

## **Eileen McEnroe Hanks, P.E.**

Eileen has a comprehensive background in structural design, assessment, investigation, and building renovation. She brings extensive specialized experience in investigative engineering and restoration of older and historic buildings. Eileen's projects have included renovations, condition assessments, reinforcing and repairs to structures of all construction types.

### **Professional Registration:**

Professional Engineer – WI, CO

### **Education:**

M.S., Civil Engineering (Structural), 2002 Georgia Institute of Technology, Atlanta, GA

B.S., Civil Engineering (Structural), 1997 University of Notre Dame, Notre Dame, IN

### **Professional Affiliations (lapsed since employment change in 2017):**

The Masonry Society – Existing Masonry Committee

International Concrete Repair Institute

American Institute of Steel Construction

Association of Preservation Technology International

**Mitchell Park Conservatory (Domes), Milwaukee, WI:** Structural investigation of concrete frame including spalling concrete that forced closure of the domes. Development of stainless steel netting system installed in all Domes intended to keep the buildings safe for occupancy during public discussion period, design and implementation of a long-term plan for the facility. The system has been praised for its ability to blend with the existing structure and not detract from the visitor experience.

### **Milwaukee County Zoo, Pachyderm Tunnel Reinforcement, Milwaukee, WI – Project Manager:**

Responsible for designing structural reinforcements of two tunnels connecting the basements of the east and west halves of the Pachyderm Building. The design is for new precast roof slabs on thickened foundation walls that tie to the inside face of the existing walls. The new roof deck will be waterproofed and a new topping slab installed over it to form the pedestrian walkway. The roof decks at the center portion of the tunnels will be waterproofed, and a new concrete slab installed over them to support the weight of a concrete truck.

**1433 Water Street, Milwaukee WI:** New 5 story steel office building adjacent to a renovation of 1930's manufacturing and retail building into office space. Renovation included reinforcing heavy timber structure for increased capacity, façade repairs of corroded steel lintels and cracking, and new Riverwalk supported by existing foundation.

**University of Wisconsin-Milwaukee Southwest Quadrant Building Evaluation, Milwaukee, WI – Structural Engineer:** Visual evaluation and code review of all classroom and office buildings on the science quad to assist in master planning for the campus.

**Milwaukee Public Museum Façade Restoration, Milwaukee, WI – Project Manager and Structural Engineer:** For façade replacement on 1961 marble-clad museum. GRAEF performed a study of the existing cracked marble panels to recommend repair and replacement options. We then provided engineering analysis and design for the new photovoltaic and phenolic panel systems on the north and south elevations.

### **Milwaukee Art Museum and War Memorial Center Structural Evaluation – Project Manager:**

Structural evaluation of 1955 and 1965 buildings including interior, exterior, façade, and plaza assessments. Comprehensive report of findings, recommendations for repair and maintenance and estimated construction costs were provided to aid in future planning for the site.

**St. John's on the Lake Existing Facility Audit – Project Manager and Structural Engineer:** Managed

structural, mechanical, electrical and plumbing evaluation of 160,000-square-foot independent living and health center buildings. Work included a visual assessment, report of findings, recommendations for repair and maintenance, life expectancy and budgetary costs for identified repair/replacement conditions.

**Caterpillar (Bucyrus International) Heritage Building, South Milwaukee, WI – Structural Engineer:**

Extensive renovation and adaptive reuse of a circa 1900 four story masonry and heavy timber industrial building into a showcase museum space. Significant structural challenges included underpinning foundations, increased capacity of floor systems, designing and constructing steel trusses in attic space to hang lower floors in order to provide additional capacity for floors without additional columns in first story space.

**Caterpillar (Bucyrus International), South Milwaukee, WI:** Structural assessment and design for renovation of the existing 224,000-square-foot machining building. Renovation work included replacement of the exterior building envelope, rework of interior spaces, and demolition and rebuilding certain areas of the facility. As part of this project, the entire roof structural system was evaluated, analyzed and upgraded when required. The building is a collection of more than 30 individual buildings constructed adjacent to one another over the past 100+ years. GRAEF staff members also provided architectural, civil and MEP services.

