From Arterial to Asset: Examining the Role of the Multi-Way Boulevard in Coordinated Transportation Land Use Planning

Activity

OTREC funding has helped support student studio work for this exciting collaboration between the university, community and cities.

www.franklincorridor.org/

Partner

American Institute of Architects Southwestern Oregon Chapter

Mark Gillem,
University of Oregon

The Project

This applied research project will examine the opportunities and constraints of converting an auto-oriented five-and six-lane arterial into a multi-way boulevard with transit as a way of reducing congestion, improving pedestrian and automobile safety, and supporting more unified land uses.

The project will use a case study approach and will focus on the Franklin Corridor in the Eugene-Springfield area. Through a series of public workshops, planning studios, and student research efforts, University of Oregon graduate and undergraduate students in architecture, landscape architecture, and planning, along with local professionals, and members of the general public will work together to analyze existing conditions, develop planning objectives, prepare conceptual diagrams for development of the corridor, examine alternative right-of-way sections, and calculate potential future development capacities in terms of densities and open space.

The work effort will be focused on developing a conceptual analysis of existing and proposed conditions. The corridor is under intense development pressure; this project will look beyond these individual development proposals and study the potential for the corridor as a whole.

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Socio-Economic Effect of Vehicle Mileage Fees

Starr McMullen and
Lei Zhang, Oregon State University

Activity

Preliminary results have been presented at:

Transportation Research Forum March 2007

World Conference on Transport Research Society, June 2007

Partners

Oregon Department of Transportation

OSU Foundation

Joyce Furman Fellowship in Transportation Economics

OTREC
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The Project

The purpose of this advanced research study is to develop and implement a quantitative model to analyze the socio-economic impacts of a proposed change from the gasoline tax to a vehicle mile tax for the State of Oregon.

In recent years it has become evident that the gasoline tax may no longer be able to generate the funds needed to build and maintain the highway system. The State of Oregon established a task force to consider alternatives to the gasoline tax, with the most promising being a vehicle mile tax. OSU researchers have developed the technology and a pilot program was implemented in Portland.

In addition to technology issues, public concerns regarding social equity and distributional effects of a vehicle mile tax are also important. In particular, it has been suggested that the change in tax structure could 1) shift the burden of the tax to lower income groups, 2) shift the burden of the tax to rural areas from urban areas, creating regional or geographic inequities and 3) discourage people from purchasing and driving alternative fuel vehicles, hybrids in particular. This study will provide policymakers the information necessary to make informed decisions regarding the vehicle-mile tax as an alternative to a gasoline tax.

www.otrec.us

Using Existing ITS Commercial Vehicle Operations Data to Develop Statewide and Bi-State Truck Travel Time Information

Activity

Research is underway.

Partner

Oregon Department of Transportation

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Chris Monsere and Robert Bertini, Portland State University

The Project

The transportation of freight is an important component of the Oregon economy. The FHWA estimates that from 1998 to 2010, the total tonnage of freight shipments to, from, and within Oregon will have increased 50% and the value of those same shipments nearly doubled.

Currently, there is no system that estimates travel time for many major freight corridors in Oregon. However, the existing infrastructure of Oregon's Green Light program provides an opportunity to generate travel time estimates for many travel of these corridors. The Green Light program enrolls approximately 3,330 trucking companies with 30,200 transponder-equipped trucks. There are 22 equipped stations in Oregon where these transponders can be read and corridor travel times predicted.

The objective of this advanced research project is to test the feasibility of using data already being collected from transponder-equipped trucks to develop travel time estimates along major Oregon highway corridors and eventually link these estimates with those produced in Washington. Further, the research will seek to integrate other sources, particularly weigh-in-motion data to capture other key freight measures. As part of the research, it would be determined whether additional transponder readers can be deployed to read information at key points not at weigh stations, particularly in the Portland area.

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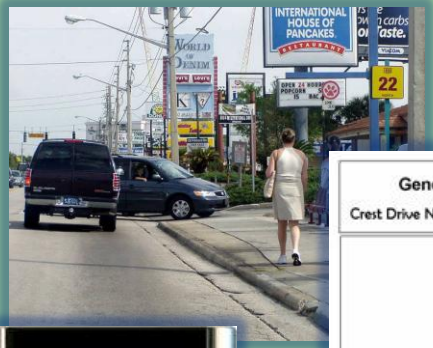
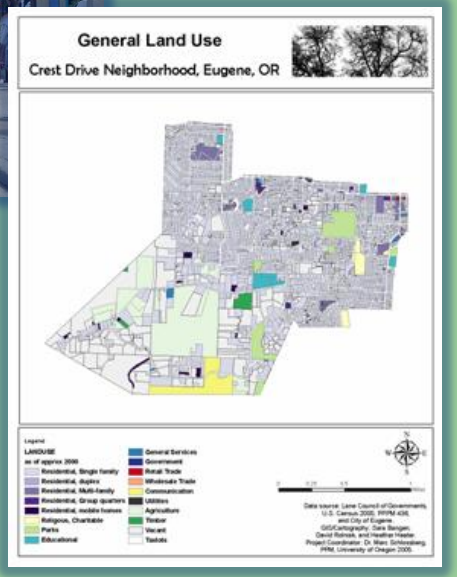
07-14

Active Transportation, Neighborhood Planning and Participatory Geographic Information Systems





Activity

Research is underway.

Partner

National Center for Biking and Walking

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Marc Schlossberg, University of Oregon

The Project

This project is aimed at developing, implementing, and evaluating new community-based walkability tools. This project is designed to utilize new mobile GIS technology to develop tools that communities can use to assess, map, analyze, and deliberate within their efforts to improve local walking conditions.

These goals will be achieved through the development, testing, evaluation, and transferring of GIS and PDA-based tools focusing on measuring and mapping the pedestrian environment. The tools will be developed in a way that maximizes public involvement by local municipalities, school districts, transit agencies, and citizen groups while minimizing the training needs of a general, non-GIS using public. With the data, communities can conduct self assessments of local scale walkability, identify specific geographic areas of unsafe conditions, prioritize areas of greatest need, engage with local transportation officials more productively, and be better prepared to leverage enhancement funds.

