ODOT Research News

Fall 2004

ODOT Research News

FY2006 Project Solicitation

The annual project solicitation for ODOT's research program is underway. The deadline for submission of research problem statements is December 17, 2004.

Funds and other resources are available for the following areas: research (study of transportation problem), development (design and/or testing of a new transportation tool or procedure), and technology transfer (demonstration of, or education about new transportation technologies).

The project selection process involves several steps. First, one or more of the eight Expert Task Groups (ETG), each consisting of 6 to 9 technical experts, will review the problem statements in December and January. The ETGs are organized into the following areas:

- Construction and Maintenance
- Pavements and Materials
- Hydraulics, Geotechnical, and Environmental
- Planning and Economic Analysis
- Structures
- Traffic, Safety and ITS
- Roadway Design and Human Factors
- Integrated Multimodal

Problem statements identified as top candidates by one of these groups will be developed into a more detailed "second stage" project proposal. Near the end of February, the ODOT Research Advisory Committee (RAC) will decide which of the second stage problem statements will receive funding for fiscal year 2005-06. Project screening and RAC selection is guided by ODOT's research priorities.

All of the information and materials needed to submit a problem statement can be accessed from the Research Unit web site at the following address:
http://www.odot.state.or.us/tddresearch

Remember, the deadline for submission of a problem statement is **December 17, 2004**.

For more information contact Barnie Jones at 503-986-2845

FY2005 Enhanced Project Selection

In March 2004, ODOT's Research Unit selected projects for FY 2005. Due to the uncertainty of funding levels at that time, a conservative number of projects were funded. Based on the actual level of funding for FY2005, an additional round of problem statements were proposed to the Research Advisory Committee (RAC) for selection in September.

A total of 12 problem statements were included in the second round of project selection. Six problem statements not selected at the March meeting were included, as well as six runners-up from the previous screening.

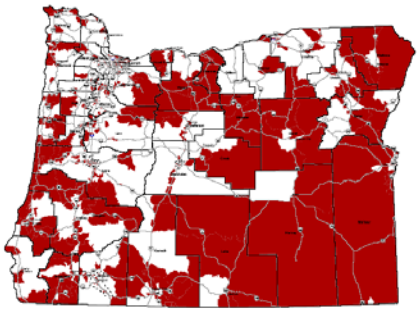
At the September meeting, each problem statement was discussed. A vote was then taken to determine the ranking of the twelve problem statements. Based on funding levels, the top five problem statements were selected. Below is a list of the five problem statements chosen at the meeting.

- Repair Methods for Reinforced Concrete Bridges with Diagonal Cracks
- Low Rainfall Analysis
- Wildlife Migration and Collisions
- Driving Behavior, Driving Cessation and Alternative Transportation Needs
- Analysis of Oregon HMAC Aggregate Gradations Using the Bailey Method

The above projects are still under-development and work plans are being drafted.

For more information about the newly selected projects, or current research projects, visit the Research Unit web site at **http://www.odot.state.or.us/tddresearch**

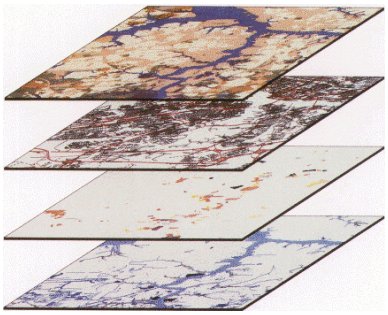
GIS Mapping and Environmental Justice



The ODOT Research Unit recently completed a project to assemble a Geographic Information System (GIS) database which would identify census tracts and block groups statewide where low-income and minority populations reside. As part of the requirements for receiving federal funds, ODOT is responsible for successfully integrating environmental justice (EJ) into its program and planning activities. Environmental justice requires ODOT to avoid, minimize, or mitigate disproportionately high and adverse effects of its activities on minority populations and low-income populations; ensure their full and fair participation; and prevent the denial of benefits to them.

