

# Green Building Concept

It has been typical to get the exterior surface of the building getting damp from the inner side of the exterior walls. When this happens, it becomes too expensive to get the interior of the room surfaces restored since every restoration costs resurfacing of the wet surface as well as the other internal surfaces (including ceiling) in order to match the interior shade. Thus for every single wet surface the cost of restoration was five times. Pradeep M Kotecha, consultant General Manager, Shapoorji Pallonji & Co. Ltd presents his case study to CIA World on how the movement of restoring exterior facade of building emerged at Parijat, Krishnachandra Marg, Opp Lilavati Hospital, Bandra.

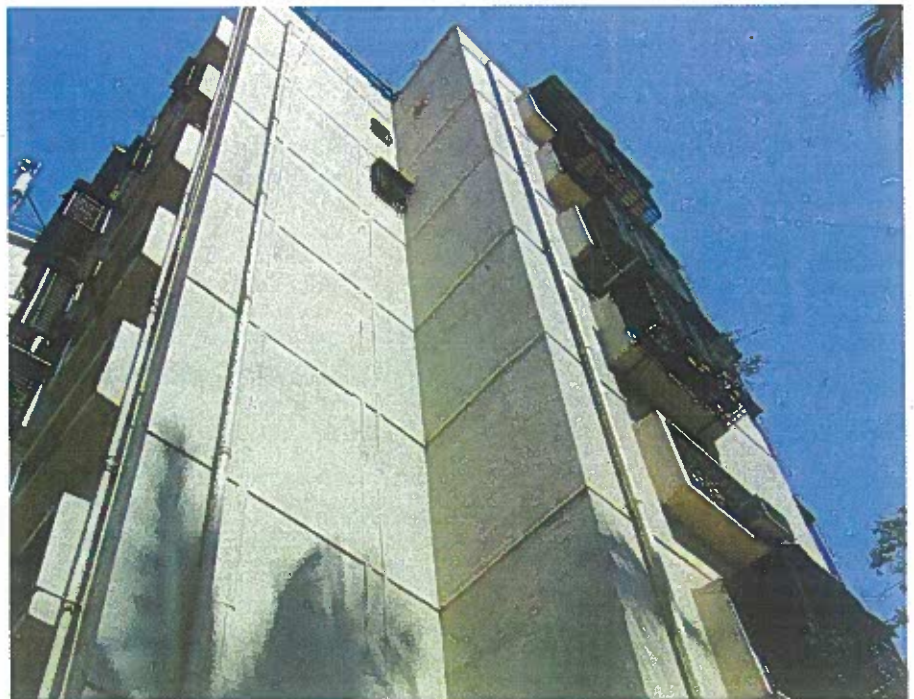
**H**aving undergone this situation for many years by every member; the managing committee decided to call for specialized water proofing agencies and consultant. The consultant specified structural repairs and their estimate worked out to ₹ 95 lakhs. Addition to this cost, the cost of guaranteed water proofing in critical areas as well as repainting the entire building surfaces for setting three building worked out to ₹ 25 lakh. Thus the total outlay including structural consultant's fees worked out to ₹ 150 lakh. This was beyond the reach of the members. Moreover, these figures scared the group of members and technical committee was appointed to review the situation and a core committee was immediately formulated giving the committee powers to positively decide the right course of action. This technical observation and support from concerned member emerged in the decision making process. The ultimate workout of estimate amounted to ₹ 40 lakh- which was affordable among the 100 members. Hence, the confidence of making the Building Core Engineering Team work emerged. The applicator-who contributed to the restoration of the building façade are no more in this world. This technique has been restored in the legacy- which has helped the core members to achieve the distinction of removing the name of their building from Black Building Concept.

Every such decision for a building needs dynamic managerial decision process: which can be summarized on following broad based principles:

- a) All exposed horizontal surfaces should have gentle slope to allow rainwater to slide down.
- b) All vertical facades of the buildings should have surface divisions – which helps in reducing the extreme

weather stresses and protect from cracks in plaster surface.

- c) The surface divisions to be provided with 15/20 mm projections to avoid rainwater to slide from the facade of the building.
- d) The restoration of basic RCC structure is expensive process and should be avoided by white cement grouting which plays significant part in arriving at cost saving decisions.



