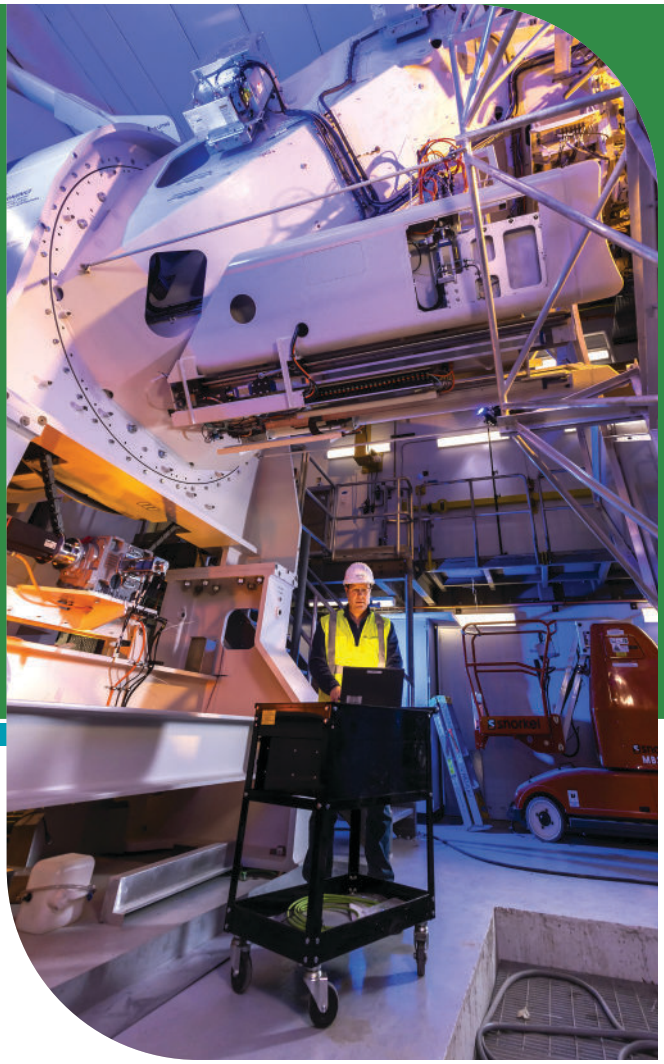
POINTCORE®

CASE STUDY

How POINTCORE Construction Built the Environment for Cutting-Edge Cancer Treatment



When OSF HealthCare, based in Peoria, IL