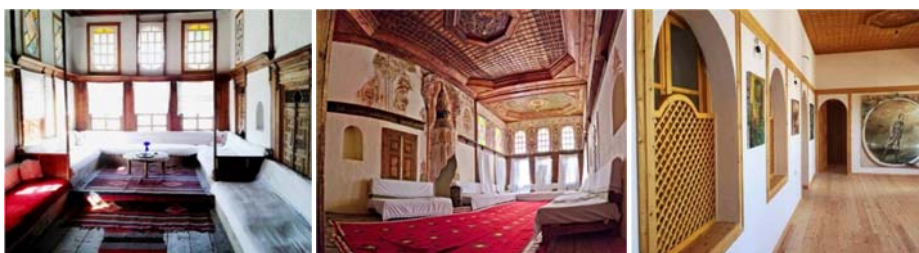


Fig. 4. Wood applied in floors and ceilings-Gjirokastra, Berat, Tirana

Based on statistics of INStitute of STATistics in the Republic of Albania (INSTAT) regarding the buildings that have used wood-construction in the respective cities, there are three classification groups. The first refers to the years before the 60s, where the total number of wood in urban center's building scored 1667 (*Table I*), (*Fig. 5*). The second one is the period from 1961 to 1990 where wood in buildings marked an increase of 3094 (*Table I*), (*Fig. 5*). The third group belongs to the period of 1991-2001 where there was a decrease of buildings in wood material scoring 1977 (*Table II*, *Table III*), (*Fig. 5*) [4].

Table I

Application of wood in building constructions through 1960-1990

Year of Construction	Prefabricate	Brick, stone	Wood	Other
Before 1960		101.286	1.667	5.953
1961 - 1990	21.594	243.372	3.094	13.368

Table II

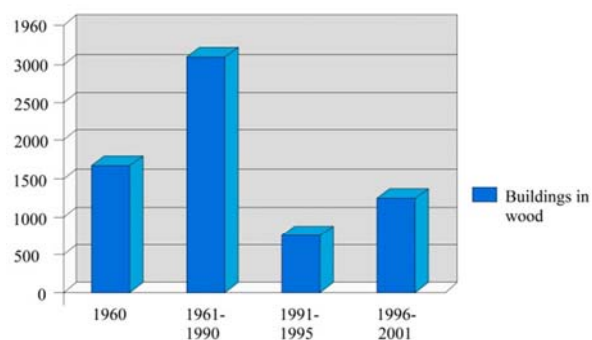
Application of wood in building constructions through 1991-1995

Prefectures	Prefabricate	Brick, stone	Wood	Other
Total	4.575	43.324	743	4.238
Berat	285	3.045	64	299
Gjirokastrë	43	994	5	17
Korçë	31	2.652	9	56
Shkoder	115	3.085	29	116
Tirana	1.720	9.722	143	1.611
Total	4.575	43.324	743	4.238

Table III

Application of wood in building constructions through 1996-2001

Prefectures	Prefabricate	Brick, stone	Wood	Other
Total	7.776	59.811	1.234	6.145
Berat	405	2.822	25	282
Gjirokastrë	47	984	6	18
Korçë	103	3.336	12	35
Shkoder	221	4.756	89	415
Tirana	3.541	17.585	355	2.993
Total	7.776	59.811	1.234	6.145

*Fig. 5.* Wood construction buildings through 1960-2001

In the second period, after the year 2001 a special attention was given to the wood from the interest groups:

- a) the private sector;
- b) the public sector.

The private sector was focused initially in the interior space, designing and implementing different furniture styles. At the same time show rooms began to import furniture from abroad. The new technologies in windows and exterior doors replaced wooden frames with those of aluminum (*Fig. 6*) and influenced buildings with different functions: multi storey building and villas inside the urban environment [5, pp. 23–60].



Fig. 6. Replacement of wooden frame windows with aluminum frames in restoration phases of existing buildings and new buildings in Tirana

Furthermore, roof constructions were replaced by terrace construction by creating a lack of thermal comfort. The wood applications in buildings for the recent decade aim to improve the ecological impact of green urban design. Urban centers of Tirana, Shkodra, Berat, Gjirokastra and Korca, reflects the traditional and historical heritage by using wood especially during the restoration phases. The first two cities are considered as metropolitan cities characterized in high multi-storey buildings and different functions. The importance of wood is seen not only in buildings with residential functions but also in sport centers, commercial spaces and urban spaces. In addition, the wood applications emphasize the important role in building facades, windows and doors as a constructive material combined with concrete. The last 3 years are identified for restoration in buildings with historical value. Their interiors apply wood as the main material in ceilings, floors, dividing space panels, furniture, etc.

