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ODU Transportation Program: Transportation Research Institute and Graduate Program in Civil & Environmental Engineering

The transportation program at Old Dominion University grew substantially during this year, focusing on regional issues in Hampton Roads, broader concerns in the Commonwealth of Virginia and also national issues. Examples of successful regional projects are the collaboration between Transportation Research Institute and the Virginia Modeling Analysis and Simulation Center (VMASC) to assess the impact of proposed transportation network improvements in the Hampton Roads region. This project was conducted at the request of the Commonwealth of Virginia General Assembly-Hampton Roads delegation. The results showed that the greatest improvement at the critical choke point of Hampton Roads Bridge Tunnel (HRBT) occurs from adding 2 lanes, but this improvement leaves significant congestion during peak rush hour periods in 2030. Simulations further showed that incidents can substantially worsen the performance of HRBT and adding capacity further helps with reductions in incident congestion. Another regionally significant project completed collaboratively with VMASC is the mesoscopic simulation to assess viability of evacuating the Hampton Roads region in a hurricane scenario using the Commonwealth of Virginia's Hurricane Emergency Response Plan. The role of accidents and incidents was analyzed, showing that they can significantly increase total travel time for those directly affected. However, the total capacity of the transportation system is large enough to recover from (non-catastrophic) incident induced congestion. On average, the total time to remove evacuees from the region increased by less than 5% as a result of accidents and incidents.

Examples of on-going research projects include analysis of secondary incidents in the Hampton Roads area (VDOT sponsored), hurricane evacuation studies taking into account the occurrence of traffic incidents (VDEM sponsored through VMASC), behavioral surveys of travelers and analysis of alternative volume delay functions in demand forecasting (VDOT sponsored), development of intelligent transportation systems decision support systems (Caltrans sponsored), re-identification of trucks (OTREC sponsored), detection of incidents in Vehicular Ad-Hoc Networks (NSF sponsored through ODU Computer Science Department). TRI has a multi-disciplinary research agenda, and it involves faculty members from various Departments on campus. We are grateful to VDOT's Virginia Transportation Research Council for providing seed money.

The development of ODU's transportation education program has occurred rapidly since the program was formed. The graduate education program has several students (6 Ph.D. students and 8 Masters) most of whom are involved in sponsored research projects. This annual report provides a summary of the many developments that have occurred during 2009-2010, including the profiles of full-time and adjunct faculty, summaries of current research activities, a description of activities at the Transportation Research Board, and a description of the graduate program.



Transportation Faculty Profiles

The Civil and Environmental Engineering Department has full-time and adjunct faculty working on transportation research and education.

Faculty

Dr. Asad J. Khattak

Frank Batten Endowed Chair Professor of Transportation Engineering
 akhattak@odu.edu
 Intelligent Transportation Systems, Safety, Planning

Dr. Mecit Cetin

Assistant Professor of Transportation Engineering
 mcetin@odu.edu
 Modeling & Simulation, ITS, Traffic Operation, Freight, Congestion Pricing

Adjunct Faculty

Dr. Camelia Ravanbakht

Deputy Executive Director
 Hampton Roads Transportation Planning Organization (HRTPO)
 cravanbakht@hrpdcva.gov
 Planning, ITS and Transportation Operations Applications

Dr. Guzin Akan

Civil Transportation Engineer
 City of Norfolk, Norfolk, Virginia
 guzin.akan@norfolk.gov
 Traffic Signal Systems Operations and Design Applications

Mr. Dwight Farmer, P.E.

Executive Director
 Hampton Roads Transportation Planning Organization (HRTPO)
 dfarmer@hrpdcva.gov
 Transportation Policies and Planning, Travel Demand Forecasting

Mr. Robert Case, P.E.

Principle Transportation Engineer
 Hampton Roads Transportation Planning Organization (HRTPO)
 rcase@hrpdcva.gov
 Operations, Travel Demand, Public Transit, and Non-Drivers



Dr. Asad J. Khattak



Dr. Mecit Cetin



Dr. Camelia
Ravanbakht



Dr. Guzin Akan



Mr. Dwight Farmer
P.E.



Mr. Robert Case
P.E.

Inter-departmental Partnerships

The transportation faculty in Civil and Environmental Engineering Department works collaboratively with other ODU departments and center to address complex and inter-disciplinary issues in transportation research.

Associated Faculty

Dr. Bryan E. Porter

Associate Professor of Psychology
 Email: BPORTER@odu.edu
 Phone: 757-683-4458



Dr. Porter studies strategies for reducing red light running; reducing following too close (tailgating); increasing pedestrian safe walking and driver yielding; increasing safety-belt use by adults and correct child restraint use by children; and aggressive driving. He studies large-scale community problems and psychology's role in solving those problems. He has studied techniques for increasing fire safety, pro-environment action, and most recently traffic safety. His current research includes partnerships with government and community agencies that are interested in changing unsafe roadway behaviors. Such work involves field research, behavioral interventions implemented and evaluated, and educational outreach.

Recent Journal Papers

- Berry, T. D., Fournier, A. K., & Porter, B. E. (Accepted pending revisions). Developing and testing a touch-path model for hand hygiene and pathogen risk: Design-behavior assessment of fast-food restaurant restrooms. *Environment and Behavior*.
- Porter, B. E., Lajunen, T., Özkan, T., & Will, K. E. (in press). A behavioral observation study of Turkish drivers' and children's safety belt use. *Procedia Social and Behavioral Sciences*.
- Porter, B. E., Bliss, J. P., Sleet, D. (2010). Human factors in injury control. *American Journal of Lifestyle Medicine*.
- Will, K. E., Sabo, C. S., & Porter, B. E. (2009). Evaluation of The Boost 'em in the Back Seat Program: Using fear and efficacy to increase booster seat use. *Accident Analysis and Prevention*, 41, 57-65.
- Martinez, K. L. H., & Porter, B. E. (2006). Characterizing red light runners following implementation of a photo enforcement program. *Accident Analysis & Prevention*, 38, 862-870.
- Rajalin, S., Summala, H., Pöysti, L., Anteroinen, P., & Porter, B. E. (2005). In-car cell phone use and hazards following hands free legislation. *Traffic Injury Prevention*, 6, 225-229.
- Will, K. E., Porter, B. E., DePasquale, J. P., & Geller, E. S. (2005). Is television a health and safety hazard? A cross-sectional analysis of at-risk behavior on primetime television. *Journal of Applied Social Psychology*, 35, 198-222.
- Martinez, K. L. H., & Porter, B. E. (2004). The likelihood of becoming a pedestrian fatality and drivers' knowledge of pedestrian rights and responsibilities in the Commonwealth of Virginia. *Transportation Research Part F: Traffic Psychology and Behaviour*, 7, 43-58.

