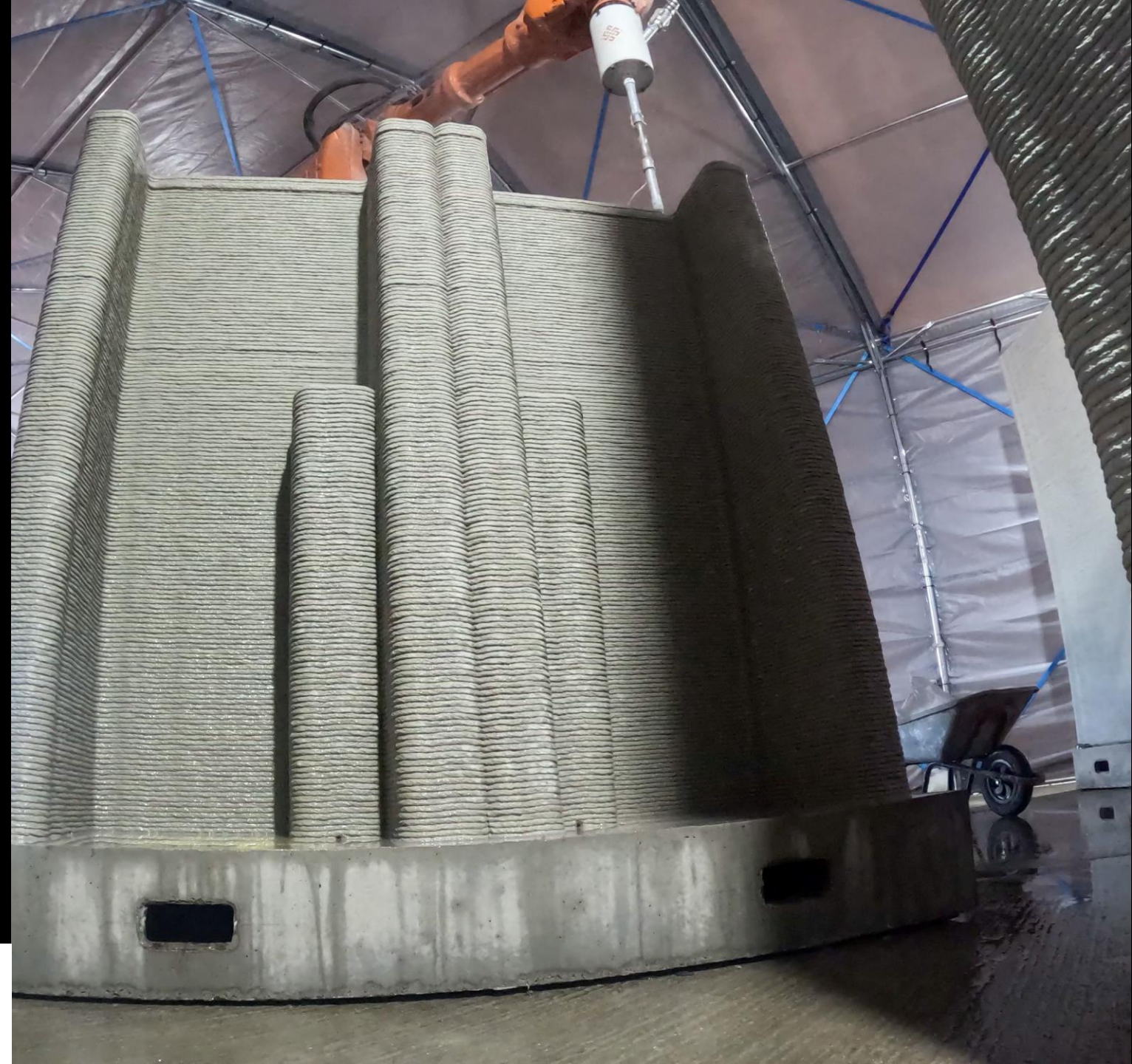


# PRINTFRASTRUCTURE

The start of a greener,  
cleaner era for UK  
construction?

January 2023





## THE MISSION

To create the UK's first 3D concrete printed asset in the rail sector:  
a muck bin for the High Speed 2 project.

Muck bins hold soil and rubble excavated during tunnelling. They ensure work can continue if the tunnelling conveyors need to pause during excavation.

SKANSKA



STRABAG

Working in  
partnership with

HS2



constructure



## A SECTOR-LEADING TEAM

With cutting edge innovation comes the need for a highly skilled team.

Printfrastructure has been developed by tech start-up **ChangeMaker3D** and will be deployed by HS2's London tunnels contractor - **Skanska Costain STRABAG JV**.

Partners from engineering, consultancy and construction have all played key roles.



## **A SECTOR-LEADING TEAM**

Kearney is a Civil Engineering Graduate Apprentice and part of the project team.

She's acquiring skills in digital construction that will be in high demand in the future by UK industry. She's also blazing the trail for women in construction.



## THE TECH

3D concrete printing uses a huge state-of-the-art robot.

