The aim of using green building materials is to construct energy-efficient structures and to build those structures one should be aware of different green building materials, their properties and how they contribute into saving energy.

Contents:

Green Building Materials used in Construction

Following is the list of Green building materials used in construction :

1. Earthen Materials
2. Wood
3. Bamboo
4. SIPs
5. Insulated Concrete Forms
6. Cordwood
7. Straw Bale
8. Earth Bags
9. Slate/ Stone Roofing
10. Steel
11. Thatch
12. Composites
13. Natural Fiber
14. Polyurethane
15. Fiber Glass
16. Cellulose
17. Cork
18. Polystyrene and isocyanurate
19. Natural Clay
20. Non- VOC paints
21. Natural Fiber Floor
22. Fiber Cement

23.Stone

1. Earthen Materials

- Earthen materials like adobe, cob, and rammed earth are being used for construction purposes since yore.
- For good strength and durability- chopped straw, grass and other fibrous materials etc. are added to earth.
- Even today, structures built with adobe or cob can be seen in some remote areas.

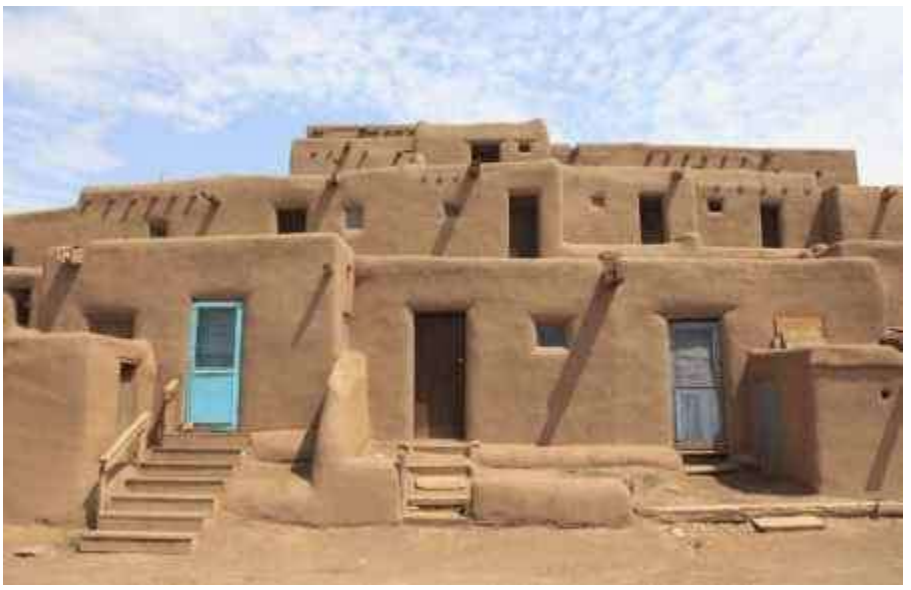

Fig 1: Adobe made Structure

2. Engineered Wood

- Wood is one of the most famous building materials used around the world.
- But in the process of conversion of raw timber to wood boards and planks, most percentage of wood may get wasted.
- This wastage can also be used to make structural parts like walls, boards, doors etc. in the form of engineered wood.
- Unlike solid wood, engineered wood contains different layers of wood, usually the middle layers are made of wood scraps, softwoods, wood fibers etc.

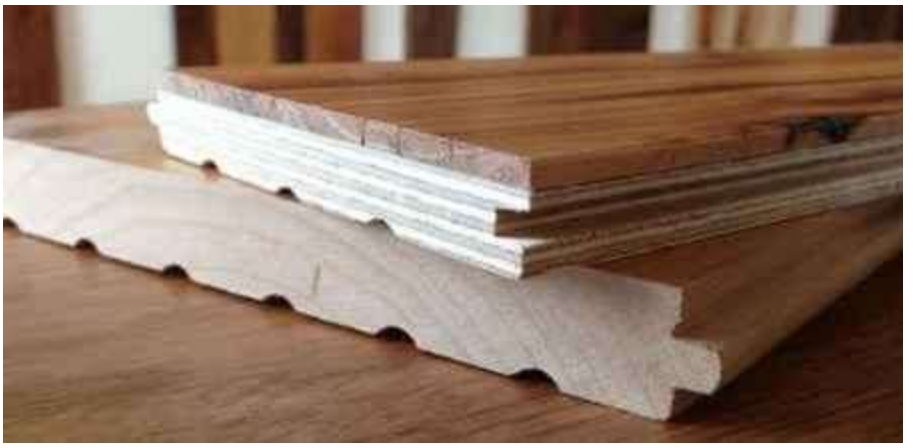

Fig 2: Engineered Wood Board over Solid Wood Board

3. Bamboo

- Bamboo is one of the most used multipurpose and durable materials used in construction.
- These trees grow faster irrespective of climatic conditions. So, it makes it economical as well.
- They can be used to construct frames or supports, walls, floors etc.
- They provide a good appearance to the structures.

