



## RAC Project Selection

Every spring the ODOT Research Advisory Committee (RAC) meets to review, ask questions about, and ultimately prioritize the top research proposals for the next fiscal year. The top ten problem statements are listed below.

- Analysis and Design of Pipe Ramming Installations
- Internal Curing of Concrete Bridge Decks
- Performance of Near-Surface Mounted CFRP's for Shear Strengthening of Reinforced Concrete Bridge Girders
- Asphalt Binder Grade Selection for HMAC with Recycled Asphalt Products
- Feasibility of Using Safety Edge in Oregon
- Effect of Implementation of the Fluvial Performance Standard on Maintenance
- Supplemental Performance Measures for Oregon Highway Plan Mobility Standards
- Climate Change Impact on Coastal River Estuaries in Oregon
- Relating TSMO Strategies to Policy Goals
- Mechanistic Design Guide Calibration for Pavement Rehabilitation

The RAC priorities determine the order in which the problem statements are funded; therefore the top priorities are more likely to go on as research projects. Additional problem statements may also move forward as projects, depending on resources and alternative sources of funding. Projects will start as early as July 1, 2009.

For more information on the project selection process and to view research currently in progress, please visit the Research Unit web site at:

[http://www.oregon.gov/ODOT/TD/TP\\_RES/](http://www.oregon.gov/ODOT/TD/TP_RES/)

### In This Issue:

#### At-Risk Driver

Evaluation of the Oregon At-Risk Driver Program (2)

#### NCHRP

FY 2010 NCHRP Project Selection (3)

#### Bridge Repair

Durability of Composite Repairs on Bridges (4)

#### Recent Reports

Recently Published Research Reports (5)

#### New Research

#### Notes

Recently Published Research Notes (6)

#### T2 Center

Oregon Technology Transfer Center (7)

#### Update

Research Personnel Changes (8)

# At-Risk Driver

## Evaluation of the Oregon At-Risk Driver Program

Oregon is one of six states with mandatory physician reporting requirements for drivers. Oregon's program, revised in 2003, identifies at-risk patients with severe functional or cognitive conditions that are considered to impair driving. To evaluate the impact of the new mandatory reporting requirements, Portland State University researchers analyzed the driver records of persons whose driving privileges were suspended through the program between July 1, 2004 and December 31, 2005. These records included persons suspended under the mandatory reporting requirements as well as those who were voluntarily referred. The records included counts of the number of crashes and convictions that occurred during the 18-month period both prior to and following the suspension date. A sample of persons with active driving privileges was selected to provide a benchmark based on the general population of Oregon drivers. This sample was compared to a sample of subjects in the Mandatory and Voluntary groups. The evaluation indicated that compared to the general population sample of Oregon drivers:

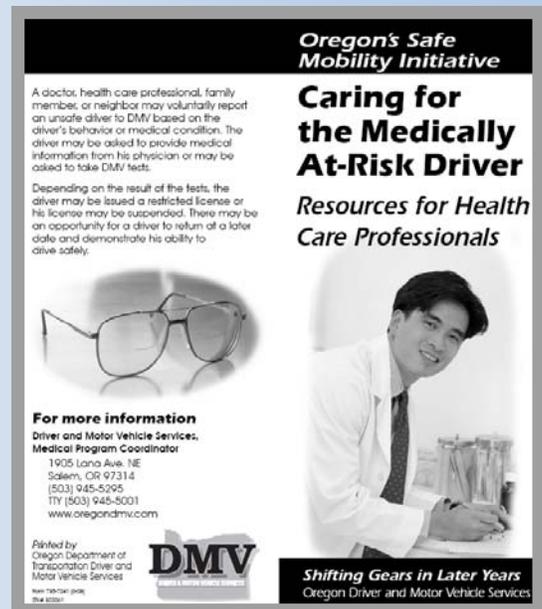
- there was an elevated incidence of major convictions (e.g., DUII, reckless driving, ...) of Mandatory sample subjects prior to and after suspension;
- there was a comparably greater pre- and post-suspension safety risk of the subgroup of Mandatory sample subjects who had their driving privileges reinstated after suspension; and
- there was a relatively high incidence of pre-suspension crashes and post-suspension major convictions among the Voluntary sample subjects.

It was found that the occurrence of a crash during the 18-month period prior to suspension is a significant predictor of the likelihood that a crash will occur after suspension. This finding could be considered when evaluating a person's application for reinstating driving privileges. In addition, for persons whose driving privileges have been reinstated, subsequent crash occurrence could be treated as a signal that re-certification is needed and/or that the person should again be required to successfully complete DMV testing.

