Superheater Pendants Replacement

Removal and replacement of superheater pendants located inside of a boiler

In 2016, Brindley Engineering designed a structural system and engineered lift plan for the removal and replacement of superheater pendants located inside of a boiler at a coal and natural gas-fired power plant located in the upper Midwest. The function of the superheater pendants are to increase the temperature of steam above its saturation temperature (see Photograph 1 below of replacement pendant). The design included various monorail beams installed throughout the structure to bull rig (move horizontally) the pendant from its installed location inside the boiler to the outside and through the building to a point on the outside of the building where a crane was located to move the pendant to grade. Due to the geometry and available space inside the boiler and the building, multiple monorails were required to be installed at two elevations with overlap to allow for handoff of pendant from one monorail trolley to another. This resulted in each pendant traveling a path measuring approximately 200 feet in length.

Photograph 1 – Replacement Pendant

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Due to clearance restrictions and crane location, the lower monorail needed to be installed diagonally through the building structure to allow for a direct run from the boiler to the outside of the structure. Figure 1 below showcases a plan view of the lower monorail layout throughout the building steel structure, while figure 2 shows the rigging arrangement for the pendants.

Figure 2 – Lower Monorail

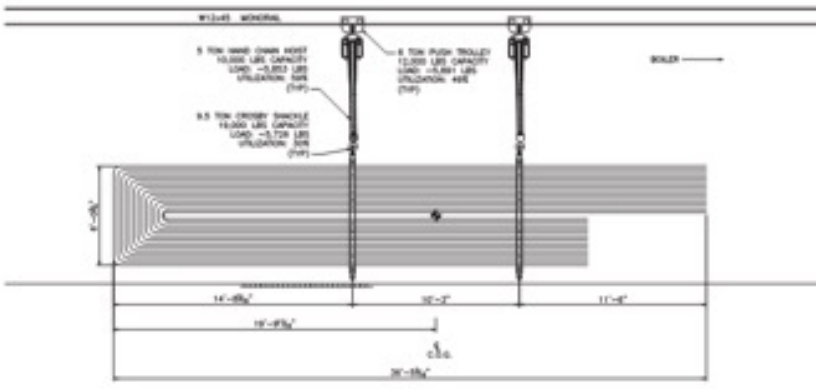

Figure 3 – Rigging Arrangement

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Capital & Maintenance Project Case Study

Superheater Pendants Replacement

Our Challenges

Challenges with this project included:

1. Providing the proper overlap between the upper and lower monorail to maintain a smooth transition of the pendant.
2. Determining the best path through the steel structure that provided adequate support to the monorail while allowing for proper clearance for the pendants to safely pass through.
3. For the final load transfer from the monorail system to the crane, the trolley beam was required to cantilever outside of the structure and e accessible via manlift for attaching the rigging.
4. Through three-dimensional laser scanning, potential obstructions to the travel pathway for the pendants were identified early in the design process and clashes were eliminated.

BE The Solution

One of the keys to the success of the project was obtaining early feedback from the contractor during constructability reviews. At each phase, Brindley collaborated with the owner and the contractor to ensure project objectives were met and all perspectives were considered in meeting the various challenges presented. Ultimately the project was successfully performed with no clashes, and it was determined to maintain the monorails for future maintenance of various boiler components. This project demonstrated Brindley Engineering's commitment to constructability and teamwork.

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