Domestic Scan 24-02

Successful Agency Approaches to Response to Bridge Emergencies

GPI

OVERVIEW

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03 Recommendations and Conclusions

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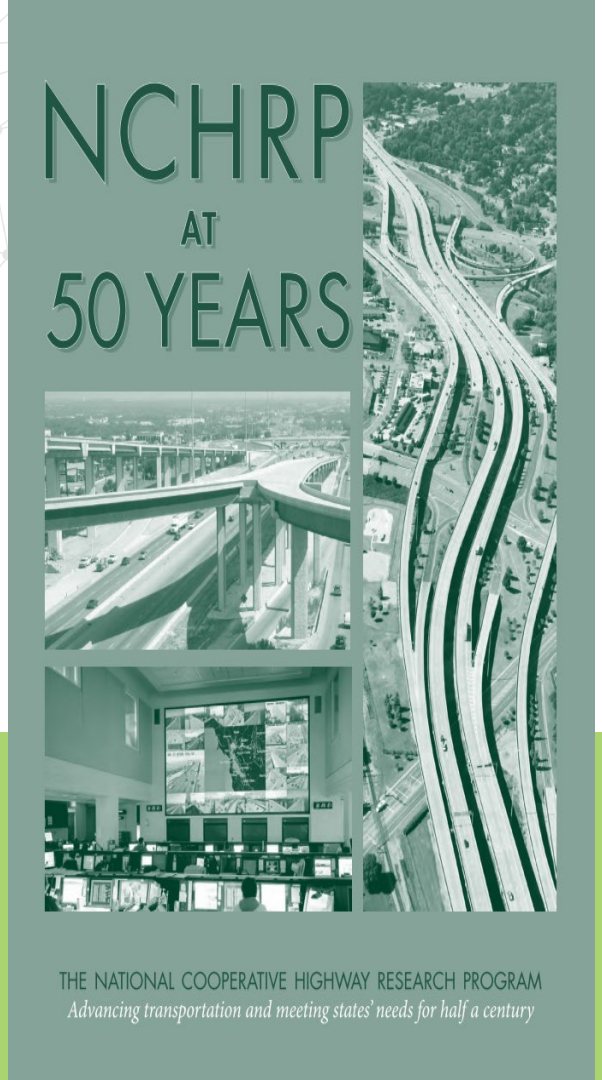

01

Domestic Scan Program

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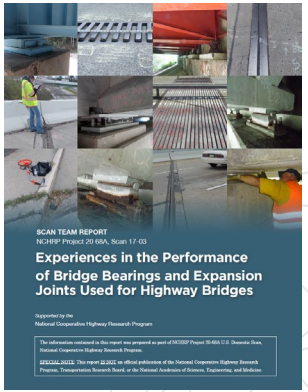
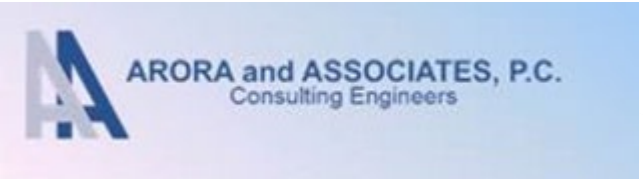
US Domestic Scan Program

- NCHRP 20-68
- The Program is a multi-year project conducting 3-4 scans per year.
- Each scan is selected by AASHTO and the NCHRP 20-68 Project Panel
- Each scan addresses a single technical topic of broad interest to many state departments of transportation and other agencies
- The purpose of each scan and of Project 20-68 as a whole is to accelerate beneficial innovation by:
  - facilitating information sharing and technology exchange among the states and other transportation agencies
  - identifying actionable items of common interest



US Domestic Scan Program

- Each scan follows similar template:
  - Literature review
  - Virtual/In-person meeting(s) with presenters answering amplifying questions
  - Report
  - Implementation/Dissemination
- Arora & Associates
  - Harry Capers, Project Manager
  - Melissa Jiang, Deputy Project Manager



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Scan 24-02 Background

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Background

- State DOTs are challenged to deal with an ever-increasing array of emergencies involving their bridge inventory:
  - Fires, both natural and man-made
  - Vehicle and vessel impacts
  - Earthquakes
  - Extreme heat and cold temperatures for prolonged periods of time
  - Increased number of severe weather events (hurricanes, tornadoes, flooding etc.)
- Scope:
  - Examine practices, procedures, and plans for agencies that have successful approaches in rapidly responding to bridge emergencies

Scan Team

Sarah Sondag – **Team Chair**
Bridge Preservation Engineer
Minnesota Department of Transportation
Bridge Office

Greg Seipel, P.E.
Bridge Condition Engineer
Washington State Department of Transportation

Matt Lott, MPA
Assistant Director for Emergency Management
Office of Safety, Security and Emergency Management
Virginia Department of Transportation

