

## Wooden Architecture's role in maintaining eco sustainability

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### **Synopsis :**

Wood played an important and vital role in the construction of buildings as a structural material in the design of structures, frames, coverings and finishes of buildings from outside and inside or structural foundations. These wooden structures included temples, religious shrines, huts and dwellings in hot , temperate and cold regions, depending on the availability of forest trees and as materials for rapid construction that can be dismantled and installed , The value of timber arises from its natural properties and specifications as a building material . Wood is characterized by a variety of properties in terms of density, specific gravity, size and operability. Wood has an important environmental role, as the availability of its resources enhances the opportunities for its investment in commercial activities. The research deals with the variety of applications of wood construction in various uses, externally and internally, and in different climates and structural structures of roofs, walls, floors and covers. Wood is renewable, recyclable and environmentally degradable without contaminants. This research is a presentation guide and a global tour of some of the world's national architecture, which can simply be described as the architecture of peoples, Designed and built by communities, families and individual builders. It is also a message that national architecture is an important global product of our time

### **Introduction:**

The cultures of different peoples around the world are intellectual achievements that have evolved over many years through daily practices and the accumulation of practical experiences that have been established through the construction of many environmental housing complying with climatic, geographic and topographical requirements until they eventually reach the present-day configurations and forms. These houses reflect the skill of the builders' creativity and skill in shaping the environmental forms and adapting them to all natural conditions that imposed themselves on the inhabitants of these environments, whether hot or cold - shallow or mountainous or near rivers in forests, deserts or on the coast The Sea.

### **Research Problem :**

What role does environmental materials play in maintaining sustainability in terms of operation and adaptation to various climatic and natural conditions, terrain, human habitation and meeting all living needs in terms of residence, housing and sleep? Can wood be compensated in terms of consumption from the same environment? Can be used as a construction material?

**Significance:**

An attempt to understand and know experiences and cultures of other peoples as examples can be relied upon in modern applications in the case of evaluating of environment, housing eco system and construction technology .

**Objectives:**

The research aims to identify the environmental advantages of wood available for construction and completion processes, so that they are adapted to environmental and residential requirements and are subject to the living and climatic conditions of local communities. and to identify its culture, which has survived for hundreds of years without any fundamental change.

**Methodology:**

There are two main methodologies:

**1- Historical Methodology:**

It is based on an analysis of the factors and causes that led to the occurrence of the problem or objective in the past, in order to determine the extent of its impact and whether it has a positive or negative aspect of applying the same elements to another problem as well as presenting them in the present and developing or changing the future

**2-Descriptive Methodology:**

In terms of methods of construction, building and exploitation of natural materials available for the construction of these buildings.

**Discussion:**

The Arab environment is characterized by rich diversity in different climates. There are agricultural and botanical environments, oases, forests, plains, mountains, seaside beaches, river banks, sandy, rocky and desert environments, as well as hot and cold weather - dry and wet. The different environments also provide building materials from either land, such as limestone, sand, basalt, granite, marble, rubble, sand, mud, wood, wool, or sheep. The natural environment in the Arab world is a microcosm of the global model in terms of the richness of diversity in building materials, which in turn has influenced architectural forms and construction methods.

Wood construction methods have developed to the level of the complex construction. What is important here is to present several models of wooden building, either as a single material or related to other non-wood materials, and each environment has its own structure.

**Contents:****Definitions:****1<sup>st</sup>: Sustainability**

An environmental formula that describes the survival of biological systems as diverse and productive over time. Sustainability for humankind is the ability to preserve their long-term

quality of life and to conserve the natural world and responsible use of natural resources. It has the following characteristics:

### **1. Geographical distribution:**

It includes models of buildings spread across five continents and in regions characterized by biodiversity, topography and climate. The dense presence of forests in the northern and southern hemispheres has provided a ready source for construction materials.

### **2. Historical extension:**

It includes buildings dating back to the last tens of centuries until the present era.

## **2<sup>nd</sup>: Structural Composition**

The structural properties of wood material, strength and height have been made to be ideal for building structures, walls, floors and ceilings. This depends on two main factors:

### **1- Types of Structural Timber:**

**A-**Real wood including hardwood and softwood.

**B-**Poaceae, including cane, bamboo, reed, straw, grass, palm branch, wicker, rattan and willow.

### **2. Poles, posts and coverings:**

The various forms of shelters in the world use flexible poles to form a straw-covered structure that is used by nomadic peoples to create a lightweight shelter that is easily erected and dismantled.

#### **A -Bamboo:**

Bamboo is an authentic raw material on the five continents. It has been used in local buildings for 2,000 years for its strength, durability and light weight. Its rapid growth and a valuable source of sustainable buildings in the future.

#### **B -Reed:**

Reed is best used in the manufacture of straw and mats for construction. The two best examples of the construction of reed are the Shatt al-Arab communities in southern Iraq and the peoples of the Urus on Lake Titicaca in Peru.

## **3<sup>rd</sup>: Asian wooden structures:**

There are examples of such architecture in countries such as Japanese Minka and Machiya, Indian Toda huts, the Philippines Kalinga and Indonesian Tongkonan and Korowai, Balinese Koren and Iraqi modhif reed house.

## **4<sup>th</sup>: African wooden structures:**

Examples of such architectures in Benin Ganvie stilt houses. Kynian Rendille Min , Malagasy Zafimaniry House and South African Zulu Indlu,

**5<sup>th</sup>: European wooden structures:**

Such as Dutch Wind Mills, British Cruck Frame Building, German Hallenhaus, Skandinavian Sami Gamme & Goahte, Russian Izba, East European wood churches and Slovenian hayrack and bee house.

**6<sup>th</sup>: North American wooden structures:**

Examples of such architecture of native Amerindian Haida plank houses in Canada and Alaska, Mexican Tzotzil Chukal Na, American Big Barns, I House, Cracker and Salt Box, Log Cabin and Shaker Style Buildings.

**7<sup>th</sup>: South American wooden structures:**

Such as Caribbean Chattel Houses, Brazilian Yanomami Shabano, Colombian Paisa houses, wood churches of Chiloe and Peruvian Urus Reed Houses.

**8<sup>th</sup>: Australian and Oceania wooden structures:**

Such as Aboriginal shelters, Samoan Fale Tele, Maori Meetinghouses and Abelam Spirit Houses.

**Results:**

Each environment has its own character in terms of all terrestrial elements, natural resources and the quality and culture of the people living there. A conscious designer who is aware of the needs of the residential environment when designing and managing environmental resources must understand the requirements and needs of the residential environment so that the design is not a burden and a waste of those resources, As well as the response of the residential environment to all living conditions of lighting, ventilation and cleanliness of the place and structural strength and quality of design and the expansion of internal spaces and the extent of their responses to the needs of the population.

**Recommendations:**

The civilized world tends to preserve natural resources, reduce fuel consumption, replacing of cheap clean energy sources such as solar, wind and water, with no emission of environmental pollution. Thus designing urban environments that meet the demands of space occupancy, including thermal and sound insulation and moisture proof. Thus achieving sustainability and extending the life of the residential space in terms of various internal activities There is also no contradiction between the use of modern technological methods and the preservation of traditional methods of construction and implementation. Modern technology can accelerate ambitious future projects based on the same old principles of home design.

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