

DIVISION HIGHLIGHTS: ADVANCED TRANSPORTATION TECHNOLOGIES

Evaluating smart technologies through simulation

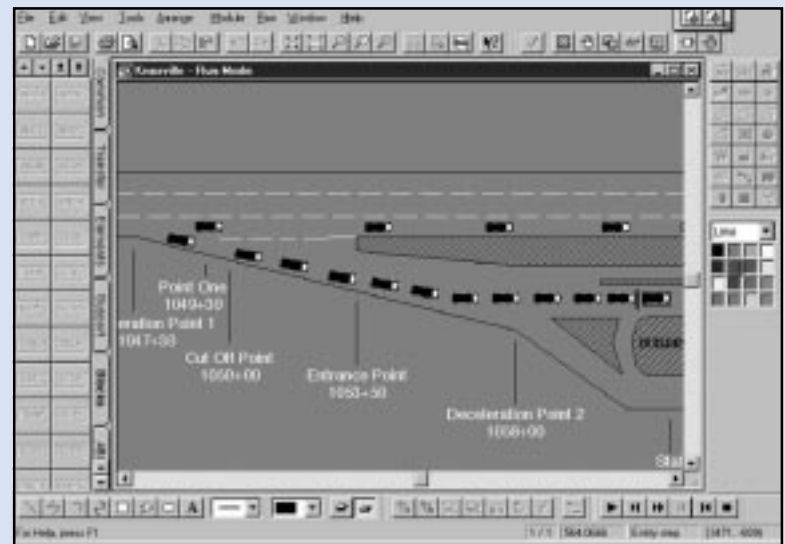
Since the advent of digital computing, traffic engineers have used simulation models to analyze the effects of planned or proposed infrastructure changes. In the last decade the usability of these models has increased significantly as their human interfaces have become more user friendly, and easy-to-understand graphic displays have replaced columns of dense output data. Today's traffic simulation models can quickly process highly complex scenarios and display outcomes that are readily comprehensible to engineers and their customers, making such models an integral feature of traffic engineering.

Several excellent universal traffic simulation modeling packages, like INTEGRATION and the Federal Highway Administration's CORSIM, have been developed. These packages, however, cannot address every simulation need, so traffic engineers are forced to innovate, in some cases borrowing simulation programs developed for other disciplines like industrial or process engineering.

CTRE is involved in two intelligent transportation system (ITS) evaluation projects for which no universal simulation

modeling package is adequate. For each of these evaluations Ali Kamyab, transportation research scientist at CTRE, has developed a special-purpose model using Arena, a simulation package from the manufacturing sector. One new model is being used to evaluate the impacts of electronic screening systems at weigh stations. The other model simulates traffic operations in traffic merge areas at work zones. See separate articles beginning on page 4. •

CTRE's Arena-based weigh station simulation model exploits Arena's decision-making logic to mimic the logic of electronic screening systems.



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CTRE en route is a free newsletter of the Center for Transportation Research and Education (CTRE) at Iowa State University. It is financed by CTRE and the Iowa Department of Transportation. The opinions, findings, or recommendations expressed herein are those of CTRE and do not necessarily reflect the views of the Iowa Department of Transportation.

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From the Director



Tom Maze

CTRE works with many partners in its programs and projects, but the Federal Highway Administration (FHWA) has been a consistent CTRE partner and one we have relied on since the center was established.

The FHWA has undergone a complete corporate make-over as a result of its own reorganization and changes related to the new surface transportation authorization act, the Transportation Equity Act for the 21st century (TEA-21).

Although the FHWA has received greater funding through TEA-21 for new and existing program activities and to aid state and local transportation programs, its own discretionary funding was considerably reduced. The principal discretionary programs of interest to us are FHWA's research and development programs and technology transfer programs. These have been downsized considerably, which means that to accomplish federal research priorities, the FHWA will be more dependent on partnerships with states and other private and public organizations.

In addition to the changes brought by TEA-21, the FHWA has reorganized its lines of authority. It has eliminated a layer of decision making within its field organization—the regional offices—and allocated more authority to state-level division offices. Simultaneously, the FHWA is moving specialized resource responsibilities to four, geographically distributed resource centers in Atlanta, Baltimore, Olympia Fields (near Chicago), and San Francisco.

CTRE works closely with the FHWA's Iowa Division and has worked closely with the Region 7 office in Kansas City. Although we are certain that this restructuring is for the better, we will miss our long-standing working relationship with the Kansas City regional office. Several engineers and managers in the Kansas City office have assisted CTRE's projects and programs and have always provided excellent advice. We will miss working with the many good friends we have made in the Kansas City office as they relocate within FHWA or move on to new endeavors.

