



March 2019

## *TRAC e-News: Delivering Research Results!*

The Washington State Transportation Center (*TRAC*), conducts transportation research through collaborative partnerships among WSDOT, the University of Washington (UW), and Washington State University (WSU).

### In this issue

- Developing connections for longitudinal joints between deck bulb tees
- Evaluating linear scheduling for heavy civil construction projects
- Changing Seattle curb allocations from paid parking to passenger loading
- Analyzing factors that cause wood guardrail post decay
- Identifying the impacts of shared mobility trends on travel demand
- Creating performance metrics for USDOT's Accessible Transportation Technologies Research Initiative
- WSDOT Webinar Wednesdays: upcoming and previous webinars

## Bridges and Structures

### Developing connections for longitudinal joints between deck bulb tees

Research Team: [John F. Stanton](#) (UW) | [Bijan Khaleghi](#) | Lu Saechao (WSDOT) | [WA-RD 869.2](#)

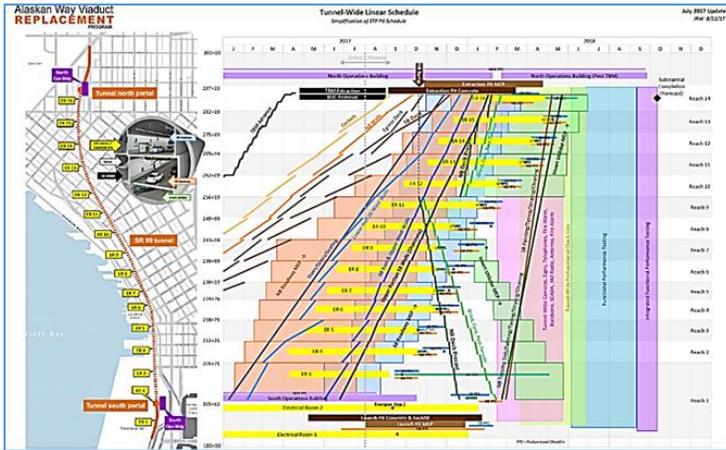
Sponsor: WSDOT

*Completed:* Many state departments of transportation have used ultra-high performance concrete (UHPC) in bridge construction because of its advanced mechanical properties. UHPC can achieve far superior compression, tension, bond strength, and ductility than conventional concrete, mostly because of the addition of steel fibers as reinforcement. In this study, researchers tested a new UHPC mix, developed at Washington State University, for its structural performance when used in a reinforced spliced connection between adjacent concrete deck bulb tee (DBT) bridge decks. Because DBT bridges can be constructed quickly, WSDOT is interested in using them on major highways, and use of UHPC could make DBT bridges more suitable for the heavier traffic loads of highways. [Read more...](#)



# Construction Management

## Linear scheduling evaluation and best practices, Phase I



Research team: [Amy Kim](#) (UW) | [Mark Gabel](#) | [Jon Peterson](#) (WSDOT)

Sponsor: WSDOT

*Ongoing:* Traditional project scheduling methods provide overwhelming amounts of data for large projects, which can be cumbersome and confusing to interpret and to communicate. Linear scheduling has the potential to be an extremely effective tool in tracking cost, duration, and appropriate justification and can enhance WSDOT’s current processes related to project cost risk assessment

and value engineering. The objective of this study is to conduct a literature review of best practices related to the use of linear scheduling for heavy civil construction projects. The findings will build confidence in WSDOT’s adoption and use of a linear scheduling program to further improve project metrics. [Read more...](#)

# Freeway and Arterial Management

## Curb allocation change study

Research team: [Anne V. Goodchild](#) (UW)  
Sponsors: Challenge Seattle, Seattle Department of Transportation, King County Metro, Sound Transit

