Future Interstate Study

Change :: Resilience :: FHWA perspectives

A Presentation by

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Listening Session
Interstates :: Overview

FHWA, Change, & Resilience

• Where Are We?
  • Quick Current Snapshot

• How Did We Get Here?
  • Milestones & Lessons

• A System of Change
  • Beyond Status Quo

• Conclusions & Takeaways
Bridges :: A Microcosm of a System

- **Count:** 57,309
  - *Rural:* 25,176
  - *Urban:* 32,133
  - *Over Water:* 22,973

- **Averages**
  - *Year Built:* 1973 (44 years)
  - *Reconstructed:* 1993 (24 years)
  - *Traffic Lanes:* 3
  - *Daily Traffic:* 36,540 vehicles
  - *% Trucks:* 17%

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**Number of Interstate Bridges Built and Reconstructed**

![Graph showing number of bridges built and reconstructed by year.](image)

- **X-axis:** Years (1946-2015)
- **Y-axis:** Number of Bridges
- **Legend:**
  - Blue: Built
  - Red: Reconstructed

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**Bridges & Structures**

- **Structures**
- **Geotech**
- **Hydraulics**
- **Safety**
Interstates :: Bridges over Time ...

614,387 Bridges
509,358 over water
57,309 Interstate
22,973 over water

Year: 1956
Presidential terms and some milestones on our journey...
A Federal Design Standard

*Designs for all Interstate culverts and bridges over streams shall ... accommodate floods at least as great as that for a 50-year frequency or the greatest flood of record, whichever is the greater, with the runoff based on the land development expected in the watershed 20 years hence ....*

Policy and Procedure Memorandum 20-4
Bureau of Public Roads
August 10, 1956
1 April 1962 :: I-29 Bridge on Big Sioux River
Interstates :: Safety

National Bridge Inspection Standards

Bridges & Structures

U.S. Department of Transportation
Federal Highway Administration

Structures  Geotech  Hydraulics  Safety
1974 :: FHWA Floodplain Regulation

Rules and Regulations

Interstates :: Risk

Bridges & Structures

U.S. Department of Transportation
Federal Highway Administration
Interstates :: Integrating NEPA & Floodplains

1977 :: Executive Order 11988

EXECUTIVE ORDER 11988

MAY 24, 1977

Flooding Management

By virtue of the authority vested in me by the Constitution and statutes of the United States of America, as President of the United States of America, in accordance with the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 et seq.), the National Flood Insurance Act of 1968, as amended (42 U.S.C. 4001 et seq.), and the Flood Disaster Protection Act of 1973 (Public Law 93-234, 87 Stat. 971), in order to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative, it is hereby ordered as follows:

Section 1. Each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities for (1) acquiring, managing, and disposing of federal lands and facilities; (2) providing federally undertaken, financed, or assisted construction and improvements; and (3) conducting federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulation, and licensing activities.

Sec. 2. In carrying out the activities described in Section 1 of this Order, each agency has a responsibility to evaluate the potential effects of any action it may take in a floodplain to ensure that its planning programs and budget requests reflect consideration of flood hazards and

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U.S. Department of Transportation
Federal Highway Administration

Structures Geotech Hydraulics Safety
I-90 – Schoharie Creek - Surface Transportation and Uniform Relocation Assistance Act

