Mn/DOT Traffic Response to the I-35W Bridge Collapse

T3 Webinar
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Jim Kranig
Metro RTMC Engineer
Minnesota Department of Transportation
I-35W Bridge Collapse

• Bridge Location and History
• Quick Overview of Incident
• Tools supporting incident and traffic management
• Initial Incident Management
• Traffic Response to Bridge Collapse
  Incident Management
  Transition to Multiple Projects
• Lessons Learned
St. Anthony Falls I35W Bridge

History

• Opened to traffic in 1967

• Four lanes of traffic in each direction

• Carried 160,000 vehicles daily, (5,700 commercial)

• Concrete & joint repair, lighting and guardrail installation were in progress

I35W Bridge - Looking North
July, 1967
The Disaster

- Bridge Collapsed at 6:05 p.m. Wednesday, August 1, 2007
  - Plunged nearly 100 vehicles into the Mississippi River
    - 13 fatalities
    - 140 injuries
Imagine that you are one of these drivers…
RTMC Operations Center

• Shared Operations Facility
  – Mn/DOT Freeway Traffic Operations
  – Mn/DOT Arterial Traffic Operations
  – Mn/DOT Metro District Maintenance Dispatch
  – State Patrol Cellular 911 Call & Dispatch Center

• Video available to all in RTMC and several other agencies

• 800 MHz emergency radio system used by all major agencies in the Twin Cities

• Quick and coordinated response to crashes, incidents and special events
Managed Freeway

- 420 CCTV
- 117 DMS
- 5500 detectors
- Freeway Service Patrol
- 511 phone & web site
- FM station contract (KBEM)
- Video provided to TV
- Direct radio to media
Mn/DOT Maintenance Tools

- Attenuator trucks
- Portable barricades
- Water filled and concrete barriers
- Portable DMS
- Incident management truck (beer truck) and incident management trailers
- Wide variety of other equipment (front loaders, etc.)
State Patrol Helicopter Video

Live video transmitted to RTMC (visual and infrared)
RTMC Incident Management Room
Mn/DOT Metro District Emergency Operations Center
Incident Management

- Organizational Setup
- Communications – 800 MHz
- Well established protocols
- Staffing
- Training
- Equipment
- Materials
- Traffic Management Infrastructure
Mn/DOT’s Immediate Response

• 6:05 p.m.
  – Numerous concurrent calls to State Patrol Dispatch (911) and from field employees to RTMC and Maintenance Dispatch

• 6:10 p.m.
  – District Emergency Operations Center activated
  – DEOC staff report to RTMC – Operations Center
Traffic Management Response

- State Patrol and FIRST units dispatched for traffic control
- 20 changeable message signs activated within 3 minutes of collapse
- Continuous coverage on KBEM-FM
- Information provided directly to media
- And to travelers via
  - 511 telephone and website
  - RTMC traveler Information page
Maintenance Traffic Response

• Immediate traffic control using vehicles and barricades

• Started setting up traffic control based on initial closures
  – Water filled barricades
  – Cones and barrels
  – Portable DMS
  – Standard traffic control signs
**First 12 Hours**

**6:20 p.m.**

- Started converting I-35W temporary traffic control measures to longer term traffic control standards
- Highway 280 was converted to a freeway with 2 intersections closed
- Detour Maps were developed and deployed on the Mn/DOT Web site.
- Mn/DOT Metro District provides maintenance staff and equipment for security efforts
- Instituted 24-hour staffed traffic control
First 12 Hours

- **7:00 p.m.**
  - Over 150 employees activated
  - Mn/DOT structural engineers called to site

- **11:00 p.m.**
  - Detour maps for a.m. rush posted on Mn/DOT Web site

- **Overnight**
  - Expanded signing and barricades of closed I-35W
  - Converted T.H. 280 to a freeway
Other Traffic Response

• City of Minneapolis responded with immediate changes
  – Signal timing
  – Parking removal
  – Special traffic control personnel deployed
  – Daily meetings with Mn/DOT to coordinate actions

• Metro Transit responded with
  – Additional bus service in affected areas
  – Additional park and ride spaces
Monitoring Changes in Traffic

• First couple days lighter than usual
  – Motorists switched to stayed home, diverted, used transit or telecommuted.