ODU Transportation Research Focus

The ODU research program in transportation continues to expand at a rapid pace. The core faculty have been successful in bringing new transportation research projects to ODU as well as in completing research projects successfully.

Active Research Projects

The active research projects during 2009-2010 include:

- ***Evaluation of Volume-Delay Functions and Their Implementations in VDOT Travel Demand Models (Principal Investigator: Mecit Cetin, Co-Principal Investigator: Asad Khattak), Virginia Department of Transportation, 2009-2011:*** The overall objective of this research is to evaluate and recommend the most appropriate volume delay functions for travel demand models in Virginia. The benefits of incorporating network attribute data to support their correct applications will also be investigated. This research effort will help in achieving greater accuracy in modeling travel demand and more accurate evaluation of future transportation improvement strategies.
- ***Exploratory Methods for Truck Re-identification in Statewide Network Based on Axle Weight and Axle Spacing Data to Enhance Freight Metrics (Principal Investigator: Mecit Cetin), Oregon Transportation Research and Education Consortium, 2009-2010, Phase II:*** This proposed research seeks to develop new methods to determine flow patterns of trucks (those without transponders) by matching archived vehicle-attribute data such as axis spacing and axis weights at multiple geographic locations.
- ***Transportation Alternatives Modeling (Co-Principal Investigator: Asad Khattak and Mecit Cetin), Virginia General Assembly, 2009-2010:*** This project defines secondary incidents, understand the occurrence of secondary incidents, and develop a tool capable of estimating incident durations in real-time. It will allow VDOT to estimate the chances of a secondary incident occurrence, evaluate associated delays, and aid in identifying incident management strategies to mitigate the impacts of both primary and secondary incidents.
- ***Nationwide Household Travel Survey (Principal Investigator: Asad Khattak), Virginia Department of Transportation, 2008-2011, Phase I & II:*** To get a sense of students' travel behavior, this project is conducting a survey of Old Dominion University students. The survey modifies the NHTS (National Household Travel Survey) instrument for University Application. The NHTS survey instrument, which also includes a travel diary, has been modified for online implementation.
- ***Comparative Analysis of Virginia University NHTS (Principal Investigator: Asad Khattak), Virginia Department of Transportation, 2010-2011:*** This project compares university students' travel behavior across four universities in Virginia: Old Dominion University, Virginia Commonwealth University, University of Virginia, and Virginia Technology. It is to develop and empirically test hypotheses regarding associations between university students' travel behavior and their spatial and socio-demographic characteristics. The travel behavior is to be compared across four universities as well as between university students and the general population.
- ***Hampton Roads-Crater Multimodal Transportation and Distribution Study (Co-Principal Investigator: Asad Khattak and Mecit Cetin), US Department of Transportation, 2010-2011:*** The Commonwealth of Virginia is considering proposals to construct a limited access toll road between Hampton Roads and Petersburg. This project creates an intermodal transportation model that combines the Hampton Roads and Crater regional areas as well as the space between the two. This model will be capable of estimating vehicle travel demand and freight flows. It will also be used to estimate freight and traveler flows for the improved U.S. Route 460 Corridor. This research effort will help the Commonwealth plan for and capitalize on future State and Regional economic and business growth in those areas to position the region to become a strategic mid-Atlantic hub for logistics, transportation, distribution, and warehousing.
- ***An Architecture for the Notification of Traffic Incidents and Congestion (NOTICE), National Science Foundation, 2007-2010:*** The goal of this project is to develop and evaluate an architecture for the Notification of Traffic Incidents and Congestion (NOTICE). NOTICE will provide secure and privacy-preserving communications between vehicles and the belts, efficiently propagate incident information to vehicles, and infer the presence of traffic congestion without driver intervention.

ODU Transportation Research Focus

Technical Reports Published

The transportation faculty co-authored technical reports to sponsoring agencies that included Virginia Department of Emergency Mgt. and the Virginia General Assembly. The technical reports include:

- Khattak A., X. Wang X., H. Zhang, and M. Cetin, *Primary and Secondary Incident Management: Predicting Durations in Real-Time*, Research Report No. VTRC 87648, Virginia Transportation Research Council, Charlottesville, VA, 2010.
- Xie, Y., N. Huynh, M. Cetin, and R. Warren, *Development of Truck Trip Generation Models*, James E. Clyburn University Transportation Center (JECUTC), November 30, 2009.
- Cetin, M., C. Monsere, and A. Nichols, *Exploratory Methods for Truck Re-identification in a Statewide Network Based on Axle Weight and Axle Spacing Data to Enhance Freight Metrics*, Oregon Transportation Research and Education Consortium (OTREC), December 2009.
- Khattak A., X. Wang, T. Vandecar-Burdin, and W. Wilson-John, *Old Dominion University Student Travel Survey*, Final report submitted to Transportation & Mobility Planning Division, Virginia Department of Transportation, Richmond, VA, 2010.
- Rodriguez, D., Y. Song, S. Arunachalam, A. Hanna, B. Morton, A. Khattak, C. Frey, N. Roupail, *Advanced Modeling System for Forecasting Regional Development, Travel Behavior, and Spatial Pattern of Emissions*, Final Report, NCER Assistance Agreement, STAR #R831835, November 2004-November 2009, Regional Development, Population Trend, and Technology Change Impacts on Future Air Pollution Emissions, 2010.

