

Multi-Year, Multi-Discipline Capital Project: Fin Fan Floor Replacement Program

Since 2013, Brindley Engineering has led the engineering, procurement, and construction field engineering services for the replacement of up to 13 pan-deck flooring systems supporting high pressure piping and equipment on modular structures located in the Arctic. The existing “fin fan floors” were at the end of their service life and exhibited signs of accelerated deterioration, leading to the multi-year capital program to replace the floors. Brindley Engineering provided pivotal services as the technical branch of an EPC team to execute this challenging program.

BE Engineering

BE was tasked to prioritize each of the fin fan floors based on preliminary inspections to provide overall direction to the program. Once field evaluations were complete, Brindley provided multidiscipline engineering services to provide a turn-key engineered product for each of the fin fan floors. Our structural engineers built finite element models to analyze the existing structure and provide engineered solutions to necessary upgrades. Mechanical and piping engineers provided pipe stress analyses for the existing piping and provided specifications for the retrofitting of existing pipe supports and the replacement of spring can systems. Instrumentation and electrical engineers were consulted for potential upgrades to existing infrastructure during the module outage. BE coordinated engineering efforts with the client’s facility and discipline engineers to provide an integrated and field-forward final product.

BE Procurement

BE facilitated and assisted in the procurement of engineered materials and interfaced with vendors to procure products per specification for the fin fan floor replacement, a challenge considering the arctic environment. Our engineers provided onsite / in-process quality control at vendor facilities to audit fabrication and ensure project specific requirements were met. Innovative materials and execution strategies were developed during this process and implemented in mock-ups to validate new ideas and provide contractors with adequate understanding of execution as there are no second chances 250 miles north of the arctic circle.

Contact Us

Brindley Engineering
901 Warrenville Road
Suite 300
Lisle, IL 60532

 630-796-2020

 info@BrindleyEngineering.com

BE Construction Support

BE's contributions to the project did not end with engineering and procurement as we provided onsite execution support with engineering and quality control for the General Contractor. Our engineers, Certified Welding Inspectors (CWI's), NACE Coating Inspectors, and ACI / ICRI concrete inspectors inspected the retrofitted pipe supports, structural steel welding, coatings, and reinforced concrete systems. The contractor's quality control process was facilitated through BE, where we created and implemented an Inspection and Test Plan (ITP) that coincided with client construction specifications and requirements. Our onsite engineers facilitated in-execution design changes based on discovery work, cutting down on response time from the Engineer of Record (EOR) and allowing for minimal disruption to construction. Our onsite engineers and quality control personnel spent most of their time in the field, providing the construction team with real time support and providing our team ongoing valuable constructability knowledge, even during a concrete pour at -83 deg F wind chills.

BE Project Services

Throughout the engineer, procure, construct process, BE provided project and scheduling services to the engineering and construction team. Project scheduling and implementation were completed by BE's project controls engineers and allowed for real-time project visibility for the engineers, contractors, and owners. Through this process, our engineers provided real time progress and project spend so the client had valuable information regarding project efficiency in near real-time.

BE The Solution

A project slated for the replacement of 13 floors originating in 2013 has finally come to an end, and BE is proud of the innovation, improvements, and family it has created over the years. Each year of the program provided new lessons learned, which were implemented and incorporated into the following year's process. The Fin Fan Floor Replacement program is a major project in the history of Brindley Engineering, and will always be remembered for the great relationships that were formed.

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