

Federal Highway Administration (FHWA) Research and Technology Updates Newsletter

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Source: FHWA.

Figure 1. Staff photo.

Senior Leadership Tours Turner-Fairbank

In March, Turner-Fairbank Highway Research Center (TFHRC) staff provided a tour for U. S. Department of Transportation (USDOT) Deputy Secretary Polly E. Trottenberg, FHWA Administrator Shailen P. Bhatt, and FHWA Executive Director Gloria M. Shepherd. During the tour, the senior leaders also witnessed a full-scale crash test of a small sign support (figure 1).

TFHRC contains 15 laboratories, which encompass more than

100 transportation-related disciplines. For more information and to request a tour, visit the TFHRC Laboratories Overview web page at <https://highways.dot.gov/research/turner-fairbank-highway-research-center/laboratories/laboratories-overview>.⁽¹⁾

Small Business Innovation Research (SBIR)

Congress established the SBIR Program to stimulate technological innovation, utilize small businesses to meet Federal research and development (R&D) needs, encourage participation by minority

and disadvantaged businesses in technological innovation, and increase private sector commercialization of innovations derived from Federal R&D.⁽²⁻⁴⁾

The first solicitation included the following highway topics: Addressing Stormwater Runoff with a Self-Contained Portable Treatment System (23-FH1) and Traffic Monitoring and In Situ Information Processing Using Edge Computing (23-FH2), which are part of the SBIR solicitation process that closed in March 2023.⁽⁵⁻⁷⁾



For more information, visit:

<https://highways.dot.gov/research/opportunities-partnerships/opportunities/small-business-innovation-research>. For more information on the Report to Congress, please visit: <https://crsreports.congress.gov/product/pdf/R/R43695>.^(3,4)

Repository and Open Science Access Portal (Rosa P)

The Office of Research, Development, and Technology (HRT) cataloged and uploaded more than 12,000 FHWA technical, research, policy, and innovation transfer documents in USDOT's publication repository called ROSA P.^(10,11)

This repository ensures public access to the agency's technical knowledge and efforts to support USDOT's plan to increase public access to federally funded research.⁽¹²⁾

The National Transportation Library manages ROSA P which uses data visualization tools to access documents from across the Department of Transportation. All resources are available to the public, and materials can be accessed over the Web.⁽¹³⁾

For more information, visit:

<https://rosap.ntl.bts.gov/gsearch?collection=&terms=rosa+p>.⁽¹¹⁾

Every Day Counts (EDC): Enhancing Performance with Internally Cured Concrete (Epic²)

The latest round of the EDC administrator initiatives rolled out in January 2023. TFHRC employees are active in getting the word out

on EPIC², an innovation increasing concrete's resistance to cracking and adding up to 75 years to the life of the concrete.^(14,15)

Internal curing can be used anywhere traditional concrete is used. It mitigates shrinkage cracking that is particularly problematic in low water-to-cementitious materials ratio concretes, allowing construction with lower permeability concretes to improve durability. It also lasts several times longer than traditional concretes, reducing the need to rehabilitate or replace critical elements, such as bridge decks during the design life of the bridge, resulting in lifecycle cost savings.

EDC is a group of innovations that the FHWA administrator prioritizes.⁽¹⁴⁾ This initiative began in 2011 to provide additional funding to encourage States to identify and advance proven, yet underutilized, innovations in transportation.

For more information, visit: https://www.fhwa.dot.gov/innovation/everydaycounts/edc_7/enhancing_epic.cfm.⁽¹⁵⁾

Competitions Are Heating Up

TPF Excellence Award

Debuts August 8—The Transportation Pooled Fund (TPF) Excellence Award will recognize outstanding TPF projects that go above and beyond to achieve research excellence.⁽¹⁶⁾ Nominations will be accepted from August 8 through September 12, 2023, and awardee recipients will be recognized at the 2024 American Association of State Highway and Transportation Officials Research Advisory Committee meeting.

