Washington University Record, April 16, 1992

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The crumbling infrastructure

Defense industry’s downturn could mean upgrade of bridges

Defense industry’s downturn could mean upgrade of bridges

Kardos testified Feb. 21, 1992, at a hearing of the U.S. House Subcommitte on Technology and Competitiveness. For 20 years, the chemical engineer was director of the Washington University Materials Research Laboratory and chair of the graduate program in materials science and engineering. He came to the nation’s capital in 1965 to join the nation’s first team of academic scientists to study composite materials. The wings and tails of fighter bombers that performed in Operation Desert Storm are made of composites in contrast to their counterparts in Korean War and World War II aircraft, which were made primarily of aluminum and other metals. The new materials make a leaner, meaner bomber. These composite materials can also be more streamlined, efficient aircrafts. Composite materials have one-fifth the weight of steel for the same strength and are far superior in resisting fatigue,” Kardos said in his testimony. “They don’t corrode, are unaffected by salt and don’t need to be painted or maintained, because of their tremendous ratios of strength-to-weight and stiffness-to-weight, these materials permit entirely new design concepts to be used for bridge structures. Chief among these are ways to make bridges virtually earthquake-proof.

 descends fearful fears of earthquakes that come near major earthquake fault zones. The New Madrid Fault seismic zone is located about 360 miles south of St. Louis. It extends from the Missouri Bootheel into parts of western Kentucky, southern Arkansas and southern Illinois. In the early 19th century, this seismic zone produced the most powerful earthquakes ever to hit the continental United States. Many seismologists believe the New Madrid Fault is capable of producing another very large earthquake within the next 50 years, if not sooner.

In his testimony, Kardos cited research by Washington University’s Thomas G. Harmon, Ph.D., the Clifford W. Murphy Professor of civil engineering, and Kerry Slatery, Ph.D., assistant professor of civil engineering, that illustrates the compressive strength of composites. The engineers have performed tests showing that composite confine concrete, which would be used for columns, piers and flanges (adjoining rims) in bridge construction, greatly increases maximum strength. This concrete also requires more energy to damage the structure compared with conventional, steel-reinforced concrete.

Big payoff predicted

While the current cost of composite materials is high, Kardos says their efficiency, low maintenance and durability make them cost more effective in the long run than steel. And, with more commercial applications for composites, volume will increase, eventually lowering material costs.

Kardos predicts a big payoff.

"First, we will be providing new jobs," he says. "By establishing new companies and new directions for existing companies, we hope to provide an economic boost for the St. Louis area and eventually for the entire country. Once production is in full swing, we estimate that the first-year effort at McDonnell Douglas alone would generate 225 new jobs. In the St. Louis area, as many as 5,000 new jobs will be created during the initial six-year start-up period, based on the development of a single bridge structure product. nationwide, with the spectrum of composite applications we have in mind, 100,000 new jobs are possible."

Kardos notes that the infrastructure to create a new industry out of the downsized defense-based one already is in place in the Gateway City.

McDonnell Douglas Corp., one of the world’s key makers of military aircraft, has a 500,000 square-foot facility where composite materials have been designed and manufactured specifically for fighter aircraft. Zollie Corp. has the technology to manufacture carbon fibers, a basic ingredient in composite materials. A way to help the faltering defense industry — composite materials — says John L. Kardos, Ph.D., chair of the Department of Chemical Engineering. Kardos represents the consortium that wants to convert these materials into the glue that binds together the nation’s crumbling infrastructure and prime bridges.

Composite materials are composites comprising two or more individual substances that together provide greater benefit than each alone can. The composites are multilayered, lightweight synthetic materials — a variety of plastic composites — that are reinforced with strong fibers such as glass or carbon.

We believe that the same composite materials that were developed in the aerospace companies for use in military hardware also can be used to build earthquake-proof bridges at a lower cost than is possible with current technologically advanced materials,” Kardos said. Moreover, it is known that the Europeans and Japanese are beginning to invest in advanced composites. The United States leads the world in this technology. It’s time for us to get off our duffs and put our expertise to work.”

Kardos and the Composites for Civil Structures Consortium, a group formed in 1991 with members from Washington University, McDonnell Douglas Corp., Production Products Inc., Zollie Corp. and the Missouri Advanced Technology Institute, believe these same materials can be used to shore up the nation’s 125,000 structurally deficient, decrepit bridges, introducing jobs and industrial growth throughout the nation.