There are four primary components of this applied project: 1) refine an existing walkability audit tool for Safe Routes to School; 2) develop additional walkability PDA and GIS based audit tools focusing on ADA standards, Complete Streets, and walking environments around transit stops; 3) test each of these tools in communities throughout the country interested in addressing walkability at the local scale; and 4) to conduct an evaluation of the utilization of these tools in the various communities and develop a way to share these tools with localities across the country.

www.otrec.us

07-18

The Influence of Community Walkability and Safety on Active Transportation Among Low Income Children

Jessica Greene,
University of Oregon

Activity

Research is underway.

Partner

The Center for Health Care Strategies

The Project

Researchers have started to examine the degree to which community-level factors influence children's physical activity, and in particular, active transportation to and from school. Studies have found that "walkability" factors such as the density of intersections, lack of dead ends, and tree cover near schools are positive predictors of children walking to school. Other literature focuses on the influence of neighborhood safety on levels of physical activity.

This applied project will exam two key research questions. First, we will examine the contributions of walkability measures and perceived neighborhood safety (traffic and crime-related) on active transportation among an ethnically diverse group of low income children. Second, we will investigate the relationship between children's active transportation and overall physical activity and obesity.

Data from a cross sectional survey of 765 parents and guardians of children in Florida aged 5-18 who receive Medicaid will be used to develop multivariate regression models to identify the independent influences of walkability and safety on active transportation. It will test whether walkability factors are equally important in communities that are perceived to be safe and those that are unsafe. It will also examine the relationship between active transportation and overall physical activity and obesity for this low income population of children.

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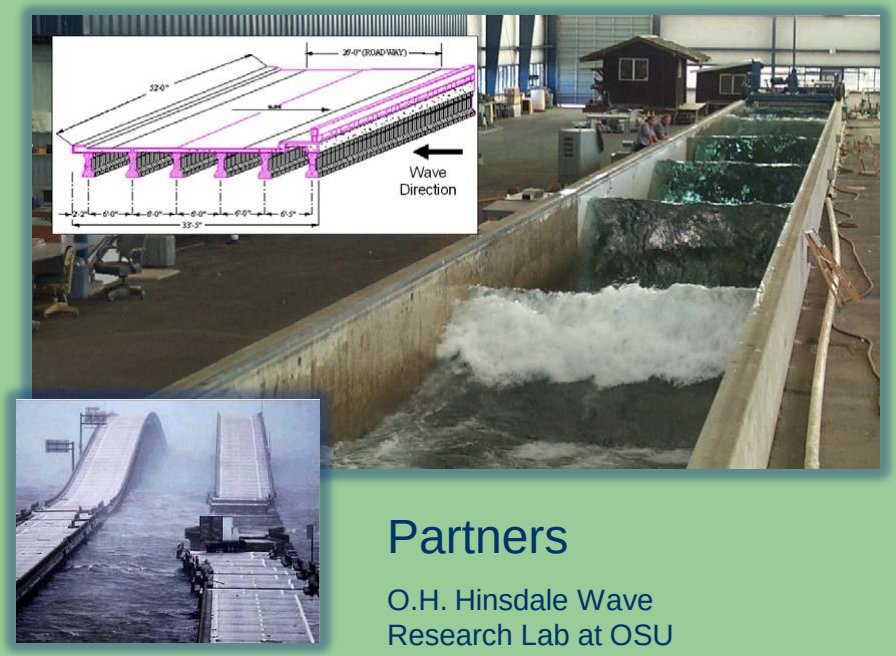
Hurricane Wave Forces on Highway Bridge Superstructure



Activity

Research is underway.

Partners

O.H. Hinsdale Wave Research Lab at OSU

Kiewit Center for Infrastructure and Transportation at OSU

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Daniel Cox,
Oregon State University

The Project

This research will aid in our understanding of the dynamic loads by hurricane waves on highway bridge superstructures and assess the accuracy of present methods for safer design of new bridges or retrofit of existing bridges. The objectives of this research are (1) conduct the first, large-scale physical model study of wave loads on a highway bridge superstructure under realistic wave conditions and bridge geometries, and (2) evaluate the application of existing design formulas developed for deep water, wave-in-deck loading of offshore structures to shallow water, highway bridge geometries.

This research project will conduct the first-of-its-kind, large-scale, hydraulic model test of wave forces on a highway bridge superstructure cross-section, similar to those bridges that failed during Hurricanes Katrina in 2005 and Ivan in 2004. The hydraulic model will be scaled 1:4 for length and 1:2 for time using Froude similitude. The model will be constructed of concrete and steel using a realistic cross-section and will be instrumented with sensors to provide wave conditions, impact pressures, dynamic horizontal and vertical loads, and moments. The wave climate will be derived from available buoy data and existing wave modeling studies. Existing methods developed for wave-indeck loading of offshore platforms will be compared with the data to evaluate the accuracy of these methods.

This project advances technologies leading to safer design and repair of bridges subjected to wave loadings, and will develop new knowledge in this area.

www.otrec.us

Understanding and Measuring Bicycling Behavior: a Focus on Travel Time and Route Choice

Jennifer Dill, Portland State University

Activity

The first phase of this survey included a phone survey of 500 adults who answered questions about their cycling habits. The study showed that 56% of the riders said they wanted to bike more but didn't because of "too much traffic." Thirty-seven percent cited a lack of nearby bike lanes and trails as their barrier. Those with a network of quiet streets near their home were more likely to ride regularly.

The second phase of this project, collecting and analyzing GPS data from Portland bicycle riders, is ongoing during summer 2007.

Dr. Dill's work was featured in the July 13, 2007 *Portland Tribune* article: "Why we bike – or don't"

Partner

Robert Wood Johnson Foundation, Active Living Research

The Project

With rates of obesity, heart disease, and related health problems increasing in the U.S., health professionals, planners, and policy makers are looking for ways to increase physical activity through changing urban form. While much of the focus is on walking, bicycling also offers many benefits.

