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## TITLE:USE OF LIGHT WEIGHT MATERIAL FOR CONSTRUCTION

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### Abstract

The paper deals with an introduction and application for Super performing building materials .Some light weight construction materials are have low density and high specific strength as well as other attractive characteristics such as corrosion resistance , dimensional stability high durability, availability and great life span .The light weight concrete has many advantages as compared to conventional concrete . This paper represents a review of the types of material and there applications of the light weight materials . The different types of materials were discussed and compared light weight construction usually results in higher weight reduction and factors of safety. The uses and properties for each type of light weight material was reviewed in this paper . This paper also discuss about the application of light weight materials

**Index Terms:** *Light Weight Materials , Mechanical Properties , Applications , Uses , Additives, etc.*

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### 1.Introduction

Replacing cast iron and traditional steel components with light weight materials . Such as high strength steel ,Magnesium alloys ,Polymer composites .The light weight material is estimated to grow at a CAGR of 8.5% from 2014 to 2019 and reach a value of \$133.1 billion .The demand is increasing and will continue to increase due to the strengthening of standards of CAEE regulations in the US and the European Union regulations on Co2 emissions for vehicles in the recent past .

DURING THE INDUSTRIAL REVOLUTION OF The 18<sup>th</sup> and 19<sup>th</sup> centuries , the basic materials of construction were spares . There was wood , stone , Brick and mortar and iron and steel . however , the iron and steel of that day were vastly inferior to the once used today . in 1709 , Abraham Darby establish a coke-fired blast furnance to produce cast iron and by the end of 18<sup>th</sup> century . with the Adwent of 20<sup>th</sup> century , Improved light weight materials such as, aluminium , magnesium , beryllium , titanium , Engineering plastic,

structural ceramics and composites polymer , Metal and Ceramic matrices began to appear

ALUMINIUM : Before the Hall - Heroult process was developed in the late 18805, aluminium was exceeding difficult to extract from its various once . Aluminium silicon alloy has proven to be exceptional due to corrosion resistance low wear rates and low thermal expansion . Aluminium is widely used in the automotive industry because of its low density i.e 2.7g/cm cube an advantage to weight reduction and gas mileage .These properties have become ideal in the production of a variety of automotive parts such as pistons, connecting rod and many more .

Bamboo : Bamboo is a wooden perennial grass that lives for an indefinite number of years . it grows fast , occurring naturally throughout the world , but particularly in tropical Asia . The Chinese bamboo or yellow bamboo has been introduced in several African and Latin countries where it is now found . Bamboo structures being employed to Solve The

most Varied of building tasks . This has a resulted in a wide range of Building characteristics , shape and structural details .

**1.1 Materials**

Light weight materials that are composed of wood plastic and sheet metals sand cements and even fibre . This materials are good for the construction of walls and roofs , light weight materials are use in automobile, aerospace , industry and building construction .

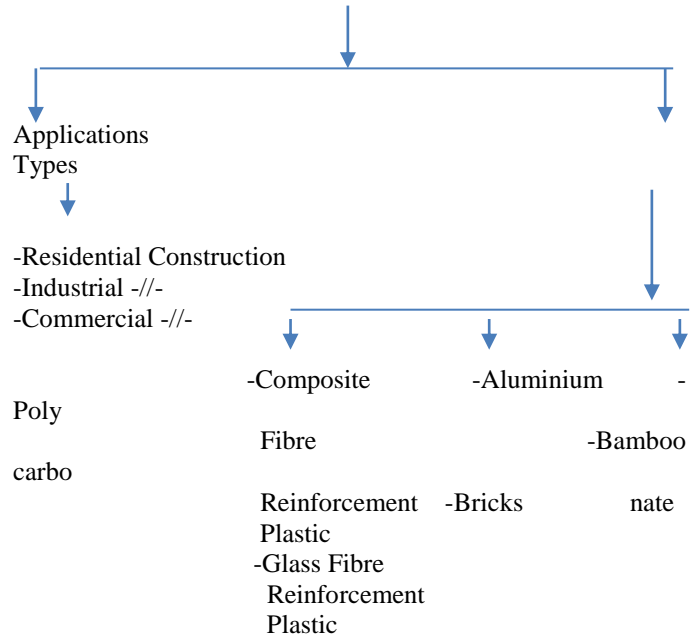
Some examples one can adopt are as follows :

- Aluminium doors and window frames are light weight in compression in to steel frames
- Bamboo can be used instead of timber and steel achieve the desire objective and at the some time bearing a much heavier load and it being a light weight materials . Bamboo also used instead of reinforcement .
- Suspension bridge with tension cables is obviously lighter than a truss bridge with welded bans which in turns is lighter than a box gnider bridge made of concrete
- Using Aluminium roof structure instead of timber roof structure will reduce the overall dead weight of the buildings .