Information obtained from structured interviews of Medically At-Risk program stakeholders suggests that the medical community is not fully aware of the mandatory requirements. The effectiveness of the program would be improved by taking the following steps: provide more information about the program to primary care physicians; expand insurance coverage to include driving assessment and rehabilitation services; and integrate the Voluntary and Mandatory data management systems. The timeline for implementing these recommendations has not been established. The implementation of changes will require a commitment of DMV staff resources for program review, public outreach and education, and database reprogramming.

For additional information, the final report is available at:

[http://www.oregon.gov/ODOT/TD/TP\\_RES/docs/Reports/2009/At\\_Risk\\_FR.pdf](http://www.oregon.gov/ODOT/TD/TP_RES/docs/Reports/2009/At_Risk_FR.pdf)



**Oregon's Safe Mobility Initiative**

**Caring for the Medically At-Risk Driver**

*Resources for Health Care Professionals*

A doctor, health care professional, family member, or neighbor may voluntarily report an unsafe driver to DMV based on the driver's behavior or medical condition. The driver may be asked to provide medical information from his physician or may be asked to take DMV tests.

Depending on the result of the tests, the driver may be issued a restricted license or his license may be suspended. There may be an opportunity for a driver to return at a later date and demonstrate his ability to drive safely.

**For more information**  
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DMV  
Oregon Department of Transportation Driver and Motor Vehicle Services

*Shifting Gears in Later Years*  
Oregon Driver and Motor Vehicle Services

# National Cooperative Highway Research Program

## Projects for Fiscal Year 2010 Selected for NCHRP

In March the AASHTO Standing Committee on Research (SCOR) met to select new projects for the National Cooperative Highway Research Program (NCHRP). NCHRP is the oldest and largest of several Cooperative Research Programs administered by the Transportation Research Board. Fifty-four projects were selected, including 35 new projects and 19 continuations. Among the projects selected was an ODOT submittal, *D-13 Evaluation of Fuel Usage Factors in Highway Construction* submitted by Kevin Brophy, Barnie Jones and John Riedl.

### Research Resources

Below is a list of the some frequently used transportation search engines, article databases, and libraries that are important and helpful research tools.

#### National Transportation Library (TRIS)

<http://ntlsearch.bts.gov/tris/index.do>

#### Research in Progress

<http://rip.trb.org/>

#### Federal Highway Association

<http://www.fhwa.dot.gov/>

#### AASHTO

<http://www.transportation.org/>

#### Oregon State Library

<http://www.oregon.gov/OSL/index.shtml>

#### ODOT Library

<http://www.oregon.gov/ODOT/CS/BSS/library.shtml>

NCHRP is supported by annual contributions from the 50 states, District of Columbia and Puerto Rico. Annual funding for NCHRP is based on a percentage of SPR funding received by states. In FY'09, total funding was around \$37 million. Oregon's share of that was about \$432,000.

State DOTs and AASHTO Committees may submit problem statements for consideration by NCHRP. NCHRP problem statements may be submitted throughout the year but the deadline for each fiscal year is usually in mid-September of the previous year.

ODOT participates in NCHRP in several ways:

- Any ODOT employee may submit an NCHRP problem statement.
- An advisory ballot is prepared and submitted in February. Preparation of that ballot is coordinated by the ODOT Research Unit, and up to 60 or more ODOT employees are invited to participate in evaluating problem statements in their areas. Ballots from the 50 states are used to prepare a preliminary ranking of projects, prior to the SCOR meeting.
- ODOT employees may also be nominated to serve on an NCHRP Panel. The panel assists TRB staff in developing a work plan and selecting a contractor, reviews project progress, and reviews preliminary and final reports. Travel expenses related to service on an NCHRP panel are fully covered by TRB. Panel nominations can come from any AASHTO committee member within ODOT.

More information about NCHRP, including lists of reports, current projects and new projects, is available on the TRB website.

<http://trb.org/CRP/NCHRP/NCHRP.asp>

# Bridge Repair

## Durability of Composite Repairs on Bridges

Oregon has many older reinforced concrete bridges still in service. These bridges were designed according to the standards of their time, which were not as stringent as today's requirements. Since construction decades ago, these bridges have been exposed to millions of load cycles from traffic. In addition, the loads have become heavier due to the larger capacities of modern trucks. Not surprisingly, many of the vintage bridges need to be strengthened or replaced to maintain safe and efficient highway operations.

Where strengthening is the most appropriate action, carbon fiber reinforced polymer composites (CFRP) provide a good option for quickly strengthening a bridge while minimizing traffic disruption. Installers flatten and roughen the surface and fill any cracks that would lie under the CFRP. After surface preparation, the carbon fiber strips are bonded to the concrete with a polymer resin. Because the material is lightweight, it is easy to maneuver into position, and the installation only requires simple hand tools.

