

## Highlights

1. Heat gains or losses through ceilings, roof, walls, windows and floors determine thermal behaviour.
2. Light coloured and smooth materials have higher reflectivity than dark coloured and rough material.
3. Construct walls of sufficient thickness for better insulation.
4. Harvested rainwater increases groundwater reserves.
5. Rainwater harvesting can help in saving of public water supply.

## Home Guide Series

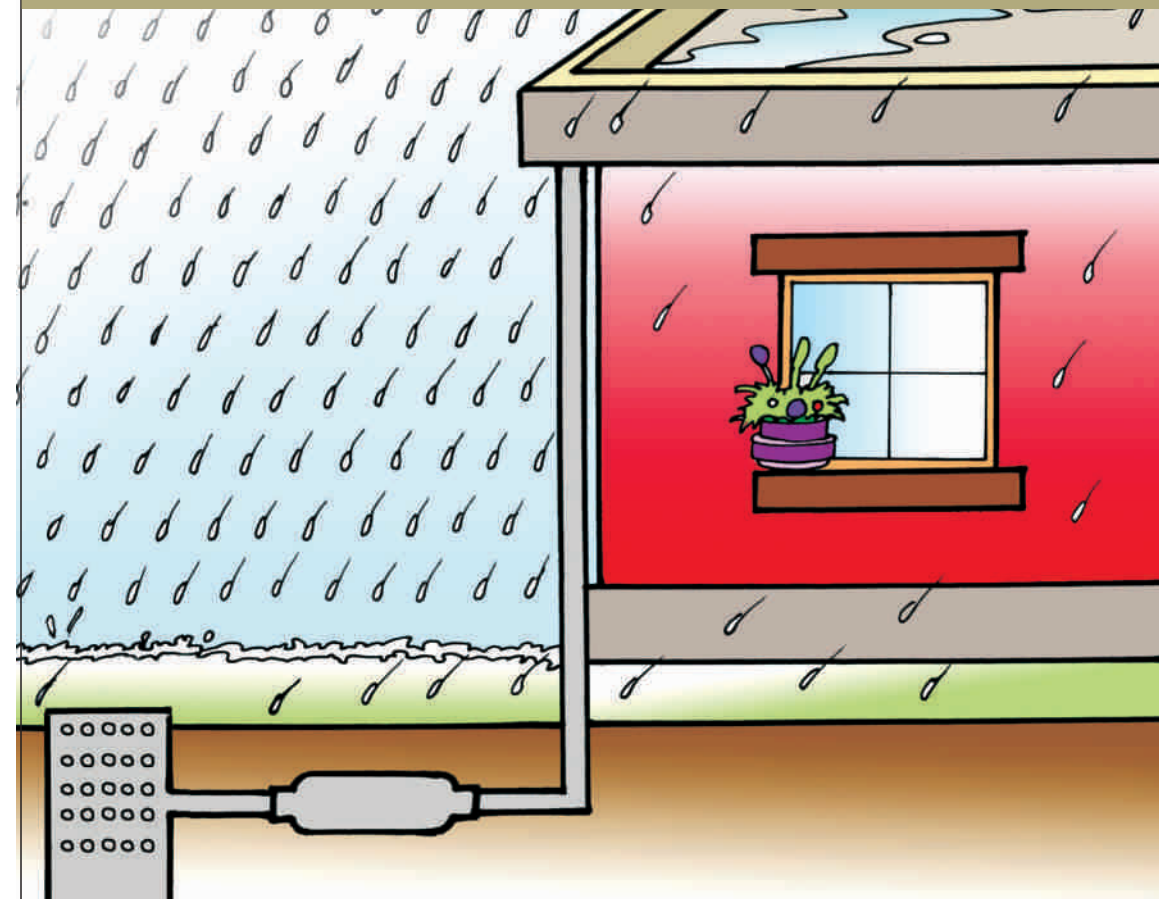
1. Pre-Planning Home Construction
2. Planning Construction Costs
3. Construction Materials And Their Characteristics
4. Good Construction Practices
5. Protecting And Beautifying Your Home
6. Essential Utilities For Your Home
7. Heat Insulation And Rainwater Harvesting
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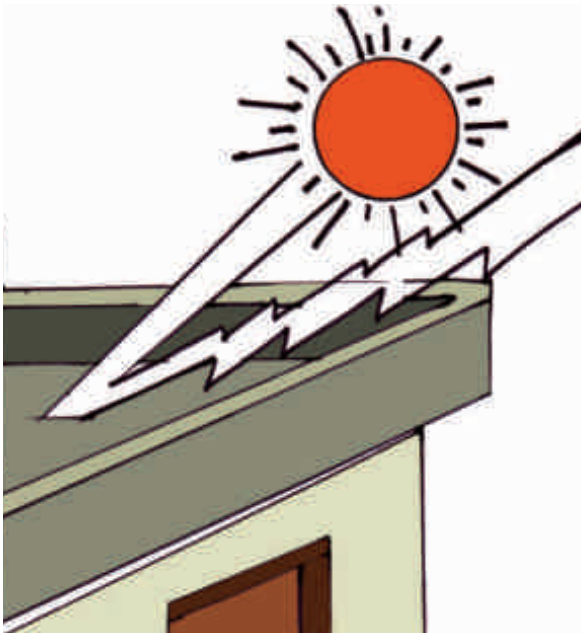
## Heat Insulation And Rainwater Harvesting