(Parijat at Bandra west): The effect of rain water on the facade is not seen. As indicated; the rainwater slides at every floor from “kani” to “kani” leaving the facade of the building dry -even during the monsoon” This is one of the redeeming feature of the technique.

While arriving at any decision, the financial projections should be for ten years hence this technical observation and support from concerned member-who knew applicator of Roffe Products- called for re-evaluation as well as open tender from group of applicators. It may be possible through this case study to initiate this technique to many more abodes rendering improved skyline appearance and gradually move towards "Green Building Concept"

### Urban Scene

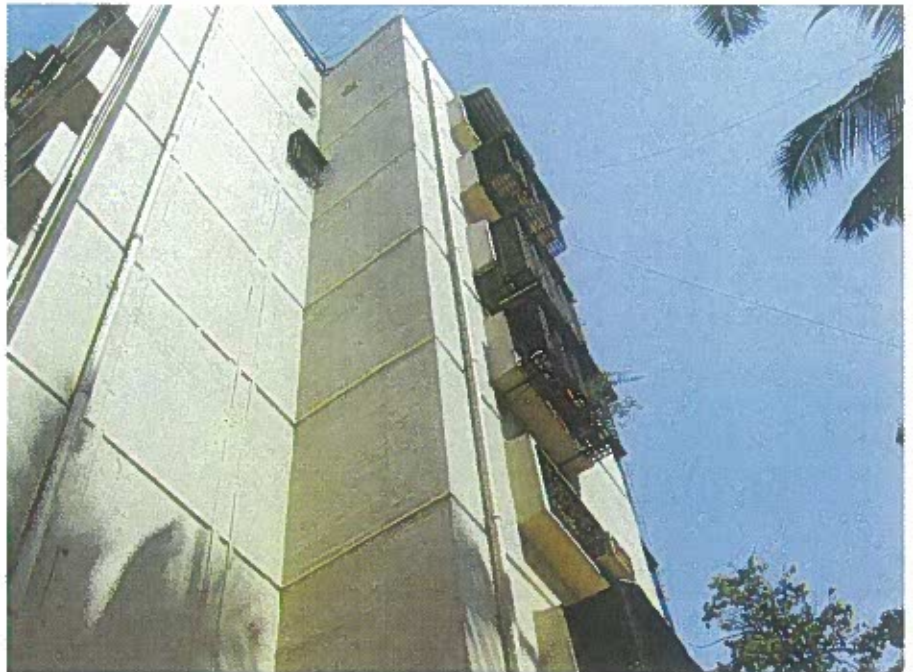
Often, literary elites consider Urban Civilization in one common phrase- "concrete jungle" and it is to be seen to believe that the phrase means what it states. Only redeeming feature of the concept is that the concrete so installed turns "black" during the course of years and hence whatever is the colour rendered on the exterior of the building shows black patches during the course of the years commencing from the top (below terrace level exterior facade - gradually descending in a building .

Let us consider a building of Gr + 7 Floor- Say 7th Floor/6th Floor/5th Floor/ so on. Year after year; The black colour on facade gradually descends till the lower floors; when there is concern of the members to re-paint the exterior surface which once again descends to render black colour from the top floor in another series of events every year.

It is a concern to note: - "how on earth; the cycle of descending black colour continues to flourish years after years! Shall we call this phenomenon as "black building concept?" One wonders regarding how this mechanism pursues on the exterior façade endlessly.

### 2.0 Composition of Concrete and Plaster

The main cause for this occurrence (blackening of exterior building surface) is due to displacement of cement particle in the Plaster. This happens due to "mass production technique adopted while constructing the building's exterior façade."



This picture indicates the vertical facade carrying on left side of the projected wall of master toilet with projected fixed ventilator which protects exterior part of toilet wall which not only renders impervious surfaces at either ends -It adds to the aesthetic value by keeping the down take pipes in vertical faultless alignment.