The research team reviewed the approaches that other jurisdictions have taken in mapping EJ characteristics and researched related materials at the national level and within Oregon. In addition to the federally required categories, the project also assembled census data on the elderly, linguistically isolated, people dependent on public transportation, and people with go-outside-the-home disabilities.

Maps showing the basic census data, related to the presence of low-income and minority populations, can give planners a general indication of whether a given planning area, or transportation improvement project location may be in or near EJ communities. The maps can thus serve as a screening tool for providing an initial look at potential EJ issues for the project.



The GIS layers for EJ characteristics have been delivered to the ODOT GIS Unit, allowing staff to access these layers along with any other features they wish to map, such as: jurisdictional boundaries, highways, place names, etc. For more information about the project, contact Alan Kirk at 503-986-2843.

Optimum Nighttime Flagger Illumination

One of the most dangerous jobs in highway construction and maintenance is the work zone traffic control flagger. These flaggers are well known to drivers, especially with their reflector vests and stop/slow paddle signs out at the edge of the traffic lane. Their exposed position makes it vitally important that they be seen by motorists traveling through a work zone.

As daytime traffic demands increase, nighttime construction and maintenance work is becoming more prevalent. The effective and efficient illumination of flaggers is a significant concern. Insufficient light levels, disabling glare, poor quality personnel protective equipment, and a lack of mobility can increase the risk to flaggers, motorists, and workers within or near a work zone.

ODOT and Oregon State University are evaluating a wide range of commercially available lighting systems with the objective of developing guidelines and recommendations regarding optimal illumination of flaggers during nighttime operations. While current practice meets minimum lighting requirements, the amount of light emitted is commonly much more than needed and often creates disabling glare for motorists.

Laboratory testing of the lighting equipment has been completed. Field testing of suitable lighting systems is currently underway, and a final report is expected early in 2005. For more information about the project, contact Mark Joerger at 503-986-3464.

Testing a New Method for Improving Streams

Highway construction and maintenance frequently involves the disturbance of soil and rock. Disturbed materials from construction can be washed into streams. Natural conditions such as floods and landslide can also increase the amount of soil and rock that becomes mixed with the water in a stream. Such muddying of the waters is referred to as turbidity. Increased turbidity can have adverse affects on the organisms living in a stream. As one drives around Oregon it is common to see straw bails, black fabric fences and orange pillows full of straw or mulch placed to try and intercept soil and rock material before it gets washed into streams.

Plume of turbidity moving down a stream as part of an experiment to improve control of turbidity caused by construction.

Sometimes construction must occur very near or within a stream and there isn't a chance to intercept the materials. The ODOT Research Unit is working with OSU testing a new approach to reducing the potentially harmful turbidity in streams. The approach being tested is to use a substance called Chitosan. Chitosan is derived from the shells of crustaceans which are made of chitin, which is a natural polymer. Chitosan molecules have an electric charge that attract soil particles to them. By gathering the soil particles together in the water, they settle out of the water more quickly. Materials that do this gathering together are referred to as flocculants. Flocculants are regularly used in various kinds of water treatment plants to facilitate the clarification of water. This research project is investigating whether a naturally derived flocculant, such as Chitosan, can be used directly in a stream to reduce turbidity. This type of in-situ use has not been tried before. To do this, brief pulses of muddy water were introduced to a stream under controlled conditions. Turbidity and other water quality parameters were monitored downstream, with and without the Chitosan, to determine the effectiveness of the flocculant.

The results of the test are still being analyzed, but preliminary results are raising hopes. If the final analyses indicate that the concept works in practice, then additional research will need to be conducted before it is used during construction projects. Questions about the long term impacts of the Chitosan will need to be answered. Procedures for using Chitosan will also need to be developed before its use.

For more information about the project, contact Matthew Mabey at 503-986-2847.

OSU student researchers spray Chitosan, a flocculant derived from crustacean shells, into a stream as part of a turbidity control experiment.