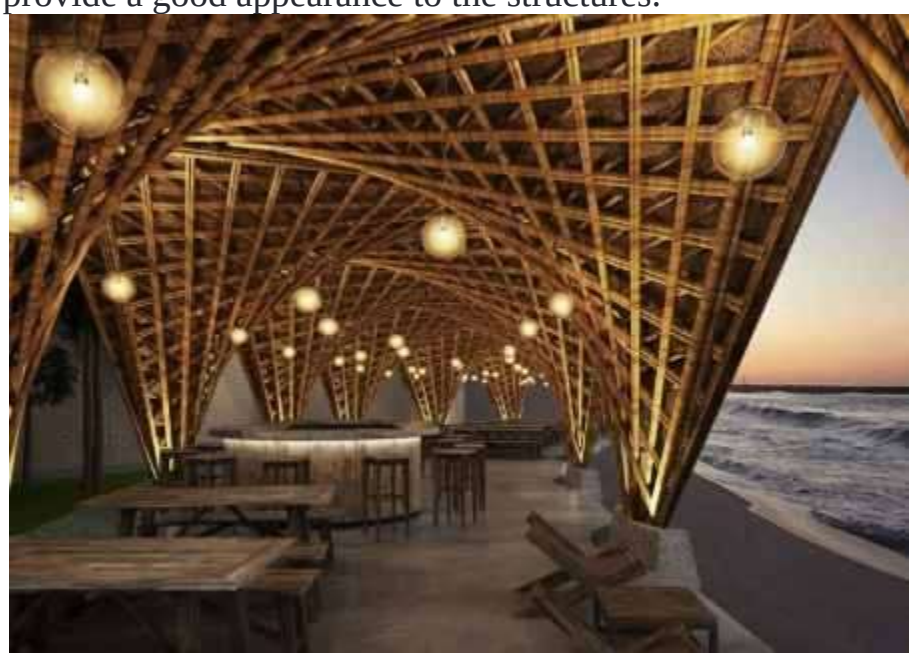

Fig 3: Bamboo Structure

4. SIPs

- Structural insulated panels (SIPs) consist of two sheets of oriented strand boards or flake board with a foam layer between them.
- They are generally available in larger sizes and are used as walls for the structure.
- Because of their large size, they need heavy equipment to install however, they provide good insulation.

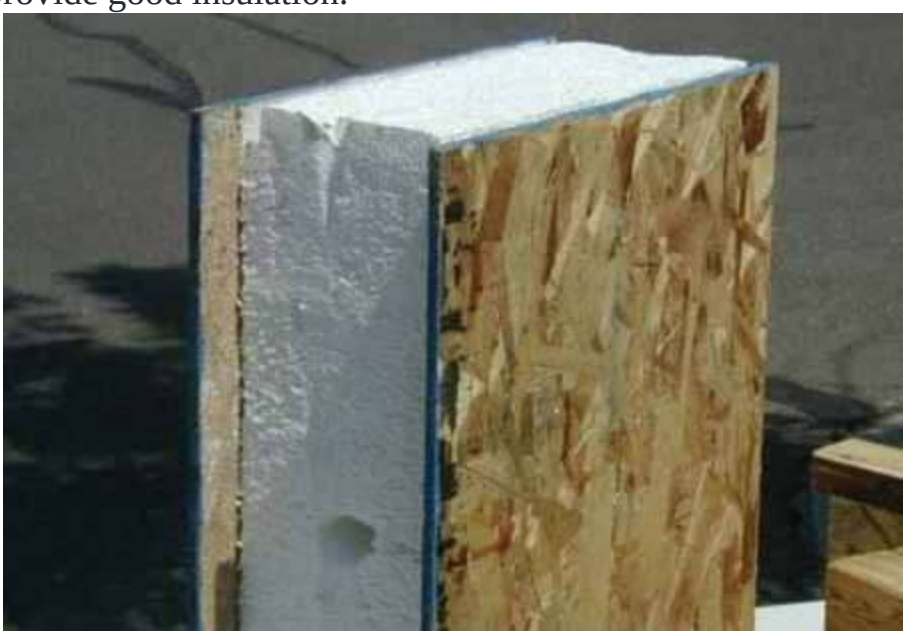

Fig 4: Structural Insulated Panel (SIP)

