Donna L. Vlasak  
Transportation Research Board of the National Academies of Science  
500 Fifth Street, NW  
Washington, DC 20001  

18-August-2015  

Subj: Letter of Interest  
NCHRP Synthesis 20-05/Topic 47-15  
Traffic Signal Preemption at Intersections near Highway-Rail Grade Crossings

Dear Ms Vlasak:

On behalf of the University of Wisconsin Traffic Operations & Safety Laboratory (TOPS Lab), we are pleased to submit this Letter of Interest for NCHRP Synthesis 20-05 Topic 45-17. Dr. Madhav Chitturi will serve as Principal Investigator with Mr. John Shaw (Co-PI) and Mr. William Bremer.

Our team has extensive experience on this topic and a strong interest in producing a synthesis that can be readily incorporated into practice by states, localities, and railroads:

- In 1995, flawed signal preemption at a grade crossing in Fox River Grove, Illinois contributed to the collision of a school bus and commuter train and the deaths of seven high school students. FHWA and FRA formed a Grade Crossing Safety Task Force to address the incident. Mr. Bremer co-chaired the Task Force’s Technical Working Group, co-authored the Implementation Report, and co-edited the ensuing changes to the US Manual on Uniform Traffic Control Devices (MUTCD) and other related guidelines.
- Mr. Shaw has considerable experience with rail systems and grade crossing safety, including work as a System Engineer for a fully-automated rail system. He recently served as lead author for NCHRP Synthesis 20-05 Topic 45-06 titled Work Zone Speed Management in collaboration with Dr. Chitturi and Mr. Bremer. The 45-06 synthesis is now in the final stages of being prepared for publication.
- Our team is experienced in the NCHRP synthesis process and takes pride in delivering thorough syntheses that are easy for practitioners and agency decision-makers to understand and apply. We have full access to relevant journals, reports, and dissertations. We also have excellent ongoing working relationships with officials from numerous transportation agencies.

Through our previous work, we are acutely aware of the challenges of implementing traffic signal preemption at railroad-highway crossings. These issues include technical differences between railroad signals and highway signals, trade-offs between road user safety and road user delay, and organizational issues stemming from the very different objectives and cultures of railroads and transportation agencies. The importance of a state-of-practice review is accentuated by recent technological advances in highway and railway signaling equipment, inconsistencies regarding use of back-up power supplies, and significant organizational changes resulting from both corporate consolidation in the rail industry and staffing reductions in the public sector.
We propose a three-person team for this project:

- **Dr. Madhav Chitturi** has been deeply involved in highway safety research since 2002. He recently served as Principal Investigator for NCHRP Synthesis of Practice 20-05 Topic 45-06, *Work Zone Speed Management*. He has worked extensively with traffic signal systems and vehicle detection technologies as part of the Wisconsin Experimental Intersection (WEXI), and is currently involved in research on elongated pavement markings for FHWA. He was the lead researcher on *Evaluation of Automated Speed Enforcement in Work Zones*, the first study in the nation to evaluate automated enforcement. Dr. Chitturi has also developed capacity, queue, and delay models. He currently serves on the project panel for NCHRP 03-107: *Work Zone Capacity Methods for the Highway Capacity Manual*.

- **Mr. William (Bill) Bremer** served as the FHWA Wisconsin Division Safety Engineer from 1976 until his retirement from full-time work in 2012. He is currently a Senior Transportation Engineer at the UW TOPS Lab. He served as member of US DOT Grade Crossing Safety Task Force and as co-chair of the Task Force’s Technical Working Group established in the aftermath of the 1995 Fox River Grove collision. He co-authored the Task Force’s 1997 USDOT Implementation Report and served as a member of ITE Traffic Engineering Council Committee TENC-4M-35 which was responsible for developing the ITE Recommended Practice publication, “Preemption of Traffic Signals At or Near Railroad Grade Crossings with Active Warning Devices.” In 2000, Bill served as co-editor of MUTCD Part B, *Traffic Controls for Highway-Rail Grade Crossings*. He also co-authored the 2002 US DOT Highway/Rail Grade Crossing Technical Working Group final report, “Guidance on Traffic Control Devices at Highway-Rail Grade Crossings.” Prior retiring from FHWA in 2012, Bill served as an instructor for FHWA National Highway Institute railroad-highway grade crossing training courses.

- **Mr. John Shaw, PE** is a transportation engineer, planner, and researcher with 23 years of experience in industry, government, and academia. He began his professional career in the early 1990s as a System Engineer working on operational safety and security for the fully-automated passenger rail system that connects the terminals at O’Hare Airport. He later joined Wisconsin DOT where he was involved in planning, engineering, program management, and data management activities (including efforts to reduce the number of railroad-highway crossings in the state). Of equal importance to Synthesis 47-15, John has more than 20 years of experience as a writer and editor of technical documents. He was the lead author of the recently-completed NCHRP *Work Zone Speed Management* synthesis and is currently developing work zone design procedures and training for FHWA. His writing ranges from operating procedures and technical guidelines to academic research reports. He is passionate about distilling complex technical information into clear, concise, actionable statements. This is crucial because the *Signal Preemption* synthesis will need to be read and understood not only by engineers, but also by railroad industry executives, highway agency managers, and elected officials.