ODOT and other transportation departments have used CFRP to strengthen and repair structures. Results so far have been good, but there has been little long-term experience with CFRP for transportation infrastructure. Of special concern is the durability of the material when exposed to moisture, freeze-thaw cycles, and repeated loading.

The Research Group contracted with Oregon State University to develop design guidelines for the long-term performance of CFRP. The researchers built large-size beams, pre-cracked the beams, strengthened the beams with CFRP, and exposed the beams to various combinations of moisture, freeze-thaw, and fatigue. The beams were then loaded to failure to determine the effect of the environmental factors on performance.

The research showed that conditions that allow moisture to get under the CFRP, combined with freeze-thaw, are detrimental to durability. Consequently, the research recommended design calculations to account for possible degradation over time and still assure safe performance. Further recommendations were made on installation techniques to minimize moisture infiltration and on inspection approaches to focus on the most susceptible locations.



For additional information,  
the final report is available at:  
[http://www.oregon.gov/ODOT/TD/TP\\_RES/docs/Reports/2009/FRP\\_Durability.pdf](http://www.oregon.gov/ODOT/TD/TP_RES/docs/Reports/2009/FRP_Durability.pdf)

# Research Reports

## Recently Published Research Reports

### [Animal-Vehicle Crash Mitigation Using Advanced Technology--Phase II: System Effectiveness and System Acceptance](#)



This project focused on assessing the effectiveness and acceptance of an animal detection system in Yellowstone National Park. An animal detection system designed to alert drivers that large animals were crossing the highway was installed, tested, and modified to reduce blind spots. Speed measurements were taken that showed that lower vehicle speed resulted when the warning signs were activated compared to when the warning signs were off. The number of collisions with large

wild animals was 58-67% lower than expected, but because of the variability in the number of collisions and only one year of post-installation collision data, the researchers could not determine whether this reduction was significant. Interviews indicated that the majority of travelers who were familiar with the system thought animal detection systems were a good idea. In accordance with an agreement with Yellowstone National Park, the system was removed in fall 2008. The findings of this research project are being used to improve the design of animal-vehicle detection systems being tested at other locations.

### [Oregon's ACTs, Cross-Jurisdictional Collaboration, and Improved Transportation Planning](#)

The Oregon Transportation Commission (OTC) created Area Commissions on Transportation (ACTs) to improve coordination, help prioritize infrastructure investment, and provide input on statewide transportation issues. The structure of the ACTs is designed to provide a cross-section of input from the state, regional, local, private, and community sectors. A research project was initiated to: assess the role and experiences of ACTs, research comparative approaches in the state and nationally, and develop and assess options for improving coordination and increasing effectiveness. This study used interviews, an on-line survey, case studies from Oregon, and comparative studies from three other states to assess ACTs and identify options. The findings reveal that ACTs have improved the state prioritization process and increased communication among the parties involved, but they face challenges in relation to cross-regional coordination, strategic investment decisions, and regional problems such as urban travelsheds. The study highlights a range of options for improving ACT functioning under its current structure, and more significant options that would require policy and structural changes.

# Research Notes

## Recently Published Research Notes

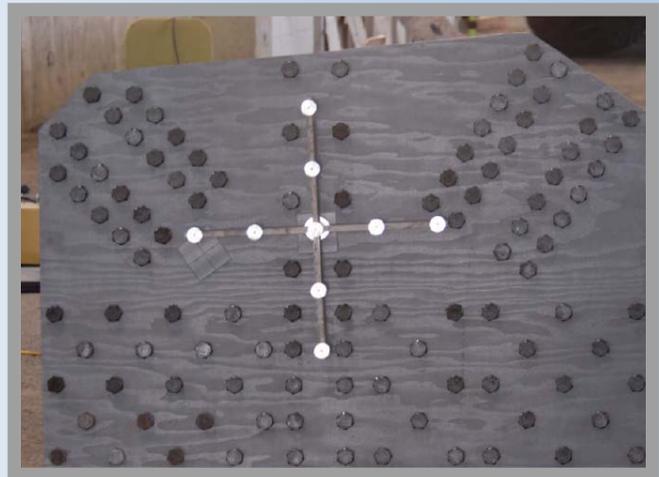
### Roadway Design Treatments for Rural to Urban Transitions



Traffic operating speeds in transition corridors, such as where highways change from high speed rural environments to more suburban/urban environments, are typically high, even at locations with reduced posted speed limits. An ODOT Research study, lead by Karen Dixon at Oregon State University, reviewed research evaluating potential traffic calming strategies for rural-to-urban transitions on high speed highways. Driving simulator evaluations were conducted to assess several design features that simulated physically or perceptually narrowing the road at these transition locations.