Upcoming Research Projects

The new research projects to be initiated shortly include:

- Comparative Analysis of Virginia University NHTS, Virginia Department of Transportation, VA, ODU Transportation Research Institute, 2010-2011.
- Supplemental University NHTS Survey, Virginia Department of Transportation, VA, ODU Transportation Research Institute, 2010-2011.
- Investigation of New Equilibrium Assignment Methods for VDOT Travel Demand Models, Virginia Department of Transportation, VA, ODU Transportation Research Institute, 2010-2012.
- Analysis of Virginia Add-On National Household Travel Survey and Metropolitan Washington Council of Governments Household Travel Survey, Virginia Department of Transportation, VA, ODU Transportation Research Institute, 2010-2012.



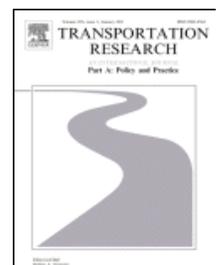
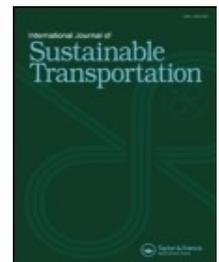
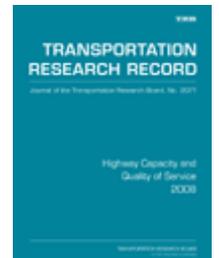
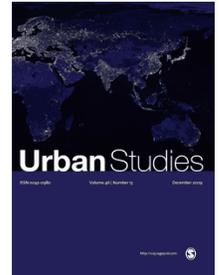
Publications of ODU Transportation Program

Our 2009-2010 goals were to work collaboratively across the campus and nationally to do scholarly research, obtain sponsored research projects and effectively complete the projects that are underway; continue working with graduate students, involving them in research and recruit new students into the transportation program; and enhance ODU and BCET reputation and visibility through editorships, publications, conference presentations and marketing activities. In this context, there have been a number of accomplishments in 2009-2010.

Journal Publications

In 2009-2010, 13 peer-reviewed scholarly papers in ISI-indexed journals were published, resulting from collaborative research efforts. Research journal publications are as follows:

- Fan Y., A. Khattak, and D. Rodriguez, Household excess travel and neighborhood characteristics: Associations and trade-offs, Forthcoming in *Urban Studies*, 2010.
- Robinson M., and A. Khattak, Route change decision-making by evacuees facing congestion, Forthcoming in *Transportation Research Record: Journal of the Transportation Research Board*, National Academies, Washington, D.C., 2010.
- Zhang, H., and A. Khattak, Analysis of cascading incident event durations on urban freeways. Forthcoming in *Transportation Research Record: Journal of the Transportation Research Board*, National Academies, Washington, D.C., 2010.
- Khattak A., X. Wang, H. Zhang, Spatial analysis and modeling of traffic incidents for proactive incident management and strategic planning? Forthcoming in *Transportation Research Record: Journal of the Transportation Research Board*, National Academies, Washington, D.C., 2010.
- Shay E., and A. Khattak, Toward Sustainable Transport: Conventional and Disruptive Approaches in the U.S. Context, *International Journal of Sustainable Transportation*, 4:1, pp. 14 - 40 2010.
- Fan Y., and A. Khattak, Does urban form matter in solo and joint activity engagement? *Journal of Landscape and Urban Planning*, Elsevier, 92:3-4, 2009, pp. 199-209.
- Cho G., D. Rodriguez, and A. Khattak, What is the role of the built environment in explaining relationships between perceived and actual pedestrian safety? *Accident Analysis & Prevention*, 41:4, 2009, pp. 692-702.
- Wang X., A. Khattak, Y. Fan, Role of dynamic information in supporting travel behavior changes: Two-stage process of travel decision, *Transportation Research Record: Journal of the Transportation Research Board*, 2138, National Academies, Washington, D.C., 2009, pp. 85-93.
- Hu H., W. Williams, N. Roupail, A. Khattak, and X. Zhou, Modeling the role of transportation information in mitigating major capacity reductions in a regional network, *Transportation Research Record: Journal of the Transportation Research Board*, 2138, National Academies, Washington, D.C., 2009, pp. 75-84.
- Khattak A., X. Wang, H. Zhang, Are incident durations and secondary incident occurrence interdependent? *Transportation Research Record: Journal of the Transportation Research Board*, 2099, National Academies, Washington, D.C., 2009, pp. 39-49.
- M. Cetin and A.P. Nichols, "Improving the Accuracy of Vehicle Reidentification Algorithms by Solving the Assignment Problem," *Transportation Research Record* 2129, pp. 1-8, 2010.
- J. Holguín-Veras and M. Cetin, "Optimal Tolls for Multi-Class Traffic: Analytical Formulations and Policy Implications," *Transportation Research Part A. Policy and Practice* Vol. 43, No 4, 445-467, 2009.
- G. Comert and M. Cetin, "Queue Length Estimation from Probe Vehicle Location and the Impacts of Sample Size," *European Journal of Operational Research*, 197, pp. 196-202, 2009.

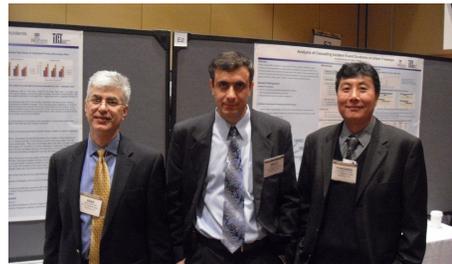


2010 Transportation Research Board Presentations

ODU Civil and Environmental Engineering faculty, Drs. Khattak and Cetin, present 6 research papers at the 2010 TRB Annual Meeting

ODU Civil and Environmental Engineering faculty participated in the 89th Annual Transportation Research Board (TRB) held in January in Washington, DC. They presented 6 research papers/posters, reflecting collaborations with other centers. At the conference, they arranged the Second Annual Lunch for students, researchers and practitioners of Hampton Roads, with participants from Old Dominion University, Virginia Modeling Analysis and Simulation Center, and Hampton Roads Metropolitan Planning Organization.

The TRB Annual Meeting covered all transportation modes, with more than thousands of presentations in nearly 600 sessions addressing topics of interest that included a diverse set of transportation topics. The TRB 89th Annual Meeting attracted nearly 10,000 transportation professionals from around the world to Washington, D.C., in January 2010. ODU Civil and Environmental Engineering faculty chaired the Advanced Traveler Information Systems sub-committee and presented the following papers and posters on transportation planning and operations.



