

# Century of Change: A Thorough Analysis of Evolution of Building Materials and Techniques in Albania

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**Abstract:** The construction field in Albania today is one of the sectors with the most investments, domestic and foreign ones. These have led to a colossal leap in the number and types of buildings that are built today. During the last century, the construction industry in Albania has been influenced by many factors, the availability of materials, the techniques and principles used in construction and the need of people for housing, buildings. In this article we will examine the evolution of construction materials.

As a first case of the study, we will take a look into the early 20-30s in Albania where houses were built with organic materials like wood, brick, mudbrick and stones. Later, during the Italian occupation, the first attempts started in Albania for buildings with much harder materials such as the use of reinforced concrete or concrete blocks.

In a second phase during the 50-90s in Albania, from the Eastern European influence, an increase in construction is noted. Now buildings were made of prefabricated materials, full baked clay bricks, silicate bricks in addition of concrete and steel. Buildings during this period began to rise and reach up to 5 floors, with the exception of one of the most prominent buildings at that time, the “Tirana” Hotel, which reached 15 floors.

Through the third case study of this article, is been studied the phase from 90s to today. Starting from the beginning of period where the use of reinforced concrete columns, accompanied by numerous masonries with perforated bricks, to today, where we have reinforced concrete structures accompanied by glass, metal cladding, the use of thermal insulation, waterproofing materials, and so much more.

As a conclusion, through this article we will be able to learn and understand how through the past 100 years, construction materials in Albania have gone from the use of traditional materials such as stone and wood to the use of modern materials such as glass, steel or aluminum. Obviously, the transition of building materials in Albania over the last century is a reflection of the country’s profound political and economic changes.

**Keywords:** wood, brick, mudbrick, stones, reinforced concrete, concrete blocks, baked clay bricks, silicate bricks, glass, metal cladding, perforated bricks, thermal insulation

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## I. Introduction

Albania over the last century has gone through a diverse and complicated history. Starting with the period under the leadership of King Zog, followed by the Italian and German invasion, the communist period, and the beginning of democracy in our country until today. These events have had a major impact on every field, specifically in the field of construction, since construction materials have been transformed in accordance with the economic, political, and technological conditions of each period.

As a result, in this article, we will study the evolution of construction materials used in Albania by analyzing each phase that our country has gone through that has brought the most fundamental changes.

At the beginning of the XX century, Albania was an underdeveloped country with a very weak economy and no technological development.[3] Private buildings were built with materials that were easily found on Earth such as stone, wood, straw, and clay. Houses were rare, where a family of many members could live in one building which was one or two stories high. [2] Later on, during the years of the Italian occupation, Albania was involved in a rapid period of urban development and construction. Italians as invaders, brought to Albania modern construction technologies and materials for the time, such as concrete and steel. The cities that experienced greater development were Tirana and Durrës, therefore as case studies, we will analyze a building built in the capital city, Tirana.

During the communist period in Albania, after the war was finished, it was necessary to renovate the country’s infrastructure since the war had left behind great destruction. Access to construction materials was limited, as Albania was a country isolated from Western Europe, and the state was the only factor in the allocation of resources and materials. [14] Construction materials mainly used were concrete, steel, brick, stones, asphalt, and bitumen. The focus was on durability, mass production, and practicality, over aesthetics. For this period, we will take studies on the National Museum of Tirana.

Since the fall of communism and until today, Albania has taken a strong turn in the development of architecture, urban planning, and infrastructure. Nowadays, the construction industry is at its peak in Albania.

Various buildings, major domestic and foreign projects have been built and are being built. The use of construction materials is increasing with each passing year. Materials such as reinforced concrete, steel, and glass became more common in modern construction. In large cities such as Tirana and Durrës, multi-story buildings, shopping malls, and urban infrastructure were built with the most advanced materials available on the international market like thermal insulation materials, stainless steel, drywall, high-performance glass, and green building materials. As a case study, we will analyze Downtown One building located in Tirana, Albania.

## **II. Procommunism Period in Albania**

As the first part of our study, we will analyze the pre-communist period in Albania. The Italian and German invasions of our country have had a huge impact on the history of our country, which has led to a massive change in the construction, architecture, and urban planning in the country. The architectural heritage of Italian style and its monumental structures built during the '30s in Albania possess precious architectonic and cultural elements. Before studying the change that was experienced by the Italian architects, let us examine the buildings and materials used in Albania during the 20-30s.

