

## Diploma Thesis

### Properties

*Title:* Influence of self-healing on properties of recycled concrete aggregates

*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, sustainable concrete, self-healing

*Subject area:* Civil Engineering, Materials Sciences

*Targeted fields of study:* Civil Engineering, Technical Chemistry, 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 construction industry significantly impacts the environment due to its high material and energy consumption. Concrete has a significant environmental footprint because of the raw materials, energy, and CO<sub>2</sub> emissions associated with its production (about 5–7% of global emissions).

However, one strategy to improve concrete's sustainability is using construction and demolition waste as aggregates in its production. Recycled concrete aggregates (RCAs) cannot be directly reused due to their poor quality in terms of physical and mechanical properties. This experimental work aims to improve the properties of RCAs through autogenous self-healing. The study will examine different environments and methods, focusing on determining the effect of autogenous self-healing on the physical and mechanical properties of the RCA. Furthermore, after optimizing the parameters, the study will investigate the properties of the concrete incorporating the treated RCA.

#### Your Responsibilities:

- Literature review
- Treating the RCA in different environments and with different methods.
- Optimizing the parameters affecting the self-healing of the RCA.
- Casting and investigating the properties of concrete incorporating treated RCA.
- Reviewing results and sharing outcomes in symposiums and 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 six months.

#### Starting Date:

As soon as possible.

#### Required Qualifications and Experience:

- Skilled in efficiently searching academic databases.
- Familiar with building materials and concrete components.
- Enthusiastic about laboratory work.

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