LTIP Annual Student Data

Competition Closes August 1—

The Long-Term Infrastructure Performance (LTIP) program invites undergraduate and graduate students to submit a technical paper that studies the various factors affecting pavement and bridge lifecycles using the Federal Highway Administration (FHWA) data from InfoPave™ or InfoBridge™.^(17–19) Submit papers by Friday, August 1, 2023. Winning papers will be published by FHWA and presented in a webinar. First-place and second-place lead authors will receive an all-expenses-paid trip to the Transportation Research Board Annual Meeting.⁽²⁰⁾

HSIS 2024 Excellence in Highway Safety Data Award Opens this Fall—

The Highway Safety Information Systems (HSIS) team encourages graduate and undergraduate students to leverage the HSIS database to create a technical paper that addresses key safety issues.⁽²¹⁾ Papers are due in spring 2024. Winning papers will receive a cash award and recognition at the Institute of Transportation Engineers Annual Meeting.⁽²²⁾

Public Roads Student Writing

Competition Launches—For its inaugural year, the *Public Roads* Student Writing Competition received 54 applications from students hoping to see their article published in the *Public Roads* magazine's Winter 2024 issue.⁽²³⁾ Of the 54 applications, 10 were from high school students; 19 were from undergraduate students; and 25 were from graduate students.



Laboratory (LAB) Renovations

In February 2023, the long-planned renovations and additions to five laboratories at TFHRC officially commenced.⁽¹⁾ These updates include transforming the Aerodynamics Laboratory into the Structural Materials Testing Laboratory. Throughout 2023, renovations and enhancements will also be made to the Coatings and Corrosion Laboratory, the Saxton Transportation Operations Laboratory, and the Federal Outdoor Impact Laboratory.

For more information, visit: <https://highways.dot.gov/research/turner-fairbank-highway-research-center/laboratories/laboratories-overview>.⁽¹⁾

Alkali Threshold Test

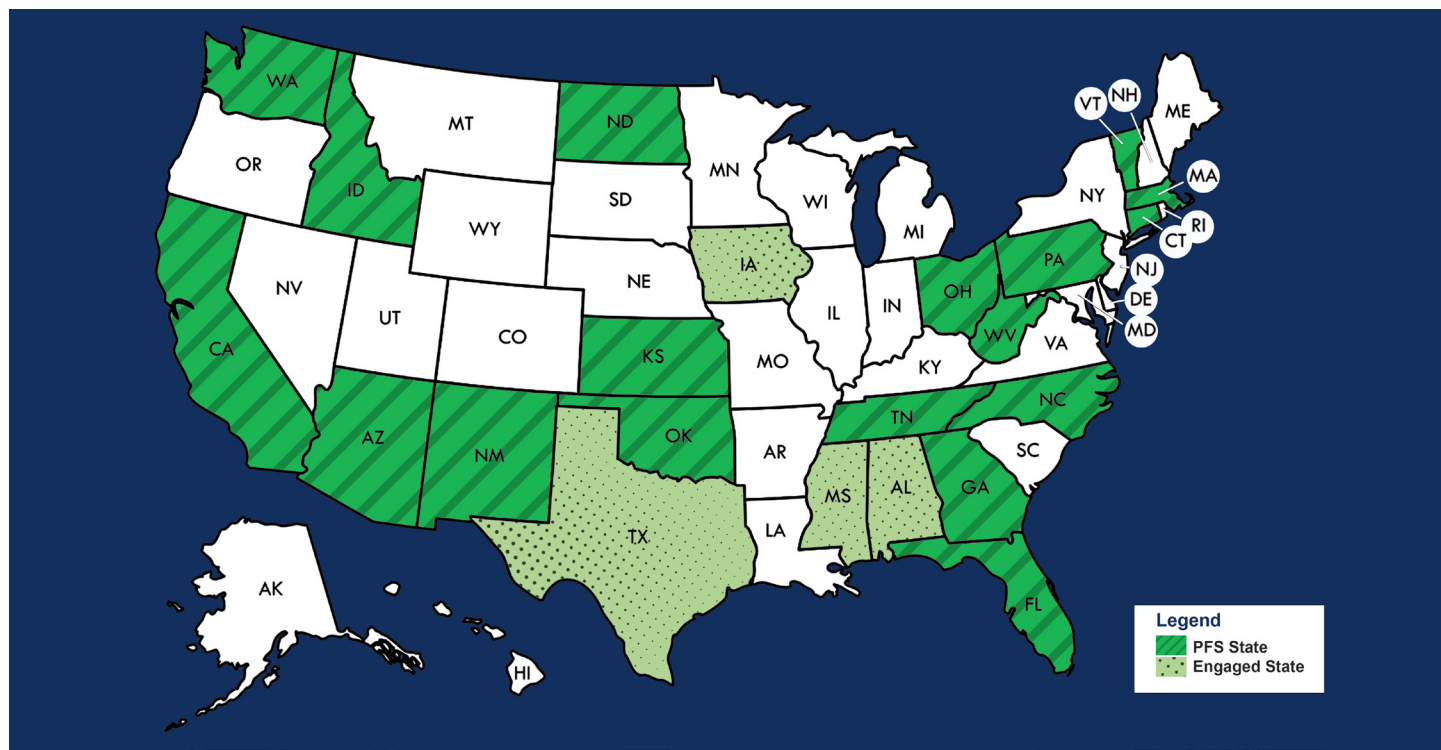
Repairing alkali-silica reactivity (ASR) damage to concrete infrastructure costs billions of dollars in the United States annually. The reason for the damage is too much alkali in the concrete, causing cracking and a shorter pavement life.

