



Getting Future-Proof

CW reviews durable waterproofing options for different conditions and structures.



Photo courtesy: Play Architecture

Moisture is one of the hardest aspects of a building to control and manage. This makes the waterproofing decisions of developers very significant. What factors influence these choices?

“We select waterproofing products after verifying their performance, the number of monsoons they have weathered, the project size, and local climatic circumstances,” responds **Harleen Oberoi, SVP, Head - Project Management, Tata Realty & Infrastructure**. “In general, the cost of waterproofing a solitary building is about ₹75 per sq ft and upwards (material plus application). We apply products as per the material data sheet.”

“In choosing a waterproofing solution, we consider the location, soil report, structure type, area, technical parameters and cost economics,” shares **Raman Sapru,**

QUICK BYTES

- A large building will need a variety of waterproofing solutions to ensure watertightness.
- Dry conditions are necessary for waterproofing to be immune to moisture content.
- Waterproofing an existing building is different than the needs of a new structure.

Director, Design and Engineering, KRaheja Corp.

Typically, a large building will need a variety of waterproofing

solutions to ensure that it is completely watertight.

Underground options

Different waterproofing solutions are best suited for different parts of a structure. For instance, HDPE waterproofing is a popular option for underground sections. “For 88 East Alipore in Kolkata, we used HDPE membranes to waterproof about 70,000 sq ft of the basement raft and retaining wall, at a cost of about ₹250 per sq ft (material plus application),” shares Oberoi. “We chose HDPE membrane for that part of the building because it is unaffected by hydrostatic pressure and has high puncture resistance, higher elongation percentage and good tensile strength.

For residential towers, Raheja Modern Vivarea, Sapru says HDPE waterproofing (₹730 per sq m) was chosen for below the raft and the

confined retaining wall, and SBS membranes (₹875 per sq m) for the unconfined retaining wall as the entire basement is in submerged water conditions. The raft was designed for full water pressure.

The upcoming Likabali Housing buildings in Assam which has a substantial part planned underground is in an area with a very shallow water table. Seepage and moisture control were important aspects both during and after construction to ensure the design life of the structure, says **Sneha Gurjar, Director, CEM Engineers**. "We designed a reinforced concrete wall and a diaphragm wall, the latter to limit the selection of the waterproofing system due to limited space and access. We used hydro-swellable bars on the inner and outer walls (two layers) in the outer wall system and for the reinforced cement concrete walls. We will also spray-apply EVA (ethylene-vinyl acetate) polymer-based waterproofing treatment over the D-wall, as the area has a very shallow water table, and over the underground area roof slab with both side slopes. Additionally,



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- **Sneha Gurjar**, Director, CEM Engineers

re-injectable hoses are provided to protect all the construction joints/coupler locations. Waterproofing will cost ₹14,400 per sq m for 3,500 sq m approximately."

Water-retaining structures

Dr Fixit Fast Flex works well for water-retaining structures such as

swimming pools, water tanks, reservoirs, drains and other wet areas, opines **BM Thakur, GM - Projects, Rudrabhishek Enterprises (REPL)**. "We applied Dr Fixit Fast Flex, a two-component cementitious coating composed of high-quality cement, properly selected and graded fillers, additives and liquid polymer, for Goldfinch, a residential tower in Lucknow's Paarath Republic Township. It was applied in 2019 and, so far, there has been no leakage, seepage or any type of dampness. The approximate cost of waterproofing, including the preparation of the surface, treatment and sealing of all joints, corners, junctions of pipes, was ₹42 per sq ft."

All the tanks of Raheja Modern Vivareawere first coated with a two-component reactive acrylicreinforced cementitious flexible solution (₹450 per sq m) and, thereafter, the domestic tanks were coated with a potable and food-grade epoxy solution (₹1,200 per sq m), and the STP tanks with a solvent-free pitch extended epoxy resin system (₹1,100 per sqm), shares Saprur.

Exposed areas

In creating a timber vaulting structure, **Senthil Kumar Doss, Principal Architect and Founder, Play Architecture**, opted for three waterproofing products: Dr Fixit Pidiproof LW+, an integral liquid waterproofing compound for concrete and plaster, epoxy-based sealants, and Zycosil, a reactive organosilane-based waterproofing agent that seals through to the nano-pore level.

"We used the Dr Fixit compound as an admixture for the structure made of thin clay tiles and thin clay bricks," shares Doss. "Thereafter, we used epoxy-based sealants for the joints in the top surface of the



Photo courtesy: K Raheja Corp

For Raheja Modern Vivarea, HDPE waterproofing and SBS membranes were chosen for this project, as the entire basement is submerged in water.

