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CTRE's mission is to develop and implement innovative methods, materials, and technologies for improving transportation efficiency, safety, and reliability, while improving the learning environment of students, faculty, and staff in transportation-related fields.

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CTRE director's message: A major national project

CTRE and Iowa State University faculty are proud to be involved in a project of national significance—the development of a research plan for accelerated renewal of the nation's highways. Most of us have heard the phrase, “get in, get out, stay out.” That is what this project is all about. Note that this is not just for special projects. The intent is to revamp the way highway projects are delivered to the public.

About F-SHRP

In TEA 21 (1998), congress charged the Transportation Research Board with investigating the merits of a new Strategic Highway Research Program, generally called “F-SHRP.” TRB Special Report 260, *Strategic Highway Research*, published in 2001, recommends a new SHRP with the overarching theme of “providing outstanding customer service for the 21st century.” The report recommends that Congress appropriate about \$450 million over the six years of the next transportation reauthorization legislation.

Special Report 260 and Highway Research and Technology, The Need for Greater Investment (TRB, 2001) note a set of facts in support of F-SHRP that collectively amount to an impending highway crisis:

- The number of vehicle miles traveled (VMT) has increased 76 percent between 1980 and 1999.
- System capacity in lane miles has increased only three percent in the same time frame.

- VMT is projected to increase another 50 percent by 2020.
- By 2025, the US population is predicted to grow 20 percent to 360 million.
- By 2020, annual truck volume is predicted to double from 8 billion tons to 16.8 billion tons.
- In 68 major cities, the cost of congestion is estimated in excess of \$70 billion annually.
- The public has very little tolerance for delay, especially multi-year delay.
- About 830 people are killed and 42,000 injured annually in work zones.
- Based on 1998 obligations, resurfacing is being performed on 12.8 percent (20,500 miles) of the national highway system annually. This is a 7–8 year resurfacing cycle for the 160,000-mile system.
- Reconstruction was performed on 3,200 miles, implying a 50-year replacement cycle. This suggests the need for a 50-year roadway or “perpetually renewable” roadway.
- Sixteen percent of the bridge inventory (583,000) is functionally obsolete or structurally deficient.

The need for major reconstruction and expansion of capacity is clear. The research problems are how to minimize disruption; do this work rapidly, often under traffic; produce a longer-lived product; and meet environmental goals.

AASHTO support
AASHTO supports F-SHRP. Through the NCHRP

program AASHTO sponsored four projects to develop research plans for each strategic focus area named in *Special Report 260*:

- renewal: accelerating the renewal of America's highways
- safety: making significant improvements in highway safety
- reliability: providing a highway system with reliable travel times
- capacity: providing highway capacity in support of the nation's economic, environmental, and social goals

If Congress authorizes F-SHRP, plans of action will be ready.

CTRE's role

CTRE leads a team of ISU faculty, Purdue University faculty, and TDC Partners, LTD staff charged with developing the research plan for renewal. The objectives are

- to achieve renewal that is performed rapidly, causes minimum disruption, and produces long-lived facilities and

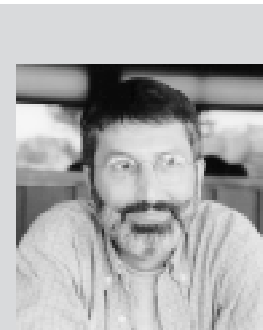
- to achieve such renewal not just on high-profile projects but consistently through the system

The CTRE research team has identified eight topics that address the goals:

1. project selection process
2. project financing
3. agency and public relationships
4. design procedures
5. construction specification and contracting procedures
6. material selection and testing
7. construction and maintenance procedures
8. policy and technology transfer

Several research projects will be recommended under each topic, totaling about \$18 million per year.

CTRE will soon be requesting feedback on the draft plan. If you have thoughts on these issues or ideas that address the goals, please contact me, 515-294-8103 or andrie@iastate.edu.

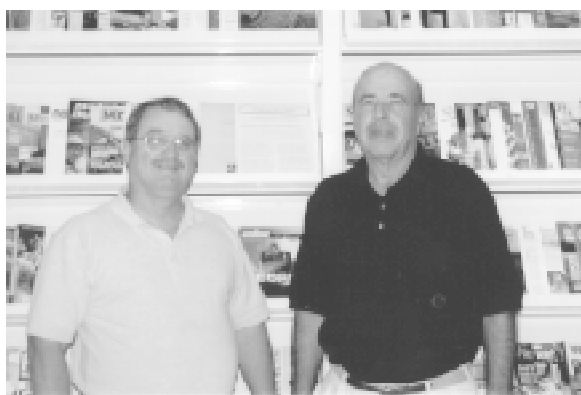


Ali Kamyab

Ali Kamyab leaves for California

Since coming to the United States from Iran in 1978, Ali Kamyab, CTRE research scientist, has spent nearly half those years working at CTRE. Now he's moving on.