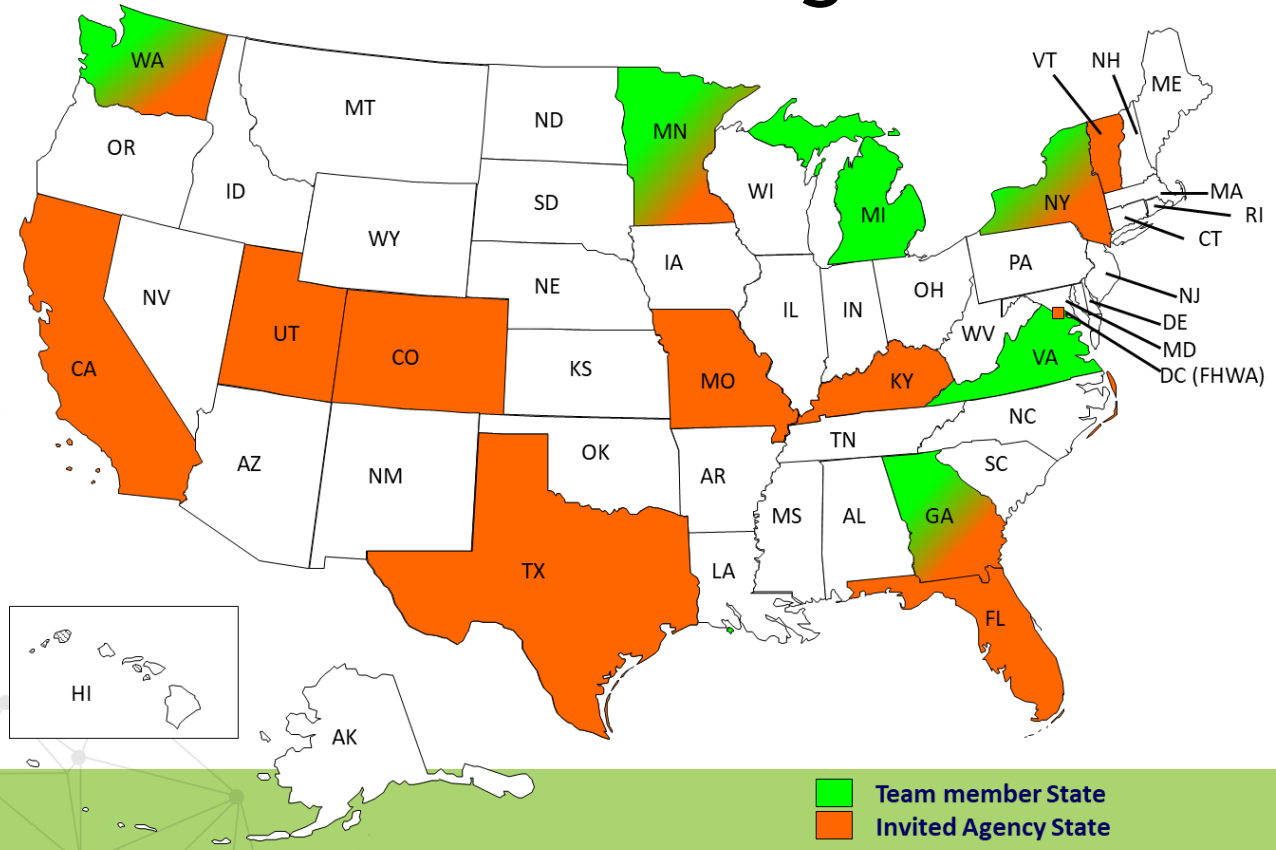
Brenda Crudele, P.E.
Deputy Chief Engineer
Office of Structures
New York State DOT

Rebecca Curtis. P.E.
Chief Bridge Engineer/Bureau Director
Michigan Department of Transportation

Michael “Mike” Garner
Georgia DOT
Office of Construction

Jason Hastings, M.C.E., P.E.
Subject Matter Expert
Greenman-Pedersen, Inc.

Scan Team and Invited Agencies



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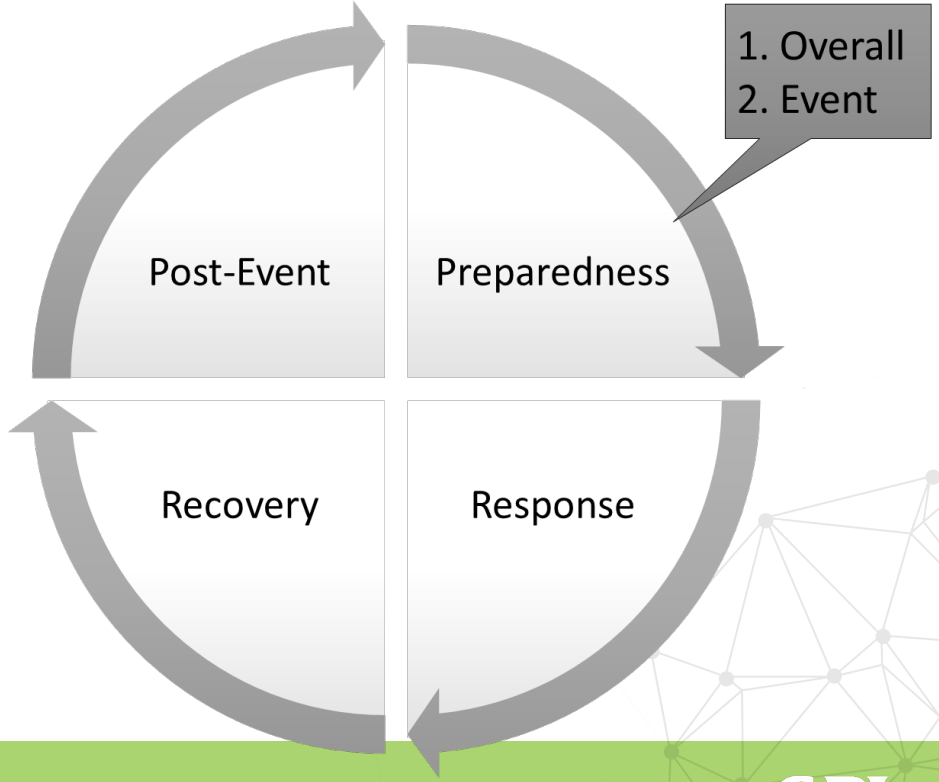
03

Conclusions and Recommendations

Summary of Initial Findings

- Bridge emergencies vary in type and scale, from oversized or errant vehicle impacts affecting one bridge to a large earthquake or flood affecting tens or hundreds of bridges.
- Agencies vary in their organizational approach to emergencies (i.e., in-house vs. consultants/contractors, centralized vs. decentralized, etc.)



