Waterproofing
Chemicals & Systems
Market Overview

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Increasing cost of construction coupled with rising costs of raw materials and labor have today led to the implementation of advanced waterproofing products and solutions for quality building practices. Though waterproofing as a solution dates back to centuries when habitats were prevented from water through thatch, reed, leaves and then through animal skins, natural stones, pitched roofs but with time and with advent of technology and materials, the options have increased manifold.

Concrete as a material has been used since time immemorial due to its cost effectiveness and versatility. V. Jayachandran Nair, Sales Manager of Bengaluru based Bostik India Private Limited, one of the largest adhesive and sealant companies in the world cites the reasons for leakage in concrete to use of excess water, inadequate compaction, long-term drying shrinkage, thermal shrinkage, crack in transition zone, structural stresses and lime leaching.
Waterproofing

Effective and durable waterproofing system ensures increasing the shelf life of concrete, in turn providing longer durability of a structure and lowering the maintenance costs. Besides, one gets a sound foundation, the property value increases and the property remains aesthetically pleasing. Water damage can lead to metal corrosion, electric hazards, rotting of timber structures and finishes, swelling of plasterboards, growth of fungus leading to health hazards.

Typically, waterproofing should be applied over all below-grade concrete surfaces. These areas would include underground structures, elevated structural slabs over underground surfaces, foundations, terraces and plazas. Internal areas that are waterproofed include bathrooms, shower recesses, laundries, and toilets.

Types of Waterproofing Systems and Products

What is of note is that waterproofing systems or products are different for different parts of a structure namely the roof, basement or walls; the location, climatic conditions, usability of a structure would determine the system to be used. Faridabad based Kunal Conchem (P) Limited, one of the leading companies engaged in manufacturing of construction chemicals for over the past 35 years has an in-house division which takes care of application works – primarily focussing on various natures of waterproofing assignments.

Kunal Prasad, director of the firm says, “The most suitable methodology for waterproofing is based on its suitability, availability of material and skilled labor, the extent of severity of waterproofing requirement and the economy.” He adds that broadly, there are five types of waterproofing methods in vogue – Conventional rigid systems, Chemical Coating, Crystalline system, flexible membranes, and water repellent impregnates.

The conventional systems would include box type waterproofing with impervious stone slabs like Kota stones/ Red Agra stone etc; Brick Bat coba system and Mud phuska system. These traditional systems especially the brickbat coba system is now known to put unnecessary load on the systems.
Waterproofing

Crystalline waterproofing systems and flexible membrane waterproofing systems are two versatile systems that are applied in India and abroad. Prasad informs, “These systems consist of applying chemicals on the surface of concrete. These chemicals react with the soft by-products of the cement hydration process and form hard crystals. These crystals lodge themselves in the pores of the concrete, thereby making it impervious. However, the concrete structure needs to be checked for honeycombs, construction joints and other week points like tie rod locations etc. These week points need to be attended to suitably to make the system work effectively.”

There has been advancement in materials too for membranes with the advent of polymer based materials. In flexible membranes, there are two further types-cold / hot applied liquids which dry into flexible membranes (namely bitumen coating, PU coating, acrylic coating, polymer coating) and flexible membranes which are pasteried/ loose laid/ mechanically fastened/ torched onto the substrate namely PP Membranes, PVC Membranes, EPDM Membranes, HDPE Membranes, TPO Membranes.

While crystalline waterproofing systems is used to waterproof and rehabilitate leaky water tanks, swimming pools and retaining walls, the flexible membrane waterproofing system is mainly applied to repair and waterproof roofs and other exteriors.

Chemical Coatings have also been a much older kind of waterproofing for metal and masonry surfaces. From simple coatings of asphalt, coal-tar pitch, bituminous and cement based waterproof coatings; today there are polyurethane elastomeric coatings, crystalline waterproof coatings and acrylic polymer-based cementitious coatings in different color and shades. Elastomeric coatings have a high crack bridging ability and can easily be applied by brush or a roller. Prasad adds, “These systems have medium flexibility and generally consist of a cementitious coating (generally an acrylic polymer) admixed with copolymers which add flexibility to the otherwise rigid material. This system can be applied in two coats or more and can be reinforced with high tensile fabrics.”