5. Insulated Concrete Forms

- Insulated concrete forms contain two insulation layers with some space in between them. This space contains some arrangement for holding reinforcement bars, after placing reinforcement, concrete is poured into this space.
- They are light in weight, fire resistant, low dense and have good thermal and sound insulation properties.

Fig 5: Insulated Concrete Forms

6. Cordwood

- If wood is abundantly available and easily accessible to the site of construction, cordwood construction is recommended.
- It requires short and round pieces of wood which are laid one above the other, width wise, and are bonded together by special mortar mix.
- They are strong, environmental friendly and also give good appearance to the structure.

Fig 6: Cordwood Wall

7. Straw Bale

- Straw bale is another green building material which can be used as framing material for building because of good insulating properties. They can also act as soundproof materials.
- Non-load bearing walls of straw bale can be used as fill material in between columns and, in beams framework is recommended.
- Since air cannot pass through them, straw bales also have some resistance to fire.

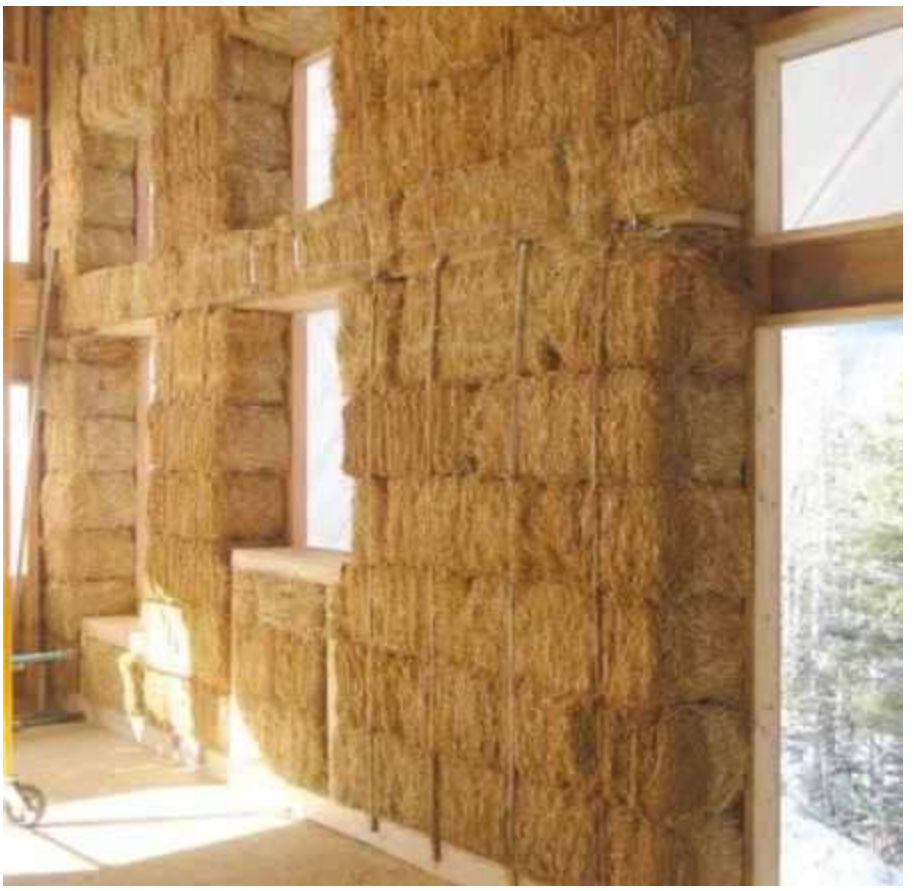

Fig 7: Straw Bale Wall

8. Earth Bags

- Earth bags or sand bags are also used to construct walls of a structure.