Public Law 100-17—APR. 2, 1987
100th Congress
Public Law 100-17

Title I—FEDERAL-AID HIGHWAY ACT OF 1987

Sec. 101. Short title.
Sec. 102. Approval of interstate cost estimate and extension of interstate program.
Sec. 103. Approval of cost estimate and authorization of appropriations for interstate construction.
Sec. 104. Authorization of appropriations for interstate system construction.
Sec. 105. Obligation ceilings.
Sec. 106. Authorization of appropriations.
Sec. 107. Federal-aid primary formula.
Sec. 108. Elimination of roadblock obstacles.
Sec. 109. Emergency call boxes.
Sec. 110. Aid to areas with limited rural transit facilities and small urban areas.
Sec. 111. Contracts.
Sec. 112. Midwest produced materials.
Sec. 113. Advance construction.
Sec. 114. Interstate discretionary funds.
Sec. 115. Flexibility of use of highway funds.
Sec. 116. Intermodal rail program.
Sec. 117. Emergency relief.
Sec. 118. Vehicle weights.
Sec. 119. Toll facilities.
Sec. 120. Railway-highway crossings.
Sec. 121. Indian employment and contracting.
Sec. 122. Bridge program.
Sec. 123. Rehabilitation.
Sec. 124. National bridge inspection program.
Sec. 125. Income from acquire right-of-way.
Sec. 126. Funding for bicycle projects.
Sec. 127. Strategic highway research program.
Sec. 128. Highway planning and research.
Sec. 129. Wildlife protection.
Sec. 130. National Highway Institute.
Sec. 131. Ban on privacy.
Sec. 132. Prohibition against disclosure and admission as evidence of State reports and surveys.
Sec. 133. Highway technical amendments.
Sec. 134. Forest highways.
Sec. 135. Compromise of terms.
Sec. 136. Implementation of certain orders.
Sec. 137. Demonstration program.
Sec. 138. Project eligibility.
Sec. 139. Eligibility of park and ride facilities.
Sec. 140. Planning, design, and construction.

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Federal Highway Administration

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105 STAT. 1914
PUBLIC LAW 102-240—DEC. 18, 1991
Public Law 102-240
102d Congress

An Act
To develop a national intermodal surface transportation system, to authorize funds for construction of highways, for highway safety programs, and for some transit programs.

BE IT ENACTED by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.
This Act may be cited as the "Intermodal Surface Transportation Efficiency Act of 1991".

SEC. 2. DECLARATION OF POLICY; INTERMODAL SURFACE TRANSPORTATION EFFICIENCY ACT.
It is the policy of the United States to develop a National Intermodal Transportation System that is economically efficient and environmentally sound, provides the foundation for the Nation to compete in the global economy, and will move people and goods in an efficient, timely, and safe manner.

The National Intermodal Transportation System shall consist of all forms of transportation in a unified, interconnected manner, including the transportation systems of the future, to reduce energy consumption and air pollution while promoting economic development and supporting the Nation's prominent position in international commerce.

The National Intermodal Transportation System shall include a National Highway System which consists of the National System of Interstate and Defense Highways and those principal arterial roads which are essential for interstate and regional commerce and travel, national defense, intermodal transfer facilities, and international commerce and border crossings.

The National Intermodal Transportation System shall include significant improvements in public transportation necessary to achieve national goals for improved air quality, energy conservation, international competitiveness, and mobility for elderly persons, persons with disabilities, and economically disadvantaged persons in urban and rural areas of the country.

The National Intermodal Transportation System shall provide improved access to ports and airports, the Nation's link to world commerce.

The National Intermodal Transportation System shall give special emphasis to the contributions of the transportation sectors to increased productivity growth. Social benefits must be considered with particular attention to the external benefits of reduced air pollution, reduced traffic congestion and other aspects of the quality of life in the United States.

The National Intermodal Transportation System must be operated and maintained with insurable attention to the concepts of innovation, competition, energy efficiency, predictability, growth, and accountability. Practices that resulted in the longevity and ever
Example: Floodplains & Transportation

- Part of Planning Process
- Alignment with NEPA on projects
- 200,000 Bridges built using floodplain regulation
- Informs Construction, Maintenance, and ER activities
- Integrated in State DOT & AASHTO approaches
Interstates :: End of Status Quo?

Aging Infrastructure & Natural Events
Interstates :: Resilience to Coastal Events

US 90 – Ocean Springs

2003-2004-2005 :: Coastal Storm Events
Interstates :: Managing Assets & Risk

I-35W – Mississippi River (2007)
Interstates :: GeoHazards

I-40 – Rockslide (2009)
Interstates :: Pavements

I-20 – Iowa Flooding (2011)
Moving Ahead for Progress in the 21st Century

One Hundred Twelfth Congress of the United States of America

AT THE SECOND SESSION

Began and held at the City of Washington on Tuesday, the third day of January, two thousand and twelve

An Act

To authorize funds for Federal-aid highways, highway safety programs, and transit programs, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE; ORGANIZATION OF ACT INTO DIVISIONS; TABLE OF CONTENTS.