Water repellant impregnates are low viscosity silicones/ siloxanes/ silanes and other similar formulations which are available in both water based and solvent based formulations. These chemicals are applied on the surface of stone/ masonry facades of buildings. They permeate into the surface and impart water repellence to the surface, thereby reducing water ingress, increasing the life of facade and improving discoloration.

A lot of times, the approach is done the other way and it is to cast as good a concrete as possible so that the concrete itself is watertight for which there are integral waterproofing compounds (basically polymers) like liquid admixtures and powders etc which are added directly to cement or concrete mix.

Then there are also sealants for prevention of passage of water in the joints or water stoppers which are swell-able water bars for construction joints with expanding capacity up to 150% of original size when in contact with water.

For basements there are interior as well as exterior basement waterproofing systems. You get interior sealants which help in controlling dampness. Humidifiers are also available which provide extra support to these sealants.

Branding
Tamil Nadu based Techny Chemy, a firm working towards ‘demystifying construction chemicals’ and creating user-friendly, versatile and consistent products has a number of waterproofing products and systems. There is Tec Wave 2000 – elastomeric waterproofing coating best suited for basements, roofs, sunken portions, balconies and swimming pools. Tec Wave 3000 which is a flexible waterproofing membrane can be applied over weathering course tiles and places where an external plastering is not possible. Besides these, they also have Tec Wave SW – a sandwich membrane type of waterproofing. Tec Wave 7000 is a crystallization waterproofing system best suited for basements and other water prone areas. There is Tec Swell – admixture used for pressure grouting of concrete surfaces to make it pores free and ensure water tightness and Tec Brite U – a acrylic based water repellent coating.

Mumbai based Penetron India Pvt Ltd, specialists in crystalline waterproofing materials offer a complete package for basement waterproofing comprising a combination of crystalline admixture and swell-able water stops. The crystalline admixture is a third generation admixture. The waterproofing admixture is capable of enhancing impermeability of concrete by more than 70% as compared to the control mix.
Sushil I Kathar, Managing Director of the firm admits, “We have successfully introduced this system in the Indian market and have been able to capture 65% of the market share in the crystalline waterproofing category.”

At Bostik, there is integral waterproofing admixture which gets contraction capillaries and is suitable for production of waterproof concrete in accordance with German industrial standards and is used in water retaining structures, humid atmospheric condition, concrete roofs, basements, tunnels, tanks etc. Bostik IWP is an integral waterproofing powder for the fabrication of permanently capillary proof and watertight concrete. Boscolastic cementitious waterproofing coating has excellent adhesion to concrete substrates and can be applied on damp surfaces. In admixtures, there is Bostik One (a smooth aqueous liquid waterproofing dispersion) to waterproof floor screeds in bathrooms, shower rooms, kitchens, and to waterproof cement sand plaster in reservoirs. There is Bostik two in one (a chloride free integral waterproofing cum water reducing admixture for concrete and plaster), Bostik Elastocoat (a high performance elastomeric acrylic based waterproofing coating), Bostik CWP (surface applied, integral crystalline waterproofing material), and Boscoseal PU (a liquid polyurethane waterproofing membrane).

Noida based Nile Waterproofing Material Co. SAE who produce and market waterproofing materials have APP (Atactic Polypropylene) & SBS (Styrene Butadiene Styrene) modified membranes with polyester and fibreglass reinforcement in plain, sand and different coloured mineral finishes in 2mm, 3mm, 4mm & 5mm thickness. In addition, special membranes are engineered to accommodate the requirements of specific uses such as in planters, where anti-root waterproofing membranes are essential. They have specially designed some APP modified membranes, which are suited to Indian climate conditions as per the specifications of C.P.W.D., M.E.S., Metro Railways, N.T.P.C., N.H.P.C., N.P.C.C. and many other government / public sector organizations. Pratap Singh Rautela, Country Head for the firm adds, “Our product mix incorporates a comprehensive range of self-adhesive modified bitumen membranes that are manufactured from the best selected raw materials procured from the most reliable sources in Egypt and the world.”