Entire configuration of building structure - Footing/Foundation/Col-

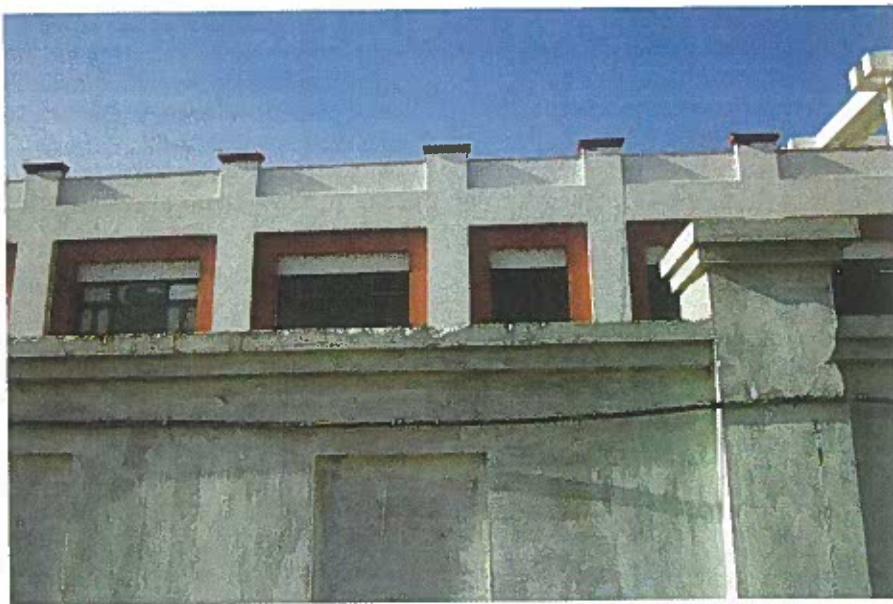
umn/Beams/Slabs/Masonry -Brickwork is done as a separate entity. However,



Mark flat projections of chhajas; above smaller & larger windows. Both projections have gathered moss (blackening effect is apparent) only redeeming feature is that the projections by themselves have allowed the rest of the fascia to be without any effect.



PEB factory structure at Chhindwada Call Centre: The brick wall constructed in long line structure since there is no direct load at the moment on the structure; it remains to be seen how the brick wall behaves under the stress of weather and vertical cladding as single line wall.



Both the structure as well as the parapet wall have been provided with projected surface around the peripheral outlines. This has protected the fascia very well from the blackening effect of the weather.

the exterior plaster by itself is taken up as single layer of plaster (may be in two coats):- undertaken from top of parapet till the ground level- in one streamlined operation.

Thus the building structure gets segregated from the exterior plaster.

2.1 Commencement of displace-

ment of cement particle from plaster surface: During Monsoon; the plastered surface from the terrace of the building gets attacked- since even the top of the parapet acts like a mini reservoir.

The water so accumulated at the top of the parapet descends below the

inner side of the plaster and replaces the binding cement particle- which had so far become integral part of the concrete and plaster.

The water particle displacing the cement particle sits in the space created by the displacement of the cement particle and gradually blackens up due to its inherent property-The phenomenon is called MOSS.

More and more displacement of the particles creates blackening of the surface and also descends further up by penetrating through surface cement particles - displacing inner layers of cement particles - thus losing the imperviousness of the plastered surface.

2.2 The single layer of plaster from top to bottom of the building adds to the closing of imperviousness further due to expansion and contraction of the unusually larger dimension surface exposed to the three main agents (monsoon, summer and winter) This causes sudden expansion/contraction cracks and losing of imperviousness.

2.3 The space created by the displaced cement particles is taken up by water particles which gradually dry up creating moss. This is the starting phase and redeeming feature of the phenomenon: "black building concept."

2.4 With the advent of years the lower floors of the building also gives way to the displaced cement particles and the facades of the lower floors of the building also starts showing blackening of the facade surface.

2.5 The mechanism which is adopted by the occupants of the building in order to achieve instant result is repainting of exterior of the building.

Often this solution ceases to be full proof measure and cannot restore and render the imperviousness of the exterior surface of the building.

### 3.0 Long term solution to the problem

As previously discussed; the need of the hour was to restore the imperviousness of the building exterior surface. This was to be simultaneously done with further ensuring that the

entire building exterior surface does not repeatedly gets attacked by the disruptive agents like rainfall- which is predominant cause; and yet protect from post monsoon attacks on building surface by winter's extreme cold wave as well as summer's hot wave.

