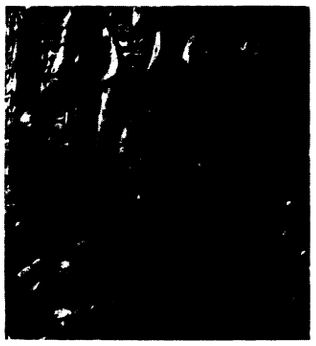
Technology

Art that makes an impact



New Mexico Tech.

In a truly dynamic collaboration, a New Mexico artist and an explosives expert at the New Mexico Institute of Technology and Mining in Socorro are using explosives to form a metal relief mural. The process, according to Alexander Szecket, the project's technical expert, is "patentable."

Artist Evelyn Rosenberg places mild explosives — in a rubbery, sheet form — on a panel of brass or steel, on top of a mold of hydrostone, or clay. Then, KABOOM!: when the explosives are detonated, the metal takes on the shape of the mold. "We're actually able to fuse different types of metals and form a complicated pattern on the metal," says Rosenberg, whose 4-foot-by-21-foot mural will depict the topography and fossils of New Mexico. Although engravers have for many years used explosives to incise their metal plates, this is the first technique, says Szecket, that allows an artist actually to shape metal.

Originally, says Rosenberg, she would do the firings on an anvil, and the shock waves would damage the metal panel and throw it high into the air. But placing the plaster mold directly on the ground eliminated most of the reflective waves. "We can pretty well control what happens with each detonation now," says Alice Seely, who assists Rosenberg in her field laboratory *cum* studio, in the wilds of a deserted naval firing range.

The creative process hardly sounds run of the mill: "It's a really big, impressive explosion with lots of smoke and fire and we have to run into a bunker," says Rosenberg.

The next step, she says, is using explosives to create three-dimensional sculpture. "I don't think, though," she adds, "you'd be able to form anything like Michelangelo's 'David.'"

VDT work station standards proposed

A society of ergonomics—or "human factors"—professionals has drafted the first set of proposed national standards for video display terminal (VDT) "work stations." The proposal is under consideration now for adoption by the New York-based American National Standards Institute (ANSI).

The proposed, voluntary standards, which would apply to the working environments of word processors, data entry workers and other office workers who use VDTs, include requirements and suggestions for such things as screen display resolution, keyboard slope and chair design.

"Our recommendations are either justified by good, scientific research or else, in some areas where research results aren't in yet, they were dictated by standard 'human factors engineering' principles," says Gene Lynch, chair of the California-based Human Factors Society committee responsible for drafting the 72-page list of guidelines.

The document must now undergo three months of public review and comment, and then, according to ANSI spokesperson Dorothy Hogan, if ANSI's Board of Standards Review decides that "all concerned interests" have reached "substantial agreement" about the standards, ANSI will adopt them.

ANSI standards are voluntarily adhered to, but are thought to affect product marketability, says Lynch.

The Washington, D.C.-based Computer and Business Equipment Manufacturers' Association says it has not yet had time to develop a position on the standards. Representatives from the Service Employees International Union, made up of 850,000 office workers and also based in Washington, could not be reached for comment.

Computers

Ivars Peterson reports from Chicago at the National Computer Conference

Lighting up magnetic memories

It takes a light touch to jam about 20,000 pages of typewritten notes, translated into strings of digits, onto a spinning disk only 3.5 inches in diameter. To change the information or to write over it takes even more care. The trick is to use a tiny laser that writes or reads information on the surface of a disk coated with a special terbium, cobalt and iron alloy. Such an erasable, optical-disk memory may be available for personal computers within two years, according to several companies that recently demonstrated prototype models.

In one type of erasable optical disk, developed by Verbatim Corp. of Sunnyvale, Calif., the information appears as microscopic dots in which the magnetic fields point up or down, perpendicular to the surface. To store data, an infrared laser heats a spot on the surface, lowering the metal film's resistance to changes in its magnetic field. A small external field can then flip the direction of the spot's magnetism without affecting the rest of the surface. When the spot cools to room temperature, the new magnetic state is frozen in.

The stored bits are read by detecting differences in the way low-intensity, polarized laser light passes through the thin metal film. Spots with an "up" magnetization rotate the light's plane of polarization in one direction, while "down" spots rotate it in the opposite direction. After the transmitted light passes through a polarization analyzer, a photodetector sees a continuously changing light pattern, which can be translated into digital bits. Several Japanese and European companies and 3M in St. Paul, Minn., are working on similar erasable laser disks.

Another approach, which doesn't involve magnetism at all, depends on a special, tellurium-based coating that readily changes from a highly reflective, crystalline form to a dull, amorphous state when a laser beam strikes it. Thus, information is stored as a sequence of dull and bright spots. A higher-power laser reverses the change. Last year, Japan's Matsushita demonstrated this technology, but whether the present films can survive millions of such crystal-form reversals isn't clear.

In general, the main advantage of reversible optical recording is that the laser used to read and write can be as much as a millimeter away from the disk's surface. To pack the same amount of information onto a conventional magnetic disk would require a recording head that skims the disk's surface at a height equivalent to an aircraft flying at full speed just inches off the ground. On a scale in which dust particles are like mountains, fewer "crashes" are likely to occur with a high-flying laser drive.

Putting color into monochrome displays

A device that uses liquid crystals as a gate to control the passage of light can now convert the yellow glow of a cathode-ray tube into various shades of color. This shutter, developed by Tektronix, Inc., of Beaverton, Ore., allows alternating bursts of red and green light (the components of yellow light) to paint brightly colored images over a screen that would normally show only a single color.

The shutter consists of several polarizing filters and a liquid-crystal cell, which form a sandwich that can be placed in front of a cathode-ray tube. Electrical signals sent to the liquid-crystal cell rotate the liquid-crystal molecules so that green and red light get through at different times. If the switching rate is fast enough, the human eye mixes the colors to produce a colored image. A special circuit board coordinates the liquid-crystal activity with output from a computer.

Although this system doesn't provide all the colors offered by a conventional color television, it offers a much sharper picture. Word processing, for example, can't be done very well on a color monitor because small letters are too fuzzy. With a liquid-crystal shutter, a monochrome display retains its original clarity while color is available to highlight passages or to label charts.