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Robot builder could 'print' houses

14:52 10 March 04

NewScientist.com news service

A robot for "printing" houses is to be trialled by the construction industry. It takes instructions directly from an architect's computerised drawings and then squirts successive layers of concrete on top of one other to build up vertical walls and domed roofs.

The precision automaton could revolutionise building sites. It can work round the clock, in darkness and without tea breaks. It needs only power and a constant feed of semi-liquid construction material.

The key to the technology is a computer-guided nozzle that deposits a line of wet concrete, like toothpaste being squeezed onto a table. Two trowels attached to the nozzle then move to shape the deposit. The robot repeats its journey many times to raise the height and builds hollow walls before returning to fill them.

Engineer Behrokh Khoshnevis, at the University of Southern California, has been perfecting his "contour crafter" for more than a year. "The goal is to be able to completely construct a one-story, 2000-square foot home on site, in one day and without using human hands," he says.

Now Degussa AG, of Dýsseldorf, Germany, the world's largest manufacturer and supplier of building materials, is to collaborate on the project to help Khoshnevis find the best kind of building material.

Mud and straw

Khoshnevis has tested his prototype with cement but believes adobe, a mix of mud and straw that is dried by the Sun, could be suitable. But Degussa will be looking at other materials.

Gerhard Albrecht, head of research at Degussa's speciality materials subsidiary, Admixture, says the company is ready to develop materials specifically for the contour crafting technology.

Khoshnevis's prototype robot hangs from a movable overhead gantry, like the cranes at ship container depots. Khoshnevis speculates that they could also be ground-based, running along rails and able to build several houses at one time. But it would be more difficult to create autonomous wheeled robots that have sufficient accuracy and precision.

The first house will be built in 2005. If the technology is successful the robot could enable new designs that cannot be built using conventional methods, for example involving complex curving walls.

Greg Lynn, a leading architect from Venice, California, said. "I believe that aesthetically there's a great potential to make things that have never been seen before."

Max Glaskin

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