

Strategic Objective 2.1—Maintain or Improve Operating Conditions

Maintain or improve the availability, reliability, and performance of the Nation's transportation infrastructure, equipment, and facilities by ensuring that they are functioning as designed within their useful lives.

PERFORMANCE SUMMARY

Recent reports on the condition of our highways, bridges, transit assets, and passenger rail facilities reveal that many fall short of a state of good repair. As a result, the performance of the U.S. transportation network is compromised in terms of its safety, capacity, and efficiency.

DOT's role in achieving state of good repair varies from mode to mode. The Department can significantly influence the condition of federally funded highway, transit, and airport infrastructure through regulation, program guidance, and technical assistance to State departments of transportation, transit agencies, and airport authorities; as well as through research and development to produce the knowledge, guidance and innovations needed to more effectively address the Nation's infrastructure challenges. While DOT has influence on state of good repair for highways, transit, and airports, federal influence over the level of state of good repair investment in other modes like railroads, seaports, and pipelines is limited to primarily safety concerns. Much of these infrastructure facilities are funded and maintained by the private sector.

DOT Operating Administrations (OAs): The following OAs contribute to DOT's strategic objective of maintaining the Nation's transportation infrastructure: Federal Highway Administration (FHWA), Federal Transit Administration (FTA), Federal Aviation Administration (FAA), Pipeline and Hazardous Materials Safety Administration (PHMSA), and Federal Railroad Administration (FRA).



Roadway Conditions (FHWA)

Overview

The condition of pavement, bridges, and tunnels across the country varies considerably and many States are struggling to maintain current conditions. DOT will continue to make state-of-good repair a top priority in its ongoing commitment to advance strategies and initiatives to improve the condition and performance of the Nation’s roadways. The National Highway System (NHS), which includes the Interstate system, principal arterial routes, the Strategic Highway Network and connectors, and intermodal connectors, comprises most major routes with the largest bridges, greatest amounts of traffic, and most important linkages between ports and cities. While the NHS represents only 5.4 percent of highway mileage and 8.9 percent of lane mileage, 55 percent of the Nation’s vehicle miles traveled (VMT) occurred on the NHS during 2012. Likewise, about 83 percent of truck travel, including most of the heavy truck movement across multiple state lines, occurred on the NHS. While representing only about 23 percent of the more than 611,000 bridges in the Nation, NHS bridges comprise about 213.5 square meters, or 58 percent of the total bridge deck area, and carry 79 percent of annual daily traffic. In MAP-21, the NHS was expanded by over 50,000 miles and the addition of nearly 23,000 bridges with approximately 30 million square meter of deck area.

Working with the States, DOT monitors and reports the condition of pavement on the NHS by measuring ride quality. In 2014, the latest year for which data are available, the percent of VMT on the NHS with good to very good ride quality was 58.7 percent. A large increase in Federal highway capital investment under the Recovery Act, combined with a decrease in construction material prices, contributed to the significant improvement in the smoothness of pavements between 2010 and 2014. DOT currently measures bridge condition as the percent of deck area on NHS bridges considered structurally deficient. In 2014, DOT met its original long-term target to decrease the percent of deck area of structurally deficient bridges on the NHS to 6.0 percent or lower by 2018. Structurally deficient deck area continues to steadily decrease. In 2015, it decreased to 5.6 percent, which was below the target of 5.9 percent, in 2015. Targets for FY 2016-17 have been revised further.