At the same time, we look forward to continuing our good relationship with the Iowa Division office and developing a relationship with the new resource center in Olympia Fields. The director is George Ostensen. He was formerly the director of safety and traffic operations with the FHWA Research and Development Laboratory and is therefore quite knowledgeable about research and technology transfer issues. Mr. Ostensen will be at Iowa State University March 26 to give a seminar.

Here at CTRE we are also experiencing change. During our 1997 external review, the reviewers confirmed our belief that CTRE needs new space. Since then, we have been working with the Office of the Vice Provost and ISU's facility management office to determine how to develop an expanded facility. During the fall of 1998, the contractor broke ground on a new multi-tenant facility in the second phase of ISU's Research Park, roughly one block south of our existing office. CTRE will move to new office space within that building in the spring or summer of 1999.

The new office will double our current space. In addition to some long-needed increased space for our existing core staff

members, the new facility will contain more offices for affiliated faculty members, a computer training laboratory, and a video conferencing classroom. The computer training laboratory provides us with the opportunity to conduct more training on geographic information systems and other transportation applications software for our students and the transportation professional community. We also expect that the video conferencing classroom will receive much use for our internal purposes as well as for other organizations located in the ISU Research Park.

CTRE recently completed a research project that investigated opportunities for distance learning through a number of technologies, including standard video conferencing technology. The results of the study indicated that, although the Iowa Communications Network's (ICN) full-motion broadcast quality video may be the preferred standard for delivery of distance learning within Iowa, the preferred standard outside of Iowa will likely be based on video conferencing standards. Therefore, in anticipation of CTRE's work on courses and training programs not only in Iowa but also throughout the region, we have focused on video conferencing standards. Although it is too early to tell, we are betting that collaboration on course work among the major research universities in the region will help Iowa State and other universities expand their curricula.

In cooperation with the Iowa Department of Transportation (Iowa DOT), CTRE has developed two additional joint appointment faculty positions. The way the arrangement works is the Iowa DOT identifies a need for specialized expertise and contracts with CTRE for a one-half-

time faculty member with expertise in that field. For the other half of the appointment, the faculty member teaches and advises for Iowa State University. We developed the first of these unique partnerships in 1997 when we hired Brian Coree, a civil engineering faculty member with expertise in asphalt pavements. Two more faculty will be added soon, one with expertise in bridge engineering and one with expertise in concrete pavement. The bridge engineer has already been selected and is an existing Iowa State civil engineering faculty member, Terry Wipf. The concrete pavement engineer will be selected through a national search, currently underway.



Terry Wipf

The remainder of this issue is devoted to ongoing and completed projects, new staff, and student awards and activities. Also included is a calendar of spring seminars sponsored by CTRE. If you are interested in attending any of the listed seminars or receiving a videotape of the seminar, please contact us.

For more information on any of CTRE's projects or programs, view our home page, www.ctre.iastate.edu/, or contact us directly. •

Evaluating electronic screening at weigh stations

Electronic screening systems at weigh stations are a key component of the Federal Highway Administration's (FHWA) Intelligent Transportation Systems for Commercial Vehicle Operations (ITS/CVO) program. The goal of electronic screening is to monitor trucks' compliance with size/weight and other regulations more efficiently.

Stations without these systems require all trucks to pull in to be weighed and checked for compliance. Queues of trucks waiting to be weighed can become quite long. When that happens, trucks are allowed to bypass the station to prevent the queue from backing up onto the mainline.

An electronic screening system identifies and checks participating (transponder-equipped) trucks for compliance *before* they reach the weigh station. The system consists of a roadside Automatic Vehicle Identification (AVI) "reader" and weigh-in-motion (WIM) scale upstream of the station. The reader and scale capture information about transponder-equipped trucks as they pass: their identity, weight, and other regulatory information. Transponder-equipped trucks that are in compliance are automatically signalled to drive past the station; all other trucks are signalled to pull in to the weigh station unless the queue is full.

As more weigh stations use electronic screening systems and more commercial vehicles become equipped with AVI transponders, commercial vehicle operations, regulatory agencies, and the traveling public should benefit:

- When compliant vehicles can bypass busy weigh stations, the stations experience fewer and shorter queues of trucks

waiting to be weighed. Compliant trucks save time and fuel, and trucks that enter the station experience shorter waits, also saving time and fuel.