The first phase of this applied research project included a phone survey of Portland area residents about bicycling behavior. The second part of the project, currently underway, involves 150-300 bicycle riders carrying a PDA/GPS unit with them when they ride. Results of this part of the project will address questions about actual bicycle use, in addition to testing the ability to accurately measure bicycle use with such a device.

Questions to be evaluated by looking at the GPS data include (among others):

- What is the difference in travel time between bicycling and driving?
- How does this difference vary spatially?
- How do cyclists' routes differ from the shortest network distance?
- How do cyclists choose their routes? How do network characteristics (e.g. bike lanes or heavy traffic) influence those decisions?

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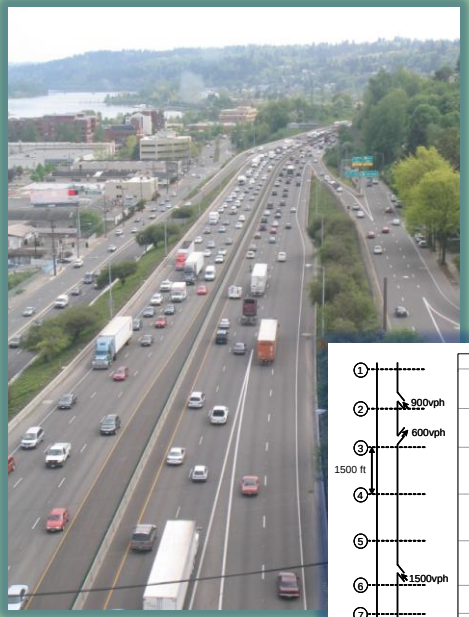
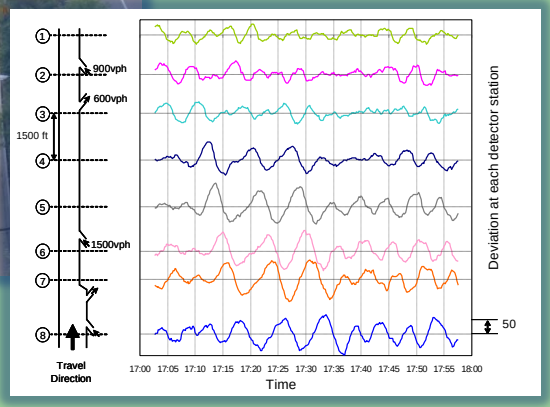
Characteristics of Transitions in Freeway Traffic

Robert Bertini, PSU and Soyoung Ahn, ASU



Activity

Research is underway. Students at PSU and ASU are working with data from several sites.



Partner

Arizona State University

The Project

This advanced research seeks to understand the characteristics of transitions as freeway traffic changes from one state to another. The work will address the features of three different types of transitions which occur near 1) the tail of a queue 2) the head of a queue (i.e. an active bottleneck) and 3) inhomogeneous points on freeway (e.g. merges and diverges).

The transition zone near the tail of a queue moves upstream as the queue grows, and moves downstream as the queue recedes with decreasing demand. Hence, the dynamics of the transition zone will be explored by analyzing the relationship between the duration of transition and various traffic and location variables.

The second and third types of transitions are stationary such that they do not propagate over space as a shock wave. For these types of transitions, the length of the transition zones with respect to traffic and location variables will be analyzed.

Several U.S. and non-U.S. freeway sites will be selected for this study in order to verify reproducibility and compare differences across sites. Researchers will use data from inductive loop detectors, and datasets from the Next Generation Simulation.

This research will provide valuable insight on how congested traffic behaves under various freeway transitions. Results will expand the current knowledge on traffic congestion and serve as a building block for future traffic modeling and management practice.

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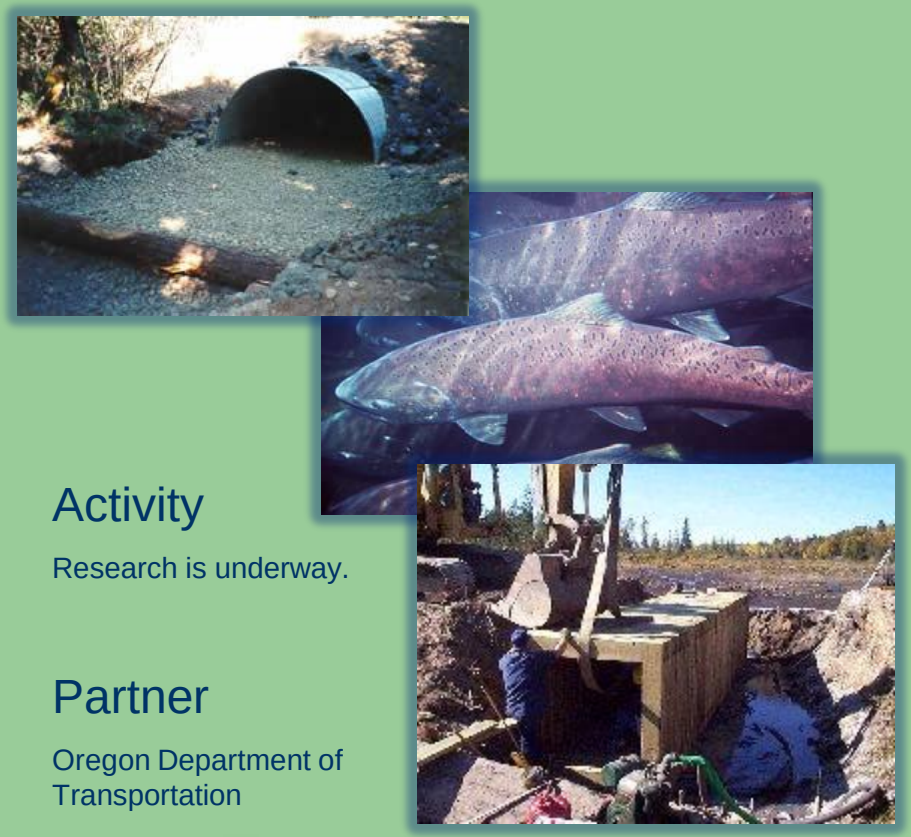
07-37

Factors for Improved Fish Passageway Waterway Construction



Activity

Research is underway.

