

First out in Sweden with the volcanic rock mixed in concrete

Already approved in parts of Europe and the USA

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Thomas Betong, the Swedish subsidiary of Thomas Concrete Group, wants to do as the Romans did, to use volcanic material as a binder into their concrete. The idea is to replace parts of the cement with ground pumice (volcanic rock) and thus create low carbon concrete.

- We have been working on this for over a year now and have come to very good results.
- What now remains is to implement this type of binder, so-called natural pozzolans of volcanic rock, in the Swedish concrete standard, just as it has been done in the UK and North America, explains Ingemar Löfgren, R&D manager at C-lab (Thomas Concrete Group).

Cement production has a major environmental impact. Even though concrete only contains 5–10 per cent of cement, it accounts for approximately 90 per cent of the concrete's climate impact. To reduce CO₂ emissions, the concrete industry is currently working hard to reduce dependence on cement and find other binders. At the same time, the cement industry plans to make its plants climate-neutral by, among other things, capturing and collecting all the carbon dioxide that is released in connection with the production process. But the latter will take time and the market does not have time to wait for that.

As early as 2006, Thomas Betong started testing to partially replace cement with a coal fly ash as a binder and delivered these products to North link project in Stockholm, Sweden. Until 2011, the company continued to supply concrete with coal fly ash to various construction projects in the country. In 2012, Thomas Betong launched its green offering and is today the one in Sweden that produces the most low carbon concrete with up to a halved climate impact.

In this concrete, large part of cement is replaced with other materials. So far, it has mostly been about slag products from the steel and iron industry as well as coal fly ash. But the industry is working hard to find new sustainable alternatives.

One such alternative is the volcanic rock (pumice), which is formed when lava rapidly cools down and hardens during explosive volcanic eruptions. Due to its high water-holding ability and non-toxic nature (e.g. it is free of heavy metals), pumice is already used in other areas. Some examples are body care, gardening, and landscape architecture. Pumice is a naturally occurring material and has significantly lower carbon footprint compared to cement.

Just over a year ago, Thomas Concrete Group and C-lab began discussions with a supplier that offers pumice from Iceland. The idea is that finely ground pumice should be able to replace parts of the cement in the concrete. After several studies and tests, it has been concluded in the lab that the material has cement-like pozzolanic properties and can be used in concrete.

- Before we can use it in our production, there is first some work left and together with RISE, in the project BETCRETE 2.0, and SIS to develop standards for this type of alternative binder so that the volcanic rock can be used in concrete in Sweden. According to the cement standard (SS-EN 197-1), the use of natural pozzolans is already accepted, so the step should not be so big to allow it in concrete production. - says Ingemar Löfgren

The hopes are high, not least considering that ground pumice is already approved today and is largely used as a substitute in concrete in the USA, Great Britain, Italy and Greece, among others.

Given that pumice has already been used in Roman times, it is strange, to say the least, if we could not use the same material in Sweden today. The old buildings that still stands today and that most

people know, the Colosseum and Pantheon are built with volcanic ash from Pozzuoli. What other building materials can exhibit something similar?

- Our hope is that we will be able to deliver the first low carbon concrete with volcanic rock as a binder on the Swedish market in 2023, says Ingemar Löfgren

Pumice will become increasingly important in the near future because coal fly ash, which until now has been one of the binders replacing cement in low carbon concrete, will disappear within a few years when coal power as a source of energy is phased out.

Thomas Concrete Group drives the development of the concrete industry through research on new alternative binders to continue to replace cement and further reduce climate impact in the future. At the same time, intensive and goal-oriented work is underway to be able to deliver the first zero carbon concrete before 2030.

For more info contact

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About Thomas Concrete Group AB

Thomas Concrete Group is a Swedish family-owned corporate group that produces and distributes high-quality concrete products and services. The company was established in Karlstad, Sweden in 1955 by Martin Thomas and currently conducts operations in the U.S., Poland, Germany, Norway and Sweden. The head office is located in Gothenburg, Sweden. The Group has 2,100 employees, produced 5.4 million m³ of concrete and had sales of more than SEK 7.5 billion in 2020. The subsidiary in Sweden is called Thomas Betong AB.

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