African Nanotechnology in Engineering

Structural Integrity Assessment of Aging Infrastructure in Uganda

Odwalo Kasozi[1]

[1] Department of Civil Engineering, Uganda Christian University, Mukono

Published: 01 February 2010 | **Received:** 01 December 2009 | **Accepted:** 11 January 2010

Correspondence: okasozi@yahoo.com

DOI: 10.5281/zenodo.18907798

Author notes

Odwalo Kasozi is affiliated with Department of Civil Engineering, Uganda Christian University, Mukono and focuses on Engineering research in Africa.

Abstract

Ugandan infrastructure, including bridges and buildings, is aging at an accelerated rate due to its construction in the mid-20th century. A combination of ultrasonic pulse velocity (UPV) and magnetic particle inspection (MPI) was employed for assessing the concrete quality and identifying cracks, respectively. Data from UPV measurements were analysed using a linear regression model to predict crack propagation rate. The analysis revealed an average crack growth rate of 0.5 mm per year in reinforced concrete structures, with significant variability influenced by environmental factors such as temperature and humidity. The findings provide valuable insights into the maintenance needs of Ugandan infrastructure and suggest that targeted repairs should be scheduled based on predicted crack progression. Ugandan authorities are advised to implement regular monitoring programmes and consider structural reinforcements in high-risk areas where cracks have been identified. Structural Integrity, Aging Infrastructure, Non-Destructive Testing, Ultrasonic Pulse Velocity, Magnetic Particle Inspection The maintenance outcome was modelled as $Y\{\} = beta 0 + beta 1\, X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *African geomorphology, ultrasonic pulse velocity, fatigue cracking, finite element analysis, material degradation, structural health monitoring, geotechnical engineering*

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

✉ REQUEST FULL PAPER

Email: info@parj.africa

Request your copy of the full paper today!

SUBMIT YOUR RESEARCH

Are you a researcher in Africa? We welcome your submissions!

Join our community of African scholars and share your groundbreaking work.

Submit at: app.parj.africa

Scan to visit app.parj.africa

Open Access Scholarship from PARJ

Empowering African Research | Advancing Global Knowledge