- These types of structures can be seen in military bases, near banks of water resources etc.
- Generally, bags made of burlap are recommended but they may rot very easily and hence, polypropylene bags are used nowadays.

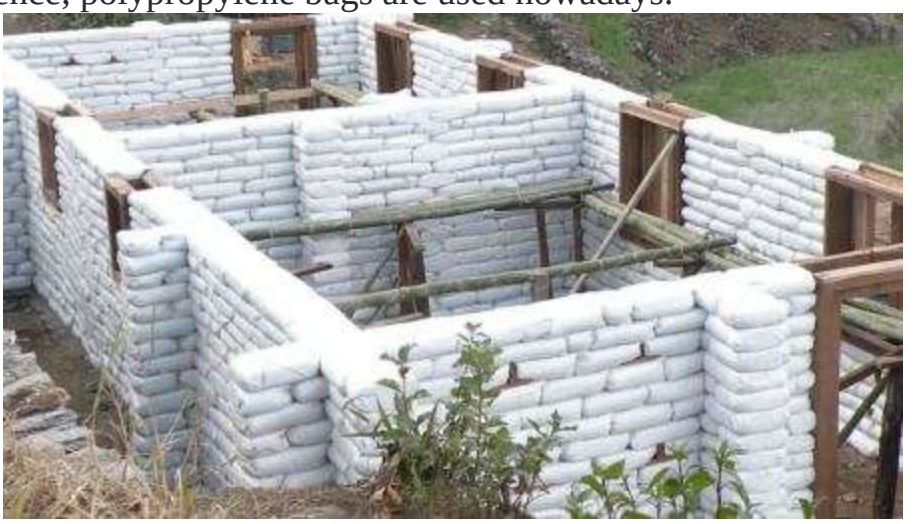

Fig 8: Earth Bag Walls

9. Slate Roofing

- Slate is naturally formed rock which is used to make tiles.
- Slate tiles have high durability and they are used as roofing materials.
- Slate roofing is preferred when it is locally or cheaply available.

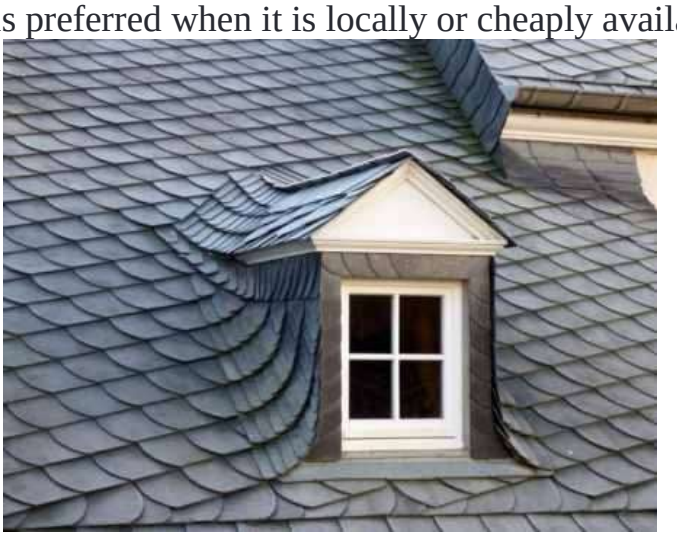

Fig 9: Slate Roofing

10. Steel

- Steel roof panels and shingles are highly durable and they can be recycled again and again. So, these are the best choices for green roofing materials.

