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Partnering in a Crisis

When Atlanta's I–85 bridge catastrophically collapsed, Federal and State transportation agencies joined forces with contractors and suppliers to rebuild in record time.

by Marc Mastronardi

During the evening rush hour on Thursday, March 30, 2017, a major freeway bridge in Atlanta, GA, collapsed because of a fire. The viaduct section of I–85 over the vicinity of Piedmont Road succumbed to intense heat fueled by burning high-density polyethylene and fiberglass conduit stored under the bridge. A man was witnessed trespassing in the secured area and was charged with setting the materials on fire. The prestressed concrete girders of one bridge span ultimately collapsed under the load of the structure as the heat caused delamination, or separation, of the concrete and compromised its steel reinforcements. Thankfully, despite the fire and collapse occurring during a peak travel time, no one was injured or killed.

Hours later, the smoke had mostly cleared, enabling bridge inspectors and design engineers from the Georgia Department of Transportation (GDOT) to assess the full damage caused by the fire. Not one, but six spans—three in each direction—were beyond repair. In all, 350 feet (107 meters) of 80-foot-wide (24-meter-wide) structure was lost in both the northbound and southbound lanes of I–85. Officials would have to detour traffic on one of Georgia's busiest corridors through Atlanta for an unknown period of time.

Because I–85 in this location normally carries more than 243,000 vehicles per day, officials realized immediately they were dealing with a traffic nightmare. As GDOT responded to the unfolding regional transportation crisis, the media and the public speculated that it would be many months before the bridge would be back in service.

GDOT and its partners beat the odds, reopening the bridge in an astounding 43 days.

(Above) The media and the public speculated that rebuilding Atlanta's I–85 bridge, which collapsed after materials stored under the bridge caught fire in March 2017, could take months. It took less than 7 weeks. *© GDOT.*

A Collaborative Focus

GDOT's emergency response efforts began minutes after the fire was discovered. "Within hours of the incident, a collaboration of stakeholders and partners was working to launch traffic management efforts, demolition strategies, and retrofit concepts," says Meg Pirkle, P.E., GDOT's chief engineer.

A famous quote attributed to President Harry S. Truman says, "It is amazing what you can accomplish if you do not care who gets the credit." This dynamic—everyone focused on getting the job done, not the credit—helped make the bridge collaboration a success. GDOT Commissioner Russell McMurry's mobile phone was quickly overwhelmed with texts and calls from those offering assistance as the event unfolded. Many of GDOT's senior staff experienced the same thing. Team members heard from elected officials, many of Georgia's State agencies, leadership from the Federal Highway Administration's Georgia Division, State and local transit operators, contractors within and outside of Georgia, materials suppliers, private consulting engineers, countless vendors, and many more—none of whom sought the spotlight.

GDOT maintains an emergency operations site within its Transportation Management Center east of downtown Atlanta. Key personnel began to gather there, even without direction to do so, as news spread of the fire and subsequent collapse.

Recently retired FHWA Georgia Division Administrator Rodney Barry, P.E., arrived mid-evening to offer his expertise and knowledge of emergency responses and contracting. Like one of the team, he joined GDOT staff who were already working to triage the collapse, develop detours, coordinate with transit operators for route alterations, optimize traffic signalization,

As emergency responders extinguished the flames, GDOT's contractor was already working to provide signage and barricades for traffic control. © *GDOT.*

deploy electronic messaging across GDOT's network, and provide critical communication to the media.

Barry's quick assessment that the significance of the freeway disruption warranted a quick release of emergency response funding and a negotiated contract procurement process, where a contractor is identified and a contract price is negotiated in lieu of a competitive bid, under the provisions of FHWA's *Emergency Relief Manual,* kick-started the rebuild project. A traditional competitive bid process that included design, review, advertisement, letting, and award would have had added significant delay.