## “Learn To Protect Your Home From Heat And Cold. And Discover How To Utilise Rainwater To Meet Your Needs.”

### Heat Insulation Of Buildings

#### Shield Your Home From Heat And Cold



Good Insulation Can Reflect Heat From The Roof

Good heat insulation in the building or adopting some proactive measures can give you relief from both severe summer heat as well as the winter cold.

The main factors that determine the thermal behaviour of a building are the heat gains or losses through the ceiling, roof, walls, windows and floor.

#### •Shading Of Windows

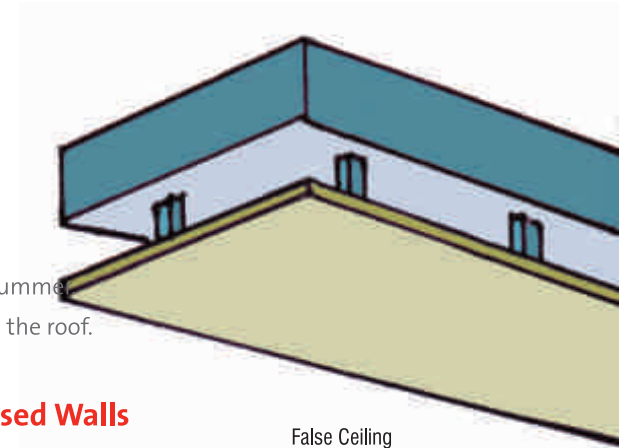
Shading devices generally used are louvres, sun shades, verandah, curtains - using materials like heat absorbing glass, painted glass, etc.

#### •Colour & Surface

Light coloured and smooth materials have higher reflectivity than dark coloured and rough materials. Whitewash, white paints, marble have high reflectivity coefficient.

#### •Heat Insulation Of Roof

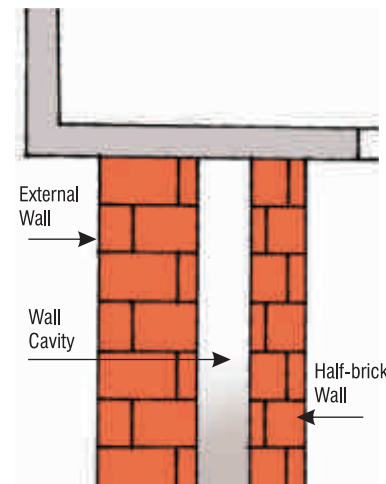
- Heat insulating materials like a mud phuska can be applied externally. False ceilings with an air gap can be built internally.
- Water sprinkling on roof.
- Whitewashing the roof before summer.
- Applying reflecting materials on the roof.



#### •Heat Insulation Of Exposed Walls

Construct walls of sufficient thickness. A brick wall of 23 cm thickness is adequate. Thermal performance can be further improved by

- Providing cavity walls (gap between two walls) and hollow bricks.
- Constructing a wall with suitable lightweight materials.
- Applying a light colour on the external surface.