- Fewer full queues at weigh stations means fewer trucks are allowed to bypass the station without being checked. Weigh station personnel waste less time checking compliant vehicles and can concentrate on noncompliant vehicles.
- The traveling public should be safer. More unsafe trucks will be detected at weigh stations. With shorter queues at weigh stations, fewer trucks will be dangerously backed up onto the mainline.

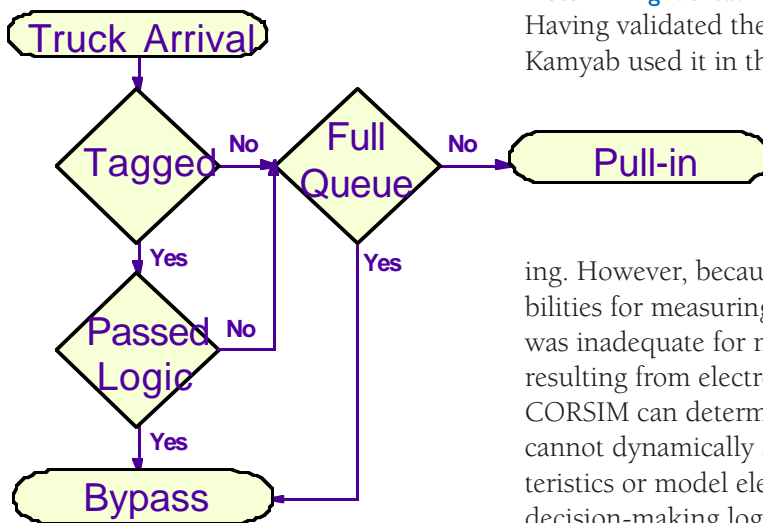
As evaluator for both the Federal Highway Administration's Advantage I-75 Mainline Automated Clearance System (MACS) project and for the Oregon Green Light initiative, CTRE was charged with quantifying the impacts of electronic screening. For the MACS project, which has been completed, travel time savings, fuel savings, station productivity, and other impacts were measured in the field. Such exhaustive field evaluations are expensive. So, as CTRE staff collected time savings data for the MACS evaluation, Ali Kamyab, transportation research scientist, began developing a simulation model to conduct the same evaluation virtually.

Measuring travel time savings

Kamyab built a special-purpose weigh station module with enhanced capabilities in Arena simulation language. Arena is typically used in the manufacturing industry to simulate manufacturing processes and has the dynamic assignment capabilities needed for this project.

Based on various inputs identified by the user (e.g., amount of traffic, number of trucks equipped with transponders, etc.),

the Arena-based module generates “trucks” coming down the mainline, then dynamically assigns characteristics (classification, axle spacing, axle weights, etc.) to the vehicles. The module includes a decision-making logic that mimics the logic of electronic screening systems, assigning “bypass” or “pull-in” signals to trucks on the mainline based on the length of queue in the weigh station, presence or absence of transponders, compliance or noncompliance, and other parameters within the logic. As depicted in the figure below, if conditions in the logic are satisfied, a truck drives by the station on the mainline. If not, it enters the station. All trucks without transponders enter the weigh station unless the queue is full.



Decision-making logic in the Arena module simulates electronic screening.

The module effectively measures travel time savings attributable to electronic screening at weigh stations and, using Arena’s high-fidelity animation capabilities and Viewer software, displays truck movements through and past the station graphically (see the figure on page 1). Outputs include the number of unautho-

rized bypasses, travel times, queue length, average time in the system, and hourly number of trucks processed.

The logic of the Arena-based module was verified and the results validated by comparing truck travel times measured in the field for the MACS project to travel times generated by the module without electronic screening functions operating.

Although the module was built based on the geometry and traffic patterns of a specific weigh station, it can be modified to simulate a variety of weigh station designs and, if a station is part of a network of screening-equipped stations, can incorporate information written to the transponder at upstream stations.

Determining fuel savings

Having validated the Arena module, Kamyab used it in the Oregon Green Light evaluation to determine travel time savings resulting from electronic screening. However, because Arena lacks capabilities for measuring vehicle fuel usage, it was inadequate for measuring fuel savings resulting from electronic screening. CORSIM can determine fuel savings but cannot dynamically assign vehicle characteristics or model electronic screening’s decision-making logic. Kamyab therefore built a weigh station module in CORSIM and interfaced it with the Arena module. The resulting model incorporates Arena’s dynamic assignment and powerful display capabilities with CORSIM’s network capabilities for determining fuel savings.

