



U.S. Department of Transportation
Federal Highway Administration

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Publication No. FHWA-HOP-24-061

Truck Size and Weight Research Briefing to Congress

May 2024



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Agenda

- Meeting Goals
- Federal Highway Administration's Role
- Past Research Activities
- Implementation Plan
- Ongoing Related Research



Meeting Goals

- Review congressional requests related to Federal truck size and weight (TSW) research
- Fulfill congressional request for U.S. Department of Transportation (USDOT) actions and Federal Highway Administration (FHWA) briefing to address FHWA's implementation of a Transportation Research Board (TRB) TSW research plan
- Provide background and details on USDOT and FHWA TSW research activities, including those associated with implementation of the TRB research plan

Federal Highway Administration's Role



U.S. Department
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Federal Highway
Administration



Federal Highway Administration's Role (1/2)

- The Federal-Aid Highway Act of 1956 (Pub.L. No. 627) first included Federal TSW requirements, and they are codified in Title 23 United States Code (U.S.C.) 127.
- Subsequent acts of Congress have made changes to nationwide TSW requirements and provided specific exemptions or exceptions.
- Regulation and enforcement of Federal TSW standards help preserve Federal infrastructure investment, improve roadway and bridge safety, and support freight operations.
- States must ensure that vehicles comply with Federal TSW standards; FHWA is responsible for certifying State compliance with Federal standards.



Federal Highway Administration's Truck Size and Weight Research (2/2)

- TSW research is a broad topic; different USDOT modes/administrations conduct research.
- USDOT has researched TSW topics for decades, periodically producing studies to inform congressional consideration and to advance national interests.
- FHWA is working to advance the Department's TSW research in coordination with the Office of the Secretary for Research and Technology, Federal Motor Carrier Safety Administration (FMCSA), Federal Railroad Administration, National Highway Traffic Safety Administration, and the Maritime Administration.

How does the Federal Highway Administration approach Truck Size and Weight Research?

FHWA's TSW research agenda is subject to agency needs and priorities, as well as the availability of staff and general research funding.

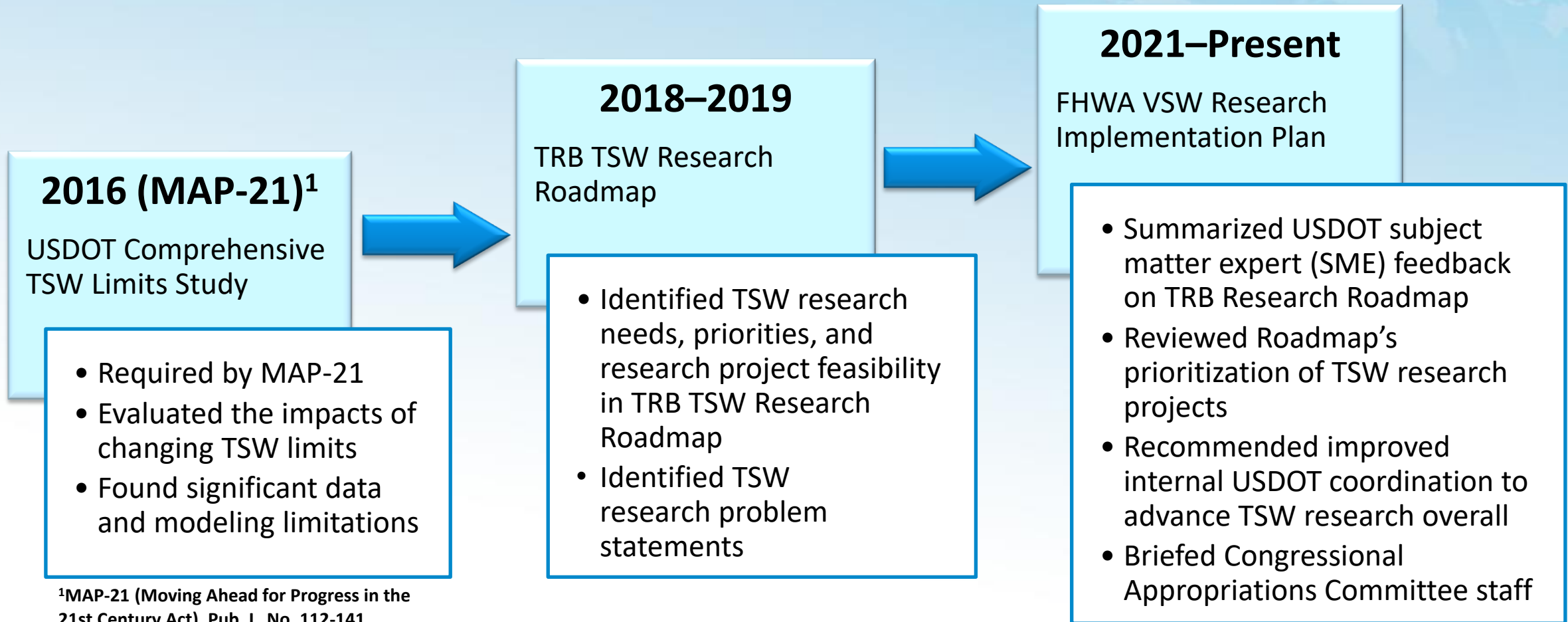
FHWA has historically convened the Department's modal stakeholders on congressional directives for TSW studies.