Partner

Oregon Department of Transportation

David Sillars, OSU; Hamid Moradkhani and Trevor Smith, PSU

The Project

Roughened chutes that simulate natural stream passages are a cost effective means of providing fish passage where existing culverts and bridges do not meet current fish passage requirements. The construction of roughened chutes often consists of using equipment and water-wash methods to place the streambed materials. Current design and construction methods may play significant roles in the loss of gravel and fines, which may result in subsurface flow that impedes fish passage.

This applied project is designed to investigate the role that construction techniques play in the loss of simulated streambed materials. This research will:

- Utilize historic ODOT installations to identify indicators of unexpected performance results.
- Develop a checklist of situations which may lead to unexpected failure, potentially providing a better means to deal with these during design.
- Recommend appropriate changes to reduce the likelihood of repeating project designs resulting in loss.
- Evaluate current construction methods and determine better construction and compaction methods for roughened chutes or channels.
- Future research may include construction of a roughened chute for a pilot case study.

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Influence of Environmental Effects on Durability of Carbon Fiber-Reinforced Polymers for Shear Strengthening of Reinforced Concrete Girders

Activity

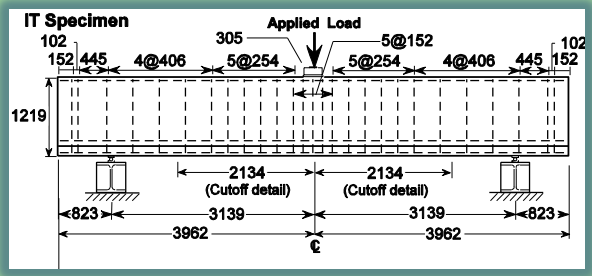
Research is underway.

The picture at left is a FRP repaired beam and one of the control specimens. Approximately 500,000 pounds of applied force was used to fail the specimen.

Partners

Oregon Department of Transportation

Kiewit Center for Infrastructure and Transportation at OSU



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Christopher Higgins, Oregon State University

The Project

Many reinforced concrete bridges in the national inventory are lightly reinforced for shear and are exhibiting diagonal cracking and distress. One of the most promising materials for strengthening these bridges is bonded carbon fiber-reinforced polymers (CFRP).

Recent OSU research on fatigue response of full-size RCDG girders repaired with CFRP indicated that the CFRP did not exhibit strength degradation under high-cycle fatigue. However, environmental deterioration of the bonded CFRP remains uncertain.

The primary objectives of this advanced research study are to: 1) assess the impact of environmental conditions on reinforced concrete bridge girders strengthened with CFRP for shear and quantify possible long-term durability issues and 2) investigate the behavior of reinforced concrete bridge girders strengthened with CFRP and exposed to *combined* accelerated environmental aging and fatigue to evaluate durability of CFRP repairs for shear.

Full-size girders strengthened with surface bonded CFRP for shear will be tested in the Structural Engineering Research Laboratory at OSU. After environmental exposure, the specimens will be tested to destruction. Results will be compared with test specimens not subjected to environmental exposure and findings will be used to recommend design, analysis, and inspection methods.

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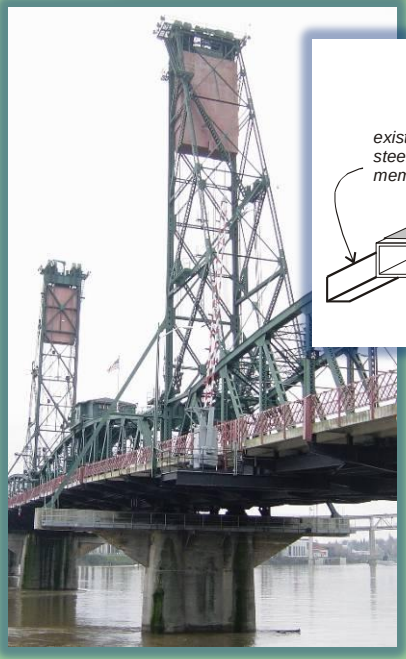
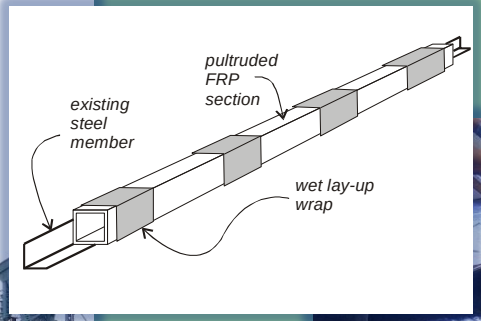
Performance Enhancement of Bridge Bracing Under Service and Extreme Loads

Peter Dusicka,
Portland State University





The Project

The demand on aging bridges continues to increase under service loads. Many bridges are comprised of slender structural elements that are crucial in resisting various loads and are typically designed primarily for tension. However, compressive resistance below the yield strength capacity is often discounted in design.

The objective of this OTREC research project is to develop and demonstrate the concept of retrofitting bridge brace elements with fiber reinforced composites (FRP) in order to provide restraint against global compression buckling. The advanced materials consist of a combination of FRP composite pultruded sections and wet lay-up wraps, intended to be applied in the field. The research will investigate suitable combinations of materials and develop prototype options. A selected number of the prototypes will be built and tested at large scale using monotonic and reverse cyclic loading in order to characterize their performance.

This exploratory research would result in gaining new understanding of FRP steel composite behavior, with significant potential for enhancing performance of existing steel bridges. The product of the research effort will be a retrofit measure that is as applicable for service loads as it is for extreme loads, leading to increased longevity and enhanced functionality of these vital segments of the transportation network.

Partner

Oregon Department of Transportation

Activity

Research is underway. Above: students in PSU's iSTAR Lab assemble a small scale version of the retrofit measure for an upcoming test.

