Thinking Basics

Benny Kuriakose pushes the design community to look beyond its preoccupation with visual detailing to delve on basics which foster functional responses and durability.

Photographs: courtesy Benny Kuriakose & Sathya S

The biggest challenge the building industry in India is facing today is to ensure good quality in construction. The durability of a building is highly dependent on the quality of workmanship and the design details. Many of the modern buildings have maintenance problems. It is not because Reinforced Cement Concrete was used, but the way in which it was handled during the construction. The quality of construction and the attention to details assume great importance, where standards and specifications are not strictly followed in the residential building construction scene. The quality of workmanship has come down drastically during the last two decades. Waterproofing the toilets or waterproofing the RCC roof was not at all common when I started practice twenty years ago. Now it has become the order of the day. Using these construction materials as a short cut to good workmanship is not at all right for the durability of the buildings.

THINKING DURABILITY

Among building materials, only mortar increases in strength over time. A building exposed to the elements of weather is constantly decaying. Every building material has a definite life. For example, roofs with coconut thatch last for one year while those with palm thatch last for four years.

Once the minimum quality of the materials are assured, the durability of a structure is dependent on the quality of workmanship and the design details. There is no short cut to quality workmanship. Take the case of plastering, for example. The separation of plaster from backing occurs due to the following reasons:

1. Water penetration inside the wall, which may be due to plumbing leakage or other reasons.
2. Finishing coat being stronger than undercoat.
3. Lack of suction control during application.
4. Excessive thickness of coats.
5. Inadequate raking out the joints.

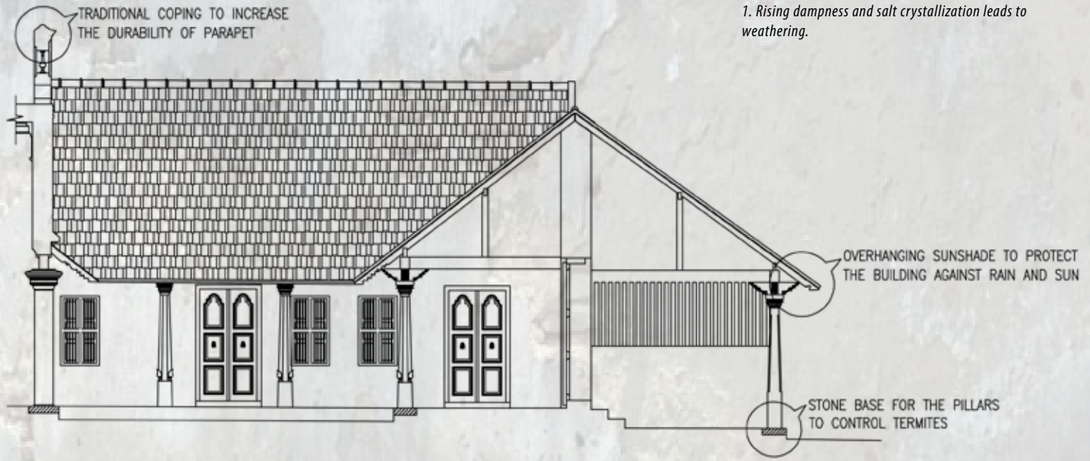
Of the above, the last four are controlled by the mason on site. Peeling of plaster is, in the final analysis, because of inadequate understanding of the procedures to be followed. In other words, it is because of poor workmanship. The greater concern is that a building with poor workmanship is not durable.

THINKING QUALITY

Architecture can be conveyed in words and by drawings: workmanship cannot. The architect hopes that the workmanship will be good but it is the worker who decides whether it will be good or not. The engineer or architect can point out and correct the major defects of workmanship, but they cannot make bad workers produce good workmanship.

Society is accustomed to pay for quantity, not quality. Labour contracts and overtime lead to reduction in quality. In labour contracts, the labour cheats by reducing the quality. The owner thinks that he has gained because of the apparent increased output. Building owners don't realise that they are cheated in this manner. The additional cost in attaining quality is actually only marginal, whereas ensuring quality pays off in the long run in lowered maintenance costs.

Today, there is little incentive for the worker to do quality work. Manual labour is no longer respected. There seem to be only workers, no craftsmen. A craftsman understands the technology of his craft and he can provide leadership to do good quality work.



SECTION DETAIL OF A CHETTINAD HOUSE

THINKING DESIGN DETAILS

Design details play a major role in the durability of the buildings. Unfortunately many of the traditional details such as roof overhang, coping etc which we used to follow in our old buildings are not being followed in contemporary buildings. We have a notion that the traditional building materials are not durable and the modern building materials such as Reinforced Cement Concrete are quite durable. Experiences over the years have shown that many of the RCC buildings need repairs of serious nature. Some of the details which are missing in the present day construction practice are mentioned below:

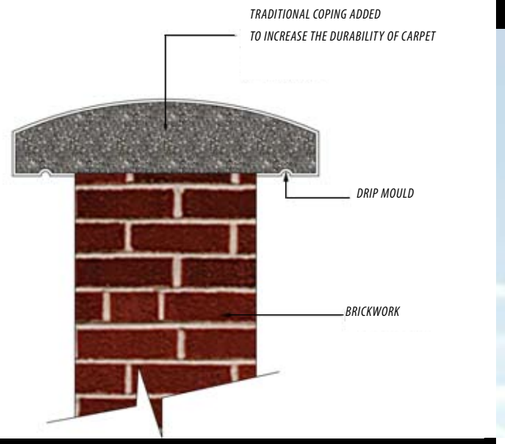
Rising damp

If a porous walling material such as brick or stone is in contact with damp soil, moisture will be drawn into the pores by a physical process called capillary action. The absorbed moisture will rise in the wall to a height at which there is a balance between the rate of evaporation and the rate at which it can be drawn by capillary forces. The height will vary in accordance with the level of the water table of the soil.