Recently Published Reports (click on underlined items for electronic reports)

Motor Carrier Concerns About Transportation Problems
OR-RD-04-11

This report summarizes an analysis of data from a statewide survey of freight motor carrier firms, conducted by the Oregon Department of Transportation in the summer of 2001. The survey was used to identify freight industry concerns about problems they encounter on Oregon's roadways.

Remaining Life of Reinforced Concrete Beams with Diagonal-Tension Cracks
FHWA-OR-RD-04-12
This report covers the initial efforts of a research study investigating the remaining capacity and life of cast-in-place reinforced concrete deck-girder bridges with diagonal tension cracks.

Development and Application of a Statistical Quality Assessment Method for Dense-Graded Mixes
FHWA-OR-RD-05-01

This report describes the development of the statistical quality assessment method, and the procedure for mapping the measures obtained to a composite pay factor. The report also describes the development of a smoothness specification based on the International Roughness Index (IRI).

Evaluation of 3M™ Scotchlite™ Linear Delineation System
OR-EF-05-03

This project evaluated the installation, maintenance, and effectiveness of the linear delineation system to improve the delineation of lane shifts, sharp turns, and detours within highway work zones. The delineators were installed on concrete barriers within three different Oregon highway work zones.

Assessment Methodology for Diagonally Cracked Reinforced Concrete Deck Girders
FHWA-OR-RD-05-04

This report details the results of a research project conducted to estimate the capacity and remaining life of 1950's vintage conventionally reinforced concrete deck girder (RCDG) bridges with diagonal cracks. The investigation encompassed field testing, laboratory testing, and analysis to develop a reliability based assessment methodology. Recommendations are made for implementing the assessment methodology.

This report is available on CD only. Please request a copy by contacting the ODOT Research Unit.

GIS Mapping of Environmental Justice Census Characteristics FHWA-OR-RD-05-02

As an entity utilizing federal funds, ODOT is responsible for successfully integrating environmental justice (EJ) into its program and planning activities. The objective of this project was to assemble a GIS database which identifies census tracts and block groups statewide where low-income and minority populations reside. In addition, other census characteristics have been used by various jurisdictions to describe EJ communities and include the elderly, linguistically isolated, people dependent on public transportation, and people with go-outside-the-home disabilities.

New Research Notes (click on underlined items for electronic reports)

Detecting Objects at Railroad Crossings
RSN 04-06 (April 2004)

The goal of the project was to evaluate promising technologies for the detection of objects at railroad-roadway intersections. Two technologies were lab tested and field tested – a video detection system and a microwave detection system.

Effects of Enhanced Law Enforcement on Vehicle Speeds RSN 04-07 (June 2004)

The objective of this project was to evaluate different levels of law enforcement to determine if one particular pattern was more effective than others in controlling motorists' speeds.

Improving Freight Data Collection Methods
RSN 05-01 (July 2004)

The goal of this study was to identify data collection methods capable of generating the information at a level of detail that would better fill ODOT's modeling and freight planning needs. Two pilot studies were conducted – a roadside interview approach, and a mail/fax survey approach .

In the Glare of Headlights
RSN 05-02 (October 2004)

This project evaluated the 3M™ Scotchlite™ Linear Delineation System within three different highway work zones. The delineators were attached to concrete barriers and used to guide traffic through lane shifts, sharp turns, and detours within the highway work zones.

Capacity of Cracked Reinforced Concrete Beams
RSN 05-03 (November 2004)

Oregon has several hundred reinforced concrete deck girder bridges that exhibit diagonal cracks. This project evaluated methods to accurately estimate the load capacity of cracked girders and developed a procedure to load rate the girders.

T2 Center

The Oregon Technology Transfer Center (T2 Center) was officially established on September 1, 1984 with little fanfare or ceremony. The purpose then was to assist local agencies in obtaining the latest and best available information and training on transportation technology.