Continued on p. 3

Continued on p. 3
Summer School emphasizes foreign languages, cultures

From exploring French culture through film, to learning how to prepare Spanish dishes - the seventh annual Summer School is now offering students an expanded array of courses on foreign languages and cultures.

“Our emphasis on more language courses is to get people involved in what they are already interested in and to provide them a chance to learn in a team setting,” says Stamos Metzidakis, Ph.D., director of the summer school and associate professor of French.

Creating a foreign language atmosphere and using summer as the tool sessions is something “that’s been done successfully at other universities,” notes Metzidakis. “There is no reason on earth for us not to be doing the same thing here.”

The school’s new foreign language offerings include a five-week course titled Special Topics in French Language and Literature: Politics and Civilization, to be taught beginning July 15 by Rene Kochmann, one of the school’s visiting faculty scholars. Kochmann, a specialist in the teaching of French as a foreign language, is a faculty member at the University of Rennes in France.

The school’s other visiting faculty members include Brigitte Auscher of the Universite de Rennes and Bruno Torrence of the Centre de Physique Theorique in Nantes. They will each teach a mathematics course.

During the French course, Kochmann will show five classic French films and use them for class discussion. The course will examine how the French people relate to each other and their language. The advanced course is for undergraduate French majors, graduate students in the field, and high school French teachers. Also making a debut on campus is Tai Phan, visiting professor of Spanish.

Phased-in Hilltop parking increases to be spread over additional year

Washington University Hilltop parking fees will increase next year on a reviewed schedule. These increases are less than those previously announced, and the University has decided to extend the current fee schedule through 1994-95, according to Richard A. Roloff, executive vice chancellor.

The slower rate of increase results from a delay in anticipated costs for a new parking facility. Under the new schedule, the rates through 1994-95 are as shown in the table above. This replaces the original three-year fee schedule announced in July 1991.

The green permit lottery for faculty and staff will be held again this year. A date for the lottery will be announced in a mailing to be sent out this summer.

For undergraduate students, permit procedures will be revised. The new procedures will allow returning students to add the cost of parking to their tuition and fees bill and to pick up their permits at the full class registration site. Faculty, staff and graduate students also will have the option to purchase permits earlier than in previous years.

Construction of a new parking facility will begin at a site directly north of the current parking deck along Throop Drive. It will accommodate about 500 cars with multiple unpaid tickets and $18, respectively, to $1.50 and $25

The parking enforcement program initiated during the current fiscal year will continue, including the towing of cars with multiple unpaid tickets and refusal to sell permits in future years to those who have not settled such violations.

We are pleased that the University has found a way to spread out the necessary parking increases over an additional year, since this will make it easier for faculty, students, and staff to factor these costs into their personal budgets over the next few years,” said John H. Clay, assistant vice chancellor for Administration and Transportation Advisory Committee.

We are also encouraged by the role that the Hilltop Parking Committee has played in hearing concerns from the campus community regarding parking and transportation,” Games noted. “We continue to seek ideas and concerns and to discuss them in ways that are sensitive to the needs of the University and to members of the campus community.”

ANNUAL FEES FOR PARKING PERMITS

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Phasing in the Hilltop parking increases will help students understand free showings of classic films from France, Italy, Israel and others.

Foreign languages are not the only emphasis of this year’s programs. The Summer School continues to sponsor its popular High School Summer Scholar Programs in areas of special academic interest. The high school program is designed to introduce high school seniors to the fields and rewards of college life. Students who have completed the requirements of the French courses may enroll in selected freshman and sophomore courses and earn college credit.

In the special audit courses, students pay $250 and do not receive college credit. Topics for these courses range from American politics to opera theatre.

Among Metzidakis’ future plans is to revive the American Freedom Summer Institute for high school students. Under the plan, free courses for summer school approximately 100 high school seniors will stay on campus for four weeks to study how freedom was conceived in the United States. The seniors, who will be supervised by both school school social studies teachers, will attend daily classes taught by prominent Washington faculty.

In the fall, Kochmann hopes to use Washington’s Center for the History of Western Culture to examine how deeply rooted social studies curriculum and to discuss ideas and concerns and to discuss ways that are sensitive to the needs of the University and to members of the campus community.”