FEATURE-WATERPROOFING

Why is waterproofing in summer a bad idea?

Waterproofing a building in summer before the onset of the monsoon is a common but undesirable practice, cautions **Harleen Oberoi, SVP, Head - Project Management, Tata Realty & Infrastructure**. "Summer temperatures in most parts of India hover between 40 and 50° Celsius, which causes flash drying, potentially leading to cracks and other waterproofing issues."

Simultaneously, it is highly inadvisable to waterproof during the monsoon, advises Oberoi. "Dry conditions are necessary for any waterproofing application to be immune to moisture content."

clay tiles. We coated the top with a clear layer of Zycosil. Each waterproofing solution is chosen for its ability to enhance the watertightness of the structure in its own way."

A single-component polyurethane waterproofing system with a root barrier (₹950 per sq m) was used in the landscaped areas (podium, terrace and decks) of Raheja Modern Vivarea because the system is designed for exposure

conditions, movements in the podium, better elongation and tensile properties, explains Sapru.

"We deployed polyurethane waterproofing for the podium slab, swimming pool, bathrooms and terrace slab, about 77,000 sq ft, for its high elasticity and flexibility, excellent adhesion to concrete and mortar, high water vapour permeability (that reduces the likelihood of blistering), resistance to standing water, excellent



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adhesion on porous and non-porous substrates, and for being a fully bonded system," shares



Photo courtesy: North Wind Architects

For the Bhive Workspace in Bengaluru, polyurethane injections were used to fill cracks in the ceiling that was causing water leakage from the terrace.

What's missing in the waterproofing segment?

The Indian waterproofing market is growing at a CAGR of 20 per cent with the basement waterproofing segment evolving as a major contributor. That said, there are still gaps in the market that need to be filled.

"We see a large gap in the availability of quality products that last long," says **Harleen Oberoi, SVP, Head - Project Management, Tata Realty & Infrastructure**. "End-users suffer when the waterproofing effect wears off in one to three years, especially in water-intensive areas and, from there, sometimes spreading to neighbouring walls, affecting structural strength."

"India lacks high-grade waterproofing solutions for specialised applications in particular," says **Sneha Gurjar, Director, CEM Engineers**. "This void must be filled now that we're seeing a lot of prefabricated and composite construction, both in building projects and infrastructure works."

A few top players with limited products are making waterproofing expensive in India, opines **Raman Sapru, Director, Design and Engineering, K Raheja Corp**.

"No product exists between acrylic cementitious and polyurethane. Exploring this area would reduce the cost for other areas."

"We'd prefer using an epoxy single-product system for tanks but there are very limited manufacturers and products available in the market for this application. What's available is too expensive and hence not viable," he adds.

"While waterproofing components of every brand are available in metro cities, in Tier 2 and Tier 3 cities, we see a major shortage of genuine products from brands such as Dr Fixit, Fosroc, CICO, BASF, Pidilite, etc, a lack of knowledge of waterproofing compounds and a shortage of skilled applicators," says **BM Thakur, GM - Projects, Rudrabhishek Enterprises (REPL)**.

So it's not only the solutions, their application also falls short.

Although the availability and range of solutions have improved considerably over the last decade, correct application and post-application QA/QC usually get neglected, adds Gurjar.

Oberoi, in the context of 88 East Alipore in Kolkata. "It cost approximately ₹200 per sq ft."

Waterproofing bathrooms

Speaking of 88 East Alipore, Oberoi says, "Since the bathroom slabs accounted for a limited area, and hence the possibility of cracks and temperature variances was low, we chose an acrylic polymer base and cementitious coating that protects against carbonation and has good abrasion resistance. About 100,000 sq ft of this area was waterproofed at a cost of about ₹125 per sq ft."

"A well-suited, economical, two-component reactive acrylic-reinforced cementitious flexible waterproof coating was applied in the refuge and toilets," adds Sapru about Raheja Modern Vivarea.

Existing buildings

Waterproofing an existing



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building is a different exercise than thinking about the needs of a new structure. "When a structure already

exists, the dependency on waterproofing products (as opposed to structural design and base material choices) tends to be more," says **Shweta Malagi, Principal Architect & Founder, North Wind Architects**.

For the Bhive Workspace in Bengaluru, Malagi opted for polyurethane injections to fill cracks in the ceiling that were causing water to leak from the terrace. "We covered about 12,000 sq ft with this waterproofing method," shares Malagi. "The thick foam created by the chemical reaction spread through the gaps and sealed the cracks, thus effectively stopping the leakage."

Fortunately, India has an ever-expanding palette of waterproofing solutions.

- **CHARU BAHRI** | CW |