Partnering for Speed

Partnering is a shared understanding of the importance of the project while assuring respect for each partner's roles and commitment to delivery. FHWA encouraged e-construction and construction partnering as part of the fourth round of the Every Day Counts initiative. Construction partnering is a project management practice where transportation agencies, contractors, and other stakeholders create a team relationship of mutual trust and improved communications. Benefits include increased transparency, decreased time to delivery, and reduced costs.

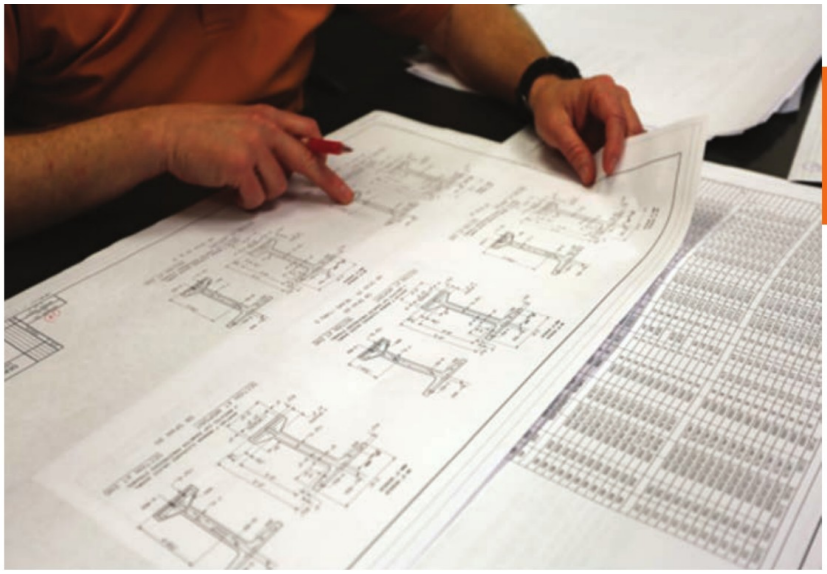
For GDOT, partnering has become a staple practice because of its increasing use of public-private partnerships and innovative contracting efforts. With this strong background, GDOT was able to leverage an existing partnership to respond quickly to the I–85 bridge incident. Many qualified and capable contractors reached out to GDOT on the night of the collapse to assist, including C.W. Matthews Contracting Company, Inc. (CWM), with whom GDOT had an active project north of the site. CWM was able to provide immediate assistance with detour implementation.

After a single phone call, the contractor provided signage, barricades, and subcontracted striping services for traffic control needs. As the company worked to implement GDOT's plans, it would contact the department to confirm details with an email sketch or a text, demonstrating a commitment to collaboration.

As the night progressed, the magnitude of the damage emerged. Contracted personnel onsite installed temporary traffic control devices, giving their experts the opportunity to consider demolition strategies and contact GDOT to determine available crews and equipment—more collaboration on the short-term needs of what was not yet an official project. Simultaneously, GDOT staff developed strategies to quickly and efficiently move forward by recalling past fires, floods, and other incidents for perspective. GDOT's bridge engineers pulled archived bridge plans to help with the preparation of reconstruction plans.

Within a few hours of the collapse, GDOT staff approached Commissioner McMurry to suggest that of four firms being considered, engaging CWM on the rebuild immediately would be most feasible and advantageous because the contract could be negotiated at a reasonable price with a single contractor rather than being put up for competitive bidding. In addition, CWM and GDOT had experience working together on a similar emergency: the replacement of an interstate bridge deck following a tractor trailer fire on I–285 in Atlanta in 2001. The contractor had crew availability, was already assisting with detour implementation, and had ideas and resources to begin demolition immediately. Because of these factors, GDOT decided to proceed with CWM as the contractor, even though

Demolition of the damaged spans began just hours after the fire was extinguished. © *GDOT.*



Teams of engineers and designers worked around the clock in the days after the collapse to prepare plans for the bridge replacement. © *GDOT.*

the project was not yet fully scoped.

In the early hours of Friday, March 31, CWM subcontracted D.H. Griffin Companies for demolition services. Demolition of the six spans began that morning—less than 24 hours after the fire. Partnering in crisis began in earnest.