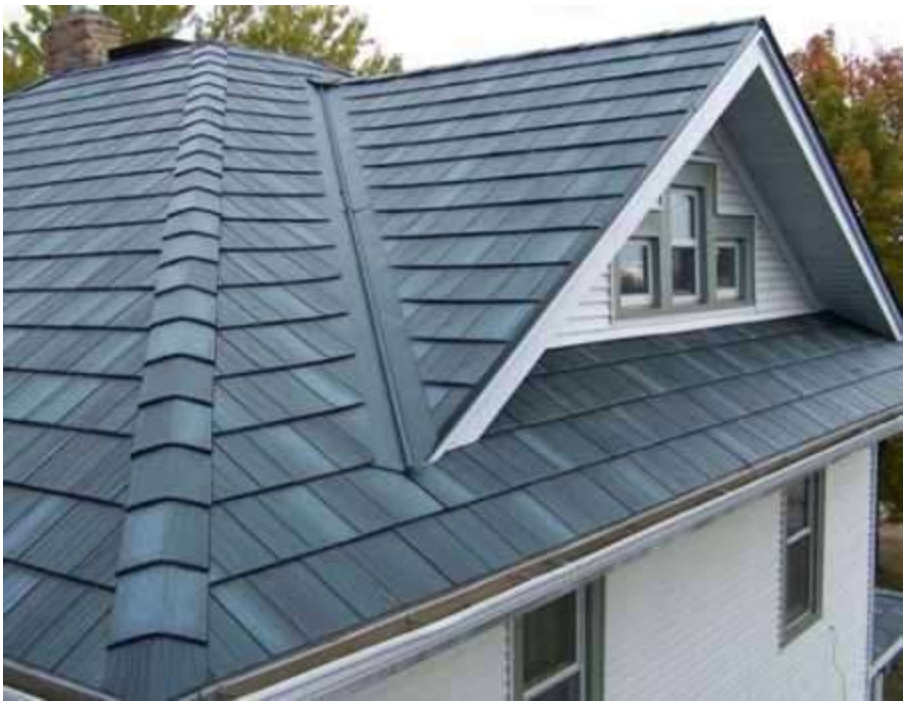

Fig 10: Steel Roofing

11. Thatch

- Thatch is nothing but dry straw, dry water reed, dried rushes etc. These are the oldest roofing materials which are still in use in some remote locations of the world and even in cities for aesthetic attractions.
- It is cheaply available for roofing and a good insulator too.

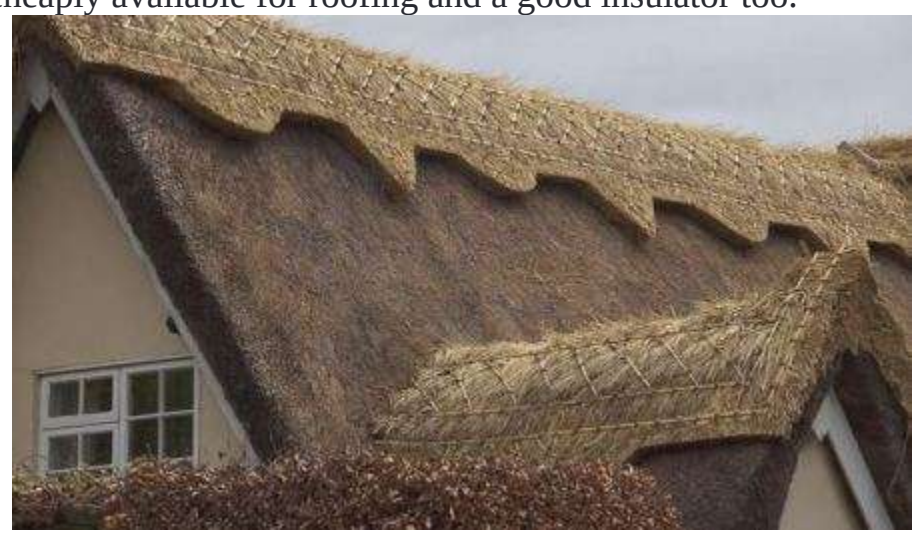

Fig 11: Thatch Roofing

12. Composites

- Roof panels made of composite materials such as foam or cellulose layer sandwiched between two metal sheets or two plastic sheets also come under green building materials.

- They are light in weight, inexpensive and provide good insulation for the structure and save energy.