For each scenario, the Arena-based module generates truck traffic and assigns characteristics to the trucks. Arena’s decision-making logic determines which

WEIGH STATION ... continued on page 6

Evaluating smart work zone technologies

On Interstate 80 in rural eastern Iowa, traffic often exceeds 30,000 vehicles per day during the summer construction season, and motorists have experienced very long work zone delays due to congestion. The Iowa Department of Transportation (DOT) is investigating means to better manage traffic in work zone areas along segments of rural interstate highway.

Among the methods being considered is the expanded use of advanced traveler information systems to better inform motorists of changing traffic conditions ahead and, when appropriate, to divert them to alternative routes. Prior to making any investment decisions, however, research is needed to improve understanding of traffic behavior within work zones.

CTRE has been given the task of collecting traffic and driver behavior data in existing work zones and, based on these observations, developing a simulation model for work zones. The simulation will help the

Iowa DOT and other agencies better understand the relationship between traffic volume, merging discipline (e.g., forcing vehicles to merge upstream of the work zone taper (merge point)), and motorist delay.

The typical strategy for designing rural interstate work zones in Iowa has been to reduce the number of travel lanes to one in each direction while work is performed on the closed lanes. The work zone simulation model will allow users to experiment with such variables as traffic volume and traffic merging discipline and to estimate the level of diversion required to keep delay at manageable levels. The model will also allow the Iowa DOT to assess the cost trade-offs between paying contractors to work extended hours to shorten the duration of the work zone versus imposing delays on motorists.

Several state transportation agencies, including the Iowa DOT, are using ATIS and dynamic traffic control devices to

WORK ZONES ... continued on page 7

WEIGH STATION ... continued from page 5

trucks enter the weigh station, or the number of "turning movements." The turning movements are then interfaced with the CORSIM module, which compares fuel consumption of trucks passing on the mainline with those of trucks driving through the weigh station and determines the relative fuel savings attributable to electronic screening.

Users can modify various parameters before running the model. Sample parameters include hourly traffic volume, percent of trucks in the traffic stream, percent of trucks with transponders, percent of trucks subjected to a safety

inspection beyond weighing, and the average duration of a safety inspection.

The Arena and CORSIM modules demonstrate that as the number of trucks with transponders increases, both the length of queues and the number of unauthorized bypasses decrease at an electronically screened station. The station is therefore more productive; it checks more noncompliant trucks and fewer compliant trucks. Relative travel time and fuel consumption are reduced not only for participating trucks that are allowed to drive by the station but also, because of shorter queues, for trucks that must drive through the weigh station. •

WORK ZONES . . . continued from page 6

reduce work zone congestion and improve traffic safety. For example, a dynamic traffic control device to improve merger discipline is being tested by the Indiana DOT. The Indiana DOT is using a dynamic no-passing zone immediately upstream of the merge point to reduce traffic stream turbulence that occurs at the lane taper immediately before a lane closure. Sonic detectors determine the formation of a queue in the open lane. When a queue forms, strobe lights on “Do Not Pass” signs are triggered upstream. Once the queue has subsided, the strobes are automatically shut off.

Computer simulation will be used to model traffic behavior at an interstate highway lane closure and to evaluate ATIS and traffic control technology like the device being tested in Indiana. Once the simulation model is built, it will be possible to investigate cost trade-offs between driver delay and traffic control policies.

As with electronic screening simulations, the dynamic assignment of characteristics to individual vehicles is an essential function for accurately modeling work zone lane closures and modifying traffic

merge discipline. Ali Kamyab, transportation research scientist, is therefore again working in Arena simulation language.

When completed, the Arena-based, high-fidelity, microscopic model will simulate traffic operations in and around a work zone. Users will be able to assess different scenarios, adjusting traffic levels, driver behavior, and merge discipline. The visual animation component of Arena will allow traffic engineers to easily demonstrate the impact of various traffic management strategies and technologies to a broad audience.

Arena lacks lane-changing and car-following algorithms found in traffic simulation tools. CTRE has developed these algorithms and is customizing the Arena model to reflect these vehicle behaviors.

The work zone simulation model is based on the geometry and traffic patterns of a particular construction site in Iowa; however, the geometry may be changed to reflect varying designs (e.g., a longer taper area). The default data present existing traffic conditions within the work zone. The model will be validated to determine if

WORK ZONES . . . continued on page 8



CTRE is collecting data on traffic/driver behavior in existing work zones. These data provide the basis for an Arena-based work zone simulation model.

For more information about the electronic screening simulation model, contact Ali Kamyab, 515-294-4303, ali@ctre.iastate.edu.

A report on the work zone simulation model will be available through CTRE or the Iowa DOT later in 1999.