2. Sustainable strategies for sustainable cities

Since the cities have expanded their boundaries one of the main scope for improving their healthy performance is the reduction of air pollution. Transportation (public and private) has shown for a direct effect on this issue. The number of citizens in the ‘target’ cities has increased. The distances are much larger than two decades before affecting the

growth of levels of air and noise pollution. The sustainable strategies for the urban centers taken in analysis are:

- a) the blockage of several road sections for vehicles-creating pedestrian walkways;
- b) the selection of sustainable materials for the restoration phases;
- c) increasing the greenery (*Fig. 7*) [6].

In Berat wood was chosen for park benches in order to realize a visual connection through traditional materials of buildings and landscape (*Fig. 8*).



Fig. 7. Pedestrian walkways, greenery in urban spaces in Shkodra and Tirana



Fig. 8. Wooden park benches inside the urban area

3. Methods for an ecological future

Recent time requirements for the country's integration highlight the green sustainability in urban plans and architecture. Much of the focus of green building is on reducing a building's energy consumption (To achieve a better insulation, more efficient appliances referring to Heating, Ventilation, and Air-Conditioning (HVAC) systems). On the other hand, reducing the negative effects for the human health indicates to be achieved by the controlled ventilation and humidity referring to new buildings and existing prefabricated apartments [7]. The energy management monitoring in the urban environment is another important issue. Improving the energetic consumption and the

building strategies, carbon dioxide emission can be reduced [8]. In addition, choosing building materials that exhibit positive environmental attributes is also a major area of focus. Wood has many positive characteristics, including low embodied energy, low carbon impact, and sustainability. As this building materials results to be: renewable, low energy, low CO₂ emissions, sourced locally, reusable and recyclable, minimum waste, non-polluting it has shown its traces in the recent projects in urban area mainly in:

- a) restoration building facades - windows and doors;
- b) restoration and reconstruction of roofs;
- c) new bridges;
- d) new residential buildings inside this area;
- e) new sport centers.

In December 2016, the construction of one of the bridges of Lana River in Tirana, was realized in wood and metal construction (*Fig. 9*). The sustainable design aims to improve directly the impact in buildings and society starting with the smallest unit in urban level (residential groups) up to it with the greatest one (neighborhood-city).



Fig. 9. New bridge in wood construction finished in 2016 (Tirana, Lana River Bridge)

Also many problems referring to the thermal insulation characterize the prefabricated apartments [9]. This has affected the energy consumption without resolving the real problem. Other issues referring to acoustic and hydro insulation, lighting and natural ventilation are avoided with the new applied technologies giving positive results in life quality and human health. The sport center 'Tirana Olympik Park' represents a semi-finished project (still under construction) in one of the main neighborhoods in Tirana (*Fig. 10*). The curved roof is all in timber construction and it represents a timber-shell as many other constructions recently spread in the contemporary architecture (*Fig. 11*), [10]. The concrete structure is chosen for the floor and some of the few straight exterior walls (*Fig. 12, Fig. 13*). The two curved main facades are realized in metal construction combined with wooden curved columns and glass (*Fig. 14*). The interior spaces are planned to be in wooden finishes.



Fig. 10. 'Tirana Olympik Park'-sport center



Fig. 11. The timber roof construction



Fig. 12. Concrete construction of the floor and bricks on one of the walls

Other building typologies that have used wood are some new residential buildings and residential buildings that were built before the 90s like Toptan's House. Referring to the inherited architectural values, the building in 1963 was declared a cultural monument. The large wooden frame windows create an architectural rhythm in the main facade of the house (*Fig. 15*). Similar types of restoration are in Shkodra and Korca in some of the main axes of the cities, considered as attractive points in the city (*Fig. 16*).

The tradition of wood applications has continued for the new buildings. In Tirana, there are many examples (*Fig. 17*).