Conference Presentations

We are pleased that the transportation faculty presented 6 research papers at the 2010 Transportation Research Board annual meeting in Washington, D.C. Some of the papers involve graduate students as co-authors—reflecting the emphasis that we place on developing a workforce that is exposed to research and a solid curriculum. The following papers were presented:

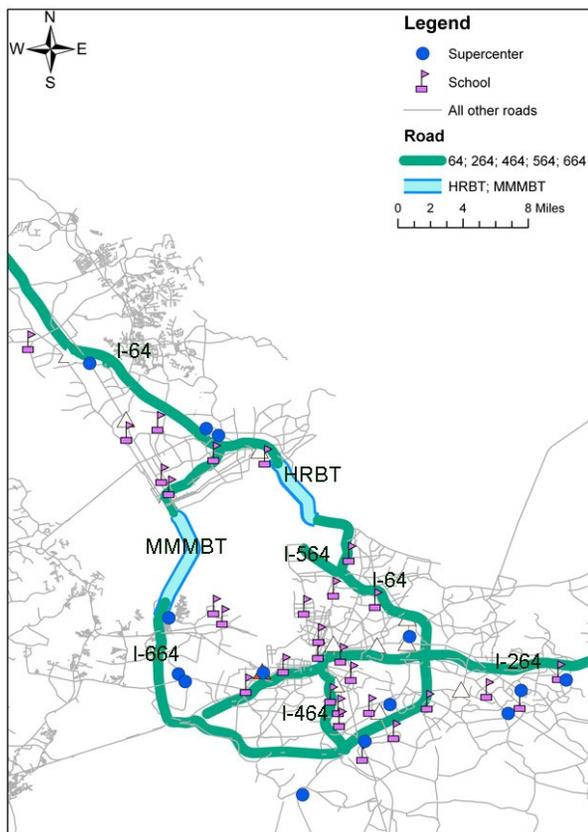
- Robinson M., and A. Khattak, Route change decision-making by evacuees facing congestion, TRB Paper No. 10-2258, Presented at the 89th Transportation Research Board, National Academies, Washington, D.C., 2010.
- Khattak A., X. Wang, H. Zhang, Spatial analysis and modeling of traffic incidents for proactive incident management and strategic planning? TRB Paper No. 10-1554, Presented at the 89th Transportation Research Board, National Academies, Washington, D.C., 2010.
- Zhang, H., M. Cetin, and A. Khattak, Evaluating factors that impact queuing delays of secondary incidents, TRB Paper No. 10-1796, Presented at the 89th Transportation Research Board, National Academies, Washington, D.C., 2010.
- Zhang, H., and A. Khattak, Analysis of cascading incident event durations on urban freeways. TRB Paper No. 10-1375, Presented at the 89th Transportation Research Board, National Academies, Washington, D.C., 2010.
- Wang, X. and A. Khattak, Role of Travel Information in Supporting Travel Decision Adaption: Exploring Spatial Patterns, TRB Paper No. 10-1208, Presented at the 89th Transportation Research Board, National Academies, Washington, D.C., 2010.
- Cetin, M., C. M. Monsere, and A.P. Nichols, Bayesian Models for Re-identification of Trucks over Long Distances Based on Axle Measurement Data, TRB Paper No. 10-0032, Presented at the 89th Transportation Research Board, National Academies, Washington, D.C., 2010.
- Khattak A., Panel Member, Traveler and Driver Information: Balance of Supply and Demand, Event 652, Transportation Research Board, National Academies, Washington, D.C., 2010.

2010 Transportation Research Board Presentations

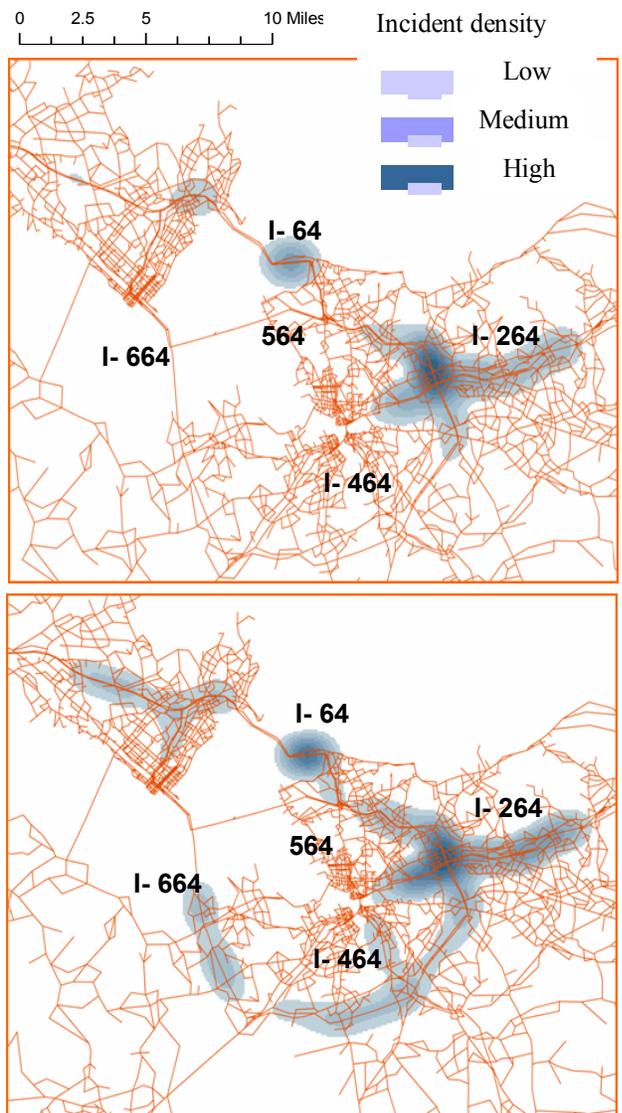
The ODU Transportation Program was well-represented at the 2010 TRB Annual Meeting, with 6 papers presented. The TRB Annual Meeting is an excellent opportunity for the program to share its most innovative research, while receiving valuable input from colleagues in transportation. Some highlights of 2010 are discussed here.

