

Diploma Thesis

Properties

Title: Exploring the impact of aggregate type on the properties of recycled aggregate concrete

Organizational Unit: E207 Institute of Material Technology, Building Physics, and Building Ecology

Main advisor: Ildiko Merta

Co-advisor:

Offered languages: English, German

Keywords: Recycled aggregate, optimization, sustainable concrete

Subject area: Civil Engineering, Materials Sciences

Targeted fields of study: Civil Engineering, Materials Sciences

Description

Background:

At the Faculty of Civil and Environmental Engineering, Institute for Materials Technology, Building Physics and Building Ecology, an opportunity for a Master's thesis topic has been announced. This thesis will contribute to an innovative Austrian industrial research project focusing on recycled aggregate concrete. The Master's thesis is part of the collaborative research project "UP!crete – Performance of Recycled Concrete in Upcycling," involving more than 20 stakeholders from the construction industry (concrete manufacturers, construction waste processors, recycling plant manufacturers, testing institutes, etc.) and significant interest groups (associations, state organizations) within the construction sector.

Master Thesis:

The CO₂ emission levels have been increasing dramatically over the past few decades, with the effects now clearly visible. The construction industry is known to be responsible for a substantial portion of CO₂ emissions. Recently, there has been an investigation into making concrete

production more sustainable through the use of recycled aggregate concrete. However, to effectively utilize recycled aggregates in traditional concrete production, all aspects must be thoroughly investigated. One crucial aspect in this context is the type of aggregate. The ÖNORM B 3140 standard defines various classes of recycled aggregates based on components (impurities). The objective of this thesis is to characterize four types of aggregates as defined in the ÖNORM B 3140 standard and to examine the fresh and hardened properties of concrete incorporating these aggregates.

Your Responsibilities:

- Collecting literature data.
- Characterizing the aggregates through a comprehensive range of aggregate tests.
- Casting concretes with and without recycled aggregate.
- Optimizing the mixture design of concrete with recycled aggregate.
- Collaborating with Ph.D. students in laboratory research.
- Evaluating the results and contributing to symposiums/academic journals.

Location & Duration:

The experimental component of the thesis will be conducted at the laboratory in the OC Building, Lilienthalgasse 14, 1030. The expected duration of the thesis is 6 months.

Starting Date:

As soon as possible.

Required Qualifications and Experience:

- Knowledge of scanning academic databases.
- Basic understanding of concrete components.
- High motivation for laboratory work.

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