PERFORMANCE REPORT

Roadway Conditions (FHWA)								
Goal Description	2010	2011	2012	2013	2014	2015 Target	2015 Actual	Performance
Percent VMT on NHS with good to very good ride quality	55.0 % (r)	54.3 % (r)	57.1% (r)	57.7% (r)	58.7%	60.3%	N/A	Potentially Met 
Percent of Deck Area on NHS Structurally Deficient Bridges	8.3%	7.8%	7.1%	6.8% (r)	6.0%	5.9%	5.6%	Met 

Notes: (r) – revised,

Progress Update- Results

Properly maintained roads that meet the standard of a good or very good rated ride are safer because drivers are less likely to lose control of the vehicle, saving money for both the user and taxpayers. Deficient bridge conditions can impact the movement of people and goods through reduced load carrying capacity and geometric constraints. With an increase in funding through the National Highway Performance Program (NHPP), pavement ride quality rated good or very good on the NHS is forecast to improve to 64.3 percent by 2018. FHWA reports conditions on structurally deficient bridges on the NHS, a subset of all publicly owned deficient bridges that are most critical to efforts to move the overall number. At the end of 2015, the total deck area on 5,481 structurally deficient bridges on the NHS was estimated at 5.6 percent and is forecast to decrease to 5.4 percent by 2018. Despite the positive trends in bridge condition, the challenge of continuing the improvement trends and preserving existing assets remains.

In January 2015, DOT issued a Notice of Proposed Rulemaking (NPRM) that would establish a new regime of national performance measures for pavement and bridge conditions in the coming years. As part of a national performance management framework called for in MAP-21, States will be required to make significant progress towards achieving targets for these performance measures, with the state-by-state results being aggregated and reported nationally.¹ The proposed measures are

- Percent of pavements in Good condition on the Interstate and on the NHS portion excluding the Interstate and
- Percent of pavements in Poor condition on the Interstate and on the NHS portion excluding the Interstate.

DOT proposes to establish two bridge condition measures using a classification system of Good, Fair, and Poor. The two proposed measures are

- Percent of NHS bridges classified as in Good condition and
- Percent of NHS bridges classified as in Poor condition.

The proposed condition measures will reflect the lowest National Bridge Inspection component (i.e., Deck, Superstructure, Substructure, and Culvert) rating for a bridge, weighted by the deck area.

During FY 2015, DOT continued to develop, update and/or deploy elements of bridge and tunnel design, inspection and rating programs that address structural, geotechnical and hydraulic features. Several circulars that provide practitioners the most current technical guidance and information related to hydraulic and geotechnical transportation engineering were issued. FHWA continued to work with States to complete plans of corrective actions needed to return to compliance with the National Bridge Inspection Standards (NBIS). Assistance was provided to several States on all aspects of the program, with a focus to improve bridge load ratings and scour practices per their plans of corrective action.

DOT published a *Final Rule* effective August 2015 that will ensure uniform standards for inspecting tunnels on all public roads, on and off Federal-aid highways, including Tribal and

¹ The current pavement condition measure is based on a single metric, which is the International Roughness Index, weighted by VMT. The proposed measures are based on multiple pavement metrics (e.g., International Roughness Index, rutting, Cracking Percent, faulting) and system mileage.

Federally owned tunnels. The regulation requires the creation of a reliable national tunnel inventory that can be used to determine the condition of tunnels and prioritize repairs, rehabilitation, or replacement to ensure public safety. Pursuant to establishing a National Tunnel Inspection Standards (NTIS) as called for in *MAP-21*, DOT began developing an oversight program that will focus on compliance and assessment of tunnels.

Information Gaps

Continued support for two of FHWA research programs, Long Term Pavement Performance (LTPP) and Long Term Bridge Performance (LTBP), is critical to advancing our understanding and prediction of infrastructure performance. In a continuing partnership with American Association of State Highway and Transportation Officials (AASHTO), Transportation Research Board, and the State transportation agencies that own the LTPP test sections, FHWA continues to perform research to identify the factors that influence pavement performance and develop products which highway engineers can apply to make decisions concerning pavement management, design, and rehabilitation. As part of its LTBP program, FHWA is working with its partners to advance the understanding of bridge performance. This work includes state-of-the-art condition assessment of concrete bridge decks, joints, bearings, prestressed concrete girders, and coatings for steel girders. The LTBP data are collected using traditional bridge inspection methods, as well as automated methods using advanced technologies. The data will be used to create beneficial tools for bridge owners, who must make decisions for planning and operations, and for prioritizing maintenance, rehabilitation, repair, and replacement of their assets.

