

Case Study – 1

EFFLORESCENCE AND CRACKING THEREBY

Site: One of our potential customers is building Villas in South India using Red clay bricks. More details like name and address are withheld for obvious reasons.

Problem: Efflorescence salts were coming up after Plastering – leading to ugly appearance of the wall plaster. When it rained, it further aggravated – depositing more efflorescence on the top.



Efflorescence as white deposit and cracking on the complete wall

What can happen further?: Efflorescence will lead to further cracking extending up to the putty and ultimately the plaster weakens up and gives away bonding with the brick wall – leading to plaster peeling off the wall.

What is efflorescence?

Efflorescence is deposit of ugly looking matter on the wall (usually in white / yellow / brownish yellow color). This keeps appearing on the wall before or after plastering – due to sulfates in the construction material.

Why Efflorescence happens?

Efflorescence happens due to presence of sulfates either in the clay brick / water used in brick binding/ water used in curing. Sulfate forms sulfate salts with Calcium and Sodium and other metals present in the medium of cement + water. When water is present, these salts are carried up to the surface of the wall.

How Efflorescence happens?

At every stage, water is used to cure the cement-mortar used in brick binding, first coat and second coat of plaster. Sulfates in the brick come up to the surface of the brick with the presence of water. These days, most of the water used in brick wall construction contains sulfates, also contributes for manufacture of sulfate salts.

How rain aggravated the problem in this site?

When it rains, rainwater reaches the sulfates through the pores in the plaster. When water as a medium is available for the sulfates, they will come up easily on drying. Plaster dries up faster when rain stops and immediately the efflorescence salts are deposited on to the surface.

How RenderCon '5S' addressed the problem?

Understanding the problem: RenderCon team visited the site and concluded that the problem is due to efflorescence of walls. The customer is using red bricks and OPC 53 Grade cement to build the walls with river sand with 2 coats. He opined that he is taking enough precautions and cannot think of any better.

Addressing the problem: Explained him about efflorescence and got his approval to complete a wall with RenderCon '5S'. We have requested him that we will use CRF in place of River Sand. He was apprehensive about the problems with CRF but agreed up on our insistence. Requested him to get a load of CRF available from the close by crusher to facilitate plastering with RenderCon '5S'.

We have used RenderCon '5S' in the preparation of mortar with CRF for plaster and completed a sample wall with his own masons. He was carefully observing the procedure, but said it was no different to what he was doing earlier. We left the site for the day and came back on the next day.

We demonstrated hydrophobicity on the walls by pouring water on the wall. He was happy for hydrophobicity but still not convinced about the cracking due to efflorescence, as it can come up after rain. We requested him to wait about for 10 days without curing. Fortunately, it rained on the 8th day and he could not find any efflorescence / cracking later.

After the whole episode, he said that besides getting benefits of reducing the plastering to a single coat, self-curing and hydrophobicity, his cost of plastering reduced to INR 5.25/sft.



Plaster with RenderCon '5S' demonstrating hydrophobicity

How to mitigate efflorescence further?

- 1) Select good raw material for construction avoid sources, which contain sulfates.
- 2) Do not use OPC cement, instead use Portland Slag Cement (PSC) conforming to IS 455.