Spatial Analysis and Modeling of Traffic Incidents for Proactive incident Management and Strategic Planning? *Asad J. Khattak, Xin Wang and Hongbing Zhang*

Traffic events involving secondary incidents can be particularly problematic for the public and incident managers. The purpose of this paper is to explore the associations of spatial characteristics, including geometric and land use factors, with secondary and non-secondary incidents. The data used in this study are 2006 incident records from Hampton Roads in Virginia and roadway inventory data, enhanced through GIS to include detailed spatial information. Secondary incidents in the same and opposite directions were identified by using a queue-based method. Such incidents represent nearly 2% of total recorded incidents, but showed longer durations than other incidents. The study found statistically significant differences between the distributions of secondary and non-secondary incidents, implying that higher risks of secondary incidents in certain roadway segments do not necessarily correlate with relatively high risk of non-secondary incidents. Poisson, zero-inflated Poisson and Negative Binomial regression models were estimated combining traffic exposure, road segment characteristics, and spatial/land use information to explore factors associated with secondary incidents. The models provide helpful information to effectively assign incident management resources, and also support regionally-based strategic planning.



Land Use and Freeways in Hampton Roads



(top) Secondary Incident Density
(bottom) Non-Secondary Incident Density

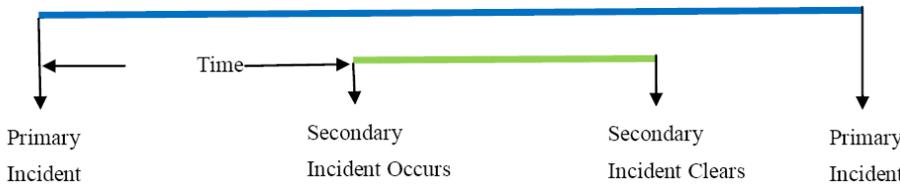
2010 Transportation Research Board Presentations

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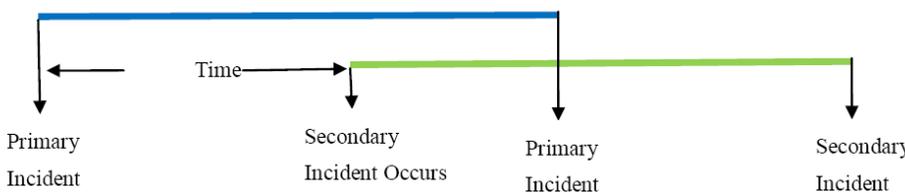
Evaluating the Factors that Impact Queuing Delays of Secondary Incidents

Hongbing Zhang, Mecit Cetin, and Asad J. Khattak

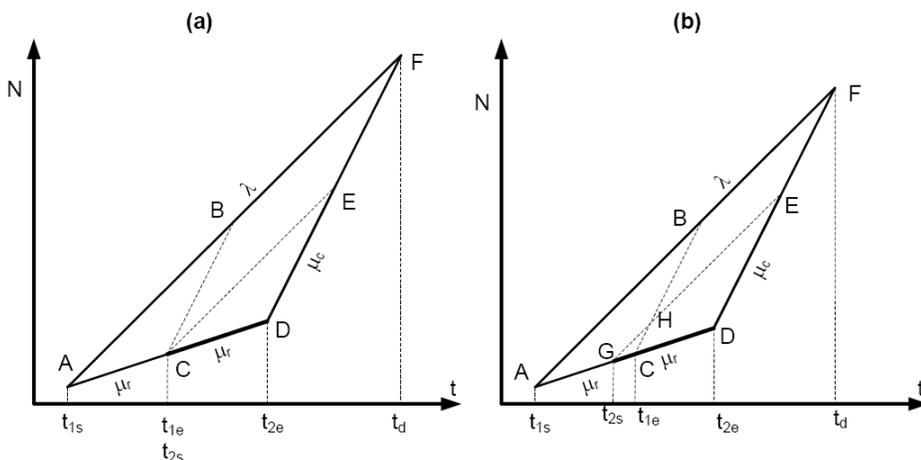
Incidents cause substantial travel delays on urban freeways. To evaluate the effectiveness of potential incident management strategies, most existing methods calculate delays for single incidents. This is not suitable for primary-secondary incident pairs, which occur on the same stretch of freeway within a short time. Due to their correlation in time and space, they present different effects on traffic movements, which have not been considered previously. The objective of this paper is to assess the total delays induced by primary-secondary incident pairs. First, incident data combined with road inventory data from Hampton Roads, Virginia are analyzed to understand the attributes of primary-secondary incident pairs, e.g., durations, lane blockages, and time gaps (between start times of the two incidents). Using simulation, three critical parameters are tested: Time gap and physical distance between primary and secondary incidents, and traffic demand levels. Specifically, a microscopic model is used to simulate various scenarios and estimate the corresponding delays. The results show that primary-secondary incident pairs have substantially larger durations than single incidents, on average. Furthermore, total delays increase as time gap increases. For those secondary incidents that end after their associated primary incidents, increasing distance is associated with declining delays. Additional results and the implications of the findings for traffic operations are presented.



Contained Primary-secondary Incident Pairs



Extended Primary-secondary Incident Pairs



Cumulative diagrams if the second incident starts as soon as the first one ends (a) or before the first one ends (b)

2010 Transportation Research Board Presentations

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Route Change Decision-making by Hurricane Evacuees Facing Congestion