**Schroeder YMCA, Brown Deer, WI:** Structural design for the renovation of a recreational facility. Renovation work included modification of space including locker room facilities, public access ways, and entry and exits. GRAEF staff members also provided MEP services.

**George Williams College Campus Evaluation, Williams Bay, WI:** Structural evaluation of three campus buildings. A report was provided for each building providing documentation of the existing structural condition along with general recommendations for repairs and an opinion of the feasibility of renovation. GRAEF staff members also provided MEP evaluation and recommendations.

**George Williams College Administration Building Repairs, Williams Bay, WI:** Structural design for repairs to the early 1900s administration building. Repairs were designed to reinforcing the porch floors and stabilize the porch columns to avoid further movement. GRAEF civil engineers provided services to renovate the drainage around the building.

**Milwaukee River Flushing Station, Milwaukee, WI – Project Manager:** Provided structural investigation of cracking in the walls of the historic 1880s lakefront building. An evaluation of the cracking, research into the construction of the building, and possible repair scenarios were developed. A report of findings and recommendations was provided along with estimates of repair costs.

**Milwaukee County Building Evaluations, Milwaukee, WI – Structural Engineer:** Team leader of an evaluation team for county building facades. Project consisted of the evaluation of the facades of 105 County buildings. The buildings ranged in size from one story to 20 stories. Ten teams comprised of GRAEF engineers and engineer subconsultants performed evaluations and provided condition reports for each building. Secondary evaluations were performed of buildings with identified unsafe conditions and repair details were developed as required for hazardous conditions.

**Milwaukee Public Library Façade Restoration, Milwaukee, WI – Structural Engineer:** Technical consultant for limestone restoration of this iconic Milwaukee building which is on the historic registry. Evaluation work was performed on east, west and north elevations to provide a condition report and recommended repairs. Repair documents were produced and construction administration was provided throughout the restoration work.

**Jones Island Waste Heat Tunnel, Wastewater Treatment Plant, Milwaukee, WI:** Structural investigation and assessment of deteriorated waste heat tunnel. An assessment of the deterioration of the concrete tunnel was performed. A report of findings and recommendations for repair was provided including schematic repair possibilities and estimated repair costs.

**Jones Island Floor Capacity, Wastewater Treatment Plant, Milwaukee, WI:** Provided structural analysis of existing floor systems to determine load capacity for trucks.

**Jones Island Building Evaluation, Wastewater Treatment Plant, Milwaukee, WI:** Provided structural and architectural evaluation of a “temporary” building constructed 20 years earlier. Foundation and slab settlement was a major source of concern as well as the lifespan of the building envelope. A report of findings, including estimated repair costs, was provided.

**City of West Bend Industrial Building Assessment, West Bend, WI:** Worked with the City of West Bend building department to evaluate the structural condition of a group of industrial buildings to determine which of the buildings could reasonably be repaired and which should be demolished.

**Milwaukee Public Schools, Milwaukee, WI:** Evaluations of existing conditions including deterioration and damage at numerous schools built from the late 1800s through the late 1900s. Work has included investigation of damage and design of repairs for roofs, walls, stairs and other portions of the buildings. Assessments of existing conditions followed by reports of findings and recommendations for continued evaluation or repair are routinely performed.

**College Court and Lapham Park Housing Developments, Milwaukee, WI:** Evaluation and repair of 1960s facades for Housing Authority of the City of Milwaukee. Repair work has included such items as concrete parapet replacement, shelf angle and flashing replacement, brick repair and tuckpointing, movement joint installation, sealant replacement, and cleaning.