Pidilite Industries Ltd with its Dr Fixit range of products for waterproofing in construction has integral liquid waterproofing and powder waterproofing compounds, waterproof coatings like bitumen elastomeric waterproof coating and epoxy resin based water thinnable coating, bitumen based membranes for waterproofing and waterproof joint filler for tiles. Dr Fixit Pidifin 2K is a high performance two component flexible acrylic polymer; modified cement based waterproof coating for concrete and masonry surfaces. The system consists of a powder and a liquid, is grey in colour and can easily be applied by a brush.
Waterproofing

Market Size, Demand Analysis and Growth Rates
Kathar states the market size for waterproofing approximately to be $1 billion per annum and for chemical waterproofing as $0.5 billion per annum. He attributes the 20% growth of this segment per annum (which is faster than the construction industry) to better awareness and need for these systems in India.

D Ravi, Director Marketing of Techny Chemy feels that waterproofing segment alone must be around ₹500 to ₹600 crores in Indian market and as of now is seeing a 30–35% growth rate. He adds, “Awareness of waterproofing has developed among majority of small time builders. Usually this segment will be cost conscious, as they cannot demand a premium price from their builders, but now they are the main source of consuming waterproofing materials.” Rautela agrees on the same saying, “At present the total waterproofing market size could be around ₹700 Crores per annum while APP waterproofing membrane contribution will be around ₹150 Crores per annum. The growth rate is around 25% per annum.”

For India, Prasad bills the current market for construction chemicals at about 1800-2000 crores and roughly out of which 25% comprises waterproofing chemicals.

Current Trends, Standards and Requirements
Traditional waterproofing products have led to usage of bitumen and polymer products today. For wood construction, there has been an appreciable use of flexible membrane products for waterproofing in the US.

Single ply synthetic waterproofing membranes which consist of providing a watertight liner all around the building element has been much used in Europe and America for years. A number of synthetic liners are available for this purpose like PVC (for basements) and TPO (for exposed roofing). These synthetic liners have a durability of 25-50 years, a lot more years than what is provided by bituminous membranes. TPO liners offer high weather and UV rays resistance, dimensional stability, are environment-friendly and non toxic. Waterproofing of basements is the most pertinent aspect of waterproofing. While the box type technique has been used over a long period of time, with deeper basements, systems like FLAGON PVC by BASF Construction Chemicals (India) Pvt Ltd have proved to be more useful which make the use of PVC membranes. The advantages amongst others include double seam welding, signal layers (due to which physical damage is visible and checked), and being unbounded (thus having the ability to move with the movement of the structure).

Drawings courtesy: Techny Chemy

The various systems and technologies in applying waterproofing coatings:

For Slopped roof areas:

For flat roofs:
Waterproofing also needs to be checked. One of the world’s most advanced and greenest technology for leak detection - a German leak detection technology known as International Leak Detection (ILD®) which looks after waterproofing membrane defects is available in India through Rooftech Enterprises Pvt. Ltd. under the business name of ILD® India. This is done with the help of EFVM® (electric field vector mapping), a low voltage test. Some prestigious projects like the Chhatrapathi Shivaji International Airport, Mumbai (New Terminal Building) are using it.

**Shrikant Shah,** cofounder of Rooftech Enterprises Pvt Ltd maintains, “The Floor (hydro) method to check the integrity of a newly installed waterproofing membrane or coating does have its own limitations. In the wake of this, EFVM is ideal for situations where waterproofing is buried or concealed. This system incorporates battery powered sensor boxes which transmit results to a solar powered central hub that collects information from sensors and sends it to a central computer where the information is further assembled and generated into regular reports.”