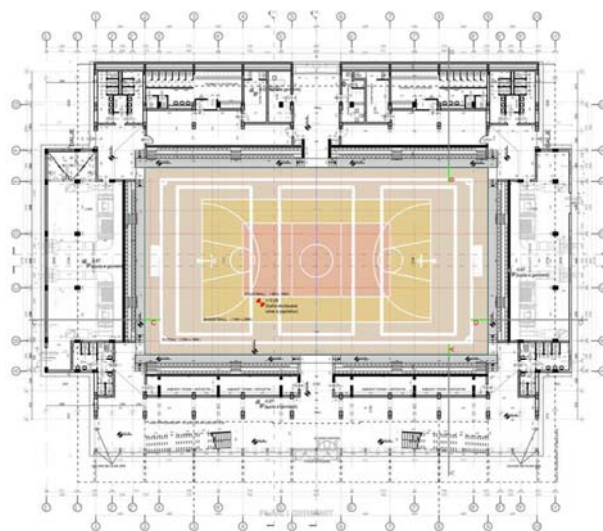


Fig. 13. Ground floor plan



Fig. 14. Wooden curved columns and metal construction



Fig. 15. Toptan's House-Tirana



Fig. 16. Wood in the urban environment of Shkodra and Korca



Fig. 17. Houses inside the urban environment-Tirana

4. The legal framework

An important role in improving the environment for an ecological future is the legal framework not only at the national level [11].

Even though it reflects a lack in materials specifications for building construction analyzes shows that law No. 10431, dated 09.06.2011, about environmental protection, is fully aligned with directive 2001/35/EC of the European Parliament and the Council of 21 April 2004 'On environmental liability, prevent and of remediation of damage to the environment' [12], [13].

The objectives are to control, prevent and reduce the pollution of water, air, soil and pollution of every kind. Another objective is the preservation and improvement of nature and biodiversity and equally important the conservation and restoration of cultural and aesthetic values of the landscape and buildings, in order to improve the quality of life and human health. From 2013, the urban centers of the cities taken in analyze, has been under construction using wood as a traditional material.

The Strategic Environmental Assessment (SEA) of the Regulatory Plan of Tirana (RPT), 2012 –had played an important role to order to improve the urban environment by proposing some scenarios [14]. The SEA of the RPT analyzes the environmental aspects of the urban environment in general as the use of land, flora, fauna, air and water quality, areas of natural beauty, areas potentially exposed to natural hazards; environment and built heritage - monuments and archaeological buildings, cultural and historical aspects and values, landscape values, historical city centers; economic and social activities - industry, health and education, and the impact that these have on the

environment [15]. Also, at the same importance is the infrastructure and provision of services - providing water, electricity and telecommunications; management of solid waste and liquids; mobility in traffic roads and transport; alternative mobility. While The National Agency for Territorial Planning, (branch of the Ministry of Urban Development and Tourism (MUDT)), in 2012 focused on environmental policies, rational resource, waste management, mobility in city, promoting environmental awareness to employees [16], [17].

5. Conclusions

Ecological impacts, for the cities taken in survey, are different in their urban environment. The use of non-ecological materials in interior and exterior building or urban spaces have caused high levels of noise, high level of pollution, physical fatigue, mental fatigue, diseases and stress. Referring to legal issues is difficult to find subsections related to the selection of materials in building construction. Wood as a building material from nature has increased aesthetic values especially in historical areas. These materials provided acoustic insulation and thermal comfort-indoor and outdoor the building spaces. Before the '90s, the materials applied in building constructions provided the rationalization of costs and time in construction. Materials represented in facades expressed a non-interesting architectural rhythm, which has caused visual fatigue while looking upon the city. Materials applied in buildings before the '90s were unable to provide thermal comfort for the interior space. At this time, the landscape around buildings was considered helpful for shaded urban areas. Material selections in buildings and their facades have affected the ecological impact after the '90s representing high levels of noise and air pollution in urban areas. Also, the lack of thermal comfort and humidity has been present in residential spaces. But the timber constructions have positive effects in reduction of noise pollution, providing a protecting environment with safety materials, reduction of carbon dioxide emission in the air, providing new patterns and diversity for the architectural language and aesthetic values for the community.

Recommendation

Usage of wood and timber construction represents a sustainable approach for the future development of the cities. At the same time it is a new way of projecting to encourage even more young architects, young urban planners, young designers to consider sustainable materials as an important part of the building, urban units and a healthy life.

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