TFHRC's Chemistry Laboratory developed a new test method that accurately determines ASR reactivity in aggregates and relies purely on chemical measurements.⁽²⁴⁾ The test is called T-FAST (Turner-Fairbank ASR Susceptibility Test). The test takes only 21 days.

For more information, visit <https://highways.dot.gov/research/laboratories/chemistry-laboratory/alkali-silica-tests>.⁽²⁴⁾

Applications of Enterprise Geographical Information Systems in Transportation (AEGIST)

FHWA has a new primer on AEGIST, which enables State and local transportation agencies to create and integrate spatial transportation data in a consistent and systematic manner for use in transportation systems and business processes (figure 2).⁽²⁵⁾ Agencies can utilize AEGIST to ensure that their data are governed by and reflect quality, accuracy, reliability, completeness, standards-incorporation, temporality, and topological connectedness.



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PFS = Pooled Fund Study.

Figure 2. Transportation PFS State activities: Outreach for AEGIST.⁽²⁵⁾



The AEGIST website offers guidance through workshops, webinars, peer exchanges, and agency-specific, dedicated technical services targeted at data modeling, integration, engineering, and analytics.

For more information, visit <https://www.gis.fhwa.dot.gov/AEGIST.aspx>.⁽²⁶⁾

FEHRL Infrastructure Research Meeting (FIRM) and Executive Board Meetings

Kelly Regal, associate administrator of research, development, and technology, and David Kuehn, exploratory advanced research team director, attended the FEHRL FIRM and executive board meetings, April 25–26, 2023, in Brussels, Belgium.⁽²⁶⁾

FEHRL was formed to promote and facilitate collaboration of road research and provide high-quality information and advice on technologies and policies related to roads.⁽⁹⁾ FEHRL meets at least twice a year to conduct business and update collaborative efforts. Kelly Regal is vice chair and attends these meetings.

