

Thomas A. Duffy, P.E.

Principal



Summary

Mr. Duffy is a structural engineer with more than 30 years of experience in the analysis, design, construction and inspection of bridges and other heavy movable structures. Areas of expertise include bridge and transportation structure design and forensics, with particular expertise with movable bridges and retractable stadium roofs.

Prior to joining the Thornton Tomasetti team, Mr. Duffy was employed by Hardesty & Hanover and worked closely with Thornton Tomasetti on many projects as part of our joint strategic alliance.

Areas of Technical Expertise

- Forensic Bridge Investigations
- Fixed and Long Span Bridge Design and Evaluation
- Movable Bridges

Education

- B.S., Civil Engineering, 1986, Columbia University, New York, NY

Registrations

- Licensed Professional Engineer (New York)
- NCEES

Professional Activities

- NYS Board of Directors, American Council of Engineering Companies New York (ACEC NY)
- Member, American Society of Civil Engineers

Awards

- Engineering Excellence Awards: Platinum Award, "Scour Monitoring of the Long Island Bridges," New York Association of Civil Engineers (NYACE), 2001.

Select Project Experience

Forensic Bridge Investigations

Diamond Causeway, Skidaway Island, GA. Investigation of substructure concrete cracking for a 2,160-foot (658m) bridge.

Greater New Orleans Expressway, Lake Pontchartrain Causeway

New Orleans, LA. Investigation and repair of two parallel two-lane, 24-mile vehicular causeway spanning Lake Pontchartrain between Mandeville and Metairie, LA, a suburb of the greater New Orleans metropolitan area.

Burlington Canal Lift Bridge, Ontario, CAN. Investigation and repair of a 116-meter vehicular lift-bridge.

Otsego County Bridge, Route 11C

Cooperstown, NY. Investigation of a bridge that was damaged when a tractor-trailer vehicle struck the portal frame and upper lateral bracing of the truss structure. Services included a field inspection, damage assessment and scope of damage assessment to assist the client in determining the value of the structure at the time of the incident.

Bates Bridge over Merrimack River

Haverhill, MA. Investigation of construction related defect on a reconstruction of a double-leaf bascule bridge.

TPW Bridge Collapse, Kentland, IN. Investigation for a timber trestle collapse and train derailment.

Safeco Field, Bogie Replacements, Seattle, WA. Investigation and repair of problematic retractable roof design.

Sherman Minton Bridge, spans from Louisville, KY to New Albany, IN.* Expert assistance hired to investigate the source of fatigue cracking in a critical element. Services included peer review of repair alternatives.

Confidential Investigation, of cable stayed bridge performance issues.

Fixed and Long Span Bridge Design and Evaluation

Waller Creek Canopy Walk, Austin, TX. Concrete pedestrian bridge over Waller Creek and Red River Road, linking a hotel and convention center.

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Niagara Falls Bridge Commission (NFBC) Bridges and Facilities, various locations, NY.* Structural inspection, structural design and project manager for multiple projects at three major international crossings between western New York State and Southern Ontario. Scope included rehabilitations, emergency and minor repair projects, capital planning projections, and asset management recommendations to the Commission for the Whirlpool Rapids, Rainbow and Lewiston-Queenston bridges.

Fire Island Inlet Bridge, Fire Island, NY.* Major rehabilitation of an inlet bridge from indepth inspection through final design. Built in the 1960s, the steel bridge has a 1,068-foot tied arch main span flanked by 24 approach spans for a total length of 4,232 feet. Scope included services throughout all phases of the project including indepth inspection; load rating and identification of deficiencies; seismic analysis and retrofit recommendations; steel repairs; deck slab repair and replacement; maintenance and protection of traffic; diving inspection and fathometer survey; scour countermeasure investigation; continuous sonar scour monitoring system of streambed at 13 pier locations; electrical engineering for scour monitoring system; pier stability analysis; pier repair; feasibility study for addition of bikeway; preparation of design report and environmental assessment; preliminary alternatives for replacement structure; and construction support services.

McKinley Bridge, spans St. Louis, MO and Venice, IL.* Multidisciplinary restoration of a major river crossing built in 1911 that spans the Mississippi River between St. Louis, MO and Venice, IL. The bridge had been in poor condition for decades, because of a lack of funds for maintenance and original design details that promoted corrosion. Limited emergency repairs could not stop rapid deterioration of the bridge and the bridge was closed in 2001. Its three main spans are 520-foot steel through trusses that are flanked by five steel-deck truss spans. The approaches on each side of the bridge are steel viaducts; the entire main line of the structure is approximately one mile in length. The decks were framed with various combinations of timber, steel beams, and concrete slab. Repairs were undertaken to ease traffic into St. Louis until a new bridge could be built. Scope included in-depth inspection, load rating and identification of deficiencies, seismic analysis, hydraulic analysis, design of steel repairs, complete replacement of viaduct approach structures, correction of horizontal alignment, and main span deck slab repair and replacement.

Movable Bridge Projects

West Jefferson Avenue-Rouge River Bridge, Detroit, MI. Damage assessment and repair of a double-leaf bascule bridge. Scope included steel repairs at point of impact, the forward leaf bascule truss, floor system and bracing, bascule pier, concrete and masonry repairs at the bascule piers, and the replacement of the mechanical system.