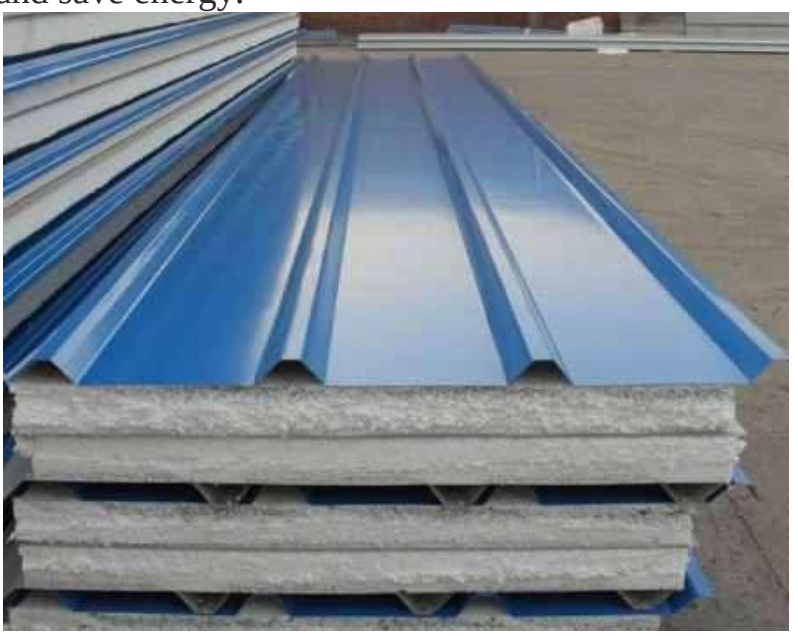

Fig 12: Composite Roof Panels

13. Natural Fiber

- Natural fibers like cotton, wool can also be used as insulation materials.
- Recycled cotton fibers or wool fibers are converted into a batt and installed in preformed wooden frame sections.

Fig 13: Cotton Insulation

14. Polyurethane

- Polyurethane foam is available in the form of spray bottles. They are directly sprayed onto the surface or wall or to which part insulation is required.

- After spraying it expands and forms a thick layer which hardens later on.
- They offer excellent insulation and prevent leakage of air.

Fig 14: Polyurethane Foam Spray

15. Fiberglass

- Fiberglass is also used for insulation purposes in the form of fiberglass batts.
- Even though it contains some toxic binding agents, because of its super insulation property at low cost it can be considered as a green building material.

Fig 15: Fibreglass batt

16. Cellulose

- Cellulose is a recycled product of paper waste and it is widely used around the world for insulation purposes in structure.

- It acts as good sound insulator and available for cheap prices in the market.

Fig 16: Installing Cellulose Insulation

17. Cork

- Cork is also a good insulator. Boards or panels made of cork are available in markets.
- A great amount of electrical energy can be saved by corkboard insulation in winter.
- These cork boards are also good for sound insulation.

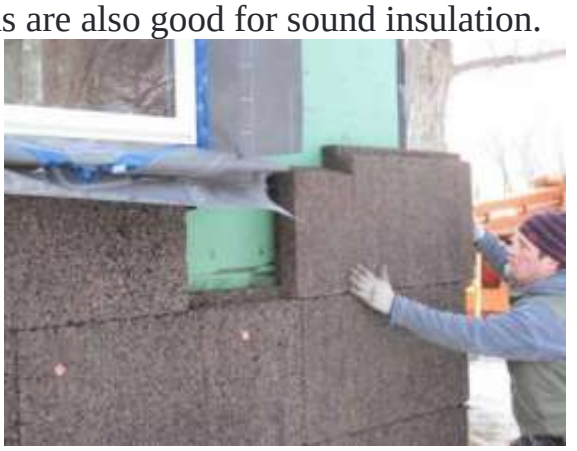

Fig 17: Installing Cork Boards

18. Polystyrene and isocyanurate

- Polystyrene and isocyanurate foam sheets are another type of insulation materials which are available in the form of boards or sheets.

- These are generally provided as insulators on exterior sides of a structure, below the grade etc.