\*Today lightweight materials :

The distinguish features of the materials covered in this book is that all have low densities range from as low as 0.80g/cubic cm for titanium in addition unfilled polymers have rather low tensile strengths that manage from 34 to 103mpa while epoxy can attain tensile strengths as high as 240mpa .

**Table-1: Name of the table SEGMENTATION**

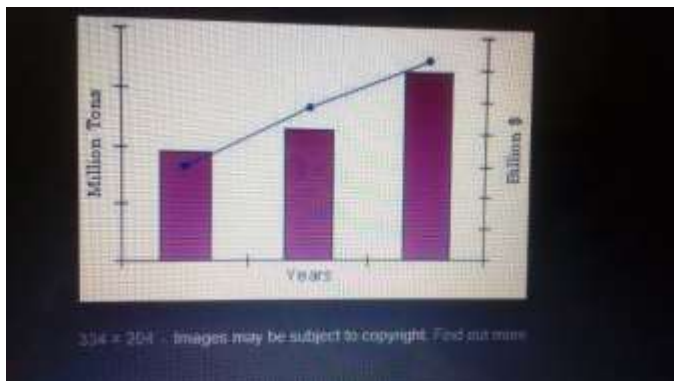


**ADVANTAGES :**

- Lightweight materials can also respond rapidly to temperature changes and cool rapidly overnight in warmer climates.
- Materials can be cheaper to produce and transport, particularly to remote locations and they often require less preliminary site works.
- Polystyrene also provides excellent insulation and can be used for walls, roofs and under floors.
- These materials generally have a lower embodied energy rating than heavyweight materials and may result in lower overall life cycle energy use.
- Different products can also provide the opportunity for increased design flexibility allow you to shape and finish the material in a range of different and innovative ways.

**RESEARCH :**

**INNOVATIVE CONSTRUCTION MATERIAL**



Some methods used for futures in innovative construction materials :

1. Translucent wood:

The much awaited and anticipated revolution in construction is gaining momentum . Development in concrete and various other construction materials has been aggressive and intense

2. Cooling system in bricks :

Through the combination of clay and hydrogel students at the institute of advance Architecture of catalnia have created a new material that has a cooling effect on building interiors . It is cooling effect comes from the presence of hydrogel in its structure which absorb water up to 500 times its weight . The absorbed water is released to reduce the temperature during hot days .

3. Martian Concrete: Concrete that can be used to build structure in mars now . The researching team at north western university has created concrete that ca be made with the materials available on mars .

4. Light generating cement

Dr Jose Carlos rubio avalas from UMNSH of Morelia has created that has the ability to absorb and irradiate light .From this light the cement generate the potential uses and there applications in huge ways .

5. Biological produce furniture :

This is very beautiful innovation in construction industry is the invention of bioplastic furniture from the innovation , They created two pieces of furniture That is the material chase lounge and a small chair this process is low energy pollution free and required less technology .

6. Self - Healing Concrete :

This is demonstrated by breaking the material in two , putting the pieces together and heating the concrete in the microwave oven . When the melted material cools down, it is join together .

7. Polution Absorbing Bricks :

This type of bricks in pollutants in the air and releases Filtered air . This material which is innovative design t be a part of a building standard ventilation system . It has two layers specialist brings on the outside and standards insulation on the inside .

1. Technology Point of view , a combination of light weight constructions and materials has the greatest potential . Therefore, anyone who wants to reduce the weights of components must be familiar with the limitations material construction .

2. One goal could therefore be to increase the payload of a vehicle without increasing the weight of the vehicle to the same possible payload without compromising its function as a safety of comfort and assistance system .



**CONCLUSION :**

1. The analysis of tense gravity structures reveals the concept that light weight is real measures of structural effectiveness .

2. These are light weights materials helps in save energy and higher life span and some material are making our pollutant free.

3. If these light weight materials are used in construction , then it have comparable durable and not existing heavy weight .

4. From the above discussion , we were conclude that the light weight materials from excellent for construction and provide better insulations properties for building constructions .

**RESULTS:**



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