Plans and Incentives

The morning after the fire, U.S. Secretary of Transportation Elaine Chao announced the release of $10 million in emergency repair funds following State and Federal declarations of emergency.

Over the course of the weekend, bridge designers worked to redesign the spans, including a retrofit of 61 bulb-tee beams to replace the original Type 5 girders. The project required the custom design of individual beams because of the horizontal curve of I–85 passing over Piedmont Road, creating bridge spans in a trapezoid shape in each direction. To tackle this task and other elements necessary for the reconstruction plans, 15-member bridge design crews worked in alternating shifts throughout the weekend under the oversight of Bill DuVall, P.E., the State bridge engineer. As GDOT and the contractor coalesced into a design-build team, they exchanged preliminary plans, refined them, developed shop drawings, and solicited quotes from vendors.

GDOT leveraged incentives to complete the work as expeditiously as possible. "[Then] Governor Nathan Deal asked GDOT how we could employ private sector principles to ensure the work was done as fast as possible and that was where we began evaluating incentives," says Commissioner McMurry.

The agency employed a road user cost analysis to establish those incentives. Using an average daily traffic figure of 243,000 vehicles, the detoured travel time compared to the open freeway travel time, and the input adjustments typically made for expected distribution, GDOT conservatively estimated the impact of the collapse and repairs to be $850,000 per day. The agency estimated the total cost of the rebuild to be $12 million, and the team determined an aggressive but achievable goal for project completion prior to June 15, 2017.

Representatives from GDOT, FHWA's Georgia Division, and the contractor met on April 7 to negotiate the contract. After three rounds of considerations, the group agreed to an itemized contract for a total of almost $12 million and a tiered incentive structure. The final contract provided a $2 million incentive if work were to be completed by May 21, with an additional $200,000 per day for earlier completion up to a maximum of $3.1 million. However, GDOT added a provision that if all work were completed by May 25, the contractor would still receive an incentive of $1.5 million. The contract also included a disincentive of $200,000 per day beyond June 15.

As it turned out, the incentives—and commitment to partnership—worked, and the project maintained a 24/7 schedule throughout the rebuild. The bridge reopened to traffic on Saturday, May 13, only 43 days after the collapse.

Exceeding the Goal

To maintain the aggressive schedule, the project team needed to manage multiple activities concurrently. During demolition, which was conducted and paid for separately from the rebuild, CWM and its concrete mix supplier began working hand-in-hand with GDOT to develop mix designs starting on April 4. Specimen testing began on April 5. Demolition crews completed their work on April 7, hauling away the last of 13 million pounds of charred material from the site. Underscoring the urgency of the rebuild, onsite crews completed the first column pour with the approved concrete mix that same evening. They were fortunate to be able to retain portions of the original columns and encase them in

GDOT and CWM supported the project with onsite experts to ensure smooth communications and quick responses throughout the rebuild. © *GDOT.*

new concrete, saving time.

GDOT staffed the rebuild with two bridge construction engineers from its Construction Division. Each worked alternating 12- to 14-hour shifts to provide onsite subject matter expertise at all times. The lead engineers also supervised teams of 8 to 10 consultant engineering inspectors per shift. With this onsite support and an extended network of senior GDOT and contracted staff committed to the success of the rebuild, decisions needing higher level review were escalated and resolved within minutes.

"With concurrent activities advancing the construction, scheduling was based not on days, but hours," says Adam Grist, vice president of structures at CWM. "Practicing real-time coordination and joint project ownership was vital to managing such an intensive schedule without sacrificing quality."

On April 17, 2017, 18 days after the fire, crews set beams on one span in each direction. They installed all 61 beams by April 25. Deck pours began on April 27. Crews completed all northbound spans by May 1 and all southbound spans by May 5. The team also carried on with work on ancillary items including traffic barrier walls, striping, hardware replacement for intelligent transportation systems, and repairs to Piedmont Road.

