Latest Trends in Concrete Technology

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Past ten years witnessed a number of advances in new concrete technology. In almost all areas of concrete production including materials, recycling, mixture proportioning, durability, environmental quality etc these advancements made existence. Unfortunately the concrete users / buyers or even the major part of the concrete industry itself haven't adopted these new advancements. The reason may be some common resistance to change based on cost considerations and the absence of familiarity with the new technology.

Even though the new concrete technology is slowly gaining acceptance in the modern industrial environment. Some of the new entrants in concrete industry are called high performance concrete (HPC), ultra high performance concrete, and geopolymer concrete. When compared to standard concrete in use today these new players have significant advantages and practically little or no disadvantages.

HPC usually contains recycled materials and thereby reduces the need to disposal of these materials. Some of these materials include fly ash, ground granulated blast furnace slag, and silica fume. But the major benefit of using these materials is the reduction in the need to use the Portland cement. The reduction in the production and use of cement will have many beneficial effects. These benefits will include a reduction in the creation of carbon dioxide emissions and a reduction in energy consumption, both of which will improve the global warming situation. As per the studies conducted recently estimated that the manufacture of portland cement worldwide contributes five to eight percent of global carbon dioxide emissions. More over, the use of materials like fly ash and furnace slag is cheaper than cement and they have some properties which will improve the quality of the final concrete.

Latest concrete technology has produced new types of concrete that have live spans measured in the hundreds of years rather than decades. Also it will save hundreds of thousands of acres of land that would have been used for disposal purposes of fly ash and other by-product materials. Fly ash, some other by-products from burning coal etc are some of the most abundant industrial waste by-products on earth. The elimination of burial sites for these sort of waste by-products will reduce the risk of contamination of surface and ground water supplies. The new concretes have better corrosion resistance, equal or higher compressive and tensile strengths, higher fire resistance, and rapid curing and strength gain when compared to standard concrete. . More over, the production and life cycle of these new concretes will reduce greenhouse gas emissions by as much as 90%.

BSI is a new concrete technology that has a much higher tensile and flexural (bending) strength than standard concrete. It will be a fiber-reinforced concrete that is combined with premixed dry components which will be much denser than the standard concrete and structures built with it will require less new concrete, perhaps as much as 80% less. Due to the high density BSI concrete will get other properties such as extremely high resistance to corrosion from chemicals. The higher strength of BSI eliminates the need for placement of steel rebar in structural designs. The structures built with BSI will have much longer life spans and will require very less maintenance.

Ductal is another new concrete technology that is denser than BSI. It uses steel or organic fibers to create a concrete that is stronger than BSI. It is being tested for use in earthquake resistant structures, bridges, tunnels, and nuclear containment structures. Although it is more expensive than traditional Portland cement concrete there are a number of cost savings that will make it price competitive. The cost savings factors are no steel rebar is needed, less material is needed with less related labor and equipment costs. Structures are thinner with less weight and require smaller foundations. More over, both BSI and Ductal have low maintenance costs because of their very low porosity and are very resistant to penetration by water or chemicals. They are both resistant to salt water which is very corrosive and damaging to today's bridges and roadways. This exciting feature will helps these materials to be the leading players in the current as well as future industrial scenario.

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