Preparedness

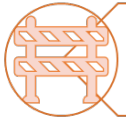
- Response Guidelines
- Training
- Standards for Emergency Response
- Resources
- Contracts
- Software Tools
- Emergency Funding
- Detour/Evacuation Routes
- Innovation

Response

Communication and Coordination

Event Initiation

Structure Evaluation



Implementing Closures and Detours

Reporting

Data Collection for Reimbursement

Recovery

Reallocation of Resources for Recovery

Deploying Resources

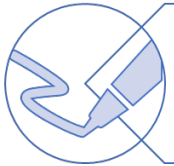
Emergency Contracting

Reporting

Data Collection for Procurement and Reimbursement

Post-Event

After Action Review



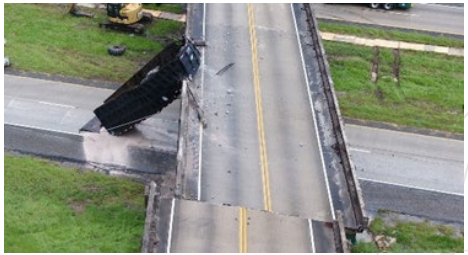
Documentation

Resource Recovery

Mitigation to Reduce Risk

National-Level Recommendations

- AASHTO should collaborate with FHWA to consider codifying regulations to not store materials under bridges
- AASHTO should collaborate with FHWA to lobby truck industry to require installation of safety mechanisms on trucks such as alarms or governing devices that prevent trucks from driving with the beds up over a maximum speed of 5-10 mph
    - Consideration must be given to snow/ice operations



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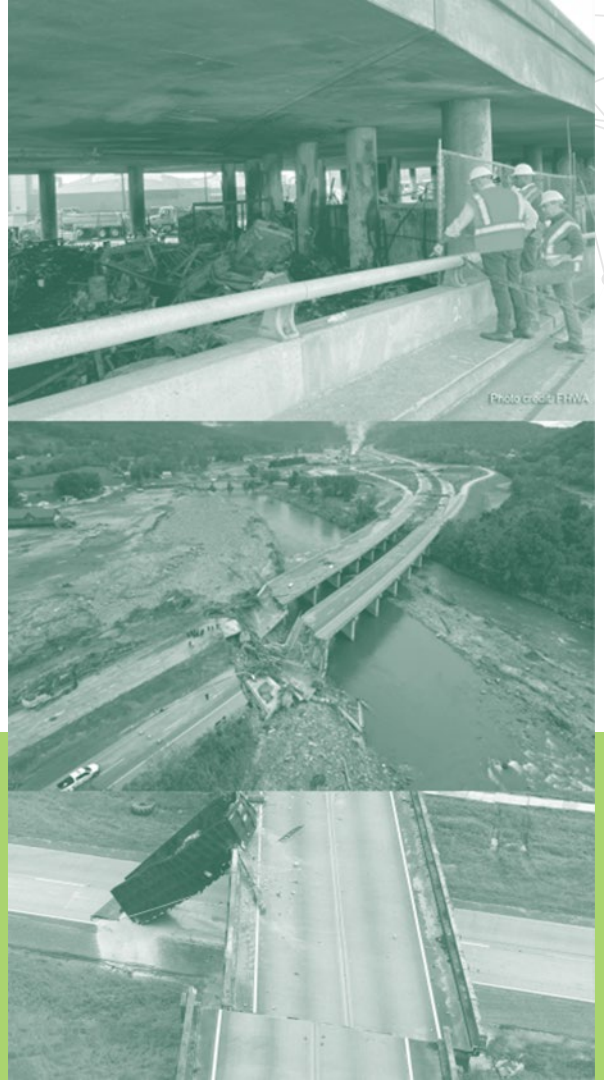
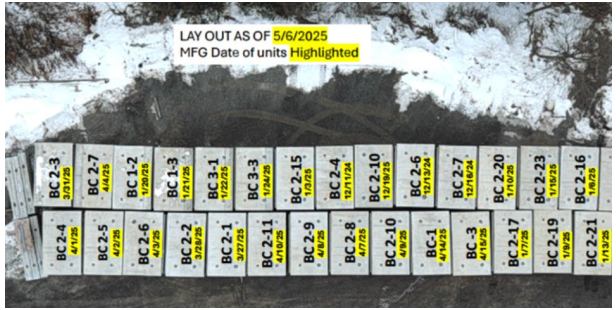
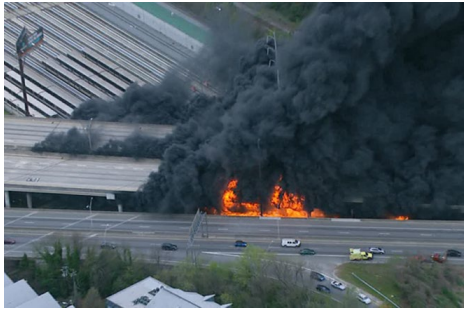
Case Studies