• But that would change
  – Normal traffic levels
  – State Fair
  – U of M in Session
  – U of M Football
  – Twins baseball
  – Vikings football
I-35W TRAFFIC RESTORATION PROJECTS
Traffic Restoration Project Guidelines

• Must increase capacity, improve safety, or manage traffic (ITS)

• Must build in a weekend or on weeknights
  – No traffic impact for peak periods allowed

• Must be within circle of impact

• Must be let before end of September
  – Most must be done by end of August

• Designers have one week from concept to construction

• Final cost – less than $7 million
BUILDING ON PROVEN SUCCESS

Three recent successful congestion relief projects provided the basis for the approach to quick spot improvements:

1. WB I-394 auxiliary lane from TH 100 to TH 169
2. I-94 from Century Ave to McKnight Rd
3. TH 100 from Excelsior Blvd to Cedar Lake Rd
CASE STUDY: TH 100

Added one lane in each direction from Excelsior Blvd to Cedar Lake Rd & modified and interchange

- Two-miles in length
- Project cost $7.1 million
- Reduction in crashes and significant reduction in injury crashes
- Decrease of ten-miles of congestion
- 13 to 1 travel time benefit to cost ratio
Traffic Restoration Projects

- Considered 40+ projects
- Held meeting with experts in various traffic disciplines to identify projects
- Built 24 projects including
  - Adding lanes on 94, 694 and 100
  - Rebuilding an interchange
  - Enhancing ramp geometry and capacity
  - Continuous lighting, temp concrete median barrier
  - Frontage road construction
  - Bus shoulders
  - ITS improvements – TMC cameras and loop detectors
- Contract Costs were under 7 million dollars
- 23 substantially completed in August
Timeframe of a Project

• Scoping meeting on Friday at noon
• Preliminary layout completed Sat AM
• Final plans completed Sun PM
• Signed plans and construction documents completed Monday AM
• Out on E-bid website Monday PM
• Bid opening Wed
• Construction begins Friday PM
• Open to Traffic Sun PM
External Involvement

• Interagency Traffic meetings
  – First daily – later as needed
• Inter-jurisdictional scoping meeting
  – Met with most local units of government to describe projects and gather input
• Tremendous cooperation from everyone
• Public notice
• Media information
Internal Involvement

• Everything related to bridge was top priority
• Met Mon, Wed, Fri to go over program and every project
• Met with project manager every day
• Kept the feds in the loop – on projects, funding, and design exceptions
Major Traffic Restoration Projects

- TH 280 partial freeway with three intersections and two old substandard interchanges (3 miles):
  - Intersections barricaded in pm of 08/01/07
  - North ramp widened to two lanes by 08/12/07
  - Continuous lighting done by 08/19/07
  - South ramp from I-94 to TH 280 widened to two lanes by 08/19/07
  - Substandard cloverleaf revised to diamond by 08/19/07
Highway 280

Before – with full intersection

After – with right-in only intersection
Highway 280

Before – substandard cloverleaf interchange

After – diamond interchange
Major Traffic Restoration Projects

• New Field Equipment on TH 280
  – Camera trailer with broadband cellular data communication redeployed to TH 280 and video available by 4:00pm 08/02/07
  – Full permanent Freeway Management System on TH 280 under construction and will be functional by 10/30/07
    • Cameras
    • Detection
    • CMS
Major Traffic Restoration Projects

• I-94 fourth lanes added in each direction between TH 280 and I-35W (3 miles each direction):
  – Full closure 10pm Friday to 5am Monday (08/17-19)
  – Milled and overlaid entire segment
  – Lowered fiber communications line on side slope
  – Constructed emergency pull offs
  – Worst weather weekend of year (rain and thunderstorms)
I-94 Lane Addition

Before – 3 lanes with single lane left exit

After – 4 lanes with 2 lane left exit
I-94 Lane Addition

Before – 3 lanes with shoulder

After – 4 lanes with no shoulder and emergency pull off
Using Video to Refine Projects
I-94 Travel Times - EB

EB I-94 from I-394 to Hwy 280

Travel Time in Minutes

Time of Day

October 2006  WK of Aug 6th  October 2007
Evening Congestion Impacts
2:00 to 7:00 p.m. – Relatively Unchanged

Traffic Data

- I-94
  - Before 150,000 to 171,000 ADT
  - After approximately 210,000 ADT
- TH 280
  - Before 36,000 to 57,000
  - After 73,000 to 99,000 ADT
Safety

• I-94 Minneapolis to St Paul
  – July 46 crashes during 2 weeks
  – Sept 47 crashes during 2 weeks

• TH 280
  – Reduction in local police calls to 280
  – Concrete med barrier
  – Continuous lighting
Economic Impacts

- Mn/DOT Office of Investment Management Estimates the Daily Cost to Motorists at $400,000
  - Additional travel time and distance

- State Department of Economic Development Impact Analysis
  - Average net economic impact is an additional $113,000 daily reduction in the State’s economic output
    - $17 million in 2007
    - $43 million in 2008
Lessons Learned and Affirmed

• Employees are Critical to Success
• Preparation Pays Off
• Extensive tools enable staff to perform well
• Leverage the Benefits of the Incident Command Structure
• Anticipate Concurrent and Complex Activities
• Logistics Support and Action is Critical
• Manage Public Information, Media Requests, and Investigation Information
• Documentation and Communication - Critical
Thank You

Questions?

http://www.dot.state.mn.us/i35wbridge/index.html