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3D PRINTING CONCRETE MADE FROM FLY ASH AND STEEL SLAG



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3D printing concrete has made the material a bit more sustainable, as less material is necessary to create objects and even building. However, making **concrete** still generates a lot of CO₂. Researchers from Nanyang Technological University in Singapore created a new concrete-like material to 3D print, made from two waste materials: **fly ash** and **steel slag**.

driven out of coal-fired boilers, while steel slag is by-product of the steel industry, left over after a metal is separated from its raw ore. Both materials have been used as additive to cement before, but are now used together with only the addition of some chemicals to make a concrete like material that can be 3D printed.

The team used fly ash from a coal power plant in India, but other plants generating fly ash are just as suitable. The main



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Fly ash consists of fine particles of fuel that are



challenge in the research was to create a material that was suitable for 3D printing, with the right flow rate and setting times. They now have come up with a more-or-less viable product.

The current material is as strong as normal concrete, but the researchers are looking at how it can be strengthened to make it a suitable substitute for reinforced concrete. The geopolymer mortar is 3D printable using concrete printing equipment to fabricate large, solid structures.

The researchers are looking to implement

their findings close to home as well. Singapore has just one landfill, which will need to be closed by 2035. By using waste to produce fly ash, and thus the new material, the closing date could possibly be postponed.

But not just Singapore can profit from the new material. The 3D printable concrete could help the construction industry, which generates about 5 per cent of the world's carbon emissions with the production of concrete, to drastically reduce its carbon footprint.

Photos: NTU

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