### Faster Load Rating for Steel Truss Bridges

After the collapse of the I-35W Bridge in Minneapolis, the Federal Highway Administration mandated that owners of steel truss bridges include calculations for gusset plates as part of the capacity analysis. The ODOT Bridge Engineering Section recently completed a project with Oregon State University to develop a viable, more cost-effective alternative to the manually collected field measurement procedure. The new method employs a computer application to acquire the dimensional data from photographs of gusset plates.



### Ensuring Project Performance and Adherence to Completion Dates



The primary method used to ensure on-time performance in standard ODOT contracting is liquidated damages: if a project exceeds its adjusted completion time a specified dollar amount is assessed, theoretically at an amount sufficient to compensate ODOT for the cost of the delay. Liquidated damages have several limitations, though: they are assessed after a delay has occurred; they are only a disincentive, in that they focus on preventing delay instead of encouraging acceleration; and it is difficult to prove fault of delay on complex projects; hence they are rarely assessed. A recently completed ODOT Research project, led by David Sillars at Oregon State University, sought to identify alternative methods to liquidated damages and to develop a model to aid in selecting among those methods.

# T2 Center

## Oregon Technology Transportation Center



The Oregon Technology Transfer (T2) Center, housed within the Research Unit, offers training, technical assistance and technology transfer programs, and services to local government agencies.

The primary focus of the T2 Center is to provide low-cost training to its customers. The Center's training program is a blend of general training classes, the *Roads Scholar* Program, and co-sponsored training events. The general training is taught by three part-time employees referred to as "Circuit Riders". The *Roads Scholar* Program, initiated in 2001, consists of 10 core classes and

four electives. These classes are usually taught by trainers contracted by the T2 Center. Upon completion of the core and elective classes, participants receive a certificate, travel mug, and a commendation letter to their supervisor. Currently there are over 900 active participants in the program and there have been 147 graduates to date. In the co-sponsored training, the Oregon Chapter of the APWA is the T2 Center's primary partner. In a typical year, the T2 Center and APWA co-sponsor five to six events that include a spring and fall school and three leadership classes.

During the spring and summer months, in addition to teaching classes, the T2 Center's trainers travel around the state "circuit riding." They visit up to 250 locations each year to share information and useful publications related to transportation. These locations include counties, cities, tribal governments, road districts, and transit providers.

The T2 Center maintains a lending library that includes more than 475 videos on both VHS and DVD and over 375 technical documents. The topics cover infrastructure management, highway safety, worker safety and workforce development. A video catalog is available upon request, and the contents of both the video and technical library are posted on the T2 Center website along with ordering instructions.

The Center also publishes *Oregon Roads*, a quarterly newsletter, which provides information on services as well as technical articles on transportation topics. The newsletter is currently printed and mailed, but later this fall it will only be available electronically, distributed via email and the T2 website. If you are interested in receiving the newsletter, please provide both your mailing and e-mail addresses to Rebekah Clack, T2 Assistant. Rebekah can be reached by phone at: (503) 986-2855 or by e-mail at: [Rebekah.A.CLACK@odot.state.or.us](mailto:Rebekah.A.CLACK@odot.state.or.us)

For general information regarding the Oregon T2 Center's training programs and other services, or to view the new look of the Center's website go to:

[http://www.oregon.gov/ODOT/TD/TP\\_T2/](http://www.oregon.gov/ODOT/TD/TP_T2/).

# Update

## Research Personnel Changes

In December, Rebekah Clack was hired as the new T2 Center Assistant. A native Oregonian, Rebekah has over 5 years of experience in administrative/office work. She is a hard worker and enthusiastic



The ODOT Technology Transfer Center welcomes Trainer/Circuit Rider Bob Yates. Bob has worked with ODOT for 31 years in a variety of functions. These have included working with Highway Maintenance for 13 years, developing and implementing training programs, and working as a Project Manager for ODOT Information Services.



Also joining staff as a Research Specialist is Myra Sperley. She was hired in February and has a background in safety, policy analysis, and publications. Her responsibilities include helping to collect and analyze data, conduct research projects, and edit and format reports.



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### What Can We Do For You?

Let us help you! Do you have a transportation-related problem that you think could be addressed through research? Need help in locating current research on an issue? The Research Unit may be able to help. We are available year-round to help answer transportation-related questions. We often answer information requests from ODOT staff by locating technical references, conducting literature searches, or conducting a research project.