Wall Cavity Helps In Insulation

## Mud Phuska Terracing

Mud phuska terracing and paving with brick tiles is good for waterproofing and heat proofing of flat roofs. This is best suited for hot and arid regions.

Soil mixed with water is applied on a bitumen laid roof surface. The water quantity should be such that soil can retain its shape in the form of a ball. Generally, 150 litres of water is sufficient for 1 cubic metre of mud phuska. A slope of 1:50 and with 1" thickness at the end is adequate.

After laying the mud phuska, the surface should be coated with mud plaster (a mixture of clay soil, wood shavings and water) of 1" thickness. After the plaster has dried, the surface should be coated with cow dung so as to fill any hair cracks that may have formed in the mud plaster. Finally, flat tile bricks should be laid using a minimum amount of plain mud mortar as bedding for the correct slope. Ensure that mud mortar does not rise to the vertical joints of the tiles by more than ½ inch. The thickness of the joints should not be more than ½ inch.



It is essential that tiles are allowed to set and the bedding mortar dries up, so that the tiles are not disturbed during subsequent operation of grouting of the joints. The joints of the tiles are then grouted with cement mortar of 1:3 (1 part cement and 3 parts fine sand) such that all the joints of the tiles are completely filled with mortar. The cement used for the grouting mortar can be mixed with 2% of waterproofing compound (1 kg per bag of cement). Water curing is recommended for 7 days, after completion of the application.

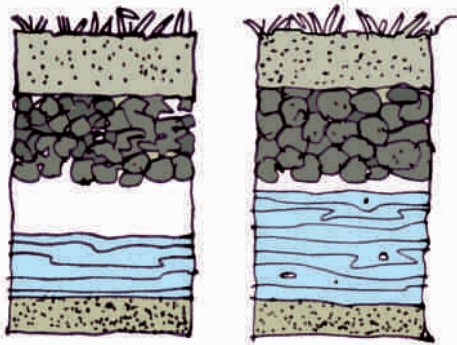


**Earthenware Or Designer Tiles Can Be Used For Insulation Of Sloping Concrete Roofs**

# Rainwater Harvesting

## Utilising Rainwater To Meet And Supplement Your Needs

Water Table

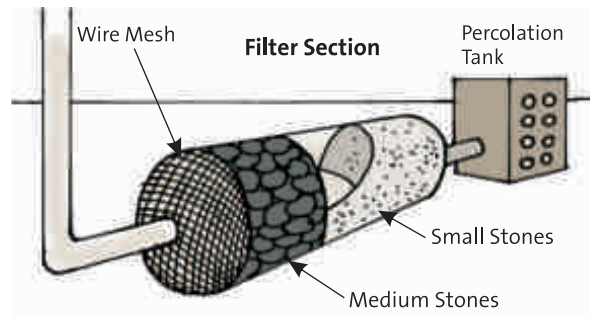


Before Water Harvesting    After Water Harvesting

Rainwater can supplement some of your water needs, if harnessed properly. Harvested rainwater can serve a variety of purposes, some of which include:

- Increase groundwater recharge
- Reduce sea water ingress in coastal areas
- Provide water for general purposes

There is tremendous potential for water harvesting in our country. Consider your own building with a flat terrace area of 100 square metres. Assume that the average rainfall in your area is 40" or 1000 mm approximately. Thus, even if only 60 percent of the total rainfall is harvested, you will be able to harvest  $100 \times 1.0 \times 0.6 = 60$  cum i.e. 60,000 litres of water



A year. This volume is more than a year's (about 400 days) domestic water requirement of 1 person, assuming average daily water requirement for domestic use per person is 150 litres.

If we use the stored rainwater only during the monsoons for washing clothes, washing cars etc., you will help in reducing the overall water needed from public utilities and therefore prevent water shortage in the summer.

In some developed countries, buildings are required to supplement their water needs through rainwater harvesting. In many cities of our country, there is a major thrust on rainwater harvesting in individual houses, while provision for rainwater harvesting is compulsory.

You can also recharge groundwater by connecting the water from rooftops to the bore or open well through a filter.