The University of Wisconsin is a public research university and can comply with the terms of the NCHRP Synthesis contract. This process will be handled through our Office of Research & Sponsored Programs at the time of award.

Thank you for the opportunity to make this proposal. If you have questions you can reach Dr. Chitturi on 608-890-2439 or Mr. Shaw on 414-263-9049.

Sincerely,

[Signature]

Digitally signed by John Shaw
Date: 2015.08.20 11:39:01
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John W. Shaw on behalf of Dr. Madhav Chitturi
Madhav Chitturi is an Associate Researcher in the Traffic Operations and Safety Laboratory at the University of Wisconsin – Madison. Dr. Chitturi has published 32 articles in peer-reviewed journals, one book, 40 articles in peer-reviewed conferences as well as 30 technical reports. His research spans multiple aspects of transportation operations and safety including signal operations, winter maintenance, intelligent transportation systems, work zone operations, roundabouts, older driver safety, intersection safety, work zone safety, Bluetooth applications in transportation, human factors in crashes and incident management. He serves on the Winter Maintenance Committee and the Work Zone Traffic Control Committee of the Transportation Research Board and on the technical review panel for NCHRP 03-107: Work Zone Capacity Methods for the Highway Capacity Manual.
SELECTED PUBLICATIONS


Methodology for Computing Delays and Users Costs in Work Zones. Transportation Research Record 2055, pp. 31-38.

Automated Speed Photo Enforcement Effects on Speeds in Work Zones. Transportation Research Record 2055, TRB, Washington D.C.

Effectiveness of Automated Speed Enforcement in Work Zones. ITE Journal.

Development of Data Collection and Integration Framework for Road Inventory Data. Transportation Research Record 2160, TRB, Washington D.C.


Automated Identification and Extraction of Horizontal Curve Information from Geographical Information System Roadway Maps. Transportation Research Record 2291, TRB, Washington, D.C.

Qin, X., M. A. Sultana, M. V. Chitturi, and D. A. Noyce. (2013)
Developing a Truck Corridor Crash Severity Index. Accepted for publication In Transportation Research Record, TRB, Washington, D.C.

Safety Evaluation of Horizontal Curves on Rural Undivided Roads. Accepted for publication In Transportation Research Record, TRB, Washington, D.C.

Characteristics and Contributing Factors of Struck-by Crashes. Accepted for publication In Transportation Research Record, TRB, Washington, D.C.

M.V. Chitturi, J.W. Shaw, J.D. Campbell and D.A. Noyce. (2014)
Validation of Origin-Destination Data from Bluetooth Reidentification and Aerial Observation. Accepted for publication In Transportation Research Record, TRB, Washington, D.C.
OVERVIEW

Mr. Bremer had a 42 year career with the Federal Highway Administration until his retirement in 2012. The last 35 years he served as the Wisconsin Division Safety Engineer where he was responsible for administering the Federal-aid safety program in Wisconsin. His duties included ensuring the latest technological advances were effectively and efficiently used to deliver the Federal-aid safety programs, including the Highway-Railroad Grade Crossing Program. He had full authority for the delivery and stewardship of FHWA safety programs for the Wisconsin Division, including interpreting Federal regulations on the eligibility of Federal-aid funds for safety programs and projects in Wisconsin.

Since June 2014, Mr. Bremer has been a limited-term senior transportation engineer in the University of Wisconsin-Madison Traffic Operations & Safety Laboratory. His primary assignment to date has been working on developing Work Zone Safety design guidelines.

EDUCATION

University of Wisconsin-Platteville - BSCE 01/70

PROFESSIONAL EXPERIENCE

University of Wisconsin-Madison – Traffic Operations & Safety Laboratory 06/14 to Present
Senior Transportation Civil Engineer Madison WI

• Co-authoring the development of Work Zone Safety design guidelines for the Federal Highway Administration (FHWA) Work Zone Safety Grant.

Federal Highway Administration 1976 to 2012
Wisconsin Division Safety Engineer Madison WI

• Administered Federal-aid safety programs for the Wisconsin Division, including promoting technology transfer and interpreting Federal regulations on the eligibility of Federal-aid funds for safety programs and projects in Wisconsin.

• Served as a member of the USDOT Grade Crossing Safety Task Force (1996-97) and co-chaired Task Force’s Technical Working Group, which was established by FHWA and FRA to investigate railroad crossing and traffic signal interconnection standards and guidelines, and proposed new standards and guidelines in light of the aftermath of the 1995 Fox River Grove collision involving a commuter train and school bus.

• Co-authored September 1997 *ITE Journal* article, “Improving Grade Crossing Safety Near Highway Intersections.”

• Committee Member of ITE Traffic Engineering Council Committee TENC-4M-35 that was responsible for developing the 1997 Recommended Practice publication entitled, “Preemption of Traffic Signals At or Near Railroad Grade Crossings with Active Warning Devices.”