Past Research Activities



Timeline for Truck Size and Weight Research



¹MAP-21 (Moving Ahead for Progress in the 21st Century Act), Pub. L. No. 112-141.

VSW = vehicle size and weight.



Comprehensive Truck Size and Weight Limits Study (CTSWLS)

- In coordination with modal partners, FHWA led the response to congressional directives, including the 2016 CTSWLS.
- The CTSWLS was submitted to Congress in April 2016.
- Since completion of the CTSWLS in 2016, FHWA has explored data and modeling of TSW topics to address gaps and limitations found in the CTSWLS.

Comprehensive Truck Size and Weight Limits Study at a Glance

Section 32801 of MAP-21 (Public Law 112-141) required USDOT to develop a CTSWLS evaluating the impacts of changing TSW limits on infrastructure, safety, and other areas.

The 2016 CTSWLS found significant data and modeling limitations and recommended a research program to advance the state of the practice.



Findings and Recommendations From the Comprehensive Truck Size and Weight Limits Study

Findings included the following:

- Data limitations severely hampered efforts to study the effects of the size and weight of various truck configurations.
- Model and data limitations were so profound that results could not accurately be extrapolated to confidently predict national impacts.

Recommendations included the following:

- A more robust study effort is needed, starting with the design of a research program.
- The research program should consider safety, compliance and enforcement, modal shift, bridges, and pavement.

Comprehensive Truck Size and Weight Limits Study: Data and Models Needs

- Truck weight data in crash databases
- Truck configuration data in crash databases
- Weigh-in-motion (WIM) coverage
- Longitudinal barrier impacts
- Motor Carrier Management Information System
- Vehicle Inventory and Use Survey (VIUS) update
- Cost Intermodal Transportation and Inventory Model
- Passenger car equivalents for truck configurations
- Framework for modeling modal shift impacts on regional and short line railroads
- Enhance capabilities of the Freight Analysis Framework (FAF)
- Bridge damage cost allocation
- Long-Term Bridge Performance Program bridge deck deterioration modeling
- Assessment of impacts on local bridges
- Pavement performance prediction methodology
- Composite (overlay) pavement assessment
- Local road pavement impact assessment



Transportation Research Board Research Roadmap Activities

- In 2016, FHWA conceived of and provided funding to TRB to develop a research roadmap. The TRB plan was not intended to be implemented as written but for modal experts within USDOT to consider when programming their modal research priorities.
- In 2018, USDOT provided a status report to Congress on the roadmap. A report to Congress summarizing FHWA's TSW efforts is under internal review, as is an implementation plan.
- In House Report 116-452, Congress requested a briefing from FHWA on an implementation plan for conducting the TSW research outlined in the TRB Research Plan—conducted March 26, 2021.