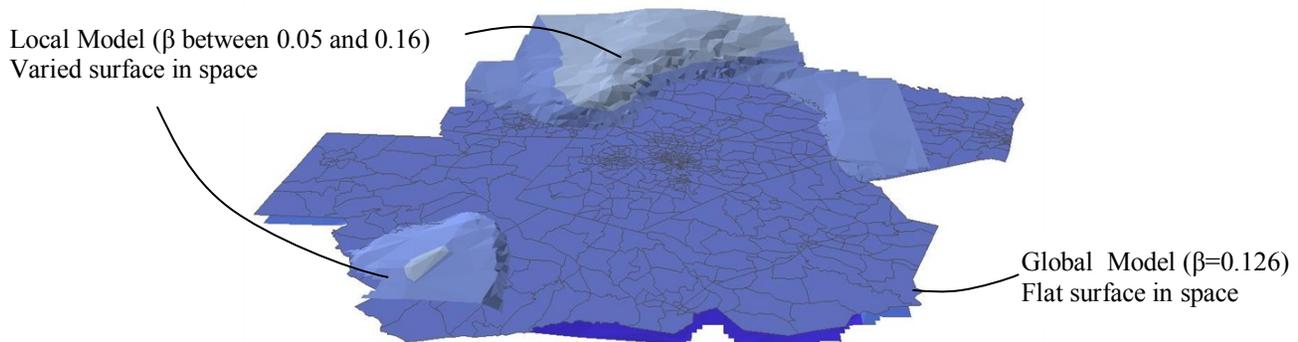
R. Michael Robinson and Asad J. Khattak

Successful evacuation of a metropolitan area requires overcoming the traffic congestion that restricts traffic flow from a region. This congestion may result from accidents and incidents or other events that reduce road capacity, including travelers' decisions to leave pre-planned evacuation routes for what appear to be quicker routes. Traffic professionals and emergency managers may desire to promote deviations from preplanned routes to bypass an area of congestion and speed mass exit. However, in some cases, when evacuees detour to avoid congestion, it may actually reduce traffic flow rates and so decision-makers may want to discourage use of a different route. This study uses the results of a behavioral survey taken of potential hurricane evacuees to identify and prioritize the variables associated with a decision to evacuate and also identify the most frequently used source of information. A dynamic traffic simulation with a decision-making model using this information is proposed as a means for evacuation decision makers to influence driver behavior and minimize the time necessary to move all evacuees to safety. Results from over 800 responses showed the potentially strong influence of effective Intelligent Transportation System use on the decisions made by hurricane evacuees concerning whether or not to use an alternate route when faced with congestion during an evacuation. Results of this study are a timely contribution to those seeking to better understand driver behavior during evacuations and improve emergency management efficiency and efficacy.

Role of Travel Information in Supporting Travel Decision Adaption: Exploring Spatial Patterns

Xin Wang and Asad J. Khattak

How consumers acquire and use dynamic traveler information to adjust their travel behavior is a key component of Intelligent Transportation Systems (ITS). The association between information acquisition/adjustments and various socio-economic and contextual factors can be captured in traditional statistical models, known as global model which yields one overall set of coefficients as the estimate. However, the associations may vary across space, more specifically, people living in different spatial locations may have different information acquisition patterns and they may respond differently to dynamic information, which cannot be captured in global model. This study uses Geographically Weighted Regression (GWR) - a local model as an alternative, to answer: 1) which factors are associated with traveler information acquisition and decision adaption; 2) whether these associations are the same over the entire study region and 3) how these associations distribute spatially. A traditional logistic regression model referred to as the global model is also presented to compare. The results show locally-based model can capture spatial variance by producing a set of mapable parameter estimates and their significance levels (t-statistics), which continuously vary over space. It indicates that GWR provides a more complete picture of information acquisition/use by capturing how correlates vary over space. The implications of the results for ITS are discussed.



Transportation Program News

Scholarships

Ms. Cheryl Reints has been awarded The American Society of Highway Engineers—Greater Hampton Roads Chapter (ASHE-GHR) Scholarship in Engineering (\$1,000) for the 2009-10 academic year. She is a full-time undergraduate student in Transportation Engineering and works for Virginia Department of Transportation. The ASHE-GHR Scholarship was established to promote transportation engineering awareness and education at Old Dominion University. The ASHE-GHR award is eligible to a full-time undergraduate Civil Engineering student with an emphasis in Transportation, a U.S. Citizen, a rising junior, and a minimum cumulative GPA of 3.0. Academic merit or potential is mainly considered.

Student Capstone Conference 2010

Mr. Ilyas Ustun, a PhD Student in Modeling, Simulation and Visualization Engineering Department, and Mr. Faisal Mahmud, a master student Civil and Environment Engineering, won the 1st and 2nd prizes in the transportation track at Modeling, Simulation & Visualization Student Capstone Conference, held in April, 2010. The Conference features student research and student projects that are central to MS&V. Especially, transportation track includes applications of modeling and simulation to solving multimodal transportation problems. The development, validation, and application of microscopic and macroscopic traffic simulation, travel demand models, and hardware in the loop simulation are some of the research topics that are typically presented at the Capstone Conference. Dr. Mecit Cetin advises both Ilyas Ustun and Faisal Mahmud.



Faisal Mahmud (left) and Ilyas Ustun (right)

International Conference

Dr. Asad Khattak presented a paper at the 12th World Conference on Transportation Research (WCTR) which was held in Lisbon. The titles of the papers are:

Khattak, A., X. Wang, and H. Zhang, A tool for dynamically predicting: incident durations, secondary incident occurrence, and incident delays, 12th WCTR, Lisbon, Portugal, 2010.

Wang, X. and A. Khattak, Role of Travel Information in Supporting Travel Decision Adaption: Exploring Spatial Patterns, 12th WCTR, Lisbon, Portugal, 2010.



Dr. Asad Khattak, Mina Torrarro and Dr. Nagui Rouphail (NCSU), and Dr. Margarida Coelho (U. of Aviero) meet at the WCTR Conference in Lisbon.

