



## Integral foamed concrete

### Pre-fab industrial lightweight concrete with a solid shell

#### Subject

The production of concrete causes a substantial part in the CO2 emission worldwide. The use of lightweight concrete elements diminish this and helps to solve the ergonomic constraints in the building industry by weight reduction. Concrete elements of which only the kernel is foamed and the outside layer is solid have the advantage of high quality hard surface, no assimilation with water and a better surface strength compared with regular aerated concrete.

#### Goal

This research project aims to develop a so-called integral foaming system. The outside of the product is solid concrete, the inside is a foamed concrete core. The aim is to develop a reproducible system including the necessary tooling for producing integral foamed concrete components on a large scale.

#### Expected Results

The project could lead to a substantial reduction of CO2 emission worldwide and helps to solve the ergonomic constraints in building industry by weight reduction.



## **Integral foamed concrete Pre-fab industrial light weight concrete with a solid shell**

**Jacob Alkema<sup>1</sup>, Wim Poelman<sup>2</sup>**

<sup>1</sup> PhD Researcher, [jacob@jacobalkema.nl](mailto:jacob@jacobalkema.nl)

<sup>2</sup> Promotor, [W.A.Poelman@ctw.utwente.nl](mailto:W.A.Poelman@ctw.utwente.nl)

University of Twente, CTW (Engineering Technology), OPM, Enschede, The Netherlands



### **Subject**

The production of concrete causes a substantial part in the CO2 emission worldwide. The use of light-weight concrete elements diminish this and helps to solve the ergonomic constraints in the building industry by weight reduction. Concrete elements of which only the kernel is foamed and the outside layer is solid have the advantage of high quality hard surface, no assimilation with water and a better surface strength compared with regular aerated concrete. In a first experiment a proof of principle was carried out successfully to realize such a concrete element. With this method the weight of a pre-fab element could be reduced by more than 50%.

### **Goals**

This research project aims to develop a so-called integral foaming system. The outside of the product is solid concrete, the inside is a foamed concrete core. The aim is to develop a reproducible system including the necessary tooling for producing integral foamed concrete components on a large scale.

### **Research Question**

How to cast a concrete element with a foamed concrete core within an outside layer of massive material.

### **Strategy**

Through experimental research the process will be developed. At the same time the possibilities will be explored with concrete suppliers and architects.

### **Expected Results**

The project could lead to a substantial reduction of CO2 emission worldwide and helps to solve the ergonomic constraints in building industry by weight reduction.

### **Preferred Partners Applications / Sponsor**

Innovatieplatform Twente; Pioneering Twente, Groothuis, Raab Karcher, University of Delft;

### **Prime Publication / Prototyping**

-

### **Research Period**

October 2009 – October 2013