**Grand Avenue Club Façade Assessment, Milwaukee, WI – Project Manager:** Evaluation of 1920s stone and brick building on National Historic Registry. Building façade includes ornate stone features. An assessment of the current condition and recommendations for short and long term repairs and maintenance were provided.

**Lakefront Building Evaluation, Village of Fontana, WI – Project Manager:** Managed structural evaluation of mid 1900s building on Geneva Lake. A report was provided documenting the existing condition of the building and a code analysis based on the International Existing Building Code. The report provided guidance to allow the village to decide whether the building should be renovated and replaced.

**Research Park M1 Building Floor Repairs, Milwaukee, WI:** Structural assessment and design of repairs for a concrete joist floor in late 1800s building. Repair work included removal of deteriorated concrete, installation of new reinforcing steel, repair of concrete, and installation of additional steel supports.

**Black Point Estate, Lake Geneva, WI – Project Engineer:** Historic Structures Assessment and Report for 1880s historic lake house. Work included assessment of building’s structural condition, recommendations for stabilization and repairs and the structural portions of the Historic Structure Report for the State of Wisconsin. MEP assessment and report were provided by other staff members.

**411 East Wisconsin Avenue, Milwaukee, WI:** Failure investigation and replacement of parking garage snow chute. Investigation into the cause of failure for collapsed precast walls. Provided report of findings followed by design and construction administration for replacement of affected walls.

**Museum of Science and Industry, Chicago, IL:** Structural design of exhibits. Provided structural guidance and design for new exhibit area within museum. Exhibits have a minimalistic feel, are supported on floors, hung from ceilings and are constructed of aluminum and steel tubing.

**NASCAR Hall of Fame, Charlotte, NC:** Structural design of museum exhibits. Provided structural guidance and design for exhibits throughout museum. Work required creative thinking to meet both structural and aesthetic needs of the project. Exhibits are constructed of steel or aluminum extrusions.

**Utah Museum of Natural History, Salt Lake City, UT:** Structural design of museum exhibits. Provided structural guidance and design for exhibits throughout museum addition and renovated areas. Examples of exhibits include multi-dimensionally curved walls, display cases, “floating” tanks, and dinosaur bone supports. Exhibits are constructed of wood, metal studs, aluminum and steel. High seismic loads created particular structural challenges.

**Orthopedic Associates, Manitowoc, WI:** Structural design for renovation and addition to a medical office building. Project included a new portion of the building constructed of concrete masonry units and wood framing, interaction with the adjacent existing building and creating openings in the existing building’s walls.

**Miralea, Masonic Homes of Kentucky, Louisville, KY:** Structural design of 145,000-square-foot, \$19 million, high-end Independent Living Center. Multiple buildings including four 3-story apartment wings, commons area and aquatic center. Wood frame and masonry structural systems with unique and complicated design features.

**Frey Village, Middletown, PA:** Structural design of 90,000-square-foot, Independent Living Center. Multiple buildings including two 4-story apartment wings, commons area and renovation of existing space. Wood frame, masonry and precast concrete structural systems.

Eileen had the following experience prior to joining GRAEF:

**Treat Hall at Johnson and Wales University, Denver, CO – Project Engineer:** Facade restoration of two historic masonry buildings, totaling 66,100 square feet, constructed of Colorado rhyolite, Manitou Springs sandstone, brick and terracotta in 1886 and 1906. Performed a stone-by-stone evaluation of the 1886 building and certain elements of the 1906 building. Repairs included cleaning to remove atmospheric staining, replacing severely damaged stones and rebuilding certain structural areas. (with another firm)

**Cherry Creek Village, Denver, CO:** Worked with Homeowners Association (HOA) to assess the structural needs of a 1970s, 200+ unit, multi-family condo complex. Project included an overall assessment of needs, repairs of wood floors in imminent danger of collapse, replacement of wood decks, replacement of steel stairs, assessment and addressing drainage concerns on property, among other work on site. The project was largely driven by assessing the most immediate of needs of the property in order to aid the HOA in using special assessment fees in the most productive way. (with another firm)  
**Navajo Headwaters Lodge Restoration, Chromo, CO:** Design for repair of 100 year old remote log cabin in southern Colorado. Project included addition of a foundation and structural floor as well as reframing much of the roof with log framing and trusses and restoring deteriorated and damaged wall logs. (with another firm)