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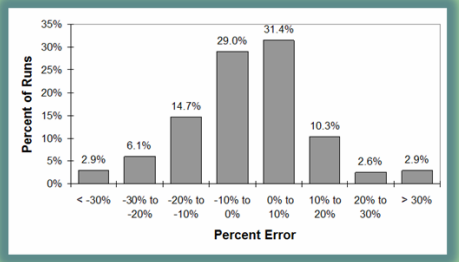
07-53

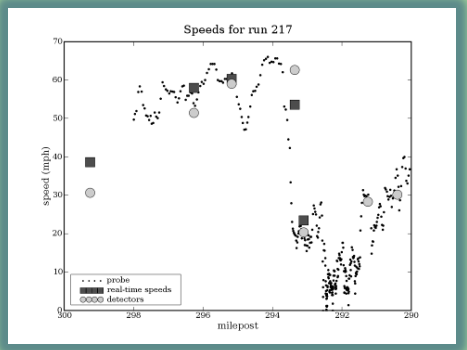
Assessment and Refinement of Real-Time Travel Time Algorithms for Use in Practice

Kristin Tufte,
Portland State University

Activity

Probe vehicles equipped with GPS-enabled Garmin iQueTM 3600 devices have made 544 ground truth runs. Data has been analyzed to determine current travel time estimation error. The top right figure shows that of the runs collected, 85% had absolute estimation error under the FHWA-suggested threshold of 20%. The evaluation has revealed that the main causes of error in travel time estimation in the Portland, OR metropolitan area are transition traffic conditions, failure of detectors and detector spacing.





Graphical and statistical analysis show a speed plot for a ground truth run on Hwy I-5 southbound, south of downtown Portland (above). The problematic section has been identified as one where there is large detector spacing and a large merge. Additional analysis shows that adding a detector in this location significantly reduces travel time estimation error.

Partner

Oregon Department of Transportation

The Project

The Federal Highway Administration (FHWA) has set a high priority on the use of existing dynamic message signs (DMS) to provide travel time estimates to the public. The Oregon Department of Transportation (ODOT) currently has three DMS in the Portland metropolitan area configured to display travel time information. ODOT would like to make travel time estimates available on additional DMS, over the Internet, or by calling 511.

The purpose of this applied research study is to extend prior travel time research conducted at PSU with additional data collection and analysis to provide statistical confidence in travel time estimates and to determine the best travel time estimation approach for ODOT. Ground truth data in the form of probe vehicle runs will be collected and travel time estimates will be evaluated using that data. Several travel time estimation algorithms will be evaluated and modifications to existing algorithms will be proposed. In addition, this project will provide analysis to help understand the reliability and performance of the algorithms under various conditions (free-flow, congestion, incidents). A methodology will be developed for determining if travel time estimates fall within acceptable accuracy limits.

At the conclusion of the project, it is desired that a methodology can be recommended that will provide accurate measures of travel time for use with DMS, the Internet, and 511 applications.

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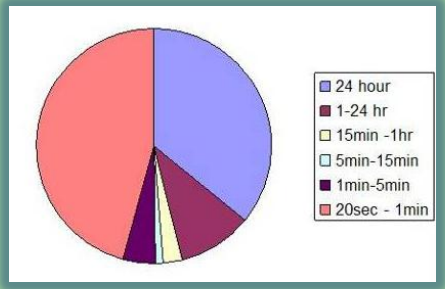
Improving Travel Information Products via Robust Estimation Techniques

David Maier and Kristin Tufte,
Portland State University

Activity

The pattern of data gaps caused by communication failure, detector failure, and poor-quality data has been studied (right). Different gap patterns may require different imputation strategies. Communication failure has been observed to cause intermittent data availability.



Various imputation strategies have been studied for various gap lengths, including rolling forward the most recently-measured quantity, time of day historical mean, and linear regression graphically shows impact of imputation using roll-forward of previous value versus historical time of day average. Confusion matrices (left) are used to demonstrate impact of error on user perception. Research is continuing

Partner

Consejo Nacional de Ciencia y Technologia (CONACYT) - the Mexican National Council for Science and Technology

The Project

Traffic-monitoring systems, such as those using loop detectors, are prone to coverage gaps that adversely affect the accuracy of Advanced Traveler Information Systems.

This applied research project will explore models based on historical data that can provide estimates to fill such gaps. The project will build on other studies and use both a linear model and an artificial neural network (ANN) trained on historical data to estimate values for reporting gaps. The researchers will also investigate other non-linear models, such as Gaussian Mixtures, that provide further statistical metrics.

This research will use the Portland Transportation Archive Listing (PORTAL) at the Intelligent Transportation Systems Laboratory at PSU which holds more than two years of Portland-area freeway-loop-detector data. Initially the research team will be building and testing estimators in off-line mode. Highway segments that represent patterns of outages will be selected. Models will be built for this segment and performance examined on estimates for synthetic gaps. Later, using live loop-detector data from PORTAL, the team will work towards on-line estimation over the local freeway network, which requires computing estimates in a timely manner.

The end target is improved end-user travel information products, such as the Portland-Metro Speed Map on ODOT's Trip Check.

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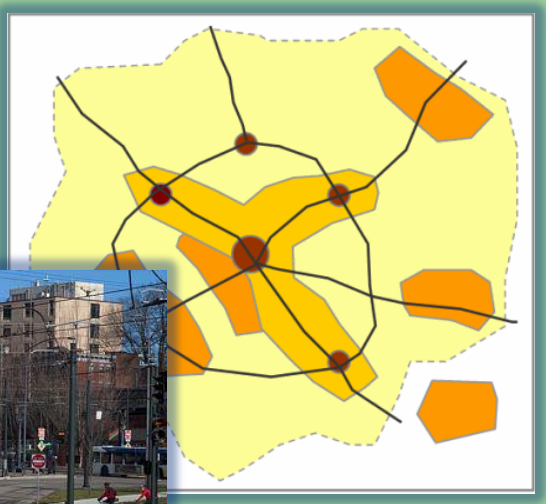
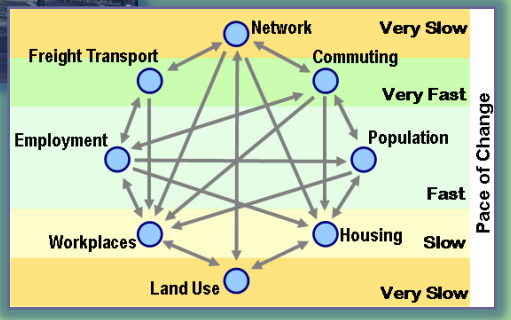
Co-Evolution of Transportation and Land Use

Lei Zhang,
Oregon State University

Activity

Research is underway.





