

CATHEDRAL STONEWORKS REDESIGNING STONE THROUGH TECHNOLOGY



"THESE SAWS CAN CREATE BEAUTIFUL SHAPES, SOME SIMILAR TO THOSE FOUND IN NATURE. AND WHAT ONCE TOOK 14 DAYS BY HAND CAN BE PRODUCED IN JUST 30 MINUTES. FINDING THE MOST EFFICIENT METHOD OF LINKING THE COMPUTER TO THE NEW SAWS CAPTURES THE BEAUTY OF LOGIC."

WEI CHING-SONG
DIRECTOR, COMPUTER SERVICES

Inventing a New Medium. The use of computer-aided design technologies is quite common today, but it has never before been adapted to stone. Cathedral Stoneworks has helped invent this new medium. We linked together optical laser-scanning devices from the cutting edge of medical research with robotic stone-cutting machines from Europe, which we introduced to the United States.

"Our premise is to harness CAD/CAM technology to vastly reduce the traditional labor-intensive process of designing and fabricating flat and moulded stone," says David M. Teitelbaum, managing general partner. "This is a genuine breakthrough. We're redefining design and production techniques that have remained essentially unchanged for millennia."

Faster & Cheaper Production. As opposed to flat stone veneers, which adorn most modern buildings, mouldwork is characteristic of the stone ornamentation of the past that has enhanced architecture since Egypt's Old Kingdom. Columns, capitols, friezes, entablatures, reliefs and other design elements can now be produced by machine at affordable cost, in traditional or completely new idioms.

"Computer technology makes stone available to more people because production is faster and cheaper," says D'Ellis ("Jeep") Kincannon, chief draftsman and master carver. "We're the first to use this technology. I didn't know how I would react to designing on a computer, but it's perfect for my generation."

A Complex Process. The process starts with a digital camera that is mounted on a linear motion table. The table moves the optical scanner across or around any three-dimensional model or object

at a known rate, projecting low power laser light through a lense onto the object. As the light is reflected back to the scanner, the data is evaluated. In a complex computer process, the raw data is then reconfigured into slices or sections along the object's surface. These slices are interfaced with computer-aided manufacturing software, which translates them into coded tool-path tapes that drive the robotic machines.

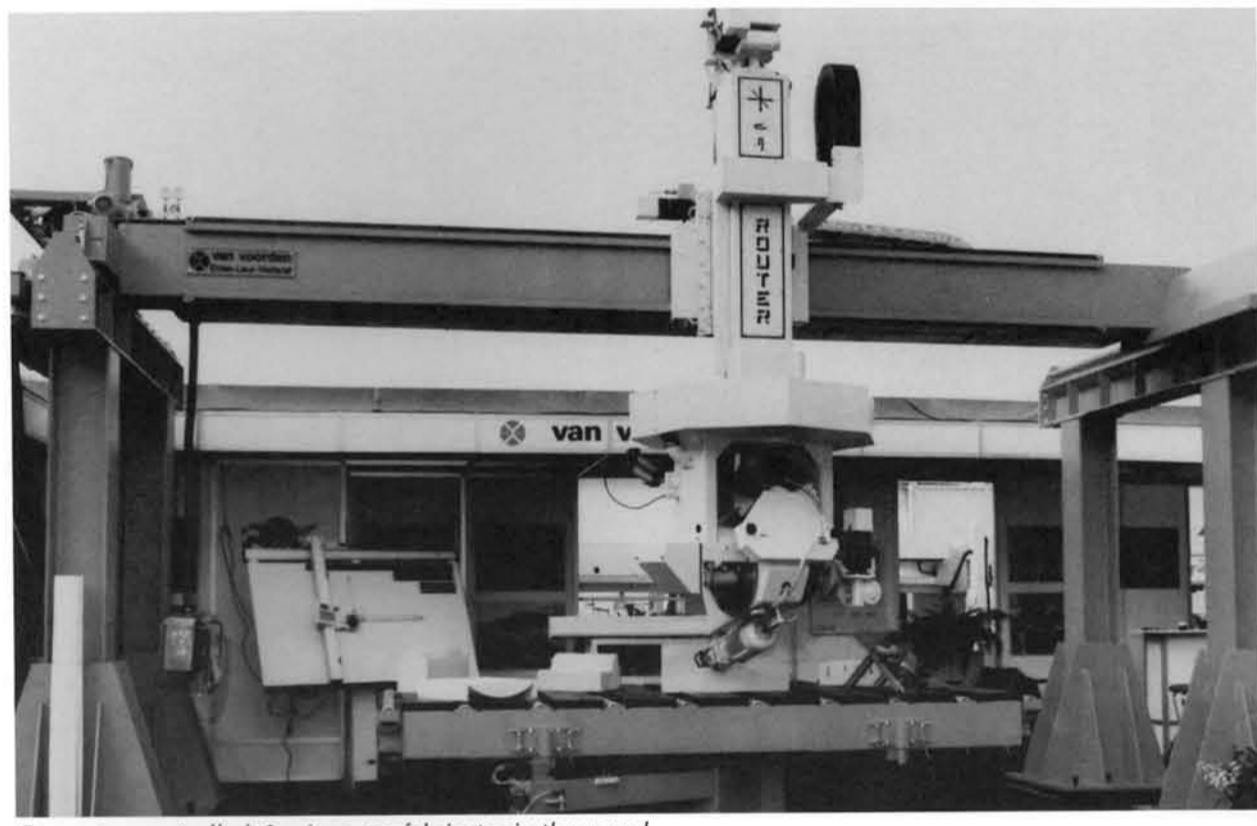
Reaching 100 Percent Efficiency. "The computer is just a tool," says "Don" Wei, director of computer services. "You must understand the entire set-up of the machines, from design to manufacture, to reach 100 percent efficiency."

The machines are remarkable in their own right. The four-axis profiling saws can cut in a matter of minutes what takes days to fabricate by hand. The six-axis router moves and swivels like the human hand and can create perfect stonework in the round. The huge block saw dispenses with the preliminary cutting in minutes. Collectively, the new machines can cut any imaginable shape, from delicate rosettes, to 12-foot Corinthian columns, to an accurate reproduction of the Venus de Milo.

A Professional Challenge. Never before have architects, engineers, designers, artists and stone professionals had as great an opportunity to experiment in stone and reinvent an architectural style as they do today. Cathedral Stoneworks issues all of them an invitation and a challenge:

"Today, we can do in stone what has never been done before," says master sculptor, Englishman Simon Verity. "I would like to see a dozen young Frank Lloyd Wrights come to us with a sheaf of new designs and say, 'There! Let's see what you can do with that!'"

COVER: A U.S. first: 4-axis circular profiling saw in action.



Computer-controlled, 6-axis router fabricates in the round.



High-tech block saw being installed.



Samuel Hernandez and Pedro Colon adjust robotic controls.

