

Reconstruction for a Sustainable and Resilient Built Environment

Summary

The purpose of this research is to investigate the opportunities and challenges for improving the resilience and sustainability of the built environment through post-disaster and/or post-conflict reconstruction and to develop theory as well as corresponding practical processes, decision tools and policy guidance. The research will address the following research questions: What is the state of the art in relation to reconstruction and its resilience and sustainability aspects? To what extent do current reconstruction practices take resilience and sustainability into account? How can concepts such as Regenerative Sustainability, Circular Economy and Build Back Better be effectively incorporated into reconstruction? What are the process and policy implications for resilient and sustainable reconstruction?

Research field:	Building and civil engineering and architecture
Supervisors:	Prof. Dr. Emlyn David Qivitoq Witt Prof. Dr. Irene Lill
Availability:	This position is available.
Offered by:	School of Engineering Department of Civil Engineering and Architecture
Application deadline:	Applications are accepted between January 01, 2024 00:00 and January 22, 2024 23:59 (Europe/Zurich)

Description

The research

Armed conflicts and disasters wreak havoc on the built environment. For example, the Institute for Economics and Peace estimates that, in Syria, conflict has destroyed 17.5% of the nation's housing and caused nearly US\$120 billion in damage to its infrastructure. In Ukraine, a joint assessment by the Government of Ukraine, the World Bank Group, the European Commission and the United Nations, estimated the cost of reconstruction and recovery to be US\$411 billion in March 2023 and these continue to rise. Estimated reconstruction costs following the earthquake which struck Turkey and Syria in February are approximately US\$120 billion.

The reconstruction process is not only essential for the rehabilitation of communities ensuring the availability of adequate housing and infrastructure, it also has significant impacts on current and future energy use, emissions and vulnerability - it is therefore critical to long-term sustainability and resilience. The purpose of this research is to investigate the opportunities and challenges for improving the resilience and sustainability of the built environment through post-conflict reconstruction and to develop corresponding theory, practical processes, decision tools and policy guidance. The research will address the following research questions: What is the state of the art in relation to reconstruction and its resilience and sustainability aspects? To what extent do current reconstruction practices take resilience and sustainability into account? How can the Regenerative Built environment, Circular Economy and Build Back Better concepts be incorporated into reconstruction? What are the policy implications for resilient and sustainable reconstruction in post-conflict and/or post-disaster contexts?

Responsibilities and (foreseen) tasks

- Conduct a systematic review of the extant literature on reconstruction.
- Develop a conceptual framework for resilient and sustainable reconstruction.
- Identify potentially relevant and accessible case studies.
- Collect data and conduct case studies.
- Refine theoretical framework for resilient and sustainable reconstruction.
- Develop practice and policy guidance.
- Participate in teaching and the development of teaching materials related to the research subject.
- Contribute to the organization of research, training and practitioner events where the research findings are presented.

Applicants should fulfil the following requirements:

- A relevant master's degree in a built environment-, sustainability- or resilience-related discipline.
- A clear interest in the topic.
- Research (including publication) experience.
- Excellent proficiency in English.
- Strong and demonstrable writing and analytical skills.
- Capacity to work both as an independent researcher and as part of an international team
- Capacity and willingness to assist in university research and teaching activities relevant to the research and the dissemination and exploitation of its results.

The candidate should submit a research plan for the topic, including an overall research and data collection strategy. The candidate may expand on the listed research questions and tasks and suggest additional, specific focuses for the research.

We offer:

- A 4-year PhD position in Estonia's leading technical university.
- The chance to pursue high-level research in a dynamic, technologically advanced context.
- Opportunities to participate in conferences, study visits and networking internationally with researchers from leading universities and research institutions in the fields of resilience, sustainability and the built environment.

About the department

The Building Lifecycle Research Group approaches the building lifecycle as a whole, integrating the construction process and its outcomes with management strategies, technologies, building materials, economics and facilities management. Recent research has included:

- Disaster resilience and the built environment;
- Energy saving, sustainable construction and the renovation of buildings;
- Multiple criteria analysis of BIM-based Building Permits;
- BIM-enabled construction education;
- Developing and providing BIM-related know-how;
- Regulation of construction activities and the creation of standards for the Estonian construction industry;
- Surveys on the building life cycle and technical conditions of housing;
- Utilization of oil shale waste materials in the production of building materials.

(Additional information)

For further information, please contact Prof Emlyn Witt emlyn.witt@taltech.ee



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