*Ongoing:* Increasing numbers of transportation network company (TNC) trips—for example, by taxi, Uber, and Lyft—have led to increased demand for loading and unloading curb spots in Seattle. In this study, researchers are gathering data about passenger load zone use and local traffic impacts before and after a curb allocation change in the South Lake Union area of Seattle. Two blocks of curbs designated for paid parking will be reallocated for passenger loading. Researchers will collect data to evaluate curb use changes, impacts on TNC demand and operation, traffic impacts, safety impacts, passenger and driver experience, and parking compliance. The results should help the Seattle Department of Transportation better understand and plan for the impacts of changes in curb parking designation. [Read more...](#)



## Highway Design and Safety

### Field analysis of wood guardrail post decay



Research team: [Adam Phillips](#) (WSU) | [Brad Manchas](#) | [John Donahue](#) | [Doug Brodin](#) (WSDOT)  
[WA-RD 890.1](#)

Sponsor: WSDOT

*Completed:* Wood guardrail posts can be inspected for decay using a non-destructive testing technique called stress wave timing (SWT). This project conducted a field investigation of 498 wood guardrail

posts using SWT and then analyzed the data to determine the factors that lead to increased wood decay rates. Impact testing showed that decay reduces the fracture resistance of wood posts by more than 50 percent. The researchers found that the factor that most strongly predicted high decay rate was climate index, a measure of a region's average annual rainfall and temperature. Areas with a climate index of greater than 40 had higher rates of decay. In addition, poor preservative retention levels were associated with high decay rates. The results of this report will help WSDOT in considering approaches to managing its guardrail assets. [Read more...](#)

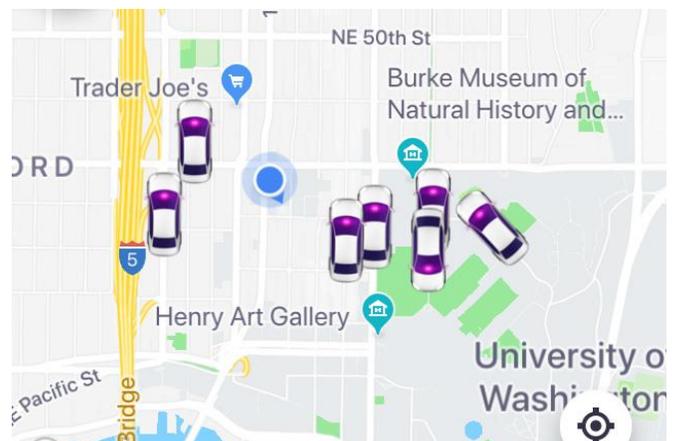
## Multimodal Travel

### The impact of shared mobility options on travel demand

Research team: [Anne Vernez Moudon](#) | [Jeff Ban](#) | [Qing Shen](#) (UW) | Mike Lowry (UI)

Sponsors: PacTrans | WSDOT | Puget Sound Regional Council

*Ongoing:* The increasing availability of shared mobility options is having a profound impact on travel behavior and travel demand. Smartphone-based technology has permitted the rapid spread of bike-, car-, ride-sharing, and ride-hailing options, which has affected how people use traditional travel modes, especially private cars and public transit. Unfortunately, a lack of data impedes the development of programs and policies to address both the positive and negative aspects of the new travel options. This project is leveraging unique travel behavior data sets to identify how the advent of shared mobility is changing the demand for traditional private travel and public transit, as well as its potential impacts on travel choices, revenue streams, and infrastructure needs. This will help planners and engineers make long-range business, policy, and planning decisions to support transportation infrastructure and movement. [Read more...](#)



## Accessible Transportation Technologies Research Initiative (ATTRI) performance metrics and evaluation



Research Team: [Anat Caspi](#) (UW) | Cambridge Systematics

Sponsor: FHWA

*Ongoing:* The focus of this project, conducted in conjunction with Cambridge Systematics, Inc., is to support the USDOT's Accessible Transportation Technologies Research Initiative (ATTRI) in its development and implementation of technologies (devices, software, data standards) and policies that improve independent, on-demand mobility—particularly access to transit—for all travelers, especially those with

disabilities. This project's development of an evaluation framework and recommended set of performance metrics will consider the complex interactions between the transportation system and land uses, social/demographic mobility characteristics, and human factors that affect personal mobility and access to services. The resulting framework and performance metrics will allow USDOT to consistently evaluate current and future ATTRI development projects, and understand and measure their impacts on mobility within the entire travel chain. [Read more...](#)