Rising damp usually contains salts carried up from the soil or dissolved from the walling material. Some of these salts are hygroscopic; i.e. they absorb moisture from the air. Their presence will maintain dampness even after the rising damp has been eliminated.

The effects of rising damp usually extend from 3 cm to 100 cm above floor level and exhibit a sharp change from wet to dry on the wall. Moisture will be present throughout the wall thickness. Contaminating salts may be seen as white deposits or crystals.

1. Rising dampness and salt crystallization leads to weathering.

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Salt crystallisation is the precipitation of salts such as chlorides, sulphates and carbonates in the building material. The salts are activated only when a suitable agent is present. Water plays a key role as an agent either in the form of moisture, which causes dampness or subsoil water rise in the structure or percolation; or seepage of water accumulated in the structure due to cracks and crevices. When water is drawn from soil, it always contains solution of salts present in the soil.

When evaporation takes place on the surface, the salts get deposited near the surface and the mechanical forces exerted during crystallisation cause the plaster or brick to disintegrate over a period of time. Damp proof courses are strictly to be provided in such areas where there are chances of rising damp.

Coping

A top is needed for a wall to throw off rainwater and protect the brickwork below from being saturated. This is called coping. Traditional copings have a slight overhang on each side of the wall face with a groove called a throating on the underside. Rainwater drips off the edge without running down the face of the brickwork.

SLOPING SUNSHADES

Sunshades should be provided to protect walls, windows and doors against sun and rain.

Sloping sunshade is advisable rather than a flat sunshade because flat sunshades can lead to dampness of the wall over a period of time.

VENTILATION OF THE TIMBER ROOF & FLOOR

In cold climates especially in hill stations, the ventilation of the roof and the timber floor are necessary to avoid the growth of wet rot and dry rot which affect the timber members. Traditionally they were ventilated by giving openings to facilitate air circulation. Absence of this detailing causes problems to the timber members in many of the buildings.


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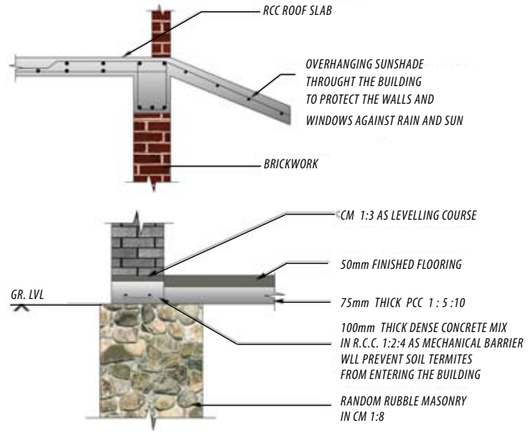
2. Coping to protect the brickwork below.
3. Provision for the ventilation below the timber floor.
4. Sunshade throughout the building helps to protect both the walls and windows.
5. Wall below sunshade is in good condition.
6. Ventilation should be provided for the roof.
7. Soil termites attacking the rafters.



CONTROL OF TERMITES

There are more than two thousand varieties of termites whose identification is a complex and skilled task for the scientists. The termite, though often called a white ant, is only very distantly related to the ant, although it is a highly organised community–building species. Its two varieties are soil termites and dry wood termites. The former is ground–nesting and the latter a flying variety. Soil termites are more widespread and they need to maintain contact with the nest in the ground. They can thus be physically barred from the building structure by providing mechanical and chemical barriers during the building process. The soil termite shuns light and where forced to take a passage along a lighted area will build a tunnel within which it can travel concealed. It cuts the way through the soft mortar or voids to form the tunnels, which carry it from the ground based colony to the upper levels where timber is plentiful. Soil termites can pass through a 2mm crack or an expansion joint (eating through the rubber compound) between adjoining concrete on ground flooring. Soil termites can also travel under parquetry and floor tiles to get to the wall framing timbers. In the process, they may well find food supplies in small organic particles in the mortar, straw, organic dust etc.

The chemical and mechanical barriers will prevent soil termites from the entering the building, but will not prevent attack by dry wood termites, which are free–flying pests. Infestation by these should be prevented either by using naturally resistant timbers or by pre–treating with timber preservatives. The pest control treatment done in the foundation will prevent only the soil termites from attacking the timber. Also giving a mechanical barrier using a dense concrete mix is more durable than the chemical treatment, because the chemicals which are added to the ground get diluted over a period of time. ■

Benny started his career in 1984 and received the basic lessons in architecture under the tutelage of Laurie Baker. The Charles Wallace India Trust Award that he received in 1986 took him to the University of York, UK, to do an MA in Conservation Studies. On return he worked in Kerala till 1991 doing projects on cost effective techniques. 1996 brought him to Chennai as the designer for the Kerala buildings and the public buildings in Dakshinachitra on the East Coast Road to Mahabalipuram. Currently Benny is pursuing a doctorate at IIT Chennai.