• Served as an as-needed national Instructor for the FHWA National Highway Institute training courses including *Railroad-Highway Grade Crossing Improvement Program* and *An Overview of the Railroad-Highway Grade Crossing Improvement Program*. 
OVERVIEW

John Shaw’s 23 years of professional experience span the boundaries of Civil Engineering, Urban Planning, Public Administration, and Professional/Technical Education. He brings a practitioners eye to research, and a researcher’s eye to practice. His professional interests include highway work zone traffic safety, microsimulation modeling, utilization of innovative traffic data sources, traffic data management, traffic forecasting, engineering economic analysis, public transportation systems, and continuing education for traffic engineers and planners.

Mr. Shaw worked for 18 years at the Wisconsin Department of Transportation (WisDOT), where his roles included oversight of traffic analysis and microsimulation, supervision of data collection and traffic forecasting, administration of local transportation grants, and development of in-house training and curricula for professional/technical staff.

Mr. Shaw is currently a Researcher in the Traffic Operations and Safety Laboratory (TOPS Lab) at the University of Wisconsin–Madison, where he is developing Work Zone Safety design guidelines and training for the Federal Highway Administration (FHWA). He recently served as lead author for the Work Zone Speed Management synthesis of practice for the National Highway Cooperative Research Program. From 2008-14 he served as a lead developer and instructor for Wisconsin DOT's work zone training for construction engineers, and as sole developer and instructor for Work Zone Traffic Analysis training. His recent experience also includes work zone capacity research.

Mr. Shaw provided general support to Wisconsin DOT's Bureau of Traffic Operations for many years. In that capacity he developed statewide microsimulation modeling and economic analysis guidance for the agency. He was also responsible for microsimulation model reviews and administrative oversight of complex analytical projects such RADIUS, a pair of regional-scale dynamic traffic assignment models designed to assess traffic diversion associated with major freeway reconstruction projects in southeastern and south-central Wisconsin.

Mr. Shaw has experience with innovative methods for collecting origin-destination data using Bluetooth readers. He provided microsimulation modeling and traffic analysis support for mega-projects such as the Zoo Interchange and I-94 Milwaukee reconstruction projects. He also served as a member of Expert Task Groups for three Strategic Highway Research Program (SHRP) projects and is active in the FHWA Work Zone Peer Exchange, where he has presented on Bluetooth for performance monitoring.

Mr. Shaw’s first peer-reviewed journal article recently appeared in the Transportation Research Record. He has also authored six peer-reviewed technical papers in Transportation Research Board conference proceedings, along with numerous technical and managerial reports. He has developed many technical guidelines, such as a comprehensive set of emergency operations procedures for a driverless Automated Guideway Transit System.

EDUCATION

University of Michigan – College of Architecture & Urban Planning – MUP 12/90
University of Michigan – College of Engineering – BSE (CE) 08/88
**PROFESSIONAL EXPERIENCE**

**University of Wisconsin-Madison – Traffic Operations & Safety Laboratory**

*Researcher*
Madison & Milwaukee, WI

- Lead author and editor of NCHRP *Work Zone Speed Management Synthesis of Practice*.
- Developed and validated methodology for de-biasing and expanding corridor-scale origin-destination data samples collected using Bluetooth detectors.
- Developed work zone traffic management training programs and Work Zone Analysis training.
- Provided oversight for development of RADIUS construction traffic diversion models.
- Reviewed and supported complex microsimulation projects.
- Provided oversight for roundabout software evaluation.
- Provided general technical support for Wisconsin DOT Bureau of Traffic Operations.
- ETG member for SHRP2 project L38.

**Wisconsin Department of Transportation – Bureau of Traffic Operations**

*Transportation Analysis & Data Management Program Leader*
Milwaukee, WI

- Developed traffic engineering continuing engineering education curriculum.
- Developed Work Zone Analysis procedures and software.
- Developed statewide microsimulation and traffic analysis technical guidelines.
- Provided ongoing microsimulation technical assistance to Regional traffic engineering staff.
- ETG member for SHRP2 project L02.

**Wisconsin Department of Transportation – Southeast Region**

*Data & Analysis Supervisor*
Waukesha, WI

- Supervised traffic forecasting and data collection personnel.
- Developed data-driven human resources allocation models.
- Managed development of large microsimulation models.
- Managed the Freeway System Operational Assessment, including development of geospatial crash analysis, traffic analysis tools, and benefit/cost analysis tools.

**Wisconsin Department of Transportation – District 2**

*Civil Engineer – Local Transportation Programs*
Waukesha, WI

- Provided oversight for local transportation funding programs.
- Identified candidate highway safety improvement projects and appropriate countermeasures.
- Developed project sponsor guide for Congestion Mitigation/Air Quality (CMAQ) program.
- Co-developed Park & Ride System Plan for Southeastern Wisconsin.

**Matra Transit, Inc.**

*System Engineer – O’Hare ATS*
Chicago, IL and Lille, France

- Developed Fault Recovery Plan and Standard Operating Procedures to guide System Operators and help assure public safety in case of terrorism, operational incidents, or major equipment failures on fully-automated (driverless) passenger rail system.
- Adapted French technical documents for an American audience.