Transportation Program News

Introduction of Thesis/Dissertation

Two master students in Transportation major, Irina O. Hoag and Faisal Mahmud, have graduated this year. Their thesis are presented:

"Investigating the Factors That Influence Injury Severity During Large Truck Crashes", Irina O. Hoag

Large Trucks and passenger cars share the transportation infrastructure. Diversity of mass, size and maneuverability of vehicles on the roads make truck involved collision very dangerous and cause injury and fatality of drivers and passengers. Considering that Large Trucks are usually traveling for long distance and cross country, Large Truck Crash Causation Study (LTCCS) collected data to analyze and predict injury or fatality from a set of predictor (independent) variables. Data were collected at 24 sites in 17 States and 2284 vehicles were involved in crashes, and have up to 1000 variables for each crash. Sixty-nine percent of these crashes caused injuries and/or fatalities. Ordered probit regression was used to predict injury severity for four types of crashes: truck-passenger car, truck-truck, single-truck, and multi vehicle type of crash. Independent variables that are associated with road geometry (curve, grade), type of accident, driver behavior factors, and presence of ITS equipment in trucks were investigated in terms of the most substantial association with crashes that caused injury and fatality. The results show that the variables such as hurrying of the drivers, illegal drugs and alcohol, road side departure and head on type of accident, junction and curve of the road were associated with higher probability of receiving a severe injury on the KABCO scale. However, for each type of crash, these variables have different associations on injury severity. ITS equipments in the trucks is associated with a decrease of the probability of being killed or receiving incapacitating injuries during single vehicle and truck-passenger car type of accident. Familiarity with the road is associated with lower probabilities of severe injury. The implications of the results are discussed.

"USING MICRO-SIMULATION TO EVALUATE TRANSIT SIGNAL PRIORITY FOR LRT OPERATIONS IN A DOWNTOWN ENVIRONMENT", Faisal Mahmud

Transit Signal Priority or TSP is an operational strategy that facilitates the movement of transit vehicles such as buses, light rails or streetcars, through traffic-signal controlled intersections. The benefits of TSP operations include improved schedule adherence and improved transit travel times while minimizing impacts to normal traffic operations. New advances in Global Positioning Systems, detection and communication, and control strategies have helped overcome many problems with early systems and increased interest in implementing TSP for Light Rail Transit (LRT) and other transit operations. The increased capabilities of these advanced systems have led to a dramatic increase in operational and planned TSP deployments across the U.S. For this study, only a portion of the network that includes six consecutive downtown intersections, been chosen to evaluate the overall measures of effectiveness (MOE) at these intersections. These intersections that are in conflict with transit line as well as two other adjacent intersections are considered to evaluate the "TSP Impacts". VISSIM, a micro-simulation tool is used with its Ring Barrier Controller (RBC) emulator to evaluate the complex TSP strategies. The overall goal of this study is to assess the operational implementation of TSP strategies and to compare the TSP system with No TSP scenario. The specific objectives of the study are to model TSP logic in VISSIM and to evaluate TSP strategies and their benefits and impacts on transit systems and general purpose traffic in micro-simulation environment. The findings of this research work includes modeling a TSP network with the best TSP strategy for a downtown environment which is in combination of different geometric conditions of intersections, finding out the key parameters within RBC for controlling the level of preference given to transit vehicles versus regular traffic, sequence of signal phasing considering peak hour traffic operations as well as detectors locations to achieve the optimum results for TSP implementation.

Transportation Issues in Hampton Roads

HRTPO Project Prioritization and Selection Process

The Hampton Roads transportation system is currently at a crossroads. Transportation funding levels are dramatically decreasing due to the downturn in the economy and a reduction in gasoline consumption. This means less money is available for an already aging and congested transportation system. Major roadway projects are being deferred or eliminated, and older bridges are being closed. Meanwhile, roadway congestion remains prevalent throughout Hampton Roads, particularly at the region's infamous bridges and tunnels.



Over the past year, a new tool has been developed to assist the Hampton Roads Transportation Planning Organization (HRTPO) with the prioritization through a consensus based process that will provide a specific prioritization to each project and aid the HRTPO on how best to allocate scarce existing and future funding to maximize benefits to the regional transportation network. The prioritization methodology is based on a set of criteria and measures of effectiveness developed for three major components: Project Utility, Project Viability, and Economic Vitality. This new project prioritization tool is being currently used for the region's 2034 Long-Range Transportation Plan to create the most feasible and viable transportation system while improving its mobility and quality of life.

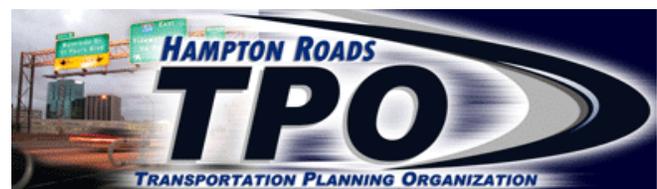
While the prioritization of future projects is underway at the HRTPO, leaders are also seeking ways to improve transportation through light rail, high speed and conventional passenger rail service to Richmond and public-private partnerships. Norfolk's 7.4-mile light rail system is on track to start running in mid-2011. The rail will run to Virginia Beach, which is considering extending the rail into the city in the future. The HRTPO is working with a consultant to define the strategic long-term high-speed and intercity passenger rail plan for the region. In addition, the state is working to bring conventional passenger rail connection to Norfolk along Route 460 /Norfolk Southern Corridor. The state is working with a private developer on a \$1.9 billion project to add a second tunnel to the Midtown Tunnel, extend the MLK Freeway to I-264 and renovate the Downtown Tunnel. In addition, the state is seeking bids from private groups to create a new U.S. 460. This 55-mile, four-lane divided highway would run from Suffolk to Petersburg, alleviating truck traffic and improving regional access and mobility needs.

The ongoing reorganization efforts that have been underway over the last two years at the HRTPO are designed to make the organization more open, more visible and more responsive so that the upcoming debates about the future direction of the region will benefit from the greatest variety of thinking and the widest input possible. This type of broad and inclusive process has the potential to build greater public understanding and support for the transportation blueprint that has never existed previously.

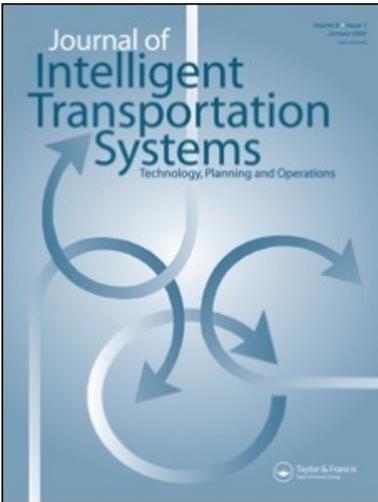
As the Deputy Executive Director of the HRTPO, It's a privilege to be a part of these regional transportation challenges.