During the last 20 years, the T2 Center has seen a steady change of individuals serving as directors, coordinators, and steering committee members, but the focus has remained the same. Today, the T2 Center continues to provide transportation resources to local governments with an emphasis on roads, bridges and public transportation.

Currently, the T2 Center offers training through both its *Roads Scholar* and Circuit Rider programs, produces a quarterly newsletter, and provides a lending service for publications and videos on safety, maintenance and other transportation topics. So far this year, the Circuit Riders have presented over 90 classes to approximately 1700 individuals and made technology sharing visits to 230 Oregon cities and counties. The *Roads Scholar* program, initiated in the Fall of 2001, has approximately 500 registered participants. Recently, over 20 participants achieved the *Roads Scholar* Level 1 Certificate which requires the attendance of at least 10 core and four elective classes.

During the last 20 years, the T2 Center has partnered with many organizations including the Oregon Chapter of the American Public Works Association (APWA) in sponsoring training for local governments. This year alone, the T2 Center and APWA have co-sponsored a number of short courses including both a spring and fall *Street Maintenance and Collection Systems School.* They will also present a *Safety in Public Works* school in mid November. The T2 Center continues to work with other agencies, organizations and individuals to develop timely training courses and technical material for sharing with their customers.

For more information about the T2 Center and their programs, contact the T2 Director, Bob Raths at 503-986-2854 or via e-mail at Bob.RATHS@odot.state.or.us

Other Transportation Research Newsletters

Several transportation agencies publish a newsletter throughout the year. Several of them are from similar state DOT research programs, and a few are from national transportation research agencies. Most of them include project updates, and information about their programs. Below is a list of links to a select few of these newsletters.

TRB E-Newsletter - The E-Newsletter provides a mechanism to help TRB facilitate the exchange of research results and other information among transportation professionals. It regularly covers transportation research developments in the United States and abroad. The E-Newsletter is available in a weekly e-mail, or on the TRB web site at http://guliver.trb.org/news/

MDT Solutions - The Montana DOTs, Research Program publishes a newsletter about their program, including project highlights, new projects, and a list of new reports at: http://www.mdt.state.mt.us/research/tech_trans/newsletters.shtml

Putting Research to Work - Wisconsin DOT's Research, Development and Technology Transfer program reports monthly on recent technical advances in the areas of highway development, construction, operations, travel and safety. The e-newsletter is available at the following web site: www.dot.wisconsin.gov/library/publications/format/newsletters/research2work.htm

CDOT Research Newsletter is published quarterly by Colorado DOTs Research Branch. View the latest edition of the newsletter at the following web site: http://www.dot.state.co.us/Research/Newsletters.htm

Moving Forward – Ohio DOT's Office of Research and Development publishes a newsletter about their program and some of their research projects. The newsletter can be found at: http://www.dot.state.oh.us/divplan/research/newsletter/newsletters.htm

ADOT Research Newsletter is published by the Arizona DOT's Transportation Research Center. The newsletter features highlights about selected projects, and updates about their program. View the newsletter at the following web site: http://www.azdot.gov/ABOUT/atrc/Publications/newsletter/newsletter.htm

New Employee

The Research Unit recently hired Felix C. Martinez as a Research Coordinator. Felix chairs the Construction and Maintenance Expert Task Group. He moved to the Research Unit from ODOT's Roadway Design Unit where he was a Roadway Designer for the past 4 years.

Felix is involved with the Product Evaluation Committee, which reviews products for inclusion on the Qualified Products List. He is also managing several research projects, including: *Reduced Skid Resistance Due to Anti-Icer Applications*, *Establishing Guidelines for Incentive/ Disincentive Contracting at ODOT*, and a pooled fund project on *Animal Vehicle Crash Mitigation*.

For more information about the Construction and Maintenance ETG or the above projects, contact Felix at 503-986-2848 or e-mail at Felix.C.Martinez@odot.state.or.us

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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.

Check Us Out!
www.odot.state.or.us/tddresearch