Partner

Kiewit Center for Infrastructure and Transportation at OSU

The Project

The interaction between land use and transportation has long been the central issue in urban and regional planning. Models of such interactions provide vital information to support many public policy decisions, such as land supply, infrastructure provision, and growth management. Both the transportation system and the land use system exhibit historical dependencies in policy decisions. For example, a specific land supply decision made at one point of time, by changing the relative attractiveness of other areas in the region, can have profound impact on future land supply decisions. Today's land use decisions clearly influence future transportation policies and vice versa.

This advanced research project examines the land use-transportation interaction from an evolutionary perspective that once a certain set of goals are determined and pursued by politicians and planners, their land supply and transportation investment decisions are to a large extent driven by their previous decisions and the supply-demand dynamics in the urban system. A model of the co-evolution of land use and transportation is the goal of this project. The co-evolution model considers both land use growth and transportation network growth as endogenous and market-driven. The central research question is how market and policies translate into transportation facilities and land use developments on the ground. The co-evolution model achieves a novel *Urban Growth Equilibrium*, which is a useful concept for planning and policy analysis.

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Identify and Address Intuitional Barriers Delaying Incident Clearance

Karen Dixon and Lei Zhang,
Oregon State University

Activity

Research is underway.

Partner

Oregon Department of Transportation

The Project

Effective incident management can substantially reduce congestion while expediting incident clearance. ODOT has a comprehensive incident management program in place. Due to cooperative efforts among ODOT, Oregon State Police, local police, and emergency providers most incidents are cleared rapidly and traffic operations resume normally. However, a major traffic-related incident can take considerable time to clear and the closure of a major highway during peak travel periods can cause major problems. The economic impact can be considerable when road closures and delays occur in a metropolitan area such as Portland. It is not known to what extent institutional constraints may account for inefficiencies that result in extended time elapsing from incident detection through final site clearance.

The applied research proposed in this study will address several key objectives. Using a variety of data resources, the research team will examine recent traffic incidents in the Portland area to determine the extent to which the incident and associated traffic obstructions impacted systemic traffic operations. The research team will also develop an enhanced implementation plan for addressing institutional barriers that may affect the rapid clearance of incidents occurring on Oregon highways. Finally, this research effort will ultimately help identify specific legislative initiatives or administrative procedures that should be implemented to minimize delayed incident clearance and estimate the benefit of the recommended changes.

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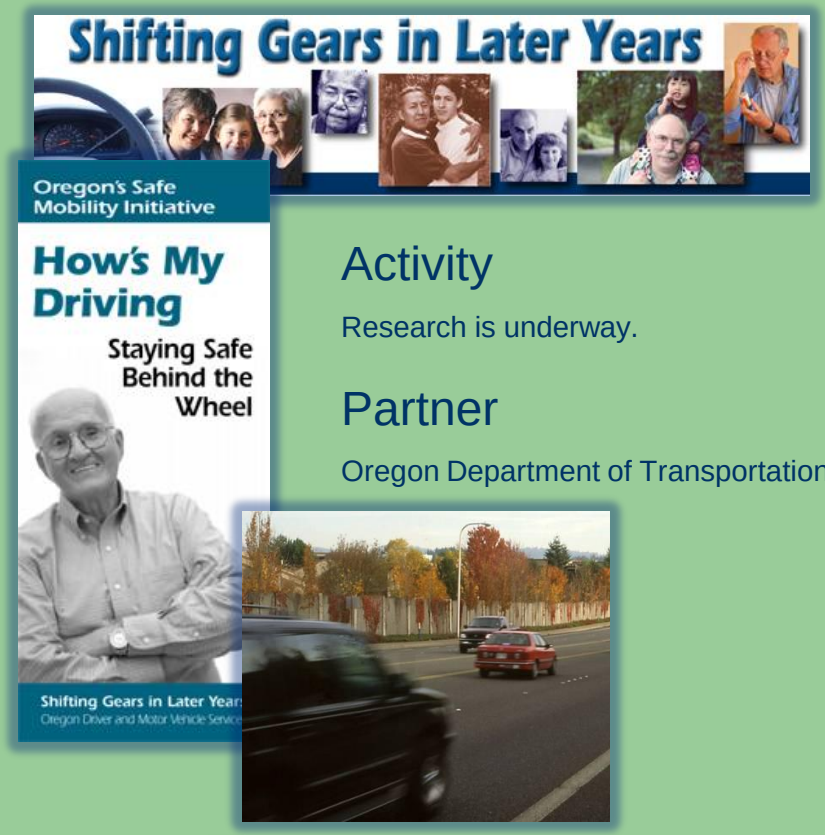
Evaluation of the Oregon Department of Motor Vehicles At-Risk Driver Program



Activity

Research is underway.

Partner

Oregon Department of Transportation

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James Strathman,
Portland State University

The Project

In June 2003 Oregon Driver and Motor Vehicle Services (DMV) implemented a new mandatory medical reporting requirement in which some Oregon physicians and health care providers are mandated to report to DMV patients with certain severe and uncontrollable cognitive and functional impairments. The previous law required reporting based on the diagnosis of conditions or impairments that bring about momentary or prolonged lapses of consciousness or control, and was determined to be too narrow to address the many possible mental and physical conditions that can affect safe driving.