- *Dr. Camelia Ravanbakht*

Dr. Ravanbakht is an adjunct faculty member in the Civil & Environmental Engineering Department at ODU. She earned a Bachelor of Science degree in Economics and Management Sciences from the University of Sorbonne, Paris, France. She has received her M.S. and Ph.D. degrees in Civil Engineering from North Carolina State University, Raleigh, North Carolina. She has more than 25 years of experience in research, and applications of transportation engineering and planning activities.



Journal Editing



Submissions Welcome

The Journal of Intelligent Transportation Systems accepts submissions of original work. A complete list of instructions for the preparation of manuscripts is available on the journal's website: (<http://www.tandf.co.uk/journals/titles/15472450.asp>)

Journal of Intelligent Transportation Systems: Technology, Planning, and Operations

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Dr. Asad Khattak is the editor of Journal of Intelligent Transportation Systems. The Journal of Intelligent Transportation Systems is devoted to scholarly research on the development, planning, management, operation, and evaluation of intelligent transportation systems. Characterized by the application of information and communication technologies to transportation, such systems provide innovative solutions to contemporary transportation problems. They encompass the full scope of information technologies used in transportation, including control, computation and communication, as well as algorithms, databases, models, and human interfaces. The emergence of these technologies as a pathway for transportation is a relatively new field of research. The Journal of Intelligent Transportation Systems is particularly interested in research that leads to the development of such systems and improved planning and operation of the transportation system through the application of these new technologies. The journal also publishes papers that add to the scientific understanding of ITS impacts on accessibility, congestion, pollution, safety, security, noise, and energy and resource consumption. The journal is interdisciplinary and multi-modal, dealing with research in the fields of engineering, economics, planning, policy, business, and management, and in all forms of ground, air, and water transportation. Example topics include:

- Role of information systems in transportation, traffic flow and control, vehicle control, routing and scheduling
- Traveler response to dynamic information
- Planning for ITS innovations
- Evaluations of ITS field operational tests
- ITS deployment experiences
- Automated highway systems
- Vehicle control systems
- Tools/software for ITS analysis

The Journal of Intelligent Transportation Systems has a 2009 Impact Factor of 0.727.

This places JITS as one of the highly ranked journals in the growing field of intelligent transportation systems. It is ranked 12th among Transportation Science and Technology Journals, based on 2009 Thomson Reuters, Journal Citation Reports. This result could not have come without the valuable contributions of the editors, authors, and reviewers. Note that a high impact factor increases the visibility and awareness of journals, and it can drive up usage and increase journal distribution.

2009 Impact Factor: 0.727

Ranking: 14/26 in Transportation Science & Technology

Transportation Engineering Degrees at ODU

The goal of the transportation educational program at ODU is to provide students with the knowledge and tools that they will need to succeed in the workforce. The undergraduate program provides a solid foundation in design, operations, and planning. At the graduate level, students learn advanced analytical tools and technologies to help address transportation problems. The graduate program in transportation offers Master's and Ph.D. degrees. Qualified full-time students pursuing a Master of Science or Ph.D. degree are eligible for funding through Research Assistantships. Students interested in learning more about the program are invited to contact Dr. Khattak or Dr. Cetin.

DEGREES & COURSEWORK

Degrees The Department of Civil & Environmental Engineering offers graduate programs leading to the following degrees:

- Bachelor of Science in Civil Eng (BSCE)
- Master of Science in Civil Eng (MSCE)
- Master of Engineering in Civil Eng (MECE)
- Doctor of Philosophy in Civil Eng (Ph.D. CE)

Bachelor's and Master's students build a solid foundation in engineering by taking a courses in transportation fundamentals, transportation planning, & operations. In addition, Master's students produce a Thesis or Project. Students can also take transportation courses through ODU Extension.

The Ph.D. program provides training in research methods that enables graduates to contribute to the development of substantive theory, knowledge, and scholarship in transportation engineering.

Undergraduate Transportation Coursework Provides knowledge of transportation and the inter-relationships between multiple transportation modes. Students can take the following courses:

- Transportation Fundamentals
- Transportation Planning
- Transportation Operations I
- Transportation Operations Applications

Graduate Coursework Provides an extensive background in transportation engineering. Students may take the following courses:

- Transportation Fundamentals
- Transportation Planning
- Transportation Operations I & II
- Transportation Safety
- Intelligent Transportation Systems
- Transportation Network Models and Optimization
- Simulation Modeling in Transportation Networks

RESEARCH & INTERNSHIPS

Current Research Faculty and students conduct research in the following areas:

- Transportation operations
- Transportation planning
- Modeling and simulation of transportation systems
- Transportation safety
- Intelligent Transportation Systems

Student Publications Graduate students are encouraged to co-author articles with faculty. Additionally, students are encouraged to present their research at forums, such as the annual Transportation Research Board meeting.

Financial Assistance & Internships Research and teaching assistantships are available to full-time students. These typically pay for student stipends and partial or full tuition.

Internships provide employment experience and the opportunity to develop professional skills. Students can work for these partners:

- Virginia Modeling, Analysis & Simulation Center
- Virginia Department of Transportation
- Hampton Roads Transportation Planning Organization



Transportation at ODU

Education, Research, and Public Service

ODU Transportation Program
Civil & Environmental Engineering Department
135 Kaufman Hall
Old Dominion University
Norfolk, VA 23529

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CEE.ODU.edu

Mission

The mission of the ODU Transportation Program is to contribute to the advancement of transportation systems in three ways:

- The education of transportation professionals,
- The development of knowledge that stimulates applications of new strategies/technologies, and
- The dissemination of knowledge to transportation practitioners and other stakeholders.

We achieve these goals by offering students a broad curriculum, faculty with diverse backgrounds and research interests, and professional development opportunities in the Hampton Roads area.

Sponsors

The Virginia Department of Transportation directly supports research activity at the ODU Transportation Program. In addition, core ODU transportation faculty received research funding from the following sponsors:

- Virginia Department of Emergency Management
- California Department of Transportation
- Oregon Transportation Research and Education Consortium
- US Department of Transportation
- National Science Foundation

Faculty

Core Transportation Faculty

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