## Webinar Wednesdays

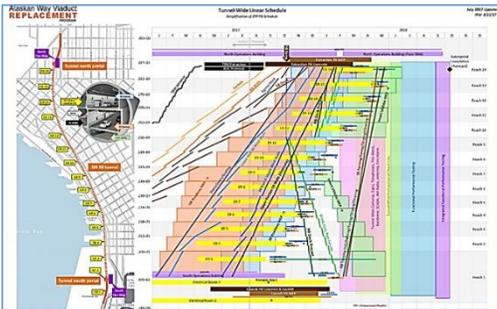
WSDOT's [Research & Library Services Office](#) hosts *Webinar Wednesdays*, a series of bimonthly, one-hour webinars. Each webinar showcases a research project whose results could eventually be implemented statewide.

Here is information about the next upcoming webinar:

### Linear scheduling – What is it? - March 13, 2019

Presenters: [Amy Kim](#), Assistant Professor of Civil Engineering, University of Washington | [Shuogi \(Stanley\) Wang](#), Postdoc Research Associate, University of Washington | [Mark Gabel](#), WSDOT Cost Risk Estimating Manager

To register (free): <https://attendee.gotowebinar.com/register/6236268721402912780>



Have you ever asked, why didn't they think of this during design? Working on a design have you ever wondered how the project might be constructed so the design can be optimized for constructability? Many in our industry, for decades, have pursued ways to improve the nexus between design and construction. This webinar explores a powerful approach to make design and construction considerations an integral part of project development.

WSDOT has launched an initiative to evaluate, develop, and implement best practices for linear scheduling of transportation projects. Linear scheduling may be an effective tool for constructability reviews earlier in design process and to identify coordination opportunities. It can enhance processes related to project cost risk

assessment, value engineering, and stakeholder engagement. This multiphase study includes surveys and interviews of key WSDOT project personnel; and pilot use of the linear scheduling with off the shelf software in a selected project. This webinar is a platform for researchers to present some preliminary findings at an early stage, gather input and attract potential interviewees and participants for future stages.

The latest in the series, held on January 30, 2019, attracted over 240 attendees nationwide:

## **TSMO, What is that thing, anyway? - Transportation Systems Management & Operations**

Presenter: [Monica Harwood Duncan, PE](#), WSDOT Statewide Traffic Operations Engineer



Have you heard about Transportation Systems Management and Operations (TSMO) and wondered what is it exactly? Maybe you are familiar with the term TSMO (pronounced Tiz-Mo) but wondered, “Is TSMO all that different from intelligent transportation systems or traffic operations?” or “How do connected vehicles and travel demand management fit into TSMO?” This webinar is intended to provide an overview of WSDOT’s efforts to develop and deploy transportation strategies that maximize the use of existing infrastructure to benefit the safety and mobility of

our communities. [Access the recording...](#)

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TRAC e-News will be delivered about three times a year. For more information about TRAC and the ground-breaking work we are doing, please visit our [Current Projects](#) and [Research News](#) pages. A downloadable, pdf version of this newsletter is also available.

For contact information, follow these links:

- [WSDOT Contacts](#)
- [UW Contacts](#)
- [WSU Contacts](#)

The Washington State Transportation Center (TRAC) is a cooperative, interdisciplinary transportation research agency. Its members, the Washington State Department of Transportation (WSDOT), Washington State University (WSU), and the University of Washington (UW), formed TRAC in 1983 to coordinate transportation research efforts—both state and commercial, public and private—and to develop research opportunities both nationally and locally. TRAC acts as a link among government agencies, university researchers, and the private sector.

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