What Is Truck Size and Weight Research?

TSW research includes development of data, models, analytical tools, methodologies, and information sources that support analysis of topics such as:

- Pavement distress
- Freight flows
- Physical and operational characteristics of truck configurations
- Disaggregation of vehicle miles traveled based on truck classifications and weight



Transportation Research Board Research Roadmap

- Presented general findings on TSW research needs and priorities.
- Concluded that improvement in models for projecting impacts of changing TSW limits may not guarantee the success of future policy studies.
- Recommended research needed to answer questions related to changes in TSW limits.
- Outlined 27 potential TSW research projects, including objectives, possible approaches, data requirements, estimated costs, and estimated duration.
- Identified project prioritization tiers based on projects' likelihood to produce results, timeframe, budget, and perceived importance.
- Identified first-tier core research projects that have a good probability of producing useful results within a practical time period and budget, while reducing uncertainty in TSW limit evaluations.



Transportation Research Board Research Roadmap: First-Tier Core Research

- Truck traffic, weight, and configuration database from nationwide WIM installations and other sources.
- Model capable of estimating the effect of changes in TSW regulations and other policies on shippers' and carriers' choices of freight mode, vehicle configuration, and shipment size.
- Pavement analysis methods for heavier axle limits, multi-axle groupings, and alternative tire and suspension types.
- Comprehensive model of the relationship of bridge deterioration and service life to vehicle loads.
- Protocols for evaluating the performance of configurations with simulation, track testing, and field trials.
- Comparative evaluations of crash risks of alternative configurations by the case-control method.
- Measurement of relationships between frequency of overloads enforcement methods and level of effort.



Synthesis and Assessment of Twin 33-Foot Trailers

FHWA evaluated data on the operation of twin 33-foot trailers in the United States to gain insight into potential impacts of this commercial vehicle configuration:

- Limited information exists concerning any safety impacts of twin 33-foot trailers.
- Findings of the CTSWLS on the impact on pavements and bridges remain unchanged due to a lack of vehicle weight data.

Implementation Plan



Implementation Plan (1/2)

Following receipt of the TRB Research Roadmap, FHWA undertook drafting of an implementation plan to improve modal coordination of TSW research. The plan addressed three areas:

- USDOT SME-perspectives on the TRB Research Roadmap
- Programmatic considerations for TSW research
- Implementation considerations for TSW research

What is the U.S. Department of Transportation Truck Size and Weight Research Implementation Plan?

The draft plan summarizes FHWA's assessment of the TRB Research Roadmap with input from other USDOT SMEs. It outlines needs, considerations, and success factors for implementation of TSW research.



Implementation Plan (2/2)

In *developing* the implementation plan, FHWA considered a number of areas, including:

- Identifying funding/resources
- Defining a TSW research agenda focused on near-term feasibility
- Establishing robust knowledge management practices
- Coordinating these elements across USDOT modes

In *advancing* the draft implementation plan, FHWA is currently focused on:

- Establishing robust data collection and management practices
- Coordinating these elements across USDOT modes



Research Knowledge Management

A TSW *research knowledge management* approach was implemented to include:

- Develop resources, such as an internal information repository, to improve USDOT coordination on TSW topics and strengthen research outcomes
- Continuing to identify needs and assistance in prioritizing and implementing USDOT's TSW research
- Developing forums to convene USDOT SMEs or other stakeholders
- Staying informed on States', TRB's, academia's, and others' external TSW research