DMV worked in consultation with medical and other experts to develop the new mandatory reporting requirement, and implementation included training for physicians and other healthcare providers across the state. The new impairment-based reporting requirement considers the type and degree of impairment rather than a medical diagnosis. This applied research project would be the first evaluation of DMV's revised reporting program.

This evaluation of the Oregon DMV At-Risk Driver Program consists of four primary elements: 1) a literature review; 2) a summary analysis of drivers processed through the program; 3) recovery of information from health care professionals on issues related to their use of the program and their compliance with the program's reporting requirements; 4) a statistical analysis of the crash and traffic offense conviction patterns of persons in the program, compared to similar drivers without impairments.

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City Design Lecture Series: Linking Transportation and Land Use Planning

Activity

This lecture series is planned for the 2007 fall term at UO




Technology Transfer

In addition to the free public lectures, planned activities include:

- TV broadcasts on Cable 21 in Eugene
- Web Podcasts
- Lecture Series Catalog (pdf)
- Lecture DVDs for public and university libraries

Partners

- City of Eugene
- Lane Transit District
- Oregon Transportation Growth Management Program
- American Society of Landscape Architects Willamette Valley
- American Institute of Architects Southwestern Oregon Chapter
- University of Oregon

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OREGON TRANSPORTATION RESEARCH AND EDUCATION CONSORTIUM

Mark Gillem,
University of Oregon

Education Project

There is a pressing need to provide broadly accessible education on the benefits of integrating transportation and land use planning. In response to this need, the University of Oregon and a variety of co-sponsors are hosting an on-going City Design lecture series in Eugene.

The objective of this multidisciplinary educational program is to host a lecture series that will inform area professionals, students, and the broader public about the need to consider transportation and land use strategies in concert that can jointly create more livable cities with enhanced safety, reduced congestion, greater mobility choices, and more housing variety.

The intent is to have an annual series of lectures by a variety of nationally-known experts in the fields of transportation planning, urban design, and transit-oriented development. These lectures are free and open to the public. Nearly 400 participants attended five lectures in 2006. In addition, the videotaped lectures have been broadcast on Metro TV (Cable 21 in Eugene) to broaden the exposure of the series theme, and are available as podcasts through the University of Oregon.

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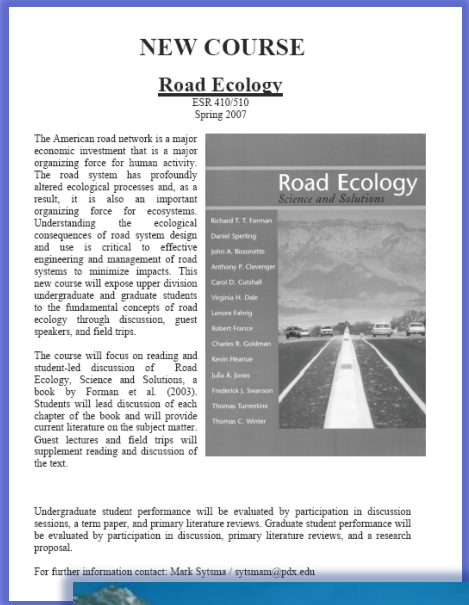
Road Ecology Course and Seminar Series

Activity

This course was offered in spring 2007 at PSU.



NEW COURSE

Road Ecology

ESR 410/510
Spring 2007

The American road network is a major economic investment that is a major organizing force for human activity. The road system has profoundly altered ecological processes and, as a result, it is also an important organizing force for ecosystems. Understanding the ecological consequences of road system design and use is critical to effective engineering and management of road systems to minimize impacts. This new course will expose upper division undergraduate and graduate students to the fundamental concepts of road ecology through discussion, guest speakers, and field trips.

The course will focus on reading and student-led discussion of Road Ecology, Science and Solutions, a book by Forman et al. (2003). Students will lead discussion of each chapter of the book and will provide current literature on the subject matter. Guest lectures and field trips will supplement reading and discussion of the text.

Undergraduate student performance will be evaluated by participation in discussion sessions, a term paper, and primary literature reviews. Graduate student performance will be evaluated by participation in discussion, primary literature reviews, and a research proposal.

For further information contact: Mark Sytsma / sytsmam@pdx.edu

Partner

PSU Department of Environmental Sciences and Resources

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Mark Sytsma,
Portland State University

Education Project

Understanding the ecological impacts of road system design and use is critical for effective engineering and management of road systems to minimize impacts. This education project is to develop a new course at PSU that will expose students to the fundamental concepts of road ecology through discussion, guest speakers, and field trips. This will be a student-led discussion course focusing on the book *Road Ecology*, edited by Forman et al.

Classroom discussion will be supplemented with guest speakers that will bring real- world examples to the classroom. Potential topics for guest speakers include:

- impacts of highway runoff and roadside spraying on water quality
- impacts of roads on erosional processes
- impacts of culverts on anadromous fish passage
- mitigation of habitat fragmentation and road impacts on animal movements
- role of maintenance activities in facilitating weed invasions.

Speakers will also be invited to provide a departmental seminar to communicate road ecology principles to a wider audience of students in Environmental Science and Resources. Field trips to observe road impacts and mitigation measures will add to students understanding of road ecology.

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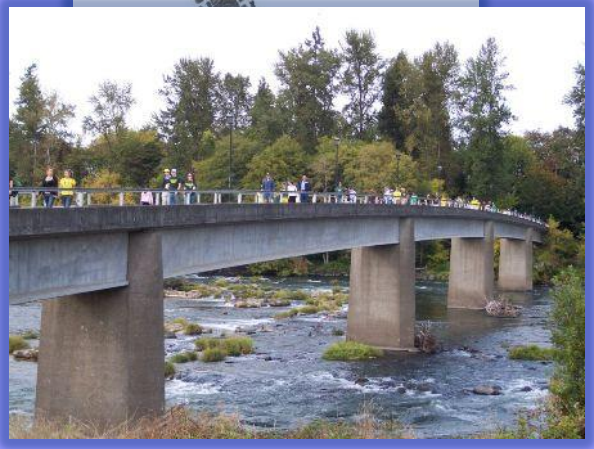
Linking Experiential Learning to Community Transportation Planning

Robert Parker & Bethany Johnson, University of Oregon

Activity

Project is underway



Partner

City of Eugene

Education Project

This cross-disciplinary OTREC education project will link experiential education with local transportation planning through a collaborative partnership between the University of Oregon and the City of Eugene.