The issue of asphalt durability has reemerged as material suppliers have adapted to the ever-changing marketplace for petroleum products and recycled materials (e.g., reclaimed asphalt pavement, recycled engine oil bottoms, and recycled asphalt shingles). FHWA is conducting research to form the basis of expanded guidance to support effective evaluation and use of these materials in the construction of truly sustainable highway pavements.

Through the Every Day Counts (EDC) initiative, FHWA has a number of projects under way to accelerate infrastructure construction and preservation. For example, research is under way to test the use of precast concrete bridge deck elements with steel beam superstructures in order to accelerate bridge construction. The results of the research will assist engineers and other transportation decision makers to utilize precast elements more effectively and efficiently, leading to improved bridge safety, integrity, and performance, as well as reduced construction delays.

Transportation agencies must use quality assurance standards to control, monitor, and assess the construction quality of bridges, pavements, and other highway infrastructure. FHWA is developing best practices and standards to strengthen and improve core areas of agencies' quality assurance programs, such as independent assurance, dispute resolution, data validation, and acceptance procedures.

PERFORMANCE PLAN

Roadway Conditions (FHWA)			
Goal	Indicator	FY 2016 Target	FY 2017 Target
Increase the percent VMT on the National Highway System (NHS) meeting pavement performance standards for good to very good rated ride quality to 64.3 percent or higher by 2018.	Percent VMT on NHS with good to very good ride quality.	61.4%	62.7%
Decrease the percentage of deck area NHS structurally deficient bridges to less than 6.0% by 2018.	Percent of Deck Area on NHS Structurally Deficient Bridges	5.5%	5.4%

Key Strategies

Past research efforts have provided a wide array of tools, technologies, guidance and specifications to support effective management of highway infrastructure. FHWA-sponsored RT&E has:

- Enabled the development of the AASHTO’s Mechanistic Empirical Pavement Design Guide (MEPDG) and accompanying AASHTOWARE Pavement ME™ software.
- Improved specifications and test methods for paving materials to achieve greater durability and sustainability including improvements to SuperPave specifications and a test method for a coefficient of thermal expansion that is key to concrete pavement performance.
- Provided analytical tools such as the RealCost and CA4PRS software to support agency pavement design and construction sequencing decisions.
- Provided improved standards for design and structural evaluation of bridges, such as more complete guidance for design and evaluation of gusset plates in the wake of the I-35 bridge collapse in Minneapolis research that resulted in newly revised specifications adopted by AASHTO.

Next Steps

In FY 2016, NHPP will support important activities associated with further implementing MAP-21 and FAST including:

- Dedicated funding for maintaining and improving the condition and performance of the NHS;
- Inspection and evaluation of bridges, tunnels, and other highway assets, as well as the provision of training for bridge and tunnel inspectors; and
- Support for State and local transportation agencies as they work to apply innovative revenue generation, procurement, and project finance strategies to support major infrastructure enhancements.

Surface Transportation Block Grant Program will improve highway infrastructure condition and performance, on and off the NHS by:

- Demonstrating innovative practices to extend life, improve performance, speed construction; and
- Providing physical improvements to highways, including designated routes of the Appalachian Development Highway System and local access roads.

Highway RT&E programs will improve knowledge, specifications, design methods, guidance, tools, technologies, and other products that will enable:

- Improvement in the safety-related attributes and characteristics of highway infrastructure.
- Demonstration of innovative practices to extend infrastructure life, improve performance, speed construction.
- Construction of more durable highway infrastructure that minimizes: the duration and frequency of lane closures for both initial construction and future maintenance and rehabilitation measures; and the life-cycle costs of the infrastructure from both an economic and environmental perspective.
- Improved connection technologies for prefabricated bridge systems and updated cost-effective design and construction methods that integrate bridge spans with roadway approaches.
- Increased compliance with established plans of corrective actions and improvement plans under the National Bridge Inspection Program (NBIP) oversight process.
- Development of guidelines for the expanded use of reclaimed asphalt pavement and fly ash in infrastructure materials.