Truck Size and Weight Research Knowledge Management Approach—Outcomes

- More systematic and strategic coordination of TSW research projects across USDOT, leading to more successful research outcomes
- Improved ability to identify research needs, prioritize and sequence research, monitor outputs, and avoid redundancy
- Leveraging of existing resources (e.g., staff, funds)



Ongoing Related Activities and Research



Related Research Completed 2021–2023

- Updated the FAF to version 5 (FAF5), which integrates data from multiple sources to create a comprehensive picture of all transportation modes' freight movement. This is used for forecasting freight flows and modeling future truck traffic.
- Developed a revised VIUS to update the Nation's principal dataset on physical and operational characteristics of U.S. light and heavy trucks. New data representing year 2021 was published in 2023.
- Developed and launched visualization tools for the public to access FAF and VIUS data in a user-friendly format. Initial VIUS visualization tool offers historic data.



Recent Truck Size and Weight-Related Activities (1/2)

- Continuing coordination via USDOT internal TSW Working Group
- Publishing periodic *USDOT Vehicle Size and Weight Research Updates Brief*; 2023 and 2024

USDOT Vehicle Size and Weight Research Updates Brief
For Internal USDOT Reference Only
Spring 2024

Not for public distribution

Overview
This Vehicle Size and Weight (VSW) Research Updates Brief provides U.S. Department of Transportation (USDOT) VSW experts with recurring updates about VSW-related projects, research, news, and events. VSW research topics refer to safety, pavement, bridges, mode choice, enforcement, economics, data, technology, regulations, guidance, and other related topics.

Research

Transportation Pooled Fund (TPF)

- [Improving Traffic Detection Through New Innovative I-15 Technology Demonstration Pilot \(in progress\)](#) – FHWA lead organization.

Transportation Research Record: Journal of Transportation Research Board

- [Necessary Infrastructure Accommodations for Automated Trucks and Truck Platoons \(in progress\)](#)
- [Asset Management of Bridges Using Uncrewed Aerial Vehicles and Machine Learning Models \(in progress\)](#)

USDOT National University Transportation Center for Safety

- [Estimating the Effects of Vehicle Automation and Vehicle Weight and Size on Crash Frequency and Severity: Phase 1 \(in progress\)](#)

National Center for Sustainable Transportation

- [Effects of High Early Strength Concrete Thermal Contraction, Shrinkage and Creep on Pavement Performance \(in progress\)](#)
- [Development of Predictive Performance Models and Calibration of Mechanistic Empirical Design Method for Optimized Transportation Infrastructure Management, Considering Life-Cycle Costs and Environmental Impacts \(in progress\)](#)

University of California Institute of Transportation (ITS)

- [Assessing Safety, Risk, and Labor Issues Related to Heavy-Duty Automated Vehicles \(In Progress\)](#)

USDOT Project Spotlight

FMCSA Crash Causal Factors Program

The Federal Motor Carrier Safety Administration (FMCSA) is developing the [Crash Causal Factors Program \(CCFP\)](#) to collect and analyze crash data involving commercial motor vehicles (CMVs). The CCFP intends to identify key factors that contribute to crashes involving CMVs, inform countermeasures to prevent these crashes from happening, and establish a foundation for continued data collection, sharing, and analysis. Phase 1 of the CCFP, which focuses on fatalities involving Class 7&8 commercial vehicles, expands on the [Large Truck Crash Causation Study \(LATCCS\)](#) (2001-2003) and incorporates lessons learned through a focused scope, increased sample size, new data elements for collection, and collaboration with state and local jurisdictions. Since 2020, fatal crashes involving CMVs have increased in the United States. This program is an effort to reverse this trend and pursue a long-term goal of zero roadway fatalities. The CCFP also aligns with the safety research recommendations from the [TRB Truck Size and Weight Research Roadmap](#). FMCSA is targeting 2029 to publish a final report for the Phase 1 study.

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Source: FHWA.

