America’s Crumbling Infrastructure

Case Study 2

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Presentation Outline

- Development Timeline
- Department of Transportation
- Bridge Inspections and Policy
- 35W Bridge Collapse
- Policy Implications
- Discussion

www.ci.maryville.tn.us
Development Timeline

- **1930’s**
  - Transnational infrastructure to boost economy and connect the U.S.

- **1938**
  - Federal-Aid Highway Act to study the network of roads across the nation

- **1944**
  - Federal Highway Act led to development of 65,000 kilometers

- **1956**
  - National System of Interstate and Defense Highways laid 41,000 miles for mobilizing military

- **1966**
  - Department of Transportation established

http://www.globalsecurity.org/military/facility/ndhs.htm
“...to develop and coordinate policies that will provide an efficient and economical national transportation system, with due regard for need, the environment, and the national defense. It is the primary agency in the federal government with the responsibility for shaping and administering policies and programs to protect and enhance the safety, adequacy, and efficiency of the transportation system and services.”
National Bridge Inspection

- Safety is ensured through hands-on inspections and bridge component (deck, superstructure, and sub-structure) ratings all of which is maintained in the National Bridge Inventory (NBI) database.

- Inspections
  - 4 year inspections
  - 2 year inspections
  - Annual inspections

Over $4 billion is apportioned annually from the Federal government to State DOTs for bridge replacement, rehabilitation and preventative maintenance.

http://www.dot.gov/affairs/factsheet080207.htm
Historic Bridge Collapses

- 1940: Tacoma Narrows Bridge, Washington

[Image of the Tacoma Narrows Bridge with a caption: www.britannica.com]

[Image of the Tacoma Narrows Bridge with a caption: www.lib.washington.edu]

Historic Bridge Collapses...

1967: Silver Bridge, Point Pleasant, W.Va

Historic Bridge Collapses…

1983: Mianus River Bridge, Connecticut

www.accidents101.com
www.tfhc.gov
www.insurancebroadcasting.com
1987: Schoharie Creek Bridge, New York
Historic Bridge Collapses…

1989: Hatchie River Bridge, Tennessee

www.tfhrc.gov

www.fhwa.dot.gov
Historic Bridge Collapses...

1989: October 17th San Francisco-Oakland Bay

www.tfhrc.gov/
Historic Bridge Collapses…

2006: Autoroute 19 Bridge, Laval, Quebec

www.ctv.ca

www.canada.com
Construction Material Policy

- “Advanced composites will be used to extend the service life of existing construction and to provide durability of new construction” (www.tfhrc.gov)
What’s Your Bridge Color?

## Road Bridge Conditions 2006

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**Total**       | 596,842     | 73,764                 | 80,226                | 153,990 |

Source: The U.S. Dept. of Transportation, Federal Highway Administration, National Bridge Inventory

Recent Work on the Bridge

To be completed September 30, 2007 for $9 million

Work involved concrete and joint repair, lighting and guardrail installation

Replacing the top 2 inches of the 9 inch roadway slab

Completed the overlay work of the outside two lanes (both directions)

Concrete was completely replaced in eight other spots for expansion joint replacement and full-depth repairs.

The average size of a section that was entirely replaced was 26 feet by 3.5 feet

http://www.dot.state.mn.us/i35wbridge/pdfs/factsheet.pdf
Collapse of the 35W Bridge

- Video

The Extent of the Collapse

Highway Catastrophe
More than 1,000 feet of the Interstate 35W bridge over the Mississippi River in Minneapolis collapsed yesterday during rush hour.

The Aftermath of the Collapse

The Aftermath of the Collapse

The Aftermath

- Thirteen people died and more than 100 people were injured

- Initial estimates by Mn/DOT concluded that costs for the loss of 35W would total $400,000 per day

The Aftermath Continued...

- Mn/DOT estimated a loss to Minnesota's economy to be $17 million in 2007 and $43 million in 2008

- It has been estimated that businesses have lost over $500,000 per day


RTMC Action and Policy

- Issues caused by the bridge collapse
  - Congestion
  - Effects of Media and Shock
  - Post shock congestion shift

- Resulting policy shifts
  - 280 Corridor
  - University to Central added lane
  - 94, 35W, 494, 210, and 169 shifts
I-35W TRAFFIC RESTORATION PROJECTS

A TH 280 $372,000 COMPLETED AUG 13
   Add second lane to northbound on ramps to I-35W/TH 35
B I-35W at 4th Ave $34,000 COMPLETED AUG 20
   Convert to a two lane exit/entrance
C TH 100 $92,000 COMPLETED AUG 13
   Second lane northbound to eastbound I-694
D TH 280 $500,000 UNDER CONSTRUCTION
   Add centerline, traffic detection sensors and dynamic message signs
E TH 65 $76,000 UNDER CONSTRUCTION
   Add centerline and traffic detection sensors
F TH 67 $76,000 UNDER CONSTRUCTION
   Add centerline and traffic detection sensors
G I-94 $112,000 COMPLETED JUL 20
   Fourth lane eastbound and westbound
   TH 280 to I-35W
H TH 280 $300,000 COMPLETED AUG 22
   Construct southbound one lane frontage road at
   Broadway Avenue
I TH 117 $30,000 UNDER STUDY
   Add auxiliary lane Duluth to TH 55
J TH 280 $680,000 COMPLETED AUG 20
   Convert to diamond interchange with two temporary signals at
   ramps at Hennepin/Lakeview
K Washington Ave $17,000
   Add eight turn lane eastbound Washington Ave to southbound
   I-35W
L TH 280 $300,000 COMPLETED AUG 19
   Add continuous lighting
M TH 280 $319,000 COMPLETED AUG 2
   Convert TH 280 to a freeway
N I-94 $164,000 COMPLETED SEPT 1
   Convert shoulder to bus only lanes
O LA 41 $168,000 COMPLETED SEPT 1
   Construct 4th lane on eastbound I-694 at Hwy 47
P I-35W $1,200,000 BEING STUDIED
   Add half diamond interchange to north from the north side
   of Hennepin Ave

Minor work: Install & maintain traffic control devices

STARTED AUG 2017 - COMPLETED DEC 20
The Days Ahead

- August 8th preliminary design teams had been established
- August 21st a layout had been submitted to the city council
- August 23rd the RFP had been released
- September 14th technical proposals are received
- September 18th financial proposals are received
- September 19th project out to bid
Current Plans

- **Rebuilding Team:**
  - Flatiron Constructors and Mason Construction

- **Expected to finish the bridge:**
  - Within 437 days
  - Budget: $234 million

- **Technical score of 91.7 determined by:**
  - Cost
  - Time
  - Technical capability
Players Involved

- Designers
- Constructors
- Inspectors
- State and Federal Transportation Departments
- City Planners
- City Council Members
- Policymakers
Questions?
Discussion Questions

- What changes will happen because of the disaster?
  - Minor?
  - Major?
  - Removal of policy?
  - New policy?

- Is it realistic to update all on American infrastructure?

- Is it fair to value life monetarily?
  - Is $4 Million/person a realistic value on human-life?
  - Should the fiscal worth of life be a factor in guiding policy?
“While history underscores inevitability, it also tells us how to break the inevitability of the life cycle. We know that the instrument of choice for the intervention in the life cycle should be technology, for we have noted that technology is the major force for change.” Levinson (pg 57)

What role should technology play in guiding policy?