

From Sludge to Structure:

Transforming Waterworks and Sewage Sludge into Concrete with Varied Compressive Properties

"Sludge-transformed concrete" is a **ready-to-deploy solution** that addresses long-standing issues related to sewage and waterworks sludge disposal. It replaces **10–25%** of conventional aggregate while achieving **compressive strengths of 20–47 MPa**, suitable for both structural and non-structural uses. **Certified Toxicity Characteristic Leaching Procedure (TCLP) tests for heavy metals comply with environmental standards**, ensuring the product is environment-friendly. Replacing conventional aggregate with sludge **reduces production costs by 32%**. As concrete is the world's most used man-made material, this innovation offers powerful **waste utilisation**, **directly solves odour and similar environmental nuisance issues**, and **significantly reduces CO₂ emissions, achieving carbon neutrality**.

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FEATURES AND ADVANTAGES

A ready-to-deploy solution for long-standing sludge disposal issues (around 1200 tonnes/day of waterworks and sewage sludge needing disposal in Hong Kong)

01

228 kg of sludge is consumed for every 1,000 kg of concrete

02

Achieved 20–47 MPa compressive strength based on application purpose (structural and non-structural)

03

Significant cost reduction of 32% compared to conventional concrete

04

Passed TCLP tests for 21 heavy metals, 26 organic pollutants, and 6 inorganic pollutants

05

Reduces CO₂ emissions by 21.5% compared to conventional concrete

06

FUTURE DEVELOPMENTS

- **Broader applications with value-added functions:** Infrastructure, building module, walls, non-structural works with acoustic and thermal functions
- **Tailor-made consumer products:** Decorative furniture, home goods, and architectural decoration
- **Engage property developers** by offering a lower-cost and more environment-friendly alternative

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