During this period Albania had limited access to construction materials. Traditional Albanian houses during these years were built with materials found on Earth such as stone, wood, straw, clay, and mudbrick.

Stone was used for the foundation of the building and wood for its structure, while the walls were built with mudbrick material. Mudbrick walls are erected starting from a higher level since stone walls extend up to the first or second timber beam. In two-story houses, the first level wall is made of mudbrick, while the ground floor is made of stone retaining walls. [1]

The proportion of stone to mudbrick in Albania's traditional structures ranged from 1:4 to 1:1. Mudbrick was considered a good material for insulating against temperature, keeping the house warm in winter and cool in summer. [1]

Later on, a new Italian spirit came to the field of construction in Albania, which brought radical changes in the history of construction in Albania.

### **Case study: Villa Nepravishte, Tirana, Albania**

Taking as a case study the Nepravishte villa built in Tirana during the late 1930s by Giulio Bertè, we will note the construction materials used.

The floor slab was composed of reinforced concrete beams and excellently worked bricks.

In the basement, the load-bearing walls of reinforced concrete were built with a thickness of 50 cm while on the ground floor and the first floor, the load-bearing walls in solid bricks were built with a thickness of 45 cm. [4]

The foundations were made with long continuous plinths that developed on the traces of the load-bearing walls, joined to each other to form a sort of network.

The structure of the building was very stable, thanks to the compactness of the volume, limited number of floors, lack of strong overhangs, and limited extension.



Figure 1 and 2 Villa Nepravishte, Tirana, Albania [4]

## **III. Albania during the communism period**

After the end of World War II, Albania was under the communist system. During this period, the need for the construction of private and public buildings and infrastructure was imperative as a result of the devastating consequences of the war. Since the country was isolated, most of the construction materials of that time were domestically produced.

As a result, some of the construction materials used at that time were:

Reinforced concrete, used in homes, factories, public buildings, and infrastructure

- Prefabricated concrete was used mostly in the many apartment blocks, mostly in the main cities

- Structural steel was used in combination with concrete for bridges, industrial buildings, and large-scale buildings at that time.
- Industrial bricks, produced in large quantities in local factories
- Granite and limestone, travertine- used for decorative facades of monuments and public buildings.
- Oak, pine, and beech wood, with limited use from earlier times, with primary use for floor elements and window frames.
- Glass was used mostly in building windows.
- Plaster and lime mortar were used mostly as the final layers of walls in residential and public buildings.
- Asphalt was used for road infrastructure, while bitumen was used as a cementitious material for waterproofing. [7-14]

Some of the most characteristic buildings during this period were:

### **Prefabricated Buildings**

These buildings in Albania constitute an important development in the industrial progress and the wide housing of the population throughout Albania. The most common objects for housing the population were palaces, with a most common height of 5 floors. The buildings were built with panels, where these panels included walls, walls with windows, walls with doors, socles, and beams. All these panels were made of either silicate bricks, solid clay bricks, or C25/30 concrete, the most resistant concrete class considered in Albania at the time.[25]

Bunkers - Bunkers were another trace of the use of steel and concrete in Albania. With about 750 thousand bunkers, the use of concrete and steel was very high. The concrete was of class C25/30.[18]



**Figure 3 Prefabricated building in Lushnje, Albania .[19]**

Other buildings - International Hotel Tirana, was one of the greatest prides of the then regime in Albania, with a height of 15 floors, a facade composed mostly of glass, with a reinforced concrete structure, at such a height, had never been seen in Albania. Other buildings where we

see the use of different materials were the Polytechnic University of Tirana, where the latter, like the Academy of Arts, the Opera and Ballet Hall, had a facade of travertine tiles. The National Museum also enjoyed the same facade, but it also had a mosaic of ceramic tiles on its front.[15]



**Figure 4 Bunkers in Albania [18]**

### **Case Study: National Museum of Tirana**

The National Museum of Tirana, built in 1981, a historical and cultural building, best reflects the architecture and building materials of the communist period in Albania.

Below are some of the main materials used:

The dominant material for the construction of the main structures of the museum was reinforced concrete, including the foundations, walls and supporting structures. Reinforced concrete was used to create a durable and strong construction.

Steel, in addition to its use in the manufacture of load-bearing structures such as columns, is also used in some decorative elements. [16-17]

To divide the internal spaces of the museum, for internal walls and for dividing rooms we can notice the use of concrete blocks and concrete bricks.