Duluth Aerial Lift Bridge, Duluth, MN.* Inspection and reconstruction of a 350-foot lift span with a vertical clearance of 135 feet. Scope included redesign of the main counterweight

sheave trunnion supports of an aerial lift bridge; structural, mechanical, and electrical inspections; and development of plans for a historic landmark reconstruction. Emergency trunnion shaft replacement was also performed for two cracked counterweight sheaves. The bridge services the busiest inland port in the world and opens more than 6,000 times a year.

Carlton Bridge, Bath, ME.* Complete structural, mechanical and electrical rehabilitation of a vertical-lift span and towers. The rehabilitation of the 330-foot and 275-foot approach spans were equally important to converting and extending the life of the 1929 bi-level rail and vehicular bridge to rail only. Scope included oversight throughout all phases including inspection, analysis, design feasibility studies, rehabilitation design and construction support.

Tomlinson Bridge, New Haven, CT.* Design of a new 90-foot-by-270-foot vertical-lift span combination railroad and highway bridge. The lift span weighs more than 6.5 million pounds and is powered by two 100HP motors (one in each tower). Each of the towers supports half the weight of the lift span and a 3.2-million-pound counterweight, as well as all of the machinery and operator's enclosures.

AMTRAK Delair Railroad VL Bridge, spans from Camden, NJ to Philadelphia, PA.* Inspection and rehabilitation of an operable Conrail-owned, 540-foot vertical-lift railroad bridge. Scope included structural, mechanical and electrical inspection; development of a monitoring program for trestle bents 27-36; structural rehabilitation of a swing span; structural and geotechnical inspection of the west approach; and construction support.

High Street and Park Street Bridges, Alameda County, CA.* Mechanical and electrical inspection condition report of two through truss bascule bridges. Scope included recommendations and cost estimates for repair and rehabilitation of the gate and lock systems of the bridges to bring them up to current standards.

National Roads Authority, 2008 Inspection and Rehabilitation of Brother Edmund Ignatius Rice Bridge, Spans River Suir, Waterford, IRL.* Structural, mechanical and electrical inspection of a bridge for the Waterford City Council and the National Roads Authority (NRA). The inspection team evaluated the performance of the twin, single leaf bascule spans, performed a condition assessment and prepared a report outlining the inspection findings with recommendations for maintenance and rehabilitation.

New Westminster Rail Bridge Study, New Westminster, British Columbia, CAN.* Inspection and evaluation of a rail bridge. Opened to traffic in 1904, the bridge has a 330-foot swing span. Scope included the inspection and evaluation of the mechanical and electrical systems for the swing span. The project included a mechanical and electrical inspection condition report with recommendations and cost estimates for the repair and rehabilitation of the primary swing span machinery, and lifters and interlocks of the bridge to bring it up to current standards.

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Buffalo Harbor Bridge, Buffalo, NY.* Site location and design of a new crossing to link downtown Buffalo to the Outer Harbor district, an underdeveloped peninsula. Concept for the new crossing allows multimodal access, including pedestrians and cyclists, to the outer harbor eliminating a lengthy access route and spurring development. Services were provided from concept study. Planning permission through the final design phase ongoing.

Wantagh State Parkway Bascule Bridge over Sloop Channel, Long Island, NY.* Replacement of a fixed bridge with a 712-foot-long bridge that includes a 105-foot, double-leaf bascule span.

Wantagh State Parkway Bascule Bridge over Goose Creek, Long Island, NY.* Forensic investigation and emergency replacement design of the flanking and bascule approach spans of a 360-foot long bascule bridge with a 93-foot long bascule span severely damaged due to scour.

Additional Bridge Projects

Robert Moses Causeway Bridge over Fire Island Inlet, Long Island, NY.*

Robert Moses Causeway Bridge spanning State Boat Channel, Long Island, NY.*

George Washington Bridge, New York, NY.*

Verrazano Narrows Bridge, New York, NY.*

Sonoma-Marin Area Rail Transit Movable Bridges, CA.*

Narrow Water Bridge over Newry River, County Louth-Newry, Mourne, IRL.*

Third Street Bridge spanning Islais Creek, San Francisco, CA.* Inspection and rehabilitation feasibility report.

Illinois Street Intermodal Bridge spanning Islais Creek, San Francisco, CA.* Owners representative for the design-build of a new hydraulically actuated bascule bridge.

Wantagh Parkway Bridges spanning Sloop Channel and Goose Creek, Long Island, NY.* Development of first NYSDOT Bridge Scour monitoring program.

State Route 36 spanning Cedar Creek, Slaughter Beach, DE.* Design of replacement bobtail swing bridge.

McArdle Bridge spanning the Chelsea River, Boston, MA.* Rehabilitation of a rolling lift bridge

Quogue Bascule Bridge, Long Island, NY.* Rehabilitation of a bascule bridge

Papers, Publications and Presentations

"Forensic investigation in the age of the internet of things," 37th IABSE Symposium, September 3-5, 2014, Madrid, Spain.

Contact

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* Denotes work performed with previous employer.