WORK ZONES . . . continued from page 7

it replicates the actual system at an acceptable level, including car-following and lane-changing characteristics. To validate the model, output of the model will be compared to traffic conditions and behavior recorded in the field.

The model will be completed by spring 1999. At that time CTRE will run a number of experiments using typical traffic volumes, vehicle mixes, and daily distribution of traffic volumes by time of day. The exercises will include the following activities:

- Examine the improvement in work zone capacity resulting from traffic control to modify merge behavior.
- Examine the impact of errant behavior on the part of drivers. For example, it is common for two truck operators to position their trucks two abreast at the end of the queue and move through the queue without allowing drivers to pass in the lane being discontinued. This practice creates a large gap between the two trucks and the traffic ahead, effectively diminishing the vehicle-handling capacity of the work zone.

- Examine the queue formation cycle under varying traffic volumes and truck percentages to determine a method to forecast when queues will form and when to begin recommending diversion of traffic to alternative routes.
- Examine cost trade-offs between expected delay costs and alternative construction policies. At some point it may be necessary to examine cutting construction schedules, requiring contractors to open lanes when volumes exceed a specified level, or full-depth paving the shoulder to create additional traffic lanes.

Current changes in transportation infrastructure, including the implementation of Intelligent Transportation System (ITS) technologies, may demand a new generation of universal traffic simulation models that can accommodate the algorithms in these technologies. In the meantime, CTRE's simulations of electronically screened weigh stations and work zone technologies provide examples of how existing models can be modified to accommodate today's modeling needs. •

Truck drivers commonly drive two abreast through a work zone queue to prevent "cheaters" from driving by in the closing lane. This practice diminishes the vehicle-handling capacity of the work zone.



Stopping fatigue cracking in steel bridge components

Project partners: Iowa Department of Transportation and the Iowa Highway Research Board (Project HR-393)

