



PATENT PORTFOLIO

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Advanced Self-Healing Concrete Composition and Method for Infrastructure Longevity Construction

Indian Utility Patent Application No. 202541006517	Published 2025 Status: Published / Pending Grant
Inventor Dr. Ashhad Imam & co-inventors	

Summary

This patent covers a concrete composition and associated method designed to autonomously repair microcracks that develop during a structure's service life. By incorporating self-healing agents into the concrete matrix, the composition targets one of the most persistent durability challenges in reinforced concrete infrastructure — the ingress of water and aggressive chemical ions through crack networks, which accelerates reinforcement corrosion and shortens structural service life.

Problem Addressed

Conventional concrete relies on manual inspection and repair to address microcracking, which is costly, disruptive, and often reactive rather than preventive. This innovation aims to reduce long-term maintenance costs and extend infrastructure service life by enabling the material to respond to damage autonomously.

Relevance

This work builds directly on the inventor's peer-reviewed research on dolomite and glass-fibre-based self-healing concrete systems, published in *Cleaner Waste Systems* (Elsevier, 2025), connecting the patented composition to a validated experimental research programme.

This is a plain-language technical summary prepared for general audiences. For full legal claims and specification, refer to the official record at the Indian Patent Office (Application No. 202541006517).

Novel Building Material Composition with Enhanced Sustainability and Durability

Indian Patent Application No. 202541078013	Published 2025 Status: Published / Pending Grant
Inventor Dr. Ashhad Imam & co-inventors	

Summary

This patent describes a building material composition formulated to improve both environmental sustainability and long-term durability relative to conventional construction materials. The composition draws on principles of industrial by-product utilization and durability-focused mix design established in the inventor's broader research on supplementary cementitious materials.

Problem Addressed

Conventional building materials often require high clinker or virgin-material content, contributing to higher embodied carbon and resource consumption. This composition targets a reduction in environmental footprint while maintaining the mechanical and durability performance required for structural applications.

Relevance

Consistent with the inventor's published record on ternary and quaternary blended concrete systems and industrial-waste utilization in construction materials.

This is a plain-language technical summary. For full legal claims and specification, refer to the official record at the Indian Patent Office (Application No. 202541078013).

Sustainable Geopolymer-Based Material for Road Construction

03

Indian Utility Patent Application No. 202441076780	Published 2024 Status: Published / Pending Grant
Inventor Dr. Ashhad Imam & co-inventors	

Summary

This patent covers a geopolymer-based material system intended as a lower-carbon alternative binder for road construction applications. Geopolymer binders are typically activated from industrial by-products such as fly ash and ground granulated blast-furnace slag (GGBS), replacing some or all of the conventional Portland cement content used in pavement construction.

Problem Addressed

Road and pavement construction consumes large volumes of cement-based materials; substituting alkali-activated geopolymer binders can meaningfully reduce the clinker demand and associated CO₂ emissions of road infrastructure projects, while utilizing industrial by-products that would otherwise require disposal.

Relevance

Builds on the inventor's published work evaluating alkali-activated concrete durability performance (fly ash/GGBS systems), extending laboratory-validated binder chemistry toward a road-construction application.

This is a plain-language technical summary. For full legal claims and specification, refer to the official record at the Indian Patent Office (Application No. 202441076780).

Eco-Friendly Brick Composition and its Preparation Thereof

Indian Patent Application No. 202411069124	Published 2026 Status: Published / Pending Grant
Inventor Dr. Ashhad Imam & co-inventors	

Summary

This patent describes an eco-friendly brick composition and its method of preparation, formulated as a sustainable alternative to conventional fired-clay bricks. The composition and preparation method are designed to reduce the embodied energy associated with traditional brick manufacturing, which typically requires high-temperature kiln firing.

Problem Addressed

Conventional clay brick manufacturing is energy- and emissions-intensive due to kiln firing requirements, and also consumes significant topsoil/clay resources. This composition targets both concerns through an alternative formulation and preparation route.

Relevance

Reflects the inventor's broader interest in sustainable and industrial-waste-derived construction materials as alternatives to conventional, energy-intensive building products.

This is a plain-language technical summary. For full legal claims and specification, refer to the official record at the Indian Patent Office (Application No. 202411069124).

Construction Material Testing Device

05

UK Design Patent Application No. 6490912	Granted 2025 Status: Granted	Inventor Dr. Ashhad Imam & co-inventors
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Summary

This is a UK-granted design patent protecting the distinctive visual/ornamental design of a device developed for testing construction materials. Unlike a utility patent, a design patent protects the specific design and appearance of the article rather than a functional method or composition.

Problem Addressed

Reliable, field- and lab-deployable testing equipment is central to quality control in construction materials engineering. This device reflects the inventor's applied, hands-on experience translating laboratory testing needs into practical instrumentation.

Relevance

Directly connects to the inventor's extensive applied testing experience (compressive/tensile strength testing, durability assessment) across 30+ consultancy engagements and years of laboratory instruction.

This is a plain-language summary of a design registration. For the full registered design record, refer to the UK Intellectual Property Office (Design Application No. 6490912).