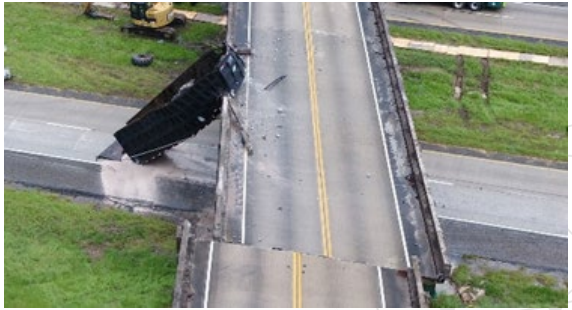


Case Studies

- NYSDOT Superbox Program (New York)
- I-85 Bridge Fire (Georgia)
- I-16 Bridge Strike (Georgia)
- FDOT Emergency Base Camps (Florida)

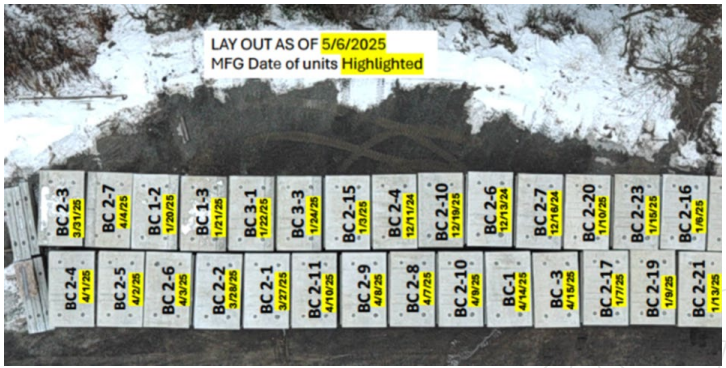






NYSDOT Superbox Program

- Established in Spring 2022 by Chief Engineer and designed/overseen by Structures Bureau
- Precast reinforced concrete box culvert unit designed for rapid deployment
  - Predesigned, prefabricated, stockpiled
  - 5 standardized sizes stored at 5 maintenance yards
    - 8 ft × 7 ft opening, up to 17’ fill height
    - 12 ft × 7 ft opening, up to 18’ fill height
    - 16 ft × 8 ft opening, up to 20’ fill height
    - 20 ft × 10 ft opening, up to 23’ fill height
    - 24 ft × 10 ft opening, up to 28’ fill height
- Any region that has a need must coordinate with the Structures Bureau



NYSDOT Superbox Program

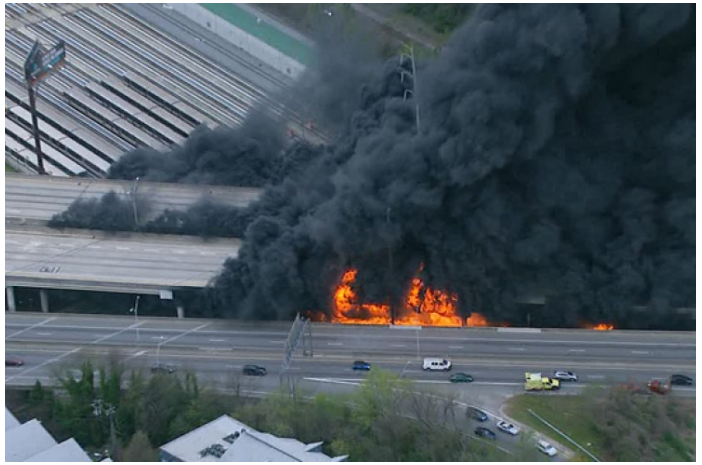
- Between January 2023 and November 2025, NYSDOT has deployed the following:
  - 24’x10’ units at 4 sites
  - 16’x8’ units at 5 sites
  - 12’x7’ units at 2 sites
- First deployment – Hoosic Overflow
  - January 13, 2023 – CMP culvert failure on SR7 over Hoosic Overflow
  - Hydraulic and structural requirements evaluated and determined 24’x10’ Superbox met the criteria
  - Installed and roadway reopened by February 3, 2023.

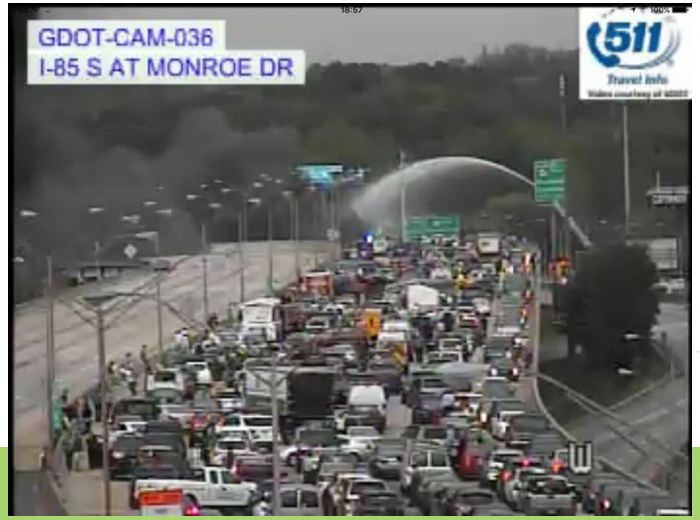
NYSDOT Superbox Program

- Inventory management was a challenge
  - Document where individual units were deployed, whether installed in the field or stored in maintenance yard
  - Developed QR-code based tracking system
  - Engineers-in charge must check in or check out the units using a smartphone
- Approved list of fabricators
  - Submit shop drawings, structural calculations, and load ratings
  - Partnered with Precast Association of New York (PCANY) to standardize joint and haunch dimensions to ensure cross-fabricator compatibility