This year's theme is climate, energy, and digitalization. Presentations included updates on biodiversity in infrastructure, big data for pavements (BD Pave), and a stakeholder engagement workshop with the Coordinating Council for Access and Mobility (CCAM) team. For access to these presentations, see: <https://www.fehrl.org/firm/firmmeetings/firm2023>.⁽²⁶⁾

Cooperative Driving Automation (CDA) Adaptive Signal Use Case

TFHRC concluded more than 2 months of integration, verification, and final validation testing. Volpe provide the Independent Evaluation Team for validation testing.⁽²⁷⁾ In the Volpe test example, the infrastructure uses basic safety messages from vehicles to adapt signal timing to minimize delays.

The vehicles can use the signal phase and timing messages from the smart infrastructure to modify approach speeds to match arrival times with the green phase to further reduce delay, fuel consumption, and emissions.

The next step is to evaluate this use case through simulation on road networks with multiple intersections to assess when the case may provide significant benefits.

Federal Lands Highway (FLH)-FHWA Coordination

FLH has ramped up its efforts to coordinate with the Office of Research, Innovative Finance, and Planning and Programming offices.⁽²⁸⁾ FHWA has developed a Federal lands management planning summary that provides insights, identifies effective practices, and provides resources that can assist State departments of transportation (DOTs), metropolitan planning organizations (MPOs) and Federal land management agencies (FLMAs) to work together to address transportation needs that benefit all partners and support continued coordination among agencies.⁽²⁸⁾

FHWA provides a wide range of resources and expertise to help improve agency coordination in the transportation planning and programming processes, such as an interactive map that enables users to select FLMAs, MPOs, and States to help clarify where agency boundaries may overlap.

FLH is interested in sharing TFHRC lab capabilities and projects that TFHRC is coordinating with the FLMAs. FLH holds an annual meeting with the FLMAs and the next meeting will be held at TFHRC on May 21–22, 2024.

For more information, visit <https://highways.dot.gov/research/rtpportfolio/federal-lands-research>.⁽²⁸⁾

Truck Platooning and Locomotion

TFHRC staff visited Locomotion, Inc., in March 2023.⁽²⁹⁾ Locomotion was founded in 2018 on autonomous vehicles, robotics, and artificial intelligence from Carnegie Mellon's National Robotics Engineering Center and trucking industry leaders.^(29,30) The reason for the visit was to learn more about automation that might benefit truck platooning.

Trucks transport more than 70 percent of the Nation's freight. Electronic commerce has sharply increased the need for freight trucking services. Demand of freight trucking service is expected to grow by 36 percent between 2020 and 2031. The vision of Locomotion was to develop and champion automation for anything



that moves. This vision began with middle-mile freight automation in the supply chain and the one best suited to integrate human-guided autonomous technology.

Locomotion is using TFHRC's research, in particular, the vehicle-to-vehicle and vehicle-to-infrastructure research, and the recent human factors studies regarding how to assist drivers operating around a platoon.^(29,31)

For more information, visit:
<https://locomotion.ai>.⁽³¹⁾

Transportation Pooled Fund (TPF) Updates

Program Updates—Since the TPF Program website was first launched in 2003, the financial

commitments of the program have grown from receiving \$9.5 million a year to now more than \$70 million each year.⁽³²⁾ In total since 2003, the program has processed more than \$656 million in research funding.

National TPF Training—This training occurred March 28 and 30, 2023. Training was open to both FHWA division research coordinators and State DOT research managers.

TPF International Participation—If you have a research project or an interest, and you would like to include other partners, the TPF Program could be a good vehicle to stretch your funding and expand your research portfolio. The TPF Program also includes partners from other Federal agencies, the private sector, and the international

community. FHWA currently has 18 global partnerships.

TPF Video Learning Series—One of the big initiatives will be for the group to develop a short series of training videos on the TPF program.

New TPF Resource Development Working Group—In the fall of 2022, TFHRC kicked off a working group to help evaluate the current resources of the TPF Program and determine what participants would like to see in the future. Current members include staff from different areas of FHWA and State DOTs.

For more information on these and other TPF Program resources, visit <https://www.pooledfund.org/>.⁽³²⁾

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CONTACT:

jill.stark@dot.gov