Math team places 11th in national contest

Washington University placed 12th in the nation during the William Lowell Putnam Mathematical Competition. The contest is known as the most prestigious event for undergraduates in mathematics.

This year’s 2,585 students from 583 colleges in the United States and Canada competed for team and individual awards.

Each college or university may enter as many students as it wishes, but faculty coaches designate who are the three students who will constitute the school’s team. The students, who are part of the mathematics department, work individually.

The three members of the Washington team were William Chen, a senior, placed 19th; Joseph Schrabman, Ph.D., professor of Romance languages and literatures, and Marc Wallace, a senior in mathematics.

The team was coached by Carl M. Bender, Ph.D., professor of physics, and Richard H. Richtberg, Ph.D., professor of mathematics.

In all, 15 students from Washing- ton University competed. "We had seven students place in the top 200 and six more in the top 500, which is absolutely superb," says Bender.

William Chen, a senior, placed 19th. "I gave up my own major, music, to study math," says Chen.

Seven students in the top 200 and six more in the top 500, which is absolutely superb," says Bender.

Bill Bowerman, who runs his own shoe company, shoes the runners with his "invention" during his time with the university. But as fast as his wife can cook the food, he eats it himself. The experience involves making food, serving food and the social rules of eating.

"The play) is about appetite," Howe writes. "It's what the food represents, not its myriad ingredients."
Jaron L. Blocher, a junior in civil engineering, received the first annual Concrete Council Scholarships. The Concrete Council of Greater St. Louis, Blocher's hometown, established the scholarship at the council's annual Quality Concrete Awards Dinner held at the Fontenelle Inn. Blocher is a senior member of the Concrete Society and is employed by the Concrete Council. The Concrete Council is an industry group dedicated to educating the public about the importance of quality concrete. Therefore, it is highly significant that Blocher will be the first to receive this scholarship.

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CALENDAR

April 16–25

Thursday, April 16
11 a.m. Theodor Koopman Lecture Seminar, Complex Dynamics, Nicolis, Atoichi, WU grad student, and Zhou, WU grad student.

Noon. Dept of Genetics Seminar, Genetic Speech Therapy, Prager, WU grad student; Warren, WU grad student; Su, M. WU grad student.

Noon. Dept of Molecular Biology and Pharmacology, "The Very High Resolution Determination of the Structural Form of a Model Ferrous Transferrin Avidin-Binding Protein," Jones, WU grad student.


2 p.m. Dept of Pharmacology, "Current Trends in Pharmacology," Margaret M. Poon, WU grad student; Rothman, WU grad student.

Thursday, April 17

11 a.m. Dept of Pediatrics, "The Role of the Polypeptide Growth Factors in the Development of Neonatal Rodent Models," Deuel, WU prof, of medicine, biochemistry and molecular biophysics, and director of oncology.

11 a.m. Dept of Biomedical Engineering, "Master of Fine Arts EL," Noon, WU grad student.

12 noon. Dept of Biochemistry and Molecular Biophysics, Seminar, "The Characterization of the Besov Spaces via the Characterization of the Three Dimensional Structure of Rat Intestinal Fatty Acid Binding Protein," Jones, WU grad student.

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Saturday, April 19
10 a.m. Dept of Chemistry Seminar, "A Compact High-Order Euler Solver of the Nature of Event, Sponsor and Admission Cost. Send Items to WU faculty and staff. For more info., call 935-5380.

Saturday, April 20
5 p.m. Department of Mathematics Colloquium, "Understanding and the title of the event; also include your name and telephone number. Send items to WU faculty and staff. For more info., call 935-5380.

Sunday, April 21
11 a.m. 8:30 a.m. Center for the Study of Data Processing Seminar, "Effective Communication with Seth Carlin, WU prof, of mathematics.

11 a.m. Dept of Mathematics Ph.D. Oral, "Spectral Decomposition and Almost Every..." Hill, WU prof, of computer science.

5:30 p.m. Catholic Student Center Hob/ 7:30 p.m. Catholic Student Center Hob/ 4444. For info., call 725-3358.

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Saturday, April 25
5 p.m. Performance Arts Association of Student Social Work Lecture, "An Early..." Cook, WU prof, of social work.

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