WORLD'S FASTEST DATA CENTER BUILT IN 5 MONTHS

Challenges

Shapiro & Duncan recently completed their most challenging project to date. The nearly 291,000 square foot addition to a Northern Virginia Data Center included more than 240,000 square feet of raised floor space housing four independent computer room environments which will incorporate redundant backup for the building's HVAC systems. Our project team had three tremendous hurdles to overcome with this project 1) An extremely aggressive schedule of five months; 2) A limited amount of area to work in around the footprint of the building; 3) *Winter Storm Jonas,* a.k.a. *Snowzilla*.

From preconstruction to completion of functional systems, we began coordination and documentation immediately in order to accommodate the fast track project schedule. All personnel and other resources provided by Shapiro & Duncan and our subcontractors had to be structured for a 24/7 work schedule. Teams were restructured to have team leaders and crews tailored to meet the demands of the project. Logistics were preplanned accordingly as well as what welding equipment and tools would be used. Our team along with all trades had a lack of space to work in, which made it necessary to preplan and coordinate all deliveries through the general contractor to avoid congestion, delays and safety issues while off-loading materials. For the most part, deliveries of mechanical equipment and piping were made in the evenings and over weekends, often during inclement weather. Remember *Winter Storm Jonas*? The storm produced up to 3 ft. of snow in parts of the area, which required additional precautions to maintain quality control standards.

Solution

With these challenges ahead of us, Shapiro & Duncan's team swiftly implemented a strategic plan that assembled personnel in teams to tackle the project in a building block approach. This approach was essential in order to facilitate coordination, design, fabrication, delivery and placement of approximately 18,000 feet of welded steel HVAC piping ranging in sizes from 10" to 3" diameter.

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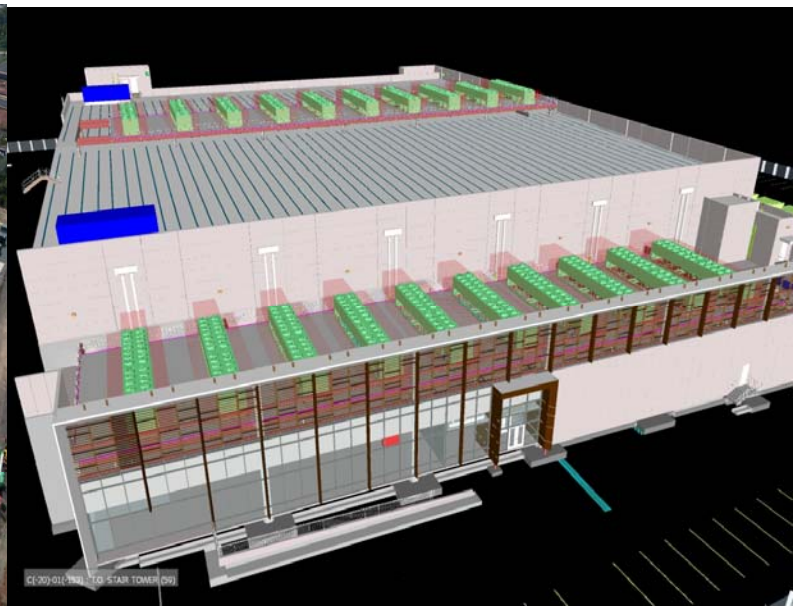

Key to this coordination process was Shapiro & Duncan's Building Information Management (BIM)/Virtual Design Coordination (VDC) process, which is used to troubleshoot mechanical and plumbing designs in conjunction with other trades. Job-specific project documentation (i.e., submittal data, shop drawings, etc.) was accelerated in order to provide needed product information to the BIM/VDC team. As segments of the BIM/VDC process were completed and the coordination drawings approved by all trades, the designs were forwarded to Shapiro & Duncan's procurement team at our 51,000 square foot fabrication facility in Landover, Maryland.

To jumpstart the fabrication effort, deliveries of bulk materials from local vendors were immediately expedited. Approximately one week following contract award, fabrication of piping systems commenced so that piping systems could be completed and loaded on flat-bed trailers in anticipation of delivery to the jobsite per the project schedule. Click here to see project Goliath video of our work.

Piping assemblies including both supply and return lines – complete with pipe supports, insulation inserts, valves, fittings, specialties, pumps and air separators, in sections up to 40 feet in length – were pre-manufactured, numbered and truck-loaded in a sequence corresponding with the general contractor's schedule. There were over 60 tractor-trailer loads of piping delivered in this fashion.

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Piping and equipment deliveries were staged so that the material went into the building and quickly came together in erector set fashion, thus expediting final weld connections, test and insulating of piping systems. Shapiro & Duncan's coordination solution was not limited to piping assemblies. Layout and placement of Chilled Water Piping as well as Computer Room Air Handling (CRAH) Units not only required extensive co-ordination with the work of other trades, but also scoping out the logistics of sharing limited laydown space.

More intricate coordination was required for placement of piping on both the low and the high roofs of the building. Piping materials, pumps and related equipment were staged on the unfinished roof, prior to placement of rooftop steel dunnage and the 20 Air Cooled Chillers. Prefabricated piping/pump assemblies were strategically placed in position on the roof so that the steel dunnage could be erected above the piping, with the piping then lifted to connect to the underside of the steel. This approach eliminated the need to man-handle large pumps and piping under the steel after it was erected, thus saving time and eliminating the potential for damaging the roof substrate.

Upon completion of erection of steel dunnage platforms by subcontractors, the Air Cooled Chillers were then craned into place on top of the steel dunnage. This required the use of a 460-ton Crawler Crane. The pre-engineered piping was then connected to each Chiller and tied into the piping extending into the building. We were able to set 800 plus feet of chilled water pipe for ten chillers in one day!

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Inside the building, over 5,000 feet of pre-engineered Custom Leak Detection Systems were installed beneath the various runs of underfloor chilled water piping. The Leak Detection System is designed to identify the presence and exact location of a water leak, should one occur, and immediately alert the building engineer via the building automation system.

One more unique aspect of Shapiro & Duncan's mechanical solution for this enterprise class data center is the building's Chilled Water System. This system is equipped with Automatic Control Valves designed to divert water flow from one area of the building to another, so that the cooling needs of any computer room can be supplied from any of the chillers and pumps installed.

This project was the perfect opportunity for Shapiro & Duncan to demonstrate how its dedication to customer satisfaction through preplanning, hard work, innovation, technology and a structured team approach can deliver outstanding results in the construction of a multi-faceted mechanical construction solution – even under the most challenging schedule and difficult conditions.

Hallmarks of this project included:

- Timeliness of deliveries;
- Ingenuity of pre-construction;
- Smooth coordination and precise design of piping systems;
- Meticulous prefabrication sequencing in concert with project schedule and the work of other trades; and
- Superior quality of workmanship.

This project was also noteworthy for the larger team effort that resulted in the mutual success of all parties including the Owner, General Contractor, Shapiro & Duncan and our subcontractors, and all other trades. In particular, the team-spirited approach fostered by HITT Contracting was key to the overall success of this project. Open lines of communication and unhindered dialog allowed everyone to work together while accommodating the individual needs of all.