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DEPARTMENT OF
SCIENCE & TECHNOLOGY
सत्यमेव जयते

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PENDING

(IN202511019454) Multi-frequency electromagnetic wave-based system and process for detecting and mapping fluid pathways within structural elements

NEED

Undetected water seepage and fluid leakage inside concrete structures cause 30–50% of early structural failures, leading to collapses, safety hazards, and repair costs exceeding $10B globally each year. But what if leakage paths could be mapped before visible damage appears?

TECHNOLOGY OVERVIEW

This system uses 2.5 GHz multi-frequency electromagnetic waves to detect and map fluid pathways hidden within concrete. It distinguishes fluids from solid materials by analyzing wave attenuation and reflection, then translates the signals into detailed visual maps. A new technology is changing the game—without disrupting existing systems.

TECHNOLOGY KEY FEATURES

Non-invasive detection, real-time fluid mapping, 2.5 GHz precision, adaptable calibration for different materials, and high-resolution visualization make this technology a breakthrough in preemptive infrastructure maintenance and structural health monitoring.

MARKET ANALYSIS

The global non-destructive testing (NDT) market is projected to reach $34.3B by 2033, growing at a CAGR of 9.3%. Indian NDT market is growing at 8.1% CAGR. Infrastructure aging, urban expansion, and compliance with safety standards are major drivers. [Source: MarketsandMarkets, IMARC]

Target Industries

Infrastructure Maintenance: Civil and structural monitoring providers for bridges, buildings, and dams. Smart Cities & Urban Safety: Tech platforms integrating preventive maintenance in city infrastructure. Construction Quality Assurance: R&D teams in cement and construction sectors for new-build and retrofitting applications in humid or flood-prone regions.

AT A GLANCE

SDG 9 (Industry, Innovation, Infrastructure), SDG 11 (Sustainable Cities and Communities), SDG 13 (Climate Action)

Read more here

Technology is available for licensing/ co-development.

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