(a) SHORT TITLE.—This Act may be cited as the “Moving Ahead for Progress in the 21st Century Act” or the “MAP-21.”

(b) DIVISIONS.—This Act is organized into 8 divisions as follows:

1. Division A—Federal-aid Highways and Highway Safety Construction Programs
2. Division B—Public Transportation
3. Division C—Transportation Safety and Surface Transportation Policy
4. Division D—Finance
5. Division E—Research and Education
6. Division F—Miscellaneous
7. Division G—Surface Transportation Extension
8. Division H—Budgetary Enactments

(c) TABLE OF CONTENTS.—The table of contents for this Act is as follows:

sec. 1. Short title, organization of Act into divisions, table of contents.
sec. 2. General definitions.

DIVISION A—FEDERAL- AID HIGHWAYS AND HIGHWAY SAFETY CONSTRUCTION PROGRAMS

TITLE I—FEDERAL- AID HIGHWAYS

Subtitle A—Authorizations and Programs

sec. 1102. Obligations and expenditures.
sec. 1103. Federal-aid highway programs.
sec. 1105. Appointments.
sec. 1107. Surface transportation programs.
sec. 1108. Workforce development program.
sec. 1109. Safety improvement projects.
sec. 1110. Highway safety improvement program.
sec. 1111. Federal-aid highway program.
sec. 1112. National freight plan.
sec. 1113. Federal-aid highway program.
sec. 1114. Transportation enhancement program.
sec. 1115. Designation of priority projects.
sec. 1116. Appointments in the Federal-aid highway program.
sec. 1117. State freight advisory committees.
• FHWA Order 5520
  Transportation System Preparedness and Resilience to Climate Change and Extreme Weather Events

  • Defines & places context of “Extreme Events”
  • FHWA decides what are appropriate scientific approaches
  • FHWA “Eligibility Memo”
Goal: Mainstream consideration of risk, resilience, and future conditions in transportation decision making

Planning
- Long Range Transportation Plans
- Asset Management Plans

Project Level
- Environmental Processes
- Engineering
- Design

Operations and Maintenance
- Emergency Relief
- Snow Removal Programs
FHWA Response: Understanding Science (and limits)

While advancing in complexity, global climate models currently lack required fidelity needed by engineers.

Resolutions
T42: 120 x 180 miles Mid-1990’s
T85: 60 x 90 miles Current
T170 & T340 Future

Resolution map: Warren Washington, NCAR
http://scied.ucar.edu/longcontent/climate-modeling
FHWA Response :: Studies, Pilots, & Case Studies

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FHWA Response :: New Technical Resources

- Highways in the Coastal Environment: Assessing Extreme Events
- Highways in the River Environment: Floodplains, Extreme Events, Risk, and Resilience
EDC-4 – Collaborative Hydraulics: Advancing to the Next Generation of Engineering
Interstates :: What’s Next?

Make it resilient!

Just design it 10% bigger!

Ignore it!

Easily solved if you pay me …

Quantify Uncertainty

I have a friend who says …

Use my projection!

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U.S. Department of Transportation
Federal Highway Administration
The Interstate Highway System (IHS) is a key component of the US transportation system. While it makes up only 1.2 percent roadway line-miles of the country’s public road system, it handles nearly 25 percent of the total vehicle miles traveled (VMT) annually and almost 40 percent of the nation’s total truck traffic. The IHS of today, with a network little changed since its inception, serves more traffic than the entire U.S. road network served when the IHS was authorized in 1956. However, what was once a premier system that stood as a symbol and enabler of American growth and economic vigor is showing its age.

The Future Interstate Study is being done pursuant to Section 6021 of the Fixing America’s Surface Transportation Act of 2015 which calls for the Transportation Research Board to conduct “a study on the actions needed to upgrade and restore the Dwight D. Eisenhower National System of Interstate and Defense Highways to its role as a premier system that meets the growing and shifting demands of the 21st century.”
Focus :: Direction from Leadership!

New Administration, new Opportunities
Questions?