GDOT I-85 Bridge Fire

- March 30, 2017
- Around 6:30 pm, a fire broke out underneath I-85 northbound.
- After burning for 40 minutes, a northbound span collapsed.
- I-85 Route Description
  - 243,000 vehicles per day
  - NB & SB
  - 6 Spans/700’
  - Reinforced Concrete





GDOT I-85 Bridge Fire

- 6:30 pm – Fire reported under bridge
- 6:47 pm – Bridge inspectors en route to site
- 7:03 pm – Bridge collapses
- 7:09 pm – State Bridge Engineer left restaurant and drove to work
- 7:10 pm – Emergency Operations Center at TMC activated
- 7:13 pm – Director of Construction calling contractors. Contractor sent trucks to scene for inspection
- 7:30 pm – Asst Bridge Engineer had pulled original bridge plans
- 7:30 pm – Construction contacted beam fabricator who stated they would be on standby for GDOT

GDOT I-85 Bridge Fire

- 8:00 pm – Hourly calls setup between Designers, on-scene inspectors, TMC, Communications, Operations, Maintenance, GEMA, Exec Management, others
- 8:30 pm – Maintenance office created project numbers for repair
- 9:00 pm – FHWA Div Administrator arrived at TMC. Stayed for duration
- 10:00 pm – Governor declares State of Emergency, enables ER funding
- 10:30 pm – Demolition crews arrived on site
- 3:00 am Fri – Official detour in place. Road closures in place. Initial cost estimate in to FHWA. Approval from FHWA to negotiate with single contractor.
- Fri AM – Demolition began
- Friday – Representatives from Secretary of Transportation met with Governor and Commissioner. Committed money that day for repair with no roadblocks.
- Fri COB – $10M Federal ER funds authorized
- Friday – Bridge design transmitted beam plans to fabricator and contractor. GDOT reviewing shop drawings on beam forms Sunday night, even before final plans complete.
- Weekend – Plans finalized and demo continued; construction commenced early following week

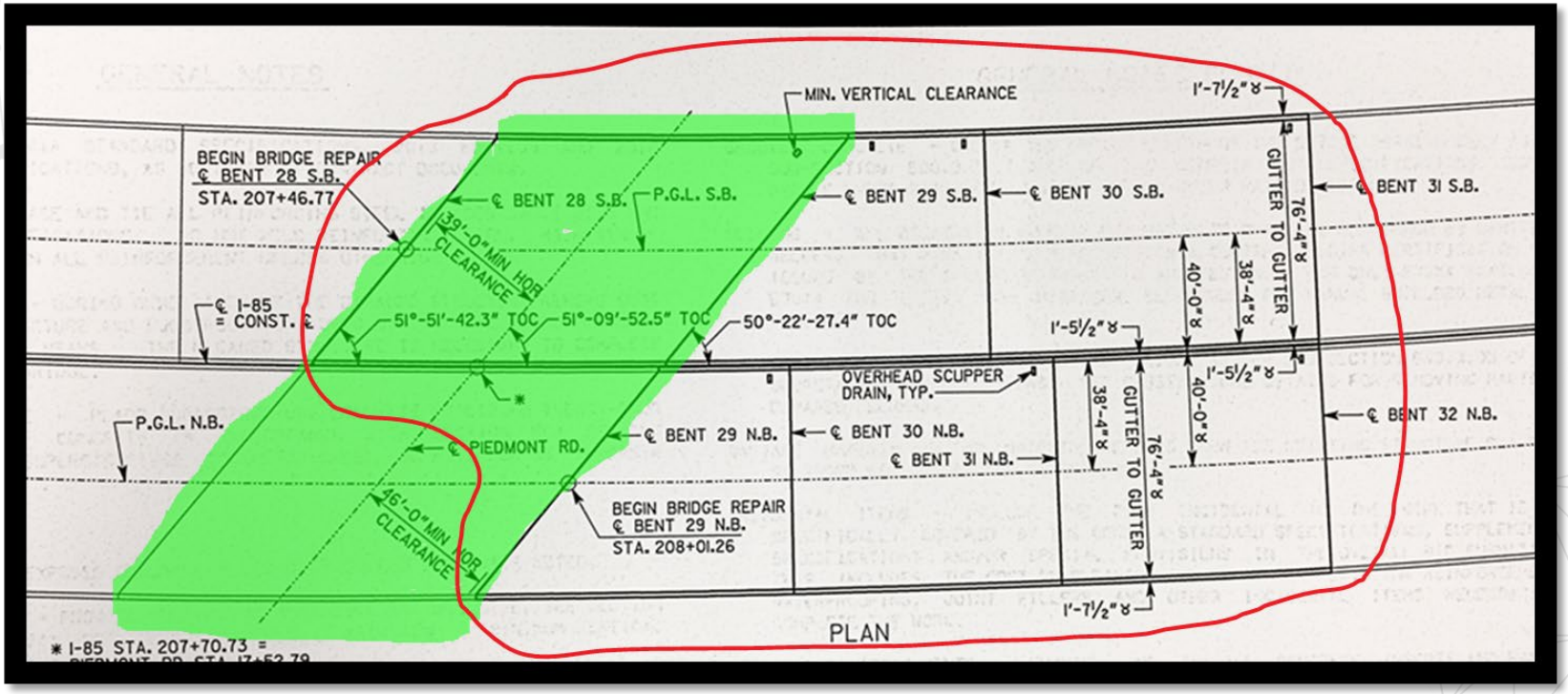
GDOT I-85 Bridge Fire - Communication

- Public Safety
- HERO Units
- Partner Coordination / Commuter Options
  - MARTA – 12% increase
  - Xpress bus service
  - Teleworking
  - Carpooling / alternate work hours
- Press Conferences
- Traveler Information
  - The use of 511 system, social media, message signs, press briefings

