

NEWS

PROJECT

Urban infra revolution -
Circular economy
materials and novel
method development
to produce recyclable
and functional urban
construction products

📍 Lappeenranta, Finland

TOPIC

Circular economy

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REVOLUTION PROJECT

Mechanical activation of geopolymers at Lappeenranta-Lahti University

See on UIA
website



The development of a new kind of circulative geopolymer composite material based on side streams of local industries is strongly promoted by the Urban Infra Revolution project partners, especially Lappeenranta-Lahti University and Apila Group Ltd. The first step in researching side streams is called characterisation.

Characterisation of the side streams from forest, pulp, mining and construction industries is implemented in order to understand their suitability as raw materials for geopolymer composites that can be used in the construction industry. The streams characterized include for example biomass fly ash, biomass bottom ash, coal fly ash, green liquor dregs, limestone mine tailings and construction and demolition waste. Based on results of characterization recipes for new material are developed. Mechanical and chemical pretreatment methods are examined.

Check the link and find out excellent demonstration of mechanical activation of geopolymers by LUT University researcher Mehmet Kuchuk.

Using 3D printing in making pilot product of side stream based geocomposite material gives both possibilities and challenges. Absence of steel structures and molds allows more free design of the outline. Form of the product can be for example curved. Geocomposite material has to be enough flexible to be workable in the printer and enough fast hardening to keep designed form.

LUT University and Apila Group have started to examine the strength of the material. By far with the tested recipe compressive strength is 30 MPa and flexural strength 9 MPa. These numbers can be higher if we add fibres to the material. Fibre can be for example wood, mineral fibre or recycled cotton. Research of fibres in the new material is in process in the project.

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