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BRUBECK FREEMAN AND STEFANI BOTUSHAROVA

JOB TITLE: PhD Students

EMPLOYER: Cardiff University

HIGHEST QUALIFICATION: Brubeck - MEng; Stefani - BEng

**BRUBECK AND STEFANI ARE CIVIL ENGINEERING RESEARCHERS;
THEY RESEARCH SELF-HEALING CONSTRUCTION MATERIALS**



The idea

The idea comes from the natural ability of our bodies to cure damage (i.e. wounds); similarly to the human body, concrete has a natural ability to heal itself, which we aim to enhance by using bacteria, glues and plastics.

Collaboration

We are a team of professors, lecturers, research associates, PhD students and even undergraduate students all working on different aspects of the project.

Funding

We get the funding to carry out our research from a research grant, which comes from EPSRC (Engineering and physical sciences research council). We also get some funding from industry – a company called Costain.

Impact

If the new product that we develop proves to be successful, it will affect the public and the environment in a very positive way. It will help with reducing the need for costly repairs and hence the need to produce cement/concrete which contribute to CO2 production.

Publication

We participate in scientific conferences where we communicate our research with other scientists. We also received interest from TV and newspapers, which helped us spread the word among people outside academia.



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PUPIL QUESTIONS FROM THE EVENT ...

💡 You work with concrete as part of your research. Who actually invented concrete, and when?

I (Stefani) am more involved with the bacterial work in soils, Brubeck does work with concrete though. Concrete as we know it was invented by the Romans and used in 300 BC to 476 AD. However, concrete-like floors made of pebbles and lime have been found in Greece and they date back to 1400-1200 BC. An important constituent of concrete – Portland cement – was first introduced by Joseph Aspdin in 1824.

💡 What's the most common reason for cracks forming in concrete?

Concrete cracks mostly due to the loading that it has to take (vehicles going on top of bridges, self-weight of big concrete buildings, even people that walk on the concrete slabs are exerting loads on the structures).

💡 Do you think it might be possible to one day make all roads, and possibly some buildings, from self-healing concrete?

We hope that with the advancement of our research one day all companies will use self-healing concrete, asphalt, etc. and all structures will 'survive' a lot longer.

💡 Can the 'self-healing with bacteria' idea be used for materials other than concrete? What about for toys that are made out of plastic?

Definitely. Plastics actually were among the first materials to be worked on in terms of self-healing.