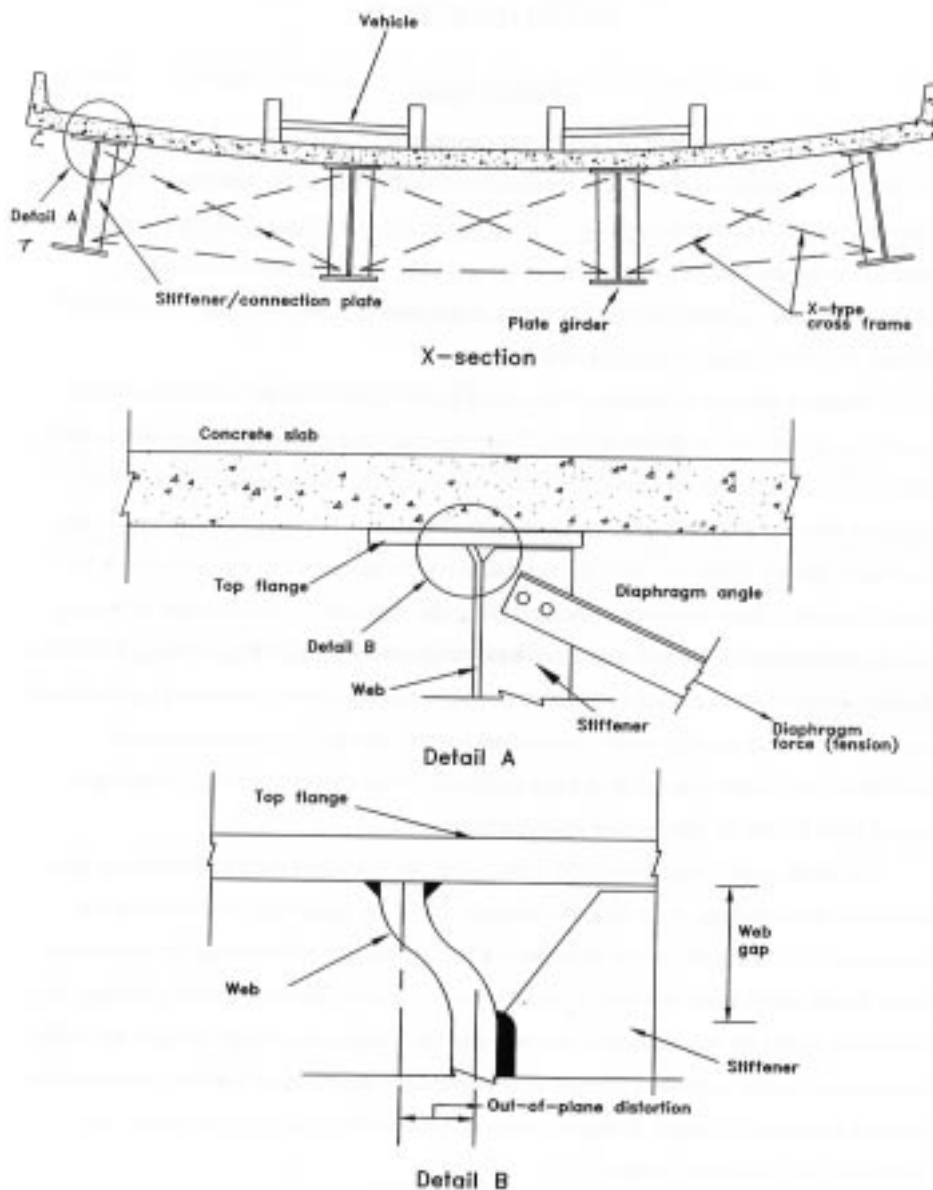
The problem

Fatigue cracks in some components of older, multiple-girder steel bridges is a common phenomenon in many states. Iowa's cracking problems are primarily

concentrated in the web area of the steel girders.

The top detail of the figure below shows a cross-section of such a bridge, with steel diaphragms and girders. The girders consist of a vertical web, the upper flange, and the lower flange, with a connection plate welded to the web and the lower

BRIDGE CRACKING . . . continued on page 10



This figure represents out-of-plane girder web distortion in the gap region.

BRIDGE CRACKING . . . continued from page 9

flange. (Before AASHTO specifications required that connection plates be welded to both flanges, Iowa did not generally weld the plates to the upper flange.) Over an intermediate support, the upper flange is in tension. The upper flanges are rigidly connected to the bridge deck. The diaphragms are bolted to the connection plates.

Under typical vehicle loads, forces develop in the diaphragms that cause out-of-plane loading on the girder web (see Detail A in the figure on page 9). Without a rigid connection between the connection plate and upper flange, this loading causes out-of-plane distortion of the web in the gaps adjacent to the upper flange, resulting in bending and cracking (see Detail B in the figure).

Various solutions to the cracking problems—drilling holes at the crack tip, increasing the web gap length, welding or bolting the stiffening plate to the top flange, even removing unnecessary diaphragms to eliminate the source of cracking—are destructive in nature, and some of them require stopping traffic during the retrofit.

A possible solution

The Iowa Department of Transportation (Iowa DOT) Office of Bridge Maintenance has proposed a simpler, nondestructive retrofit: loosening the bolts at selected connections between the diaphragms and the girders.

Under CTRE's research program with the Iowa DOT, and with the support of the Iowa Highway Research Board, Iowa State University staff in civil and construction engineering, Professors Terry Wipf and Lowell Greimann and

Structures Laboratory Manager Doug Wood, investigated the proposed retrofit.

Their study included field tests on five continuous-span steel bridges, including both X-type (depicted in the figure on page 9) and K-type diaphragm bridges. One of the bridges in particular, an X-type on Interstate 80, has extensive fatigue cracking in the web gap regions.

The experiments

To assess the proposed retrofit, researchers measured bridge responses under vehicle loads before and after loosening bolts connecting the diaphragms to the girder connection plates. Two sets of bolts, an upper and lower set, connect each diaphragm diagonal to a connection plate, with two bolts per set on X-type diaphragms and three bolts per set on K-type diaphragms.

On X-type diaphragms, loosening either set would produce the same effect, so researchers loosened the lower bolts because of their easy access. With K-type diaphragms, loosening upper bolts was expected to have a greater effect on web gap areas, so the top bolts were loosened. Researchers also evaluated the effects of loosening both upper and lower diaphragm bolts.

Forces in the diaphragms cause most of the problematic distortions and cracking. Researchers constructed a finite element model using the software program ANSYS to determine at which diaphragm/connection plate connections the greatest distortion develops. The bridges were then instrumented at the web gaps in those areas. Two types of instrumentation were used: displacement transducers and foil strain gages.

BRIDGE CRACKING . . . continued on page 11

BRIDGE CRACKING . . . continued from page 10

During tests on two of the bridges, regular traffic was restricted while one (sometimes two) rear-tandem axle truck was driven over the bridge at various speeds. Heavy traffic on the other three bridges made stopping regular traffic impossible, so tests were conducted with the loaded truck(s) running at traffic speeds.

Conclusions

The results of loosening diaphragm-girder connection bolts varied widely from girder to girder and bridge to bridge. In general, however, tests demonstrated that loosening these bolts substantially reduced diaphragm diagonal forces, the main cause of out-of-plane distortion-induced cracking.

