

**GREEN INNOVATION** | Geopolymer concrete sets new standard

# IIT-I develops cement-free, eco-friendly concrete

Our Staff Reporter

INDORE

IIT Indore has taken a major step toward eco-friendly construction by developing a new type of concrete that does not use cement. This breakthrough has been achieved by Dr. Abhishek Rajput, associate professor and his research team from the Department of Civil Engineering. Using geopolymer technology, they have created high-strength concrete that not only helps protect the environment but also performs better and lasts longer than traditional concrete.

Ordinary Portland Cement Concrete (PCC) is known to be one of the major sources of carbon dioxide emissions, contributing about 8% of global CO<sub>2</sub> emissions. It releases nearly 2.5 billion tonnes of CO<sub>2</sub> every year due to the processes involved in making



Cube, beam and cylinder sample of G-HSC for mechanical testing

cement, like burning limestone and fuel. The newly developed Geopolymer High-Strength Concrete (G-HSC) completely removes the need for cement. Instead, it uses industrial waste materials such as fly ash and ground granulated blast fur-

nace slag (GGBS). Another benefit is that this concrete does not need water curing, which helps save water, a crucial factor in today's time of water scarcity.

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## Stronger, greener and water-saving

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can cut down construction costs by up to 20% when local materials are used. It is not only sustainable but also cost-effective. One of its most remarkable features is that it gains very high strength in a very short time. It achieves over 80 MPa of compressive

strength in just three days. Because of this rapid strength development, it is perfect for use in urgent construction projects such as military bunkers, bridges, disaster relief structures, precast railway sleepers, and highway pavement repairs.

Appreciating the innovation, prof. Suhas Joshi, Director, IIT Indore, said, "This is an excellent example of how IIT Indore is contributing to national priorities through sustainable technology. Such developments align with India's vision for green infrastructure and carbon neutrality."

"This development is a step toward transforming the way we build our future infrastructure as stronger, faster and greener. The goal is to find a practical solution that benefits both the environment and the construction industry," said Dr. Abhishek Rajput, the lead researcher on the project.