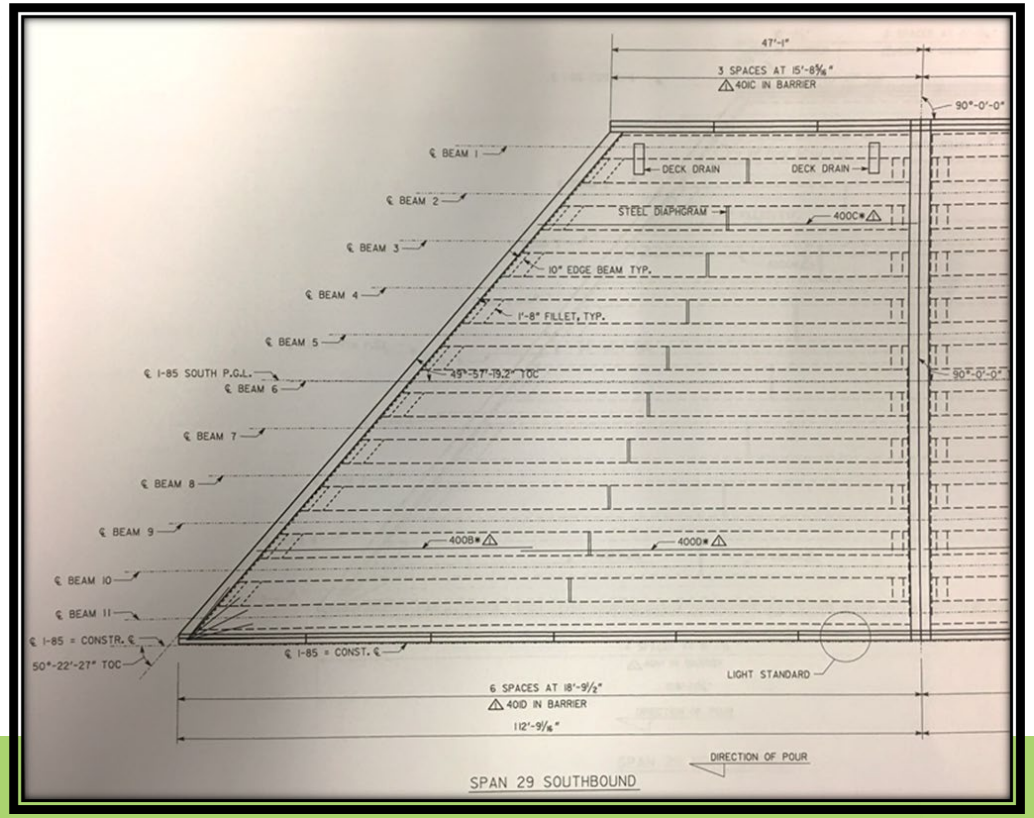
GDOT I-85 Bridge Fire - Demolition

GDOT I-85 Bridge Fire - Demolition

GDOT I-85 Bridge Fire - Reconstruction



GDOT I-85 Bridge Fire - Reconstruction



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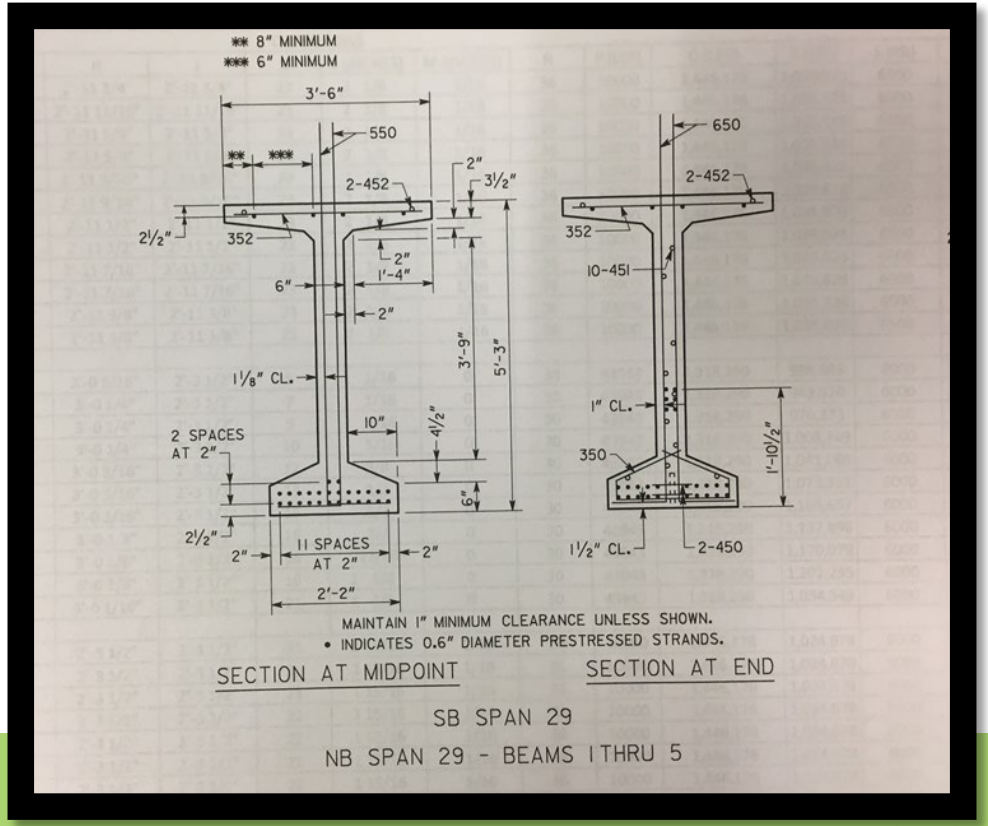