One wonders how these common disruptive agents can be controlled by singular measure! The main aspect of the solution dwells in reducing the enormosity of the building surface by dividing the vertical exterior surface into floor wise segregation of the building facade surface.

Look at the exhibit photographs which were taken after introducing a small projection in exterior surface as integral part of exterior plaster which renders and acts as protective phenomena.

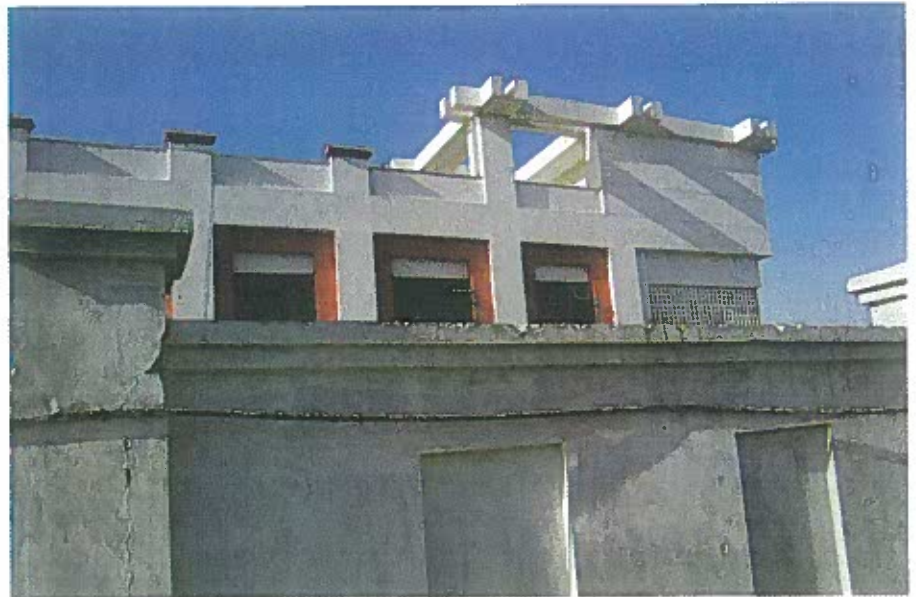
The minor projection at every floor layer reduces the exposed surface area and the severe attack on the vertical surface due to expansion during (summer and day time) and contraction (winter and night time) on the exterior plaster which remains under control and protects the building from surface expansion and contraction cracks.

Once the exterior fabric of the building facade gets protected from these possible surface cracks; the main disruptive force behind the black building concept gets substantially controlled and further helps in preventing the direct attack of rainwater on the vertical building surface.

This phenomenon of minor protective layer of projected plaster (let us call this popular measure by local mason's language- "kani" (kani is a simple local technical term - is commonly used by any builder's mason).

**How this kani helps! It is interesting to study the behaviour of rainwater on the vertical surface of the building!**

The rainwater which was previously gliding on the entire building surface; now gets break at every floor projection and drops down



Both the Structure as well as the parapet wall have been provided with projected surface around the peripheral outlines. This has protected the fascia very well from the blackening effect of the weather. This phenomena is well illustrated in this picture.