The method reduced maximum stress ranges by at least 25 percent for all but one web gap (in a K-type diaphragm bridge). Such reductions would result in significantly extending the web gap fatigue life.

The researchers recommend the retrofit for steel bridges with X-type diaphragms but believe that more research should be conducted before implementing the method on K-type diaphragm bridges.

The final report, "Preventing Cracking at Diaphragm/Plate Girder Connections in Steel Bridges," is online at www.ctre.iastate.edu/reports/CTRE_rep.htm. •

CTRE welcomes new staff



Keith Knapp

CTRE is pleased to welcome Keith Knapp. Keith has a split appointment with CTRE, where he manages traffic engineering and traffic safety programs, and ISU's Department of Civil and Construction Engineering, where he is an assistant professor.

Keith has a Ph.D. in civil engineering from Texas A&M and has spent several years as a transportation engineer for CH2M Hill, Inc. The majority of his background includes systematic functional analysis of design-related impacts at a roadway corridor level, including the operational and safety impacts of new developments, traffic control, signing, and marking. In addition, he has a special interest in the systematic analysis (supply, demand, and design) of parking—the sometimes forgotten, but always important, land-use/transportation connection.

Keith's overriding principle in transportation work is that of "perpetual impact": Any project, no matter how small, will have positive and negative impacts, and it is our job to identify the impacts before they occur. •

Something new at ISU: Transportation Student Association

Transportation is an interdisciplinary field at Iowa State University, attracting students in civil engineering, community and regional planning, transportation and logistics, and economics. Bringing these students together into one organization is the goal of the Transportation Student Association (TSA).

TSA's history

Formed by Iowa State students in 1997, TSA is the parent organization for a student chapter of the Institute of Transportation Engineers (ITE) and a student chapter of the Intelligent Transportation Society of America (ITS America). The purpose of TSA is twofold: 1) to provide professional membership and career opportunities for students and 2) to promote the growing, interdepartmental transportation program at Iowa State.

The majority of TSA's student leaders work as research assistants at CTRE. TSA's current president, Karen Giese, BSCE '98, is a master's student in transportation and is working on traffic modeling and simulation.

Iowa State University students join CTRE Director, Tom Maze, and Associate Director for Transportation Planning and Information Systems, Reg Souleyrette, at the January 1999 annual meeting of the Transportation Research Board.



TSA online

TSA's web site, www.public.iastate.edu/~stu_org/TranSA/, showcases student resumes and lists TSA's speakers and events. Speakers are invited from organizations like the Iowa Department of Transportation, the Des Moines Metropolitan Planning Organization, the Federal Highway Administration's Turner-Fairbank Highway Research Center, and private consulting firms.

TSA's activities

To kick off fall semester 1998, TSA hosted its second annual golf tournament and raised money for the 1998–1999 academic year. The money raised from the tournament and other sources enabled TSA to send 10 students to the Twin Cities metropolitan area in Minnesota to tour the Minnesota Department of Transportation's Traffic Management Center, 3M's Transportation Research Facility, and BRW Consulting.

With assistance from CTRE, TSA also sent 17 students to the January 1999 annual meeting of the Transportation Research Board in Washington, D.C. For undergraduates and those who had never attended, like Kyle Evans, it was a great opportunity to learn about aspects of transportation they are not exposed to at Iowa State. Evans was glad he went "because it allowed me to see that the research we do here at CTRE isn't just placed on a shelf somewhere."

For students who had attended the conference before, it was an opportunity to update themselves on the latest research in their areas of interest. Graduate student Brad Estochen, BSCE '97, was able to glean useful information about safety analysis and others' approaches to safety for his

TSA ... continued on page 13

Eisenhower Fellow ... again



For the last three years, at least one CTRE research assistant has won a prestigious Dwight David Eisenhower Fellowship toward graduate studies in a transportation-related field. Last

fall Christopher Monsere, MSCE '97, received a three-year doctoral fellowship worth approximately \$30,000. He won a two-year fellowship in 1996 while working on his master's degree.

Monsere's research interests include ITS, freight transportation, freight transportation planning, transportation economic

analysis, transportation systems analysis, and traffic operations.

Monsere is the second CTRE research assistant to win back-to-back Eisenhower Fellowships. The first was Michael Anderson, MSCE '96 and PhD '98, who is currently an assistant professor of civil engineering at the University of Alabama.