Glass was used for the Museum's windows, which allowed natural light to enter the museum and created more open and bright spaces.[16-17]

A very important element of this historic and magnificent building for its time was the facade of this National Museum. On the facade of the National History Museum is a mosaic measuring 37 x 11 m, which



**National Museum of Tirana [22]**

consists of 13 figurines approximately 10 meters high and occupies an area of 400 m<sup>2</sup>. The facade was built using concrete tiles, colored and decorated to create an imposing appearance.[15]

The use of these strong and durable materials for the construction of this museum is also a reflection of the state's policies to build a strong and sustainable image for Albania.

#### **IV. The evolution of construction in Albania after the fall of communism**

Another historical event that has had a great impact on the entire country of Albania, specifically in the field of construction, has been the fall of communism and the beginning of democracy. In this part of the article, we will analyze the changes that have occurred in the construction materials used in modern times. New construction materials that we can immediately identify, based only on their need today in Albania are:

- **Concrete with advanced additives**

Modernized concrete with additives such as fly ash, silica fume and superplasticizers has improved strength, durability and workability, replacing older and simpler mixtures. The class of concrete has also increased. The construction of high-rise structures, bridges and carabiners of various types of reinforced concrete, have led to the application of new policies and regulations in the use of construction materials such as concrete. The history of earthquakes in Albania has led to the use of increasing the class of concrete, where the most used class today is class C30/37, and above, where in particular very high-class concrete uses today's prefabricated elements, since most of them work in a pre-stressed state and are used in objects of high importance.[24]

- **Reinforcing Steel Improvements (Armafor)**

High-strength steel reinforcement has become more common, improving the structural integrity of buildings and infrastructure projects. High-strength steel reinforcement is widely used for reinforced concrete structures, with excellent ductility and weldability. Locally produced or imported, it meets seismic design standards.[24]

- **Stainless, ferritic and martensitic steels**

In Albania stainless ferritic and martensitic steels are applied in decorative and industrial field, commonly used for corrosion-resistant appliances. [24]

- **Thermal insulation materials**

Thermal insulation materials such as polyurethane foam, expanded polystyrene (EPS), and mineral wool have been lately introduced in Albania for better energy efficiency, especially in urban residential and commercial buildings.[24]

- **Drywall**

Drywall has become a popular choice for interior walls and ceilings especially due to its cost-effectiveness and ease of installation. [24]

- **Environmentally friendly materials**

Green building materials such as bamboo, recycled concrete aggregates, and sustainable wood products have gained traction in specific projects. It must be said, however, that green building materials in Albania are mostly used for interior design. Albania still has a long way to go in terms of using these types of materials.[24]

- **Glass innovations**

High-performance glass like double-glazed glass is now used in modern buildings for energy efficiency and aesthetics.[24]

#### **Case Study – Downtown One Tirana**

One of the Albania's skyscrapers buildings is Downtown One in Tirana, , a 140-metre tall mixed-use tower. This building consists of 13 floors, which include office floors, apartments and spaces dedicated to various services. [20] For this building, we will study and analyze some of the innovative materials used for its construction that reflect the evolution of construction materials used in modern times in Albania.

High-quality concrete, class 35/45 and 40/50 concrete, was used for the construction of the foundations and other important supporting structures.



The interior walls, in addition to the high-quality concrete walls, we can also notice the use of drywalls. For the exterior walls, we can highlight the use of advanced insulation materials such as XPS.

In addition of the insulation materials, acoustic insulation materials have also been used to reduce noise from the surrounding areas and create better living conditions for residents and office users. For interior details, natural materials such as recycled wood were used for decorative elements and parquet used for floors. [20-21]

The facade of Downtown One has a particularity of using 3D design. These 3D tiles are designed to give the facade a unique texture, all these tiles represent the map of Albania.

Another interesting aspect of the facade of this building is the use of plants that, in addition to giving a more attractive appearance, also contributes to regulating the temperature inside the building.

The use of smart LED lighting is another innovative feature in Downtown One. The lights are smart and can be adjusted automatically depending on natural light and energy requirements.



**Downtown One, Tirana [21]**

Going through the journey that Albania has had through the last century we can understand better valuable insights how the country's economic, architectural and industrial development has progressed. From traditional, locally sourced materials to the widespread use of advanced materials is a mirror of how Albania has changed from a rural, socialist economy to a rapidly urbanizing society.

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