Preparing to Make Difficult Decisions

Assessing a Regional Bridge Network and Creating Tools for Performance-Based Investments

Richard Perrin, AICP
Roberto Alvarado-Vazquez

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Purpose

- Develop a regional strategy and associated guidance for agencies to consider when identifying requisite funding for bridges as part of their capital programs

- **What it will do**
  - Quantify impacts of underinvestment and communicate related consequences
  - Provide tools to determine work types and develop priority lists of bridges

- **What it won’t do**
  - Commit Federal funds to specific bridges
  - Require agencies to repair specific bridges
### Background

- GTC is the Metropolitan Planning Organization for the Genesee-Finger Lakes Region
- Population and employment larger than eight states

#### Bridges by Owner

- **Local, 43%**
- **Thruway, 6%**
- **Other, 1%**

1,594 Bridges

#### Bridges in the Region by Year Built

- **1865-1929**
- **1930-1939**
- **1940-1949**
- **1950-1959**
- **1960-1969**
- **1970-1979**
- **1980-1989**
- **1990-1999**
- **2000-2010**
- **2010-2013**
Background (continued)

- Our bridges are old...
  - 4 out of 10 are beyond their design life (50 years or older)
  - 1 out of 5 would be eligible for Medicare (65 years or older)
  - 19 were built before the Model T (Built before 1908)

- ...and they’re showing their age
  - 1 out of 3 is structurally deficient or functionally obsolete
Scenario Development

- Demonstrate consequences of underinvestment and what could be achieved
  - Identify performance measures
  - Develop and evaluate three scenarios
    - Maintain existing conditions
    - Achieve a state of good repair
    - Manage declining assets
  - Determine necessary funding over two timeframes
    - Horizon 2025 – 10-year, accelerated
    - Horizon 2040 – 25-year, gradual
Scenario Development (continued)

Performance Measures

- Regional bridges not structurally deficient or functionally obsolete
- Percent deck area on NHS bridges not structurally deficient
- Percent regional AADT on bridges not structurally deficient or functionally obsolete
- Percent regional truck AADT on bridges not structurally deficient or functionally obsolete
- Regional bridges not structurally deficient
- State bridges not structurally deficient or functionally obsolete
- Local bridges not structurally deficient or functionally obsolete
- Percent regional AADT on bridges not structurally deficient
Scenario Development (continued)

Scenarios

1. Maintain Existing Conditions
   Calculate the funding level needed to maintain the existing network condition in the most cost-effective manner

2. Achieve a State of Good Repair
   Calculate the maximum funding level at which the incremental cost is exceeded by the incremental benefit

3. Manage Declining Assets
   Calculate the maximum performance that could be achieved based on the projected funding expected to be available
Data Assembly and Formatting

- 2013 National Bridge Inventory (NBI) Database
  - Data collected by New York State DOT and submitted to FHWA

- National Bridge Investment Analysis System (NBIAS)
  - Tool developed for the FHWA
  - State-specific improvement costs
  - Economic-optimization algorithms

- Pontis
  - Tool developed for AASHTO
  - Share the same analytical framework and economic forecasting tools as NBIAS
  - Used to model bridge culverts
Regional Bridges NOT Structurally Deficient or Functionally Obsolete

Manage Declining Assets
Assumes continuation of current annual investment, equivalent to:
- $27.6M annually through 2025
- $19.6M annually through 2040
in 2014 dollars

Maintain Existing Condition
Requires investment equivalent to:
- $31M annually through 2025
- $31M annually through 2040
in 2014 dollars

Achieve a State of Good Repair
Requires investment equivalent to:
- $75M annually through 2025
- $59M annually through 2040
in 2014 dollars

Total Bridges in Region: 1,594 bridges
Existing Network Condition: 1,077 bridges NOT Structurally Deficient or Functionally Obsolete

847 bridges in 2040
1,033 bridges in 2025
1,077 bridges in 2040
1,077 bridges in 2025
1,217 bridges in 2040
1,210 bridges in 2025

Annual Investment (millions, 2014$)
- $0
- $5
- $10
- $15
- $20
- $25
- $30
- $35
- $40
- $45
- $50
- $55
- $60
- $65
- $70
- $75

Invest Equivalent of $37M annually (Keeping Up with Annual Inflation)

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Strategy Tool Creation

- Address the most challenging and, based on current circumstances, the most likely scenario
  - Manage declining assets

- Asset Management Planning Tool
  - Recommends investment by work type based on available funding

- Prioritization Screening Tool
  - Allows for weighting of key factors to create rankings and identify candidates for decommissioning
Strategy Tool Creation (continued)

**Asset Management Planning Tool**

- Recommends investment by work type based on available funding
- Performance-based trade-off tool for network analysis
- Based on 2013 data and scenario results
- Covers all performance measures for 2025 and 2040
Strategy Tool Creation (continued)

Prioritization Screening Tool

Allows for weighting of key factors to create rankings and identify candidates for decommissioning
Strategy Tool Creation (continued)

Prioritization Screening Tool

1. Rank bridges based on user-defined criteria from most recent NBI data

2. Identify bridges that could be candidates for decommissioning and specific bridges to which their traffic could be diverted
Key Findings

- Insufficient funding has consequences
- We’re making the right investments
- Immediate action is needed
Success

Failure

GENESEE TRANSPORTATION COUNCIL
50 West Main Street-Suite 8112
Rochester, NY 14614
www.gtcmpo.org
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