Kamyab came to Iowa State University in 1991 as a PhD student in civil engineering.



CTRE's librarian, Jim Hogan (right), with Iowa DOT's librarian, Hank Zaletel

- videotapes,
- maps,
- aerial photographs, and
- historic documents.

Iowa DOT librarian Hank Zaletel and his staff also provide comprehensive reference and database services. The library has access to the Transportation Research Information Service (TRIS) and, through membership in the Online Computer Library Center, can borrow materials from thousands of libraries worldwide.

The LTAP library emphasizes training materials and also has 1,370 research and technical publications. Librarian Jim Hogan regularly helps Iowa's transportation agencies access materials on a variety of specific topics. The LTAP library catalog is online, www.ctre.iastate.edu/library/search.cfm

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He worked as a research assistant at the Iowa Transportation Center (CTRE's first name), then at CTRE as a post-doc, and finally as part of the permanent staff beginning in 1996. He has worked on numerous projects related to intelligent transportation systems and work zone safety, including the award winning Midwest States Smart Work Zone Deployment Initiative.

In his new position, Kamyab will be the liaison with the California Department of Transportation (CalTran) for Montana State University's Western Transportation Institute. He'll be based in Sacramento and will oversee CalTran-sponsored projects.

New Construction Management and Technology Group seeks to improve project efficiency

Ed Jaselskis, associate professor of civil and construction engineering at Iowa State University, is coordinating a new Construction Management and Technology Group (CMTG) at CTRE to research state-of-the-art management techniques and information technologies for the transportation community. CMTG researchers focus on information areas such as electronic bidding, constructability, as-built drawings, and field simplified drawings. Research technologies include 3-D and 4-D CAD models, GIS, and remote sensing.

Currently, CMTG focuses on the benefits of laser scanning over standard survey techniques. Laser scanning quickly scans an accurate as-built object for use in CAD software. *As-built* means the corrected versions of the design drawings or blueprints since there are usually some minor changes that are made as construction progresses. Therefore, it is imperative to construction design that the final drawings be as accurate as possible. Poor as-built drawings must be found and reworked, which can cost up to 15 percent of the total project cost.

Laser imaging technology can drastically reduce the time spent rendering an object while improving its accuracy for a particular traffic construction project. Laser scanning is a ground laser-imaging system that quickly creates a highly accurate 3-D image for use in standard CAD software packages.

CMTG proposes to use this technology to help the Iowa Department of Transportation with several important design and construction projects. This technology may help with intersection, highway, and bridge design. To date, CMTG has test scanned a borrow pit, stockpile, highway, several bridges, a bridge deck, and a concrete paving surface. CMTG is currently determining how much money laser scanning saves when compared with conventional approaches.

CTRE and CMTG envision research that directly applies to the transportation community. For example, as CMTG continues to develop laser scanner technology, it will make such technology available to Iowa's public agencies. CTRE's resources could also help CMTG educate interested parties about the new technology. CMTG staff will be working with Tom Cackler, CTRE's new associate director for construction research and advanced technology.

Hello, Tom Cackler

CTRE has recently acquired the expertise of E. Thomas (Tom) Cackler. Before coming to CTRE, Tom spent 27 years at the Iowa DOT; the last nine were spent as chief engineer for the Highway Division, a department with more than 2,600 employees. As chief engineer, Tom directly oversaw project development, contract administration, maintenance of the primary road system, and Iowa DOT support of local government programs. Before that, Tom was director of the Iowa DOT Office of Construction, and was responsible for a \$300 million highway construction program and was on quality improvement committees for four major construction and materials associations.



Tom Cackler

At CTRE, he is the associate director for construction research and advanced technology. Tom hopes that he can contribute to the development of innovative construction technology. "There's great opportunity to apply technology to construction processes. I feel we are on the verge of something new and exciting," he says. Tom is the principal investigator for the highway renewal division of the future Strategic Highway Research Program (F-SHRP) (see CTRE Director's message on page 2). He also works closely with the Center for Portland Cement Concrete Pavement Technology (PCC Center) as a research coordinator and manager.