

## Long-term aging effects on tensile characterization of steel fibre reinforced concrete

Ravindra Kute. W. Starden & atikur Rahbaz

Research article Page: 01-21

Long-term aging effects on tensile characterization of steel fibre reinforced concrete (SFRC) primarily involve assessing changes in post-cracking residual tensile strength due to environmental exposure, hydration progression, and potential fiber-matrix interface degradation over years. Studies reveal that while pre-cracking tensile strength may stabilize or slightly increase from enhanced bond strength, residual post-cracking performance can decline in some SFRC mixes due to fiber corrosion or embrittlement, though macro-synthetic alternatives show minimal loss. Temperature cycling from -15°C to 60°C over 180-360 days typically preserves flexural capacity..... [\[For more click here\]](#)

## Biomimicry in structural design for energy performance

Ravi Kumar & S. Raheem

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Biomimicry in structural design for energy performance draws from nature's efficient systems, such as termite mounds for natural ventilation or pinecone-inspired facades that open and close to regulate airflow and solar gain. These bio-inspired envelopes reduce mechanical cooling needs by 30-50% through passive thermoregulation, mimicking animal fur for insulation or lotus leaves for self-cleaning surfaces that minimize maintenance energy. Eastgate Centre in Zimbabwe exemplifies this by using termite mound chimneys for stack ventilation, cutting HVAC costs by 90% while maintaining comfort. Lotus-effect coatings and whale-fin turbines further enhance envelope efficiency and wind energy capture in high-rises. This approach aligns with sustainable materials research, optimizing lifecycle energy in urban structures.....

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## Big data analytics in urban flood prediction

Musdalifah Djamaluddin, Haedar Akib, Anshari, Andi Kasmawati & Wahira, Hamsu

Research article Page: 36-51

High-rise implementations, such as twin tower studies, demonstrate comparable carbon footprints and seismic performance Sustainable design of recycled aggregate concrete (RAC) in high-rise structures promotes environmental benefits by reducing landfill waste and virgin resource extraction through the reuse of construction and demolition debris. Performance evaluations reveal that RAC maintains adequate compressive strength and durability for structural applications when replacement levels shows slightly lower modulus of elasticity compared to natural aggregate concrete. High-rise implementations, such as twin tower studies, demonstrate comparable carbon footprints and seismic performance with optimized mixes incorporating supplementary cementitious materials..... [\[For more click here\]](#)

## BIM-based facility management for complex structures

R. Alsaffar, Assaf Abdullah Alawaji, Moneef Ibrahim Almoneef & Thamer Khalifah  
Research article Page: 52-71

BIM-based facility management for complex structures utilizes digital twins created during design to centralize asset data, maintenance schedules, and operational metrics, enabling proactive decision-making throughout a building's lifecycle. For intricate facilities like high-rises or hospitals, BIM integrates HVAC, electrical, and structural systems into a single interactive model, allowing facility managers to visualize spatial relationships and track real-time performance via linked IoT sensors. This approach supports predictive maintenance by analyzing usage patterns, reducing downtime by 20-30% and optimizing energy consumption through automated simulations. Space utilization analytics from BIM models aid occupancy planning, while lifecycle documentation ensures compliance and seamless handovers from construction teams. Such integration enhances resilience for aging urban infrastructure, complementing your interests in SHM and multi-hazard design. .... [\[For more click here\]](#)

## Fire Resistance of Composite Steel-Concrete Beams Protected by Intumescent Coatings

Christopher Ha  
Research article Page: 72-85

Fire resistance of composite steel-concrete beams protected by intumescent coatings achieves up to 120 minutes by expanding 10-50 times upon heating to form a char barrier that delays steel critical temperature (500-620°C) while concrete slab provides additional insulation. These epoxy-based thin-film coatings (0.5-3 mm DFT) outperform cementitious spray-applied systems in aesthetics, corrosion resistance, and ease of application, with off-site coating enabling quality control for exposed steel. Full-scale furnace tests per ISO 834 or hydrocarbon curves validate performance, showing minimal deflection and shear stud integrity under combined axial/bending loads. Topcoats enhance weatherability and UV stability, critical for hydrocarbon fire scenarios in industrial settings..... [\[For more click here\]](#).