**Insurance Investigations, CO:** Performed many investigations for insurance claims dealing both with cause/origin and repairs. The causes have included snow loading, fire damage, auto impact, and hydrostatic pressure loading. (with another firm)

**Snow loading of residential and commercial properties:** The results of these investigations typically resulted in repair of damage including replacement of the roof structure and reinforcing the roof structure. Some investigations led to the conclusion that the damage reported was not related to the snow event.

**Fire damage of residential properties:** The fire investigations performed included an assessment of the structural capacity and stability of the remaining structural elements. Typically, repair or replacement details were provided for these residences.

**Vehicle impact of residential and commercial properties:** Investigations of vehicle impact ranged from minor repairs in small areas of a wall to major rebuilding of the wall system depending on the extent of damage.

**Hydrostatic Pressure loading:** Investigation of a swimming pool collapse included identifying the source of unbalanced pressure and determining the cause of the failure. The source of the unbalanced load causing the failure was used by the adjuster to determine whether the loss was covered.

**Arapahoe Farms Townhomes, Fort Collins, CO:** Investigation and design of repairs for foundation movement and associated building damage for a large townhome complex built on expansive soils. Repairs included installation of piers, reestablishing voids below grade beams and in crawlspaces, drainage improvements around buildings and repair of cosmetic damage. (with another firm)  
**Wayward Wind, Fort Morgan, CO:** Design and construction administration for A-frame with significant deterioration at exposed ends of timber arch beams. (with another firm)

**2500 Littleton Boulevard, Littleton, CO:** Design and construction administration of major remodel of existing 1900s building including major reinforcing of existing roof. Construction materials generally consisted of working with existing wood framing and multi-wythe brick. (with another firm)

**Fox Theatre, Atlanta, GA:** Provided dynamic and static analysis of the theatre's steel balcony system, constructed in 1929. Produced analytic computer model to aid in evaluating the need for proposed tune-mass damper system. (with another firm)

**Colorado State Patrol, Alamosa, CO:** Design of addition to historic state patrol building and remodel of existing portion of building. Construction materials included concrete, steel, CMU, multi-wythe brick, wood, and metal studs. (with another firm)

**US Custom House Ramp Repair, Denver, CO:** Design and construction administration for strengthening and rebuilding of 1920s vehicle ramp. During reconstruction, the ramp was upgraded for HS20 truck loading. The project included significant access issues due to existing mechanical equipment in basement space below ramp. Construction materials included concrete and steel. (with another firm)

**Colorado State Governor's Mansion Carriage House Addition and Restoration, Denver, CO:** Design and construction administration of addition to the historic carriage house at the governor's mansion. Construction materials included steel, metal stud, concrete and CMU. (with another firm)

**Escuela de Guadalupe, Denver, CO:** Investigation and design of repairs for foundation failure of elementary school built in the 1940s. Project involved design of temporary shoring for existing wall for immediate stabilization, exploration of various repair options, and final design of an interior cantilevered foundation wall to reinforce the existing foundation. (with another firm)

**Reformed Dutch Church of Claverack, Claverack, NY:** Structural assessment, analysis and reinforcing of roof framing for church built in 1767. Existing heavy timber roof trusses were reinforced to limit movement that had been occurring due to modifications made to the structure over the life of the church. (with another firm)

**University of Northern Colorado – Sports and Recreation Facilities, Greeley, CO:** Design and construction administration for two new buildings, two additions to existing buildings and one remodel of an existing building for sports and recreation buildings on campus. Construction materials included CMU, wood, concrete and steel. (with another firm)