

INFRACOST – Adapting concrete infrastructure works to environmental challenges and risks

Client II – International partnerships for sustainable innovations

A functioning transport infrastructure is central to a country's economic productivity. In Ghana, high volumes of traffic and challenging climatic conditions increase the risk that vital infrastructure works might fail. The German-Ghanaian project "INFRACOST" therefore designs application-based decision-making aids for the repair of infrastructure works and tests innovative building material technologies for maintenance materials which, at the same time, strengthen local markets.

Infrastructure as an economic driver

Infrastructure works such as bridges and roads are driving forces for economic development in West Africa. However, high temperatures, high humidity, the coastal climate along the main traffic axes and regular flooding all pose serious threats to existing infrastructure works. Their failure would have fatal economic consequences in Ghana and its neighbouring countries. "INFRACOST" evaluates the structural condition of relevant pieces of infrastructure and develops repair plans that can ensure the functionality of vital infrastructure works. The goal is to design solutions that are optimized to suit local conditions and which combine innovative construction technology with local value chains.



Transport infrastructures like the Lower Volta Bridge are lifelines in Ghana.

Since long-term repair work on existing infrastructure can only succeed if the repair project is designed consistently at every stage, from planning through to final execution and post-processing, this project's results are combined with needs-based user training. In addition to university training for students, industry and authorities, this also includes practical training for users and planners. On top of this, guidelines will be developed for consultants and political decision-makers. The project results can immediately

be put into practice based on a large-scale pilot project to carry out repair work on the Saglemi Bridge in Accra.

Local solutions to global problems

The project concentrates on the analysis and evaluation of innovative building material solutions for use in the repair of infrastructure works. There is a particular focus on the use of concrete as a material for building repairs. In order to make future concrete technologies more environmentally sustainable, the "INFRACOST" project consortium will develop alternative building materials in which as many of the raw materials as possible are locally available or can be replaced by local alternatives. This includes considering the use of local organic and mineral by-products. In Ghana's case, agricultural waste materials such as cassava peel or residues from cocoa production in particular play an important role.

Research made tangible

The analysis and evaluation of innovative building material solutions will be used to draw up instructions for policy makers and guidelines for building contractors. These guidelines must take local conditions into account so as to ensure that the solutions can be successfully established in the long term. Strengthening local value chains for high-performance building materials is a key priority in this context.

The Federal Institute for Materials Research and Testing is working together with the University of Ghana to evaluate the use of local raw materials. MC Bauchemie Müller GmbH & Co. KG is developing the necessary repair materials, which will ultimately be put into practice in cooperation with Ghanaian partner GN Construction Chemicals and Technology Limited. Local universities, associations and ministries are also involved in the project.

To ensure that the technology is effectively transferred into practice, research results and technologies will be put straight to use as part of a pilot project to carry out repair work on the Saglemi Bridge in cooperation with the Ghana Highway Authority. In addition to the large-scale evaluation, this will also allow for real on-site application training for local building contractors and will serve as a case study for engineers and university students. Working together with local authorities and decision-makers, the project consortium will thus be better able to assess the effectiveness of concrete repair work and evaluate possible future potential for optimization under real conditions. The project will thus help to improve the transport infrastructure in Ghana.



Investigating suitable aggregate grain size for concrete is part of the analysis of local raw materials.

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Contact

Dr. Dipl.-Ing. Wolfram Schmidt
Bundesanstalt für Materialforschung und -prüfung
Unter den Eichen 87
12205 Berlin, Germany
Phone: +49 30 8104-3210
E-mail: wolfram.schmidt@bam.de

Project partner

MC Bauchemie Müller GmbH & Co. KG; University of Ghana – School of Engineering Sciences; GN Construction Chemicals and Technology Limited

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