The project scope will consist of developing a City of Eugene Bicycle and Pedestrian Strategic Plan. Through the Community Planning Workshop (CPW) at UO, students will be involved in all levels of a project under the guidance of CPW and City of Eugene staff. They will have an opportunity to work with professionals in the transportation field, and to conduct research, facilitate public workshops, and work with an advisory committee. In short, this project will provide students direct, hands on experience in developing the strategic plan for the City of Eugene.

The project will result in a completed City of Eugene Bicycle and Pedestrian Strategic Plan, will involve 15-20 students in a rich experiential learning process, and will result in a case study describing the methods used to integrate experiential learning into transportation planning processes as well as lessons learned. Each of these elements will build support for innovative methods of teaching in the field of transportation study.

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Developing a Coordinated Professional Development Program for OTREC

Activity

OTREC staff will be working with Dr. Layton and Dr. Monsere to identify current Northwest transportation professional development programs and to conduct a survey of need. The goal will be to identify educational needs and opportunities and to develop priorities for the OTREC education program.

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Robert Layton, OSU and Chris Monsere, PSU

Technology Transfer Project

As OTREC consortium members prepare to enhance transportation-related professional development programs through new course offerings and enhanced existing courses, there is a clear need to develop a basic understanding of the needs of the professional community and types of courses that should be offered in Oregon. This proposed technology transfer activity will develop an online survey to ascertain professional's multidisciplinary needs and training desires. In addition to surveying individuals, key managers at relevant public agencies and representatives from the League of Oregon Cities and Association of Oregon Counties will be contacted for their direct input. The results of this activity will be a prioritized list of training needs, a coordinated plan to deliver courses at consortium campuses, and a marketing strategy. Each campus can use the plan to help guide their professional development activities.

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Application of Load and Resistance Factor Design Principles for Bridge Deep Foundations in Oregon: Phase I

Trevor Smith,
Portland State University

Technology Transfer Project

Activity

A control group has been formed that includes the PI, ODOT Head Foundation Engineer, FHWA representative and AASHTO Vice-Chairman of T-15 subcommittee. It is noteworthy that this Oregon effort has already garnered significant national attention from the key AASHTO LRFD implementation committee.

Details of two pile case histories have been provided by ODOT to the research group, and these case histories are now providing the basis to study details of ODOT practice around driven pile design and the use of the code WEAP. The graduate student working on this project (Bethany, below) will work on a replication of these existing bridge designs and pile driving log projections to help gage their fit to the new LRFD 4th Edition 2007 Standards.

From the meetings of the control group, considerable progress has been made on understanding the deficiencies in the present LRFD code. It is clear the ODOT mix of soils/standards of practice/site variability/pile redundancy is not correctly represented in the LRFD code requirement.

The State of Oregon has embarked on a bridge reconstruction program that is 'fast tracked' to replace 365 bridges across the state. All new ODOT bridges are now required to be designed using Load and Resistance Factor Design (LRFD), including foundations. The Wave Equation Analysis of Piles (WEAP) method has been in use in ODOT for over 15 years, using a factor of safety of 2.5 applied to the ultimate bearing capacity. The new LRFD code specifies a factor of safety of about 3.5. This will result in much more conservative pile foundation designs for projects using the wave equation. In establishing code minimums, AASHTO "default values" were used for all soil input values in the wave equation to minimize variability from local engineering judgment. A review of the data in the NCHRP report indicates that the wave equation method generally under predicts bearing capacity when using end of initial driving data. Dictated by Oregon soils, and the present use of WEAP for capacity, ODOT is likely to see high and unnecessary increases in cost for its foundations without any improvement in confidence, safety or reliability by the new AASHTO requirements, since they are not locally specific.

The Phase 1 objectives of this research are to: attempt to fully articulate the magnitude of the anticipated cost increase for Oregon, nurture a high level of geo-competency in pile foundation statistics and reliability concepts, build regional support for a procedure to gain acceptance of raising the resistance factor locally, prepare concise LRFD deep foundation implementation feedback of the state's needs to AASHTO, and coordinate and pool experience of other affected states and establish implementation policies.

Partners:

Oregon Department of Transportation

FHWA – Western Federal Lands

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Initiative for Bicycle and Pedestrian Innovation

ibpi

Initiative for Bicycle & Pedestrian Innovation

Activity

The Initiative has gotten started on two of its core activities: summer professional development opportunities, and the creation of a research agenda that responds to the demands of practice and industry.

The first IBPI professional development course has been scheduled:
On-Street Bikeways and Off-Street Trails: An Integrated Approach, August 11, 2007

Visit the new website:
www.ibpi.usp.pdx.edu/

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Lynn Weigand, PSU

Technology Transfer Project

The Initiative for Bicycle and Pedestrian Innovation is a new center for research and learning that is focused on bicycle and pedestrian travel. IBPI's aim is to advance bicycling and walking as integral elements of the transportation system in Oregon's communities.

The concept for the Initiative developed gradually over the past year, through conversations with public agencies, private consultants, non-profit organizations, industry representatives, and researchers in the fields of bicycle and pedestrian transportation. It is a partnership between PSU, UO and OSU, and is housed within PSU's Center for Transportation Studies.

Key activities and outcomes from the OTREC funding for the Initiative's technology transfer activities will include: a website clearinghouse for research and evidence-based tools that is accessible and meaningful and a series of four white papers on areas of bicycle and pedestrian research that are directly relevant to professional practice and policy-making. Tentative white paper topics include: (1) the economic impacts of bicycle and pedestrian transportation; (2) the effectiveness of Safe Routes to School programs and other approaches to creating safe, healthy transportation options for children; (3) the effectiveness of multi-modal intersection safety treatments; and (4) the physiological and mental health benefits of bicycling and walking.

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