Monsere also received the 1998 Mid-America Transportation Center Outstanding Student Award for his strong performance as a researcher, scholar, and leader in professional activities. In addition to \$1,000, Monsere was awarded a plaque during the University Transportation Centers awards dinner at the annual TRB meeting in January. •

TSA ... continued from page 12

thesis research. Estochen likes getting different perspectives on issues. "Things tend to be a little different internationally as well as within the United States compared to Iowa," he says. •



TSA members saw how MnDOT's Traffic Management Center monitors traffic flows at different locations in the Minneapolis/St. Paul freeway system.

Scholars present papers

Students from the University of Nebraska-Lincoln and Iowa State University presented their research at the annual Scholar Conference hosted by Iowa State on November 20, 1998. Three of them were honored with cash awards.

The conference is part of Iowa State's Transportation Scholars program, an enhanced educational experience for exceptional students in transportation-related fields. It is sponsored by the Mid-America Transportation Center (MATC), the U.S. Department of Transportation's university transportation center for region 7, headed by the University of Nebraska-Lincoln.

Each year students from MATC member universities compete in a research competition. Their papers are carefully evaluated by an interuniversity panel, and those representing the most outstanding research are selected to be presented at the conference at Iowa State.

Following the conference, overall best undergraduate and graduate papers were



John Witmer, graduate student in transportation at Iowa State University, was one of several students who presented their research at Iowa State's annual Scholar Conference.

selected by the panel. The undergraduate award went to Daniel Jessen, a civil engineering student from the University of Nebraska-Lincoln, for research on "Field Procedures and Guidelines on Using Video Vehicle Detection Systems."



Daniel Jessen

Graduate awards went to Clifton Melcher, Iowa State, for "Methods of Shear Testing and Their Relation to Fiber Composite Dowel Bars," and Michael Pawlovich, Iowa State, for "A Method of Examining Dependence of Crashes on Demographic and Socioeconomic Data."



Clifton Melcher

Jessen received a cash prize of \$300; Melcher and Pawlovich received \$1,000 each. •



Michael Pawlovich

Crossroads 2000 Highlights

More than 300 people attended Crossroads 2000, Iowa State University's biennial transportation research conference held last August at Iowa State University. The conference was sponsored by CTRE at Iowa State and the Iowa Department of Transportation. Intelligent transportation systems was a topic of particular emphasis.

Three transportation professionals from Iowa were recognized for their contributions to transportation-related research and practice:

F. Wayne Klaiber, Anson Marston Distinguished Professor of Engineering at Iowa State University, was the academic recipient. Eldo W. Schornhorst, former Shelby County engineer and currently with the Asphalt paving Association of Iowa, was the public sector recipient. Fred E. McKim, Jr., Chair of the Iowa Rail Finance Authority and former general manager of

the West Bend Elevator Company, was the private sector recipient.

The conference proceedings is available online at www.ctre.iastate.edu/pubs/crossroads/. •



Special guest speakers included Robert Betsold (left), associate administrator for research and development at the Federal Highway Administration, and Francis "Frank" B. Francois, executive director of the Association of State Highway and Transportation Officials.

Conference calendar

- March 16–17 National Workshop on Sign Vandalism, Kansas City, MO
 May 5 and 12 Transportation Agencies and the Internet, national satellite broadcast

Spring '99 Scholar Seminar Series

- March 5 Gary Euler, VP, PB Farradyne, "ITS—The Dream, the Reality, and Today's Vision"
 March 12 Clint Topham, Deputy Director, Utah DOT, "Reconstruction of I-15 through Salt Lake City"
 March 26 George Ostensen, Midwest Service Center Administrator, FHWA, topic TBA
 April 2 Shirley Andre, Director, Motor Vehicle Division, Iowa DOT, "Practical Application of Intelligent Technologies in Solving Real-World Problems"
 April 9 Charles Sparado, Director ITS, 3M Company, "Practical Applications of ITS"
 April 16 Gene Pentimonti, President, Intermodal Conference, American Trucking Association, "Intermodal and International Transportation Trends and the Future"
 April 23 Mike Onder, Commercial Vehicle Operations Program Coordinator, Joint Program Office, FHWA, "ITS and Freight Mobility"
 April 30 TBA

This list includes conferences, workshops, and seminars of national interest sponsored all or in part by the Center for Transportation Research and Education at Iowa State University. The Scholar Seminars are held weekly on Iowa State's campus and broadcast to the University of Northern Iowa and other Iowa sites via the Iowa Communications Network. Visitors are welcome. For information about attending a conference or seminar, or to borrow a videotape of a seminar, contact Sharon Prochnow, CTRE's program coordinator, 515-294-3781, sharon@ctre.iastate.edu.

Do you have comments about the newsletter?

Contact:

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