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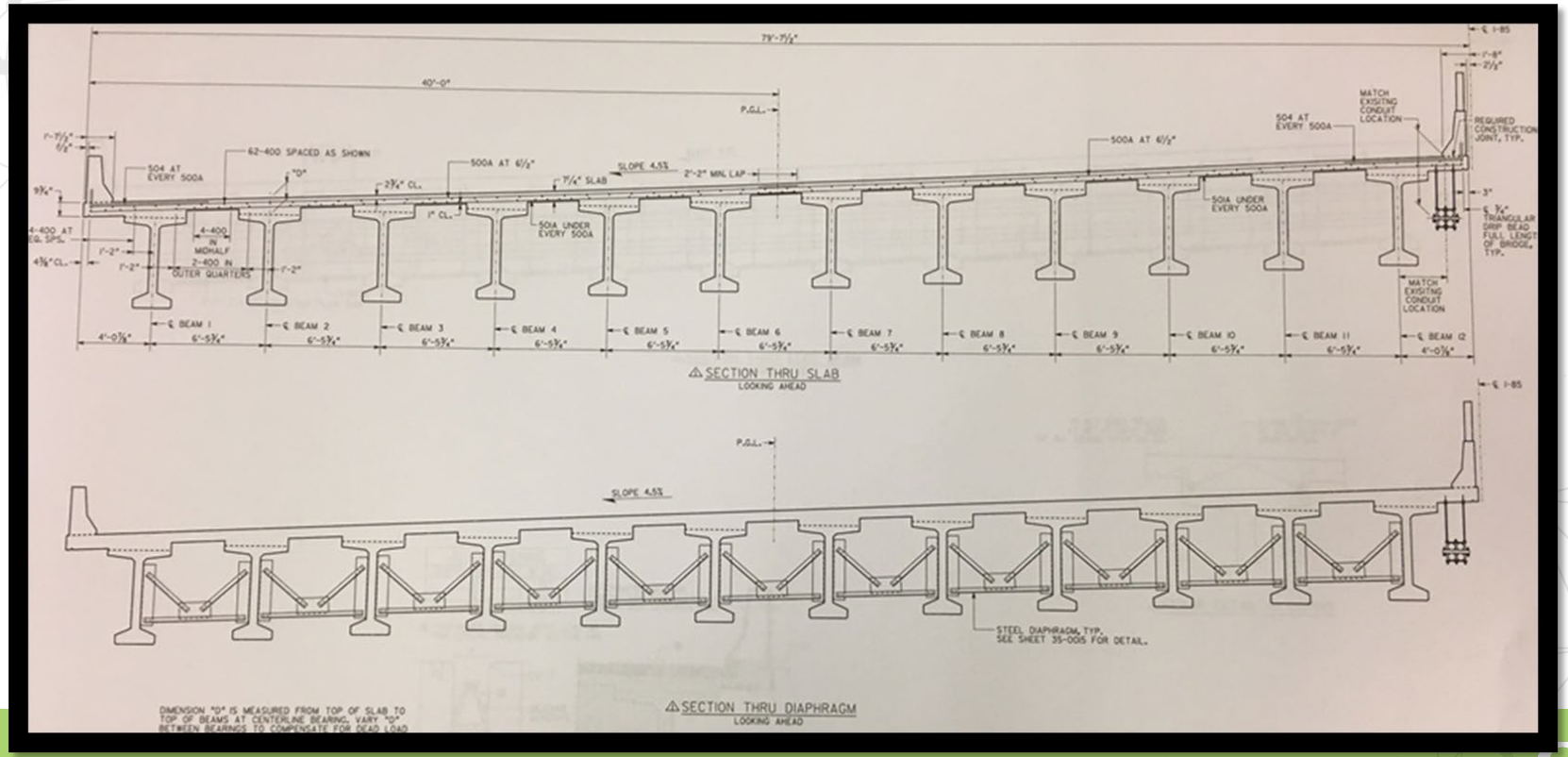
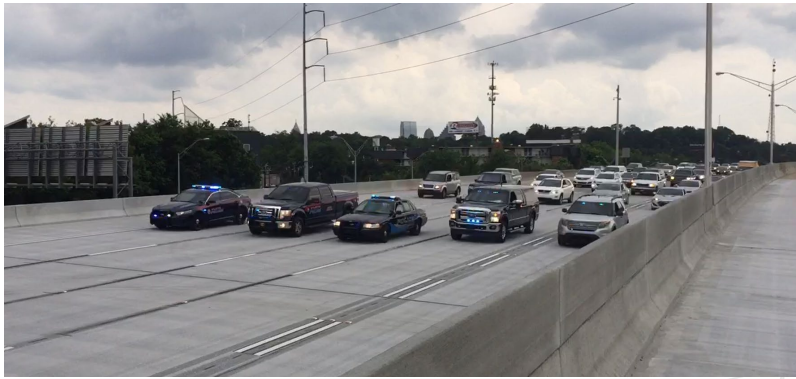


