# Useful Construction Chemicals

Construction chemicals have always been playing important roles in virtually all sorts of construction projects, be it industrial projects, residential building projects, commercial building projects and so on. These chemicals are often used in various elements of projects in order to achieve various important qualities such as workability, durability etc. Construction chemicals exist in many varieties from large number of manufacturers worldwide. Few of the most commonly used varieties have been mentioned below.

Curing compounds : A popular construction chemical widely used in most major projects, especially, industrial ones, these chemicals are often much better substitutes to the conventional method of curing, ie water curing. Curing compounds prevents escape of moisture from freshly laid concrete by sealing the concrete surface and hence water curing becomes unnecessary. They should be compatible to any coating to be applied to the surface. For example, concrete protective coating to be applied in a water or liquid retaining structure may be different from that to be applied to some other structure. Accordingly, the curing compounds should be compatible to the respective types of coatings. For example, MasterSeal 410C is recommended by it's producer for waterproofing structures while the same producer suggests Masterkure 181S for general purposes.

Curing compounds can be pigmented or clear. They can be membrane forming or non-membrane forming. Curing compounds can be acrylic, linseed oil based, water based, silicate solutions, emulsified paraffin based etc. They can be dissipating, ie non-membrane forming or membrane forming compounds. Example of non-membrane forming curing compound is silicate solution.

Form release agents : These compounds, applied on the inner surfaces of forms, not only facilitate stripping of formwork but also render concrete surfaces smoother. They also help enhancing life-span of the forms. Form releasing agents can be oil based, resin based, water based, organic chemical based etc.

Form sealers : These chemicals are applied along the joints of formwork to render it leakproof and are easier & better options than mortar, jute etc. There are many in the market. One example is polyurethane (PU) sealer quite suitable for plywood forms.

Waterproofing chemicals : These chemicals can be quite useful when a structure's waterproofing capability is to be given a boost which is especially required for structures constantly dealing with liquids. There are many varieties. Some of them are crystalline waterproofing chemicals, liquid acrylic elastomeric waterproofing compounds, polymer modified waterproofing compounds, cementitious waterproofing compounds etc. Many of these compounds form membranes on the concrete surfaces to protect them from ingress of water.

Water repellents : These chemicals have water repelling properties which is exploited to protect masonry and concrete alike from the ill affects of moisture or water. Some examples amongst many types of water repellent are acrylic protective coating, water based silane siloxane water repellent sealer for tiles, stone masonry etc.

Swelling water stops : These are primarily used in construction joints. Quite easy to install, good quality swelling water stops can be more efficient and economic option to the conventional PVC waterstops in many cases. These chemicals seal the joints by their swelling action when they come in contact with the water of freshly poured concrete. Examples are polyurethane foams and grouts. Swelling PU resins, which turn foamy and expand when coming to contact with water, are used for sealing leaking cracks as well by injecting the chemicals into the cracks.

From my personal experience in diverse projects in India as well as (short period) in the Gulf, I have a perception that construction chemicals are widely used in the Gulf region as compared to India. Extreme weather conditions there could be a reason though. For example, treatments for concrete surface protection is quite common in Gulf as compared to that in India. That is over and above maintaining adequate quality in concrete. Not too many chances are taken when it comes to quality. Places like Dubai is said to have even stricter quality measures as compared to some other places in the region. Apparently, oil money speaks well in most construction work in many places out there.

Some more commonly used and quite useful construction chemicals in addition to the already discussed ones in the previous post find mention here.

Adhesives : These construction chemicals are readily used in all sorts of projects, be it commercial, residential, industrial etc. construction projects. Adhesives are expected to have strong bonding capacity besides good waterproofing, weatherproofing etc. qualities. These are also expected to be elastic enough to accommodate repeated expansion and contraction likely to be caused by temperature fluctuations. Adhesives make their ways to myriad of construction works ranging from floor covering, panel fixing to tile fixing and so on. Various types of adhesives are PU based adhesives, silicone adhesives, acrylic adhesives, UV adhesives etc. Epoxy adhesives are among the high performing ones and are quite suitable for severe environment (heat, chemical attack and so on)

Bond breakers : These are used to break or prevent the development of bond between a freshly cast concrete element and the surface or bed on which it is cast and thus facilitate smooth lifting of the element. Typically suitable for pre-cast yards or similar construction work. Bond breakers are usually low-solid resins and can be water or solvent based.

Concrete floor hardeners : These are chemicals added in floor concrete in order to render it denser and more durable. They also usually enhance chemical resistance, impact & abrasion resistance, waterproofing capability etc.

besides reducing dusting. All these are required attributes especially for industrial, commercial or factory floors. Ultimately good quality floor hardeners reduce repairs and maintenance of concrete floors drastically besides making them long lasting thus adding to cost effectiveness as well.

Floor hardeners can be liquid or solid, metallic or non metallic. Metallic floor hardeners (solid) are well graded ferrous aggregates. Liquid floor hardeners are water, silicate etc. based solutions. Pigmented floor hardeners also improve appearance of floor surfaces. Floor hardeners are usually applied as per manufacturer's specifications.

Re-bar coating : Coatings for reinforcing steel bars can be quite useful when the bars have to stored or kept exposed to weather for considerable time. They prevent formation of rust on the bar surface which otherwise needs to be removed by sand or grit blasting. A common and effective type of re-bar coating is fusion-bonded epoxy coating. Bars can be galvanised as well.

Polyurethane (PU) foam : A good thermal insulator besides having excellent moisture or water insulation characteristics, these chemicals are suitable for diverse applications such as ceilings, roofings, walls, basement etc. Spray PU foams are especially suitable for pipe, cold storage structure, tank etc. insulation work.

Concrete protective coatings : Details on these chemicals are available in two of my previous posts, "Protective Coating for Exposed Concrete Surfaces, Part – I & Part – II.

Epoxy grouts :
Epoxy grouts have an edge over ordinary grouts especially in harsh environmental conditions such as exposure to extreme temperatures, oil, grease, acids, chemicals and so on. Besides, they are much more durable and abrasion, impact, stain resistant as compared to ordinary grouts. However, they are more expensive too. Having good vibration damping characteristics,
epoxy grouts are quite suitable for grouting of industrial equipment or machine foundations.

Available as two-component, three-component
epoxy grouts, these can be of sanded or unsanded varieties. Three-part or three-component
epoxy grouts are usually used for large applications. While 2 parts
epoxy grouts are mostly used for grouting thin gaps, many of them are also quite suitable for concrete repair works such as filling cracks, voids, honeycombs, blow-holes etc.

Epoxy primers : Applied as prime coat before application of top coats,
epoxy primers have distict edge over many ordinary primers especially in harsh industrial, chemical or weather environments.

Epoxy paints or coatings: These can come as water or oil based solutions or as solvent-free. They can be single or two-component. Single-component epoxy paints are usually oil based. Two-component epoxy coatings are mixed in situ in proportions as prescribed by their manufacturers and they are quite suitable for factory, industrial or commercial building applications by dint of their excellent chemical & thermal resistant characteristics, hardness, durability, waterproofing characteristics etc. They are solvent-free. Epoxy coatings are also used in flooring for decorative purposes.

**Source: http://civilconstructionresourcez.wordpress.com/2012/02/25/useful-construction-chemicals-part-i/**