Recent Truck Size and Weight-Related Activities (2/2)

- Developed a TSW research tracker to build awareness within USDOT of external TSW research efforts

Vehicle Size and Weight Research (VSWR) Tracker ☆

Publication Type	Source	Publication	Topics	Publication Date
Research	Federal Highway Administration (FHWA)	Best Practices in Permitting of Oversize and Overweight Vehicles: Final Report	OSOW Enforcement	2018
Research	USDOT Emergency Route Working Group	Emergency Route Working Group (ERWG) Report of Recommendations to the Secretary of Transportation December 2018	OSOW Safety	2018
Research	Specialized Carriers & Rigging Foundation (SC&RF)	Assessing the Cost and Operational Impacts of State Practices for Minimum Quad Axle Weights Granted for Routine Over-Weight Permits	OSOW Enforcement	2019
Research	Specialized Carriers & Rigging Association (SC&RA)	Uniform Permit Transport 2021 (UPT21)	Data OSOW	2021
Research	Federal Highway Administration (FHWA)	Long-Term Infrastructure Performance (LTIP) Student Data Analysis Contest Instructions	OSOW Data Pavement	2023
Research	Wisconsin Traffic Operations & Safety Laboratory (TOPS)	Work Zone Designer Series Oversize/Overweight Vehicle Accommodations in Work Zones	OSOW Data Safety	2020
Research	Virginia Department of Transportation	Impact of Virginia Participation in a Federal Pilot Study of 91,000-Pound, Six-Axle Vehicles Utilizing the Interstate (Chapter 554, 2018)	WIM Pavement Bridge	2019

Source: FHWA.



Ongoing Research (1/3)

- Building out data requirements to allow for future crosscutting research, as recommended by the TRB Roadmap Problem Statement C.1
- Initiating follow-on research from data requirements effort (C.1) for both short and long terms
- Defining a TSW research agenda that builds off resulting data foundation

Problem Statement C.1: Build truck traffic, weight, and configuration database from nationwide WIM data and other sources

Establishing baseline datasets of traffic volumes, axle/gross weights, and configuration types necessary for estimating the impacts of changes in truck size limits and developing models of the relation of loads to bridge and pavement costs.

Using vehicle data the States are now collecting, this research could develop procedures for data collection, formatting, quality control, and methods to produce a consistent base-year dataset of truck traffic volumes, weight spectra, safety data, and enforcement data for the U.S. road system. The research could also provide the truck weight data needed for infrastructure impact modeling research projects in the roadmap.

Ongoing Research (2/3)

FHWA is working with DOT modal partners to advance *short-term* TSW research, including:

- Advancing the highest priority core research recommendation in the TRB Research Roadmap to compile TSW data that can inform further crosscutting research across all research categories. (TRB Roadmap Problem Statement C.1)
- Developing the Crash Causal Factors Program to collect and analyze crash data involving commercial motor vehicles. This effort directly supports the safety recommendations from the TRB Research Roadmap. (FMCSA)
- Expanding the use of WIM data such as through the pooled-fund pilot: Improving Traffic Detection Through Inductive Loop Signature Technology (FHWA, FMCSA, State DOTs)



Ongoing Research (3/3)

FHWA is working with DOT modal partners to advance *long-term* TSW research, including:

- Developing a pavement distress evaluation model and creating analytical tools based on vehicle classifications and weights
- Continuing to research impacts of commercial vehicles on bridges
- Continuing to advance the Long-Term Pavement Performance Program
- Making TSW enforcement data from 2019 to 2022 available on the USDOT public data portal website [[“Truck Size and Weight Enforcement Data” | USDOT open data \(transportation.gov\)](#)]
- Understanding oversize/overweight (OS/OW) vehicle accommodation in work zones
- Leading the Emergency Route Working Group (ERWG) in routing trucks to respond to emergencies. [[“Emergency Routing” | FHWA Freight Management, and Operations](#)]
- Researching methods to prevent bridge strikes by OS/OW vehicles





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Publication No. FHWA-HOP-24-061

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