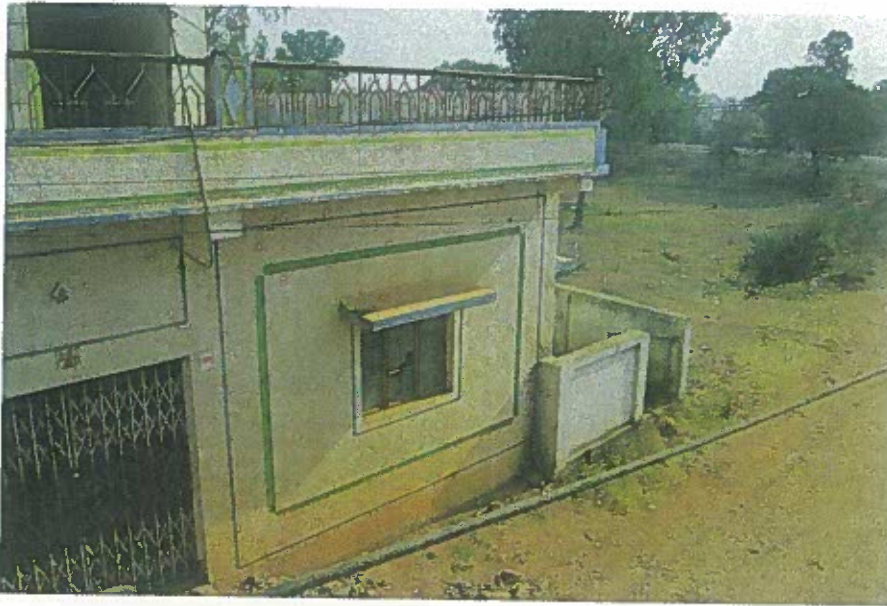


This building ground + 1 is typical example of projecting the main access as well as the rooms with projecting canopy as well as shaped chhajas which can allow the rain water to automatically slide and keep away from the face of the Building. Even the supporting window frame are segregated from the exterior plaster with grooves. The dividing column line of the Building stand segregated from the masonry work by grooves-so that the possible cracks are concealed.

from top floor kani to immediate floor below kani; and leaves the intermittent floor vertical surfaces drip dry. It is true and remains to be closely seen to believe.

**Why these measures are not commonly adopted?**

The main reason why such measures are not adopted is the minor additional cost of making kani and re-



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duction in the speed of work of exterior plaster, which renders sizeable profit when done in single operation.

#### 4.0 Overall economy in recurrence cost of maintenance and repairs:

- 4.1 The additional cost felt in this measure can be easily offset by:
- Saving in the cost of crack filling in every building which is required every second or third year.
  - Preventing the rain water from percolating to the best of the surface area-thus minimizing the moss effect on vertical building surface.
  - Maintaining the aesthetics of the building and saving in recurring repairing and repainting cost by lengthening the period of durable painted surface of the building.
  - It will not be exaggeration if it is stated that the span for recurring costs more than doubles.

#### 5.0 Protection of the building terrace parapet wall

Having gone through the massive vertical surface protection economics; it will not be out of place to mention about the starting phase of the

monsoon water attack on the top level structure - the terrace.

As mentioned earlier; the top of parapet becomes mini reservoir for monsoon water to stay and descend on the top vertical exterior of the building- which is starting phase of the black building concept. The measure is simple- protect the top layer of parapet with hard stone surface-say kotah stone or granite stone strips. This measure initiates the protection of vertical exterior facade right from top level of the building and is required to be projected about 15-20 mm from the surface of the plaster layer on both the sides of the parapet.

#### 6.0 Conclusion

There is growing concern about the green building concept- which dwells principally on the aesthetical part of the initiative and emphasis on the principally local resources to be used in construction of the buildings and infrastructure and also focuses on implements which conserves the principal sources of energy in the universe (water and power)

By controlling the recurrence of the repairs and maintenance of the

building; we as groups of occupants of these buildings contribute directly in conserving the resources. It does not require costly imported ingredients in concrete to achieve this.

We have local materials available; If used judiciously we can achieve the purpose and thus contribute directly in enhancing the green building concept movement. Further, if we as occupants of these buildings and participants in their management can contribute significantly - "by maintaining the aesthetics of the city skyline" and contribute to the environment - by controlling and minimizing the black building appearance and thus we can achieve much greater heights for our beloved city which needs our initiative inherently.

Green norms will surely go a long way in creation of eco-friendly infrastructure. A flat is a product for a lifetime and consumers live under its roof and hence its quality and eco friendliness is an important aspect. The green code comes after by industrial bodies, and govt. to promote environment friendly construction practices in the city's real estate sector.

Green homes are a trend for the future and even by a conservative estimate, a large percentage of new constructions will be eco-friendly green initiatives.

The green code will first be implemented for government buildings and those of public utilities by the end of the year. The guide lines include both mandatory and optional aspects such as creating gardens and green spaces on roofs, rainwater harvesting, preservation of top six to eight inches of soil, transplanting of 75 percent of existing vegetation use of civil constructions material with at least 10 percent recycled material, water efficient fixtures, etc.

After all the need to go green is not because a company or a building owner needs incentives, but because India needs to drastically reduce its consumptions of natural resources and other exhaustible reserves. Simple measures can lead away from hawking our natural reserves.