The Federal Lands Tribal and Transportation Program (FLTTP) will complete construction and engineering projects that will improve multimodal access, support increasing visitation, and improve visitor experiences at recreational areas on public lands; and expand economic development in and around Federal lands, while preserving the environment and reducing congestion at our national treasures. The FLTTP will support transportation planning, research, maintenance, engineering, rehabilitation, and construction of transportation facilities that provide access to, are within, or are adjacent to Tribal lands.

Goal Leaders

Walter Waidelich, Associate Administrator for Infrastructure, Federal Highway Administration
Michael Trentacoste, Associate Administrator for Research, Development and Technology, Federal Highway Administration
Timothy Hess, Associate Administrator for Federal Lands Highway, Federal Highway Administration

Runway Conditions (FAA)

Overview


The FAA works closely with the Nation’s airports² to ensure a good state of repair for runways. This requires careful attention to pavement condition and strategic timing of rehabilitation, resurfacing or reconstruction projects, which can create operational impacts if the timing is not carefully considered.

Airports are generally responsible for funding periodic and ongoing maintenance. Periodic maintenance of runways, particularly resurfacing, is a cost-effective way to delay the need for major runway rehabilitation. Deferred or delayed maintenance creates an increased risk of damage to aircraft and is a safety concern for the travelling public; and increases both the scope and cost of eventual rehabilitation or reconstruction.

Airports of all sizes rely on FAA’s financial assistance for significant rehabilitation, resurfacing, and reconstruction of runways and major taxiways. Smaller commercial service airports and particularly general aviation airports often lack sufficient revenue sources to finance routine maintenance in a timely manner.

FAA helps fund a broad range of capital infrastructure development at most airports in NPIAS including more significant rehabilitation, resurfacing or reconstruction projects. FAA’s goal is to maintain at least 93 percent of the Nation’s paved runways in excellent, good, or fair condition. This level is important because it is intended to limit the number of runways undergoing significant reconstruction at the same time. In recent years, the FAA has been able to exceed its goal; in FY 2015, 97.7 percent of runways were maintained in excellent, good, or fair condition.

PERFORMANCE REPORT

Runway Conditions (FAA)								
Goal Description	2010	2011	2012	2013	2014	2015 Target	2015 Actual	Performance
Percent of runway pavement in excellent, good, or fair condition for paved runways in the National Plan of Integrated Airport Systems.	97.2%	97.4%	97.5%	97.5%	97.6%	93%	97.7%	Met 

Progress Update

FY 2015 performance results indicate our Nation’s airports continue to remain in a state of good repair. FAA has been able to meet the FY 2015 and prior fiscal year targets due to the success of multiple efforts by the agency and our Nation’s airports. FAA prioritizes investments to preserve existing infrastructure in a state of good repair. Federally obligated airport sponsors are required to maintain a systematic approach to preventive pavement maintenance. All airports provide

² In this context, this refers to airports included in the National Plan of Integrated Airport Systems (NPIAS)—a capital development plan that DOT is required to update and publish biennially.

capital needs data included in the National Plan of Integrated Airport Systems (NPIAS) on a biennial basis. High-priority capital projects (including runway pavement rehabilitation and/or reconstruction projects) are prioritized and considered for Airport Improvement Program funding as part of the annual update of the 3-year Airports Capital Improvement Plan process. Funding runway pavement projects directly contributes to the goal of maintaining a certain level of runways in excellent, good, or fair condition.