GDOT I-85 Bridge Fire - Reconstruction

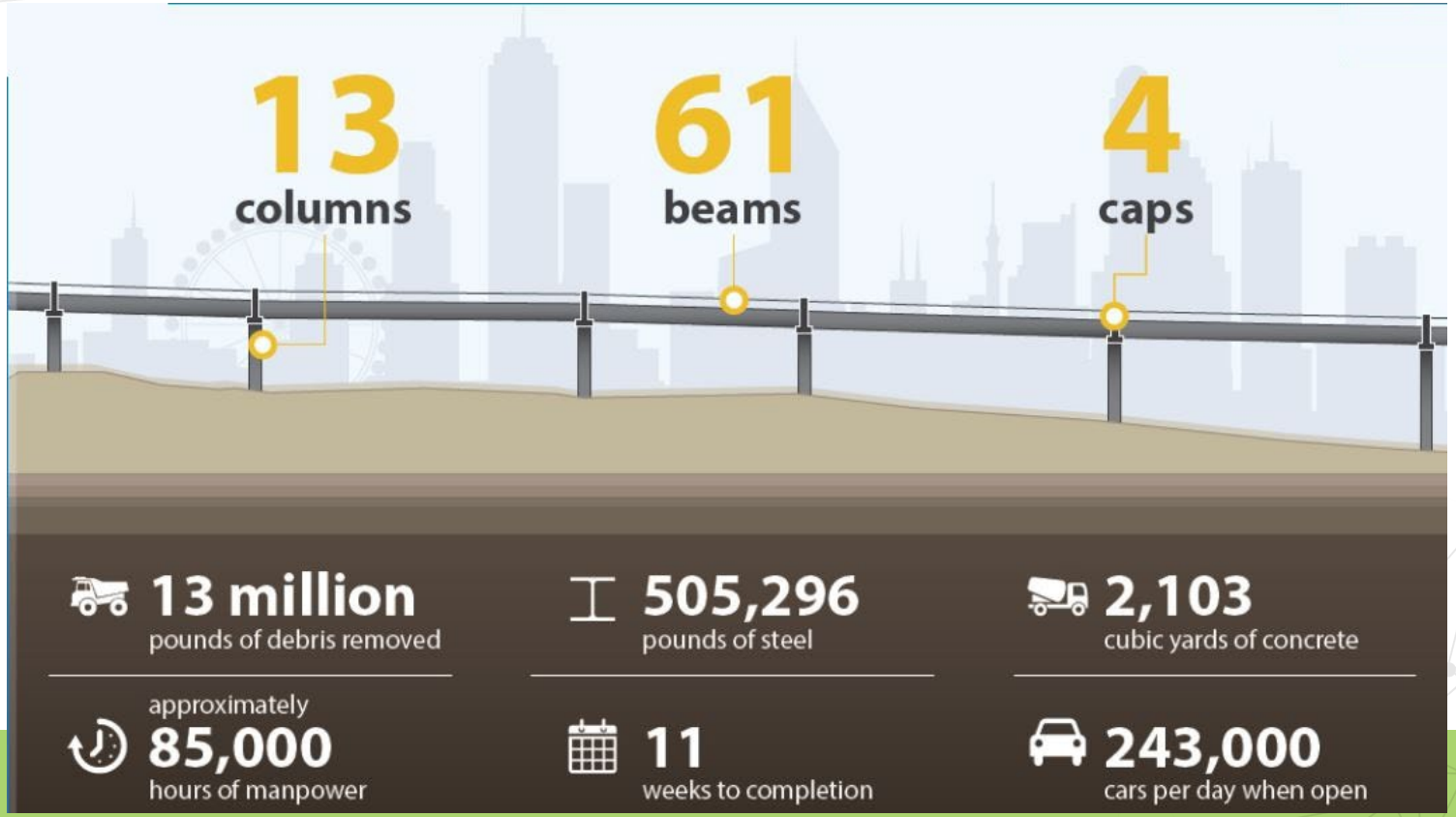
GDOT I-85 Bridge Fire - Reconstruction

GDOT I-85 Bridge Fire - Costs

- Two Separate Contracts:
  - $1.6 M Demolition
  - $11.9 M Construction
- However, incentives were added with FHWA approval:
  - Open before May 25 = $1.5 M bonus
  - Open before May 21 = $2.0 M bonus
  - Every day before that = add'l $200k per day
  - Max incentive: $3.1 million
- Original announced completion date was June 15th.
- **The bridge re-opened Friday evening May 12, approx. 5 weeks earlier than original schedule**



GDOT I-85 Bridge Fire - Statistics



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Closing

What's Next?

- Final report complete this month
- Final report to be published this spring
- Presentations at upcoming conferences
  - International Bridge Conference (June)
  - Midwest/Northeast Bridge Preservation Partnership Meeting (October)
  - World Bridge Engineering Conference (December)
  - Others (TBD)

Further information on this scan and the NCHRP 20-68 "U.S. Domestic Scan Program" is available at:

https://www.trb.org/NCHRP/USDomesticScanProgram.aspx

or

http://www.domesticscan.org/

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Questions?

Jason Hastings, MCE, PE
Director of Structures-Midwest
jhastings@gpinet.com

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