

ALTERNATIVE ASH IN CONCRETE – NEW AESTHETICAL AND TECHNICAL PERFORMANCE

PhD Project

Alternative ash in concrete – New aesthetical and Technical Performance is focusing on the possibilities to use sewage sludge ash (SSA) in concrete and mortar. The aim is to identify new aesthetical and technical properties and to define possible architectural applications. Internationally scientific research projects have examined the possibility to replace cement with SSA in mortar and concrete. The focus of this research has been on the chemical, mechanical properties and the environmental consequences attached to the use of SSA in construction materials. The current PhD project will examine both the aesthetical and technical properties on an interdisciplinary base of engineering and design, and develop cement based materials that seek to be functional both seen from a technical, and a aesthetical point of view. On the whole this project is targeting at two current discussions: how it is possible to utilize waste as a resource in development of construction materials? And, how it is possible architecturally to unfold the technical and aesthetical potentials of concrete in an industrial scale?



INTERESTED IN THIS PROJECT?

We are looking for partners: architects, precast concrete manufacturers and concrete producers, who could join us in developing this idea further:

- Test and development of new production processes.
- Architectural applications - large scale.

Sewage sludge ash

Sewage sludge ash has a high content of either iron or aluminum. These elements are used at the water treatment plants for precipitating phosphors from the wastewater. At many wastewater treatment plants, the wastewater sludge is incinerated and sewage sludge ashes are a residue from the incineration. As a result from the precipitation process the resulting incinerated ash is either in a red oxide or golden brown color. If sewage SSA is added to a concrete mix, it therefore not only affects the mechanical/chemical properties but also the aesthetical by affecting the usual grey color of concrete. This opens for new opportunities which could challenge the general idea that concrete is a grey, and in some views, a drab material.



Research method

The project is interdisciplinary and will link a technical scientific method with a practice-based research method. This means that aesthetical properties, such as color and textural qualities- rough and smooth surfaces, will be explored alongside with technical requirements such as strength, durability and frost resistance. The potential of the material is explored through hands on experiments using different casting method and form materials. Additionally, technical scientific test method will support and determine the functionality of the findings.

