

## **Degussa AG Will Work on USC 'House-Printing' Project System Will Build 2,000-Square-Foot House in 24 Hours, Says Inventor**

March 17, 2004

Last Modified: March 31, 2004

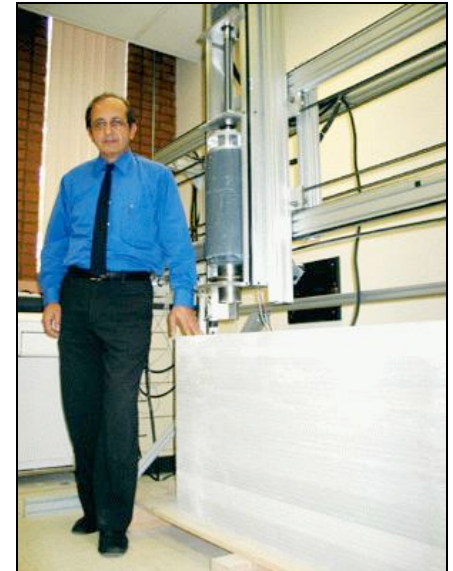
Degussa AG, one of the world's largest manufacturers and suppliers of construction materials, has announced its intention to collaborate in the development of a University of Southern California computer-controlled system designed to automatically "print out" full-size houses in hours.

Funded by a grant from the National Science Foundation, Dr. Behrokh Khoshnevis of the USC Viterbi School of Engineering's Information Sciences Institute has been developing his automated house-building process, called "Contour Crafting," for more than a year.

Khoshnevis believes his system will be able to construct a full-size, 2000-square-foot (185-square-meter) house with utilities embedded in 24 hours. He now has a working machine that can build full-scale walls, and is hoping to actually construct his first house in 2005.

Contour Crafting uses crane- or gantry-mounted nozzles, from which building material — concrete, in the prototype now operating in his laboratory — comes out at a constant rate. Moveable trowels surrounding the nozzle mold it into the desired shape, as the nozzle moves over the work.

Late last year, in Degussa's home city of Düsseldorf, Khoshnevis demonstrated the idea to executives of the €11.8 billion sales firm, a demonstration called "impressive" by Dr. Gerhard Albrecht, head of divisional research & technology transfer for Admixture, a Degussa specialty materials subsidiary.



**Professor Behrokh Khoshnevis with working Contour Crafting printer, and a wall the machine built.**



"It is our belief that your CC concept will be a quantum leap in modern construction industry," wrote Albrecht, in a subsequent letter. "Therefore we are ready to do research in our own Degussa R&D departments to develop and provide construction materials that are serviceable and fitted for the special

building conditions of the CC technology.

"Degussa not only has at its disposal a wide range of construction chemicals which will be tested with regard to their qualification and applicability for special CC cement formulations but is also ready to develop special new construction chemicals in our own R&D labs fitted for the CC process," Albrecht continued.

Khoshnevis is now perfecting a system to mix such materials continuously in industrial quantities right at the Contour Crafting nozzle, "the way a spider makes silk to build a web."

"No company in the world is better able to bridge the gap between engineering idea and commercial practice

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than Degussa," said Khoshnevis. "With their help, I believe I will be able to show the world an instant house next year."

## **Web Links**

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Contour Crafting Web site

<http://www-rcf.usc.edu/~khoshnev/RP/RP-Top-Page.htm>

Degussa AG Web site

<http://www.degussa.com/>

ISI news story

<http://www.isi.edu/stories/47.html>

**The New York Times** *Robots that Build (but Still Won't Do Windows)*

<http://www.nytimes.com/2004/03/11/garden/11ROBO.html>

**Der Spiegel** *Häuser aus dem Drucker*

<http://www.spiegel.de/spiegel/0,1518,287281,00.html>

**New Scientist** *New Process Could Print Houses*

<http://www.newscientist.com/news/news.jsp?id=ns99994764>