

Professors study bridge stress

Detecting flaws in bridges and overpasses is critical in assessing an aging freeway system.

Two Oakland University engineering professors have developed an optical strain measuring device that could save lives, major repairs and money. The U.S. Department of Transportation has given the pair nearly \$50,000 to perfect the device.

Joe Hovanessian, of Farmington Hills, and Mike Hung, of Rochester, call their technique "shearography." They use a laser and a camera to take a double-exposure photograph of an area, with that area being "stressed" between the exposures.

"When the two exposures are compared, they should match. Where they do not match, there are fringes areas that identify the location of strains in the structure," Hung explains. "Defects in the structure usually induce strain concentrations. Shearography reveals those defects by identifying those strain-induced concentrations."

Hovanessian says the critical nature of the defects can be assessed by the degree of the strain concentration revealed in the photographs.

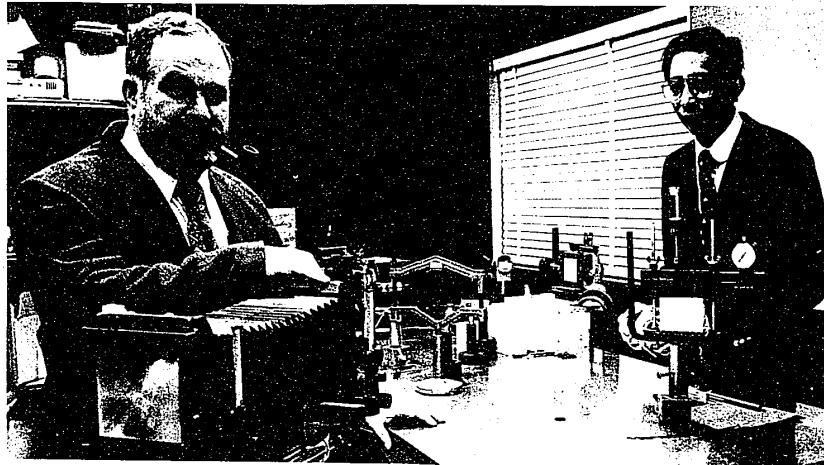
Other strain-measuring methods include magnetic particles, dye penetrant, and X-rays. They can detect flaws, but not all flaws are critical. The new method shows if there are flaws in stressed areas, and it is there that structural failure can occur, the researchers say.

Hung and Hovanessian have each received previous grants from government and industry for their work in holography, or three-dimensional photography, but their new method is superior to holography for measuring flaws and strain.

"Shearography is the equivalent of a full field strain device that can measure strain directly; holography cannot," the researchers say.

The professors claim their device can be used to measure the integrity of a structure made of almost any material: steel, concrete, asphalt, glass, etc.

The Department of Transportation grant is being used for development and laboratory evaluation of a compact shearographic camera. The developed system will then be used for field testing of bridges and other highway structures.



Joe Hovanessian of Farmington and Mike Hung of Rochester are perfecting a camera and laser device to improve highway safety. They're engineering professors at Oakland University.

Detroit Institute of Arts opens new facilities

The heart of the Detroit Institute of Arts is open again, marking the end of \$3.5 million of improvements in public facilities inside the main building.

Cafe service has resumed in the new skylight Kresge Court. Other additions include new restrooms, a new North-South corridor connecting the museum's two wings on the ground level, new ticket service facility and auditorium lounge area and a new table service restaurant with cocktails during noon hours.

The interior project, largest ever undertaken by the art institute, required 18 months to complete. It was made possible by a \$1,914,000 grant from the Kresge Foundation with additional funds from the Founders Society. The design is by William Kessler and Associates, Architects. The R.E. Dailey Co. acted as construction manager.

Museum director Frederick Cummings describes the "Kresge Sequence" as the midway point in a five-year capital improvement plan (due to be completed in 1983) which calls for refurbishing the interior and exterior spaces before the museum's Centennial Year, 1985.

Cummings said work on the public park surrounding the art institute continues on schedule. The expected completion date of the Woodward Entry Plaza with stepped waterfall, fountains and driveway is July 1. The entry plaza is made possible by a gift from the Benson and Edith Ford Fund.

Meanwhile, the start of construction of an outdoor sculpture garden is anticipated in the spring of 1981. This garden is funded by Mrs. Allan W. Sheldon. Landscaping of the entire museum perimeter is planned after 1982.

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