**Demand Drivers**

Nair adds, “Concrete has a wetable surface and an affinity for water which enters it through hydrostatic pressure or capillary action. Thus waterproofing should look at reducing the voids by waterproofing agents, by lowering water cement ratio and by proper compaction.”

For effective waterproofing, there are a lot of aspects which should work together – proper product selection, proper surface preparation, proper designing of the system, a specialist execution agency and proper protection by the end-user.

A good waterproofing product should have a built in capacity to neutralize the excess salt and clay, if present in the sand used for construction. Due to the water based nature of cement, the waterproofing product should also be cement and water-based. It is important to remember that crack filling is only one part of waterproofing. Water can seep through wall plaster even if there are no cracks. Also, waxy materials should be avoided since they are not durable and form a coating on the surface.

**Major Restraints**

The major restraints in case of waterproofing appear to be lack of awareness of using construction chemicals, shortage of skilled labour and costing. Hopefully with the recent formation of Construction Chemical Manufacturers’ Association (CCMA) things might change.

Ravi chips in, “Normally the success of waterproofing depends on the usage of the products as per the specifications. But the current market situation is such where anybody can use the product and become a waterproofing applicator. So the percentage of failure increases in doing waterproofing jobs which in turn creates a negative image for waterproofing products.”

Rautela feels that people and architects need to be educated in order to use and specify APP membrane for their projects. He finds that people need to move away from conventional methods. He further adds, “Most of the contractors fool the client in the name of waterproofing. They use cementitious and polymer based waterproofing which is just an eye wash. This system starts showing its problem within a year’s time. Then there is also the liquid system of waterproofing where the main drawback is that though the maximum thickness of coating is around 1mm but thickness of the coating cannot be attained uniformly all over.” He also feels that the segment is facing high competition from abroad where companies are offering lower prices without considering the quality and specifications. He points out that getting approval even to a bad product is not a problem in India since getting good test results from testing laboratories is not a difficult job.

Kathar cites the major restraints being the competition with the traditional waterproofing systems and the fact that this sector is largely ‘unorganised’. He adds, “The top players in waterproofing industry have less than 10% market share and the remaining 90%+ continues to be with the small time operators.” Prasad feels that the approach of people towards waterproofing is still more of searching for cure rather than prevention. People generally like to have the water-
Waterproofing

**Highlights/Facts & Figures**

- Waterproofing methods in vogue: Conventional rigid systems, Chemical Coating, Crystalline system, Flexible Membranes and Water Repellent Impregnates.
- Market size for waterproofing-$1 billion per annum.
- Market size for Chemical waterproofing- $0.5 billion per annum.
- Growth in market – 20% per annum.
- Major restraints in waterproofing segment–lack of awareness of using construction chemicals, shortage of skilled labour and costing, competition with the traditional waterproofing systems, unorganisation of the sector.
- New waterproofing systems as compared to traditional systems save up to 30–35%.
- Waterproofing roughly constitutes 4–5% of the total building cost.
- An increase of 20–30% in consumption to happen in the coming years.

Costing

“The new waterproofing systems when compared to traditional systems can make the end-user save up to 30-35% on cost of the waterproofing for a project, apart from giving many other benefits such as time saving, better planning and overall concrete protection,” maintains Kathar. Ravi further adds that though waterproofing roughly constitutes 4–5% of the total building cost at the maximum, but small and medium promoters find it difficult to incorporate it in their project cost as they are affected by the price escalation of other products during their construction.

Forecast

With the infrastructural development in India and value of properties going up, Kathar is confident that the demand for waterproofing products will increase in the future. Rautela feels that in the next five years 70% of the total waterproofing could be APP modified membrane. Ravi foresees an increase of 20–30% in consumption in the coming years. He concludes, “Now we can also see growth in infrastructure in Tier 2 and Tier 3 cities. This has opened gates for a new market of waterproofing chemicals.”

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