This robot was set up at a site in north west London, in November 2022.

The robot piped low carbon mortar to a precise digital design.



## THE PROCESS

First, the base of the muck bin wall was built, together with steel reinforcements.

Once this stage was complete, the 3D concrete printing began.

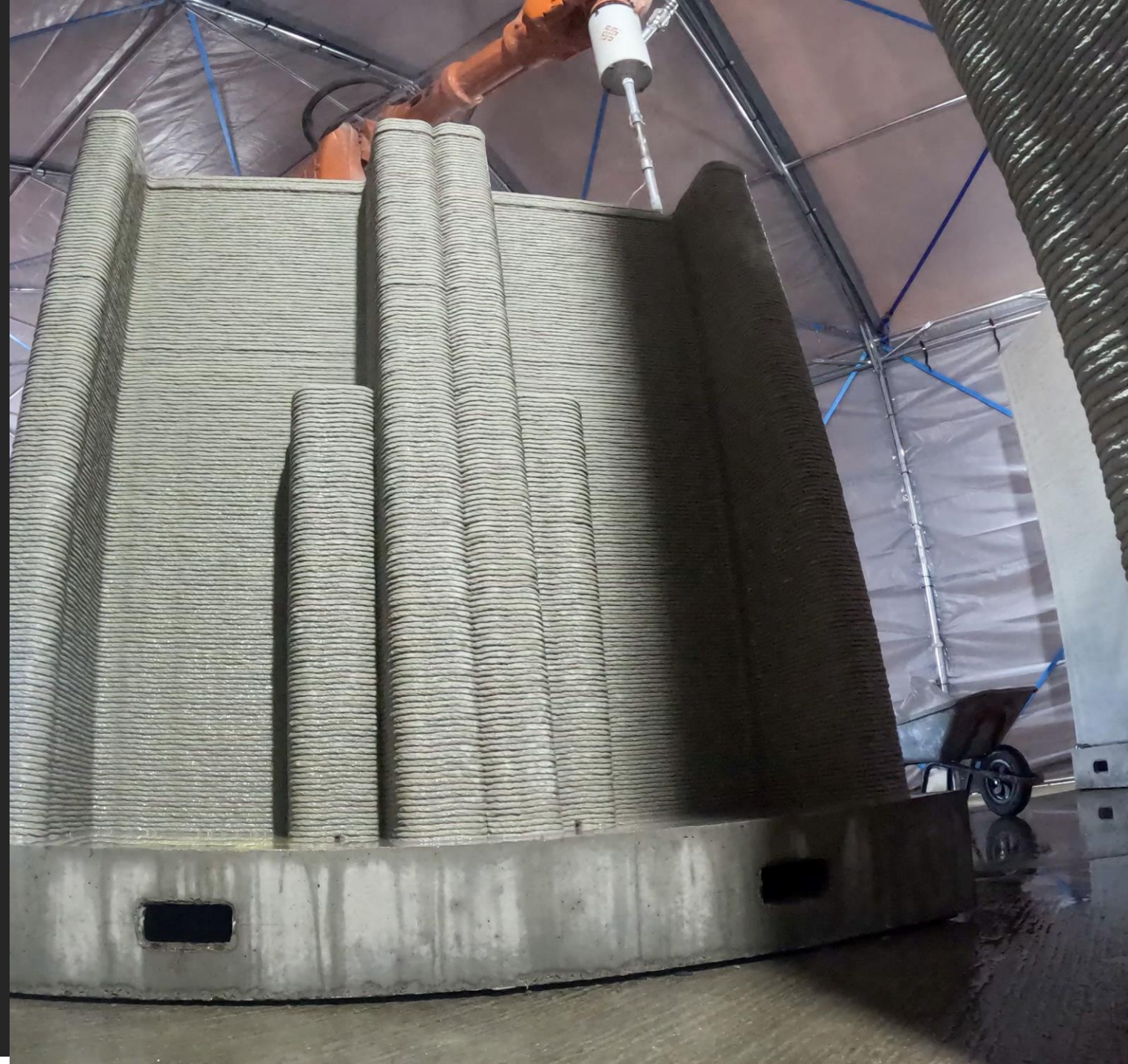
## THE PROCESS

The 3D printer built up the wall of the muck bin in layers.

An operative oversaw the process and checked for quality.

It took **228 layers** to make this 3 metre wall.

Printing was completed within **50 minutes**.



**Our results show that 3D concrete printing  
(versus traditional construction) is...**

**GREENER**

**FASTER**

**CHEAPER**

**SAFER**





‘This is a fantastic demonstration of the innovation that  
HS2 enables.’

The project is creating an ideal environment to transform  
how major infrastructure is built.’

Rob Cairns, HS2 Innovation Manager



## A LOW-CARBON FUTURE

In the UK, infrastructure is responsible for more than half our national carbon footprint. (Source: ICR 2021)

Printrastructure could play a major role in the railways, roads and utilities of tomorrow.