

A Report on Eco Friendly Smart Concrete

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Brief Report

Green concrete is a type of environmentally friendly concrete that is made from waste or residual materials from various industries and uses less energy to produce. When compared to typical concrete, it emits less CO₂, is less expensive, and lasts longer. Green concrete's goal is to reduce the use of natural resources while increasing reliance on recyclable materials. Reusing wash water to reduce water use is one of the many ways being used to promote sustainability through eco-friendly concrete. One of the most effective ways for achieving environmentally friendly construction materials is to partially replace energy-intensive cement with reusable materials. Cement, for example, can be replaced by Fly Ash, Silica Fume, and Wood Ash, among other materials.

Cement, gravel, sand, water, and a variety of materials are all used to make concrete. Concrete is the most consumed substance on the planet, second only to water, with around 10 billion tonnes created each year. Concrete is also the most frequently utilised construction material in the world; from bridges to enormous buildings, concrete is the bedrock of our infrastructure. A concrete structure houses more than 70% of the world's population. Concrete is used to construct a variety of structures, including buildings, pavements, pipes, floor slabs, beams, and pillars, due to its durability and strength. Despite the vast production and use of concrete around the world, there has been much speculation that it could be a significant contribution to greenhouse gas emissions.

Fly ash is a by-product of coal combustion that was traditionally thrown away in landfills but is now used to make green concrete. Ashcrete is a recycled fly ash-based concrete that can be used in place of ordinary concrete. Fly ash is combined with lime and water to create strong and long-lasting cement that is similar to traditional cement. The use of fly ash in Ashcrete makes it an environmentally favourable option because it can substitute cement, resulting in lower CO₂ emissions. Furthermore, high-volume fly ash concrete can be used to replace 25% of cement. When compared to typical concrete, further advantages of fly ash include reduced bleeding, higher concrete strength, and reduced shrinkage. Fly ash not only makes concrete more environmentally friendly, but it also makes it more resistant to alkali-silica reactivity.

Blast furnace slag, like fly ash, is a waste product that can be recycled and utilised to manufacture an environmentally acceptable concrete substitute.

The molten iron slag from the blast furnace is quenched in water or steam to form this glassy granular substance. This material may replace 70 to 80 percent of the cement in concrete, increasing its durability. Another benefit of blast furnace slag is that the manufacturing process produces less heat for hydration.

Micro silica is an ultrafine powder produced by the condensation of Silicon dioxide as a by-product of ferrosilicon alloy and silicon synthesis. It can displace from 7% to 12% of the cement in concrete. Microsilica is believed to increase concrete's compressive strength and make it less permeable, hence boosting its longevity. Concrete containing silica fumes is utilised in structures that are subjected to severe chemicals. It is a lot more environmentally friendly material than regular concrete.

Aside from developing cement replacements, substituting aggregate materials with recyclable and reusable resources is a viable technique for reducing greenhouse gas emissions from typical concrete. Paper/fiber, scrap plastic, post-consumer glass, and concrete debris are some aggregate choices. Waste paper is used to make Papercrete, which is then recycled and utilised as an aggregate material in concrete production. While it cannot completely replace cement in the mix, even modest amounts of papercrete can help to mitigate some of the negative consequences of concrete manufacturing. Concrete debris is an innovative approach to recycle discarded concrete and reduce resource consumption during the concrete manufacturing process. This approach saves landfill space and lowers the usage of virgin raw resources by reusing waste.

Glass is a versatile inert material that can be used as a concrete aggregate replacement. Post-consumer glass boosts the durability of concrete and helps to reduce consumer landfill trash because it can be recycled and reused many times without losing its chemical qualities. Because waste plastic is a non-biodegradable substance, recycling it is a good idea. Plastic garbage is easily recycled and can easily substitute for up to 20% of typical aggregate material. Although concrete made from plastic waste has a limited strength, it is unquestionably a more environmentally responsible option to ordinary concrete. The Buatex wall system is a sturdy and low-energy alternative to standard concrete, thanks to the utilisation of composite materials and foam beads. This is a new method for building fire-resistant, storm-resistant, and sound-absorbing walls.

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