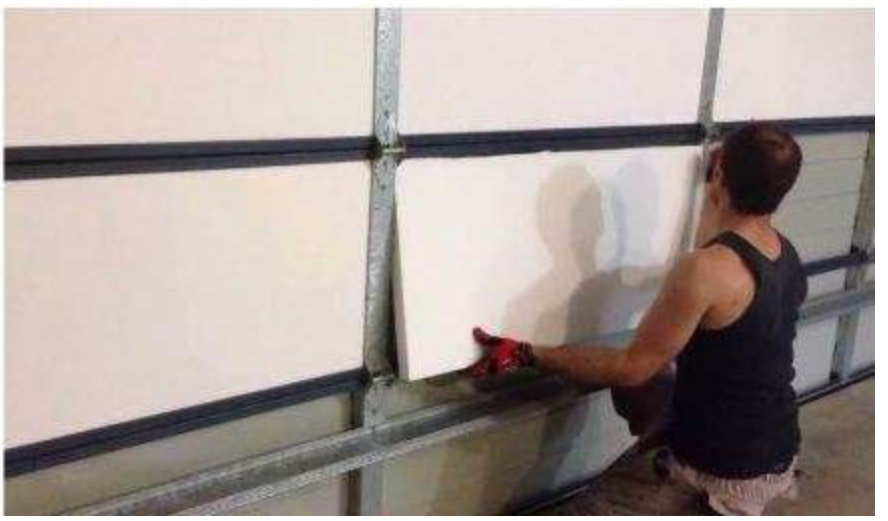

Fig 18: Installation of Polystyrene Foam Sheets

19. Natural Clay

- Plastering of walls can be done using natural clay rather than other gypsum-based plasters.
- Natural clay plaster with proper workmanship gives a beautiful appearance to the interior.

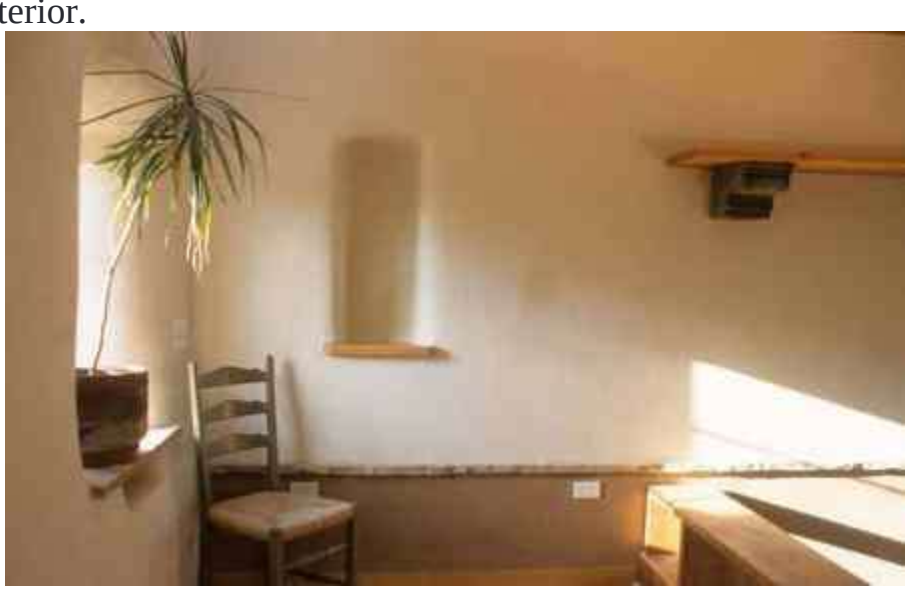

Fig 19: Natural Clay Plastered Wall

20. Non-VOC paints

- Non-VOC paint or green paint is recommended over VOC containing paints.
- Presence of Volatile Organic Compounds (VOC) in paint reacts with sunlight and nitrogen oxide resulting in the formation of ozone which can cause severe health problems for the occupants.
- If non-VOC paint is not available then try the paint with very low-VOC content in it.

Fig 20: Non-VOC Paint

21. Natural Fiber Floor

- Naturally occurring materials like bamboo, wool and cotton fiber carpets, cork etc. can be used for flooring purposes.

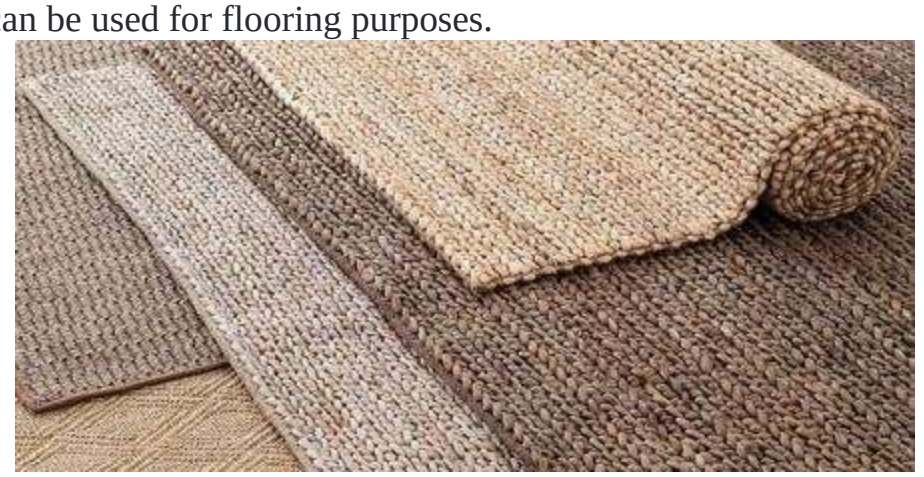

Fig 21: Natural Fiber Flooring Rugs

22. Fiber Cement

- Fiber cement boards are made of cement, sand and wood fibers.
- For exterior siding, fiber cement boards are good choice because of their cheap price, good durability and good resistance against fire.