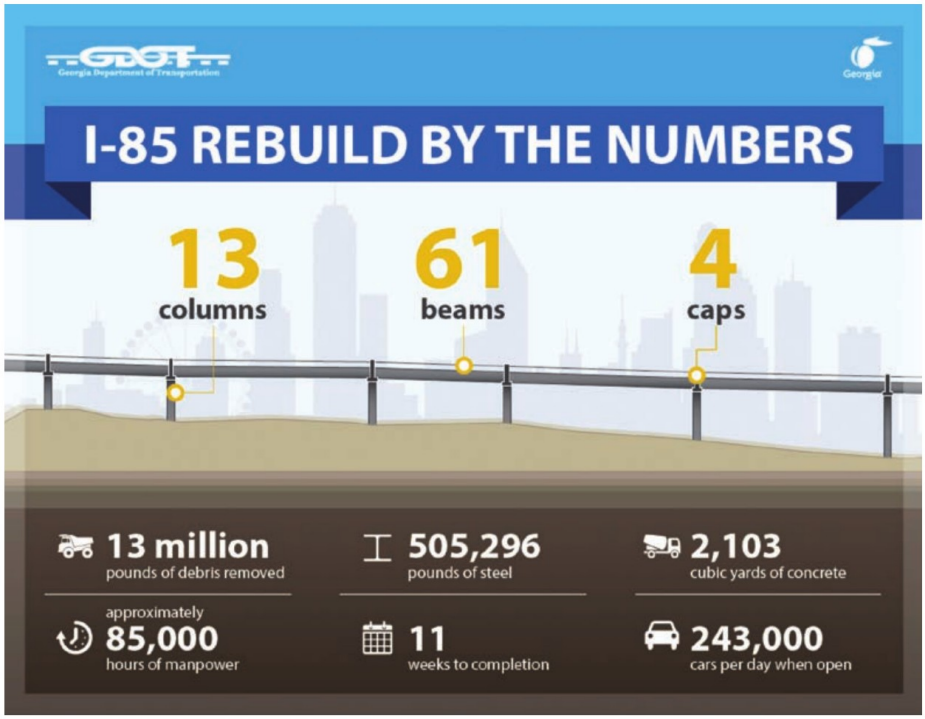
In yet another layer of concurrency and partnering, GDOT took the opportunity to coordinate asphalt mill and inlay work of an already planned, separate project on I-85 near the viaduct. This enabled GDOT to complete the additional work while I-85 was closed for the bridge repair, avoiding having to hamper travel again shortly after reopening the bridge.

A Partnering Success

GDOT and its partners opened the vital north-south link on Saturday, May 13, 2017, a mere 43 days after the fire. Including demolition and incentive, the total cost of the rebuild was $16.6 million. Compared to the cost of diverting road users to detour routes, GDOT estimated the value of the return on the incentives at approximately $27 million.

While the weather was on their side—only half of one shift was lost to inclement weather—the project's success primarily came from the partnership and commitment from all involved, as well as GDOT's willingness to use innovative contracting methods.

The success of the rebuild brought praise to GDOT, FHWA, the contractors, and their many partners involved in the project. Secretary Chao and members of her staff took part in a ceremonial ribbon cutting on May 18, 2017, to celebrate the rapid reconstruction. In her remarks at the event, the Secretary recognized that building a bridge "in [fewer] than 7 weeks is a marvel of dedication, engineering, and teamwork."



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Marc Mastronardi, P.E., M.ASCE is a 26-year veteran of GDOT construction and is currently the agency's director of construction. Mastronardi played a significant role in the I-85 rebuild and remains proud of being part of the team that collaborated to exceed customer expectations.

For more information, see www.dot.ga.gov/BuildSmart/Projects/Pages/I85Bridge.aspx#tab-2 or contact Marc Mastronardi at 404-631-1970 or mmastronardi@dot.ga.gov.

Transportation Secretary Elaine Chao praised the work of the project's partners during a ceremony celebrating the reopening on May 18, 2017. © *GDOT.*