

**METRO
FINAL**
50 cents

Detroit Free Press

FRIDAY
July 28,
2006
♦♦

www.freep.com

Lawrence Tech's focus on future

Beam, bridge research put school on map

By **LORI HIGGINS**
FREE PRESS EDUCATION WRITER

The concrete beam began to sag in the center until finally, with 130,000 pounds weighing it down, the beam buckled. In some places, the concrete broke into pieces.

It was part of a test this month at Lawrence Technological University in Southfield, where students are studying how new materials could make beams used in highway bridges stronger.

A week after the test, Nabil Grace examined some of the broken concrete.

Students are now "trying to evaluate what happened to the beam -- why it failed," said Grace, a professor and chairman of the university's civil engineering department.

The failure is exactly what might happen after decades of traffic on a highway bridge, and at Lawrence Tech, students are studying new materials that could make those bridges more durable by using a carbon-fiber reinforced polymer instead of steel. That study, the recent opening of a research facility and upcoming work with the U.S. military are giving the university's students the practical experience employers crave, said Lewis Walker, university president and chief executive officer.

And it's putting Lawrence Tech on the map.

The school, which has about 5,000 students -- with 164 of them studying civil engineering -- also has lined up key



Photos by KIMBERLY P. MITCHELL/Detroit Free Press

Nabil Grace, a professor and chairman of Lawrence Technological University's civil engineering department, oversees classroom testing on highway structures July 20. The research could lead to bridges being built with a carbon-fiber reinforced polymer instead of steel.



Joseph Hanson, 26, of Southfield works with other graduate students to build carbon-fiber cages for box-beam bridge supports at Lawrence Technological University.

projects with the Michigan Department of Transportation and the U.S. Department of Transportation. The military research will have students developing materials that could improve the safety and durability of vehicles and structures.

"We will be able to identify potential materials that can lighten the weight of a vehicle, materials that can protect our troops and also make things move faster

with less effort and less consumption of fuel, which is very critical," Grace said. Students say the work they do now will give them an advantage when they enter the job market. Last year, all of the students who responded to a university survey said they had found jobs in their fields within three months of graduating.

"I have a better understanding than most coming out of college because I've already been there, done that before," said Tony Magnan, 27, of Southfield, a graduate student in the civil engineering department.

He can tell potential employers he has taken leadership roles in government research, such as his job now as project manager for a five-year, \$1.1-million study for the U.S. Department of Transportation to examine the use of carbon-fiber reinforced polymer in I-shaped highway beams.

The test of the concrete beam that failed after 130,000 pounds was put on

it took place in the Structural Testing Center. It is part of a two-year, \$157,000 project for MDOT.

In both cases, the research involves the use of carbon fiber, a lightweight material that is sturdier, less susceptible to corrosion and more durable than steel, which is more commonly used in bridge construction.

Grace said the material is the future of highway bridge construction. About 25% of the 670,000 U.S. highway bridges are obsolete and need to be replaced. The carbon fiber "doubles the life span" of highway bridges, Grace said.

Material Testing

MDOT relies on research universities such as Lawrence Tech to "look at new materials, new methods of doing things," said Greg Johnson, metro region engineer for MDOT.

Johnson said carbon fiber has promising potential because it doesn't corrode.

"The corrosion of steel in our con-

crete bridges is one of the reasons we get concrete popping off of decks and hitting vehicles. That's one of the key areas we're hoping to partner with Lawrence Tech ... to find out if we can use carbon fiber to where you have a lesser opportunity for those types of incidents."

Still, because it's a relatively new material, carbon fiber is more expensive than steel, but that may change as its use grows, Johnson said.

Lawrence Tech was a key player in the country's first bridge made of the carbon fiber, which was completed in 2001 at the Bridge Street Industrial Park in Southfield.

"We don't know whether 20 years from now or 50 years from now if you'll see carbon. What we can say is carbon fiber will find a niche in the transportation construction area," Johnson said.

New building

Some of the research on carbon fibers is happening in a building the university opened in April. The Center for Innova-

tive Materials Research also will be the site of research the university will conduct for the Army Research Laboratory, which awarded Lawrence Tech \$11 million in March 2005 -- \$3.2 million of it for the building itself.

"It will be a unique facility in the Midwest. No one will have what CIMR has," Grace said.

That includes a fire chamber that still must be installed.

"The focus of this kind of lab is coming up with materials that are very resistant to fire," said Joseph Hanson, 26, of Southfield, a civil engineering graduate student. The building also will allow for research on how military vehicles or structures can withstand military attacks and natural disasters.

It's because of these kinds of experiences, Grace said, that his graduates — even in the state's slow economy — easily find jobs when they graduate.