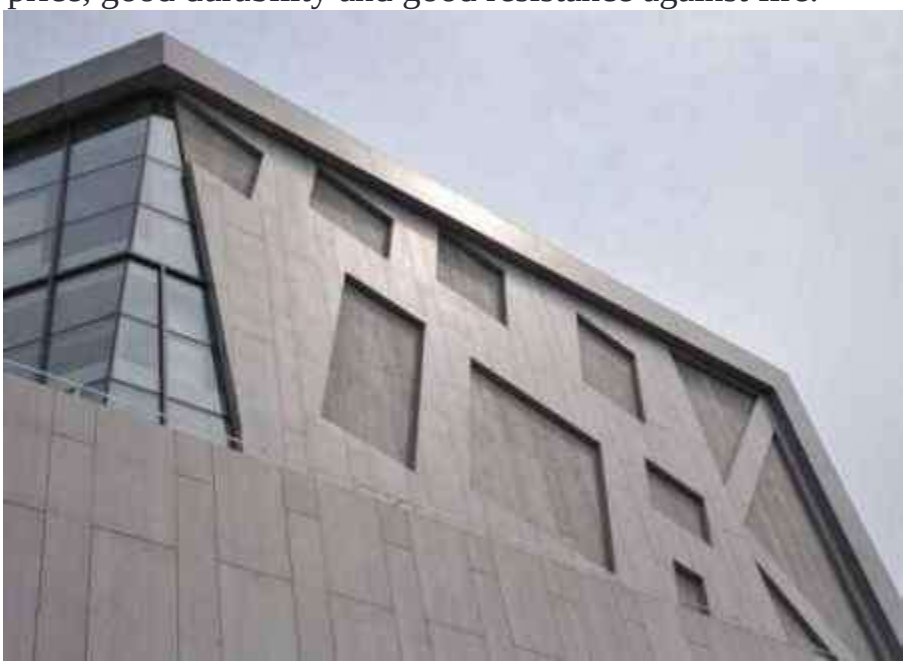

Fig 22: Exterior Siding with Fiber Cement Boards

23. Stone

- Stone is a naturally occurring and a long-lasting building material. Some Stone structures built hundreds of years ago are still in existence without much abrasion.
- Stones are good against weathering hence they can be used to construct exterior walls, steps, exterior flooring etc.

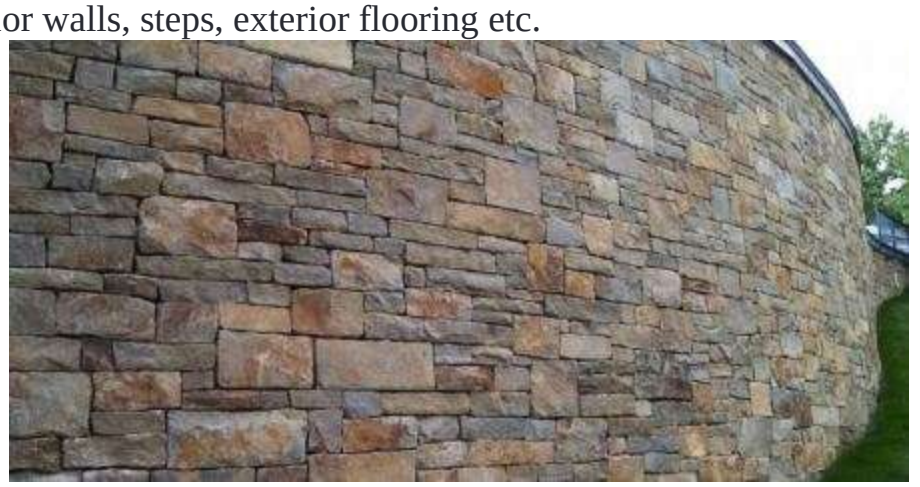

Fig 23: Natural Stone Wall