PERFORMANCE PLAN

Runway Conditions (FAA)			
Goal	Indicator	FY 2016 Target	FY 2017 Target
Maintain runway pavement in excellent, good, or fair condition for at least 93 percent of the open, paved runways in the NPIAS.	Percentage of NPIAS airports with runway pavement in excellent, good, or fair condition.	93%	93%

Key Strategies

- Assessing pavement condition via scheduled and surveillance safety inspections of certificated airports.
- Collect safety and pavement condition data under a contract program to inspect non-certificated public use airports every 3 years.
- Maintain a 5-year, forward-looking analysis of airport capital requirements that includes runway rehabilitation requirements, published in the biennial NPIAS report.
- Enforce requirements to have pavement preventive maintenance programs at Federally obligated airports.

FAA’s Office of Airports (through its Regional Offices and Airports District Offices) partners with state aeronautical agencies and individual airports to monitor pavement condition. Three other FAA offices support this effort: the Air Traffic Organization, which helps evaluate and minimize the capacity and delay impacts resulting from runway reconstruction projects and helps communicate temporary closures; the Aircraft Certification Service, which helps quantify the relationship between aircraft performance requirements and characteristics and airfield pavement engineering; and the William J. Hughes Technical Center, which assists with a broad range of pavement research. External partners include State aeronautical agencies and other aeronautical and airfield pavement associations.

Our Airport Technology Research Program is integral to FAA’s ability to achieve performance goals for runway pavement condition. Several concentrated pavement-related research programs help address the continued need to improve FAA airport design, construction, and maintenance standards. The majority of pavement research is conducted at FAA’s William J. Hughes Technical Center (Tech Center) in Atlantic City. The Tech Center houses the National Airport Pavement Test Facility (NAPTF), a 1,200-foot building with 900 feet of full-scale airport test pavement. The NAPTF allows FAA and industry to validate new design standards for existing and proposed multiple wheel landing gear configurations.

Advisory Circular (AC) 150/5320-6E, Airport Pavement Design and Evaluation, includes interactive advance pavement design software that develops state-of-the-art airfield pavement design standards using results from full-scale testing programs and other industry research. Enhancements to the design software continue. FAA will continue to update the AC, which includes addressing recycled and sustainable material design criteria and new aircraft main gear with 8- and 10-wheel arrangements.

Two independent airfield pavement research foundations have contributed to airfield pavement knowledge through applied research. The Innovative Pavement Research Foundation (IPRF) focused primarily on improving rigid concrete airfield pavement performance: <http://www.iprf.org>. The Airfield Asphalt Pavement Technology Program (AAPTP) focused on improving the quality of hot mix asphalt pavements: <http://www.aaptp.us>. Collaborative efforts between IPRF and AAPTP resulted in improved understanding of airport pavement marking practices and life cycle cost analysis and contributed directly to improvements in FAA guidance.

Next Steps

- Maintain an effective pavement research program. FAA will complete construction of a high-temperature pavement test facility at the Tech Center by August 2015.
- Continue to monitor airport pavement condition on an annual basis for certificated airports and on a 3-year basis for other public use airports.
- Continue identifying and prioritizing capital reinvestment requirements by providing technical support for planning, environmental and engineering processes, including airspace reviews and construction safety phasing plans.
- Issue FY 2016 grants (and review/approve Passenger Facility Charge (PFC) applications) to support pavement improvement projects.

Goal Leaders

Michael P. Huerta, Administrator, Federal Aviation Administration

Eduardo Angeles, Associate Administrator for Airports, Federal Aviation Administration


Transit Conditions (FTA)

Overview

The Nation needs to meet an increasing demand for public transportation while bringing transit infrastructure into a state of good repair. More than one-quarter of the Nation's bus and rail assets are in marginal or poor condition. The proportion of assets in marginal or poor condition jumps to one-third in the largest and oldest rail transit agencies, many of which suffer from a legacy of chronic underinvestment. This backlog of state of good repair needs has direct impacts in the form of heightened safety risks, decreased system reliability, increased maintenance costs, and overall decreased performance. According to the 2013 Conditions and Performance Report, the Nation's transit systems maintenance backlog now exceeds \$86 billion and all other things being equal, an additional \$2.5 billion in spending from both Federal and local sources would be needed each year just to keep it from growing.

PERFORMANCE REPORT

Transit Conditions (FTA)

Goal Description	2010	2011	2012	2013	2014	2015 Target	2015 Actual	Performance
Keep the nation’s state of good repair backlog to less than \$100 billion (current-year dollars) through 2018. (Biennial measure.)	N/A	\$77.7 billion	N/A	\$85.9 billion	N/A	\$94 billion	N/A	N/A 

Progress Update - Results

In the most recent Conditions and Performance Report, FTA estimated that there is an \$86 billion state of good repair backlog at the Nation’s transit systems with an anticipated need of \$2.5 billion per year in funding from all sources of government (State, local, and Federal) to keep the backlog from growing. FTA updates the state of good repair backlog estimate with the publication of each Conditions and Performance Report. An updated estimate will be provided in 2016 with publication of a new edition of this report using 2012 data.

During FY 2015, FTA took substantial steps towards implementing the National Transit Asset Management System. In September, FTA published a Notice of Proposed Rulemaking (NPRM) that proposed FTA’s first-ever definition of *state of good repair*, requirements for each FTA grantee to establish a transit asset management plan, and a suite of state of good repair performance measures against which each of our grantees would be required to set targets. Concurrently, FTA also published in the Federal Register a proposal to expand the National Transit Database to collect additional capital asset inventory information, as well as condition data towards the state of good repair performance measures proposed in the NPRM. Once implemented, this rule will change “business as usual” for much of the public transportation industry by requiring a systematic and strategic approach across the industry towards measuring and prioritizing *state of good repair*.

During FY 2015, FTA also expanded its technical assistance efforts to prepare the transit industry for implementation of the National Transit Asset Management System. Earlier this year, FTA began publishing a quarterly newsletter to share best practices in asset management among our stakeholders in the transit industry. In June 2015, FTA also reconvened its State of Good Repair Roundtable to help build a community of practice among asset management practitioners in the transit industry. In addition, FTA continued to maintain and expand an asset management technical assistance library on our website, and to support classroom offerings by the National Transit Institute of our “Introduction to Asset Management” training course. FTA also continued to supply a “Lite” version of our Transit Economic Requirements Model (TERM), which individual grantees can use to model 20-year capital investment scenarios for their own transit systems – and which also fulfills one of FTA’s statutory deliverables under MAP-21. By the end of FY 2015, FTA had also wrapped up five out of six asset management pilot grants, publishing the final reports from each project in the technical assistance library of our website.

PERFORMANCE PLAN

Transit Conditions (FTA)				
Goal	Indicator	FY 2016 Target	FY 2017 Target	
Keep the nation's state of good repair backlog to less than \$100 billion (current-year dollars) through 2018. (NEW)	State of Good Repair backlog (current year dollars)	\$98B	\$99B	

Next Steps

To bring transit systems into a state of good repair, FTA will do the following:

- Respond to comments and publish National Transit Asset Management System Final Rule which will:
 - Define state of good repair.
 - Require recipients and sub-recipients to establish transit asset management plans.
 - Establish state of good repair performance measures against which grantees will be required to set targets annually.
 - Require annual reporting of asset inventories, condition assessments, and state of good repair performance results to the National Transit Database.
- Continue to provide research and technical assistance on best practices in transit asset management.
- Conduct outreach to the transit industry through roundtable meetings, technical assistance products, research reports, and training sessions to encourage knowledge sharing of best practices in transit asset management.

Goal Leaders

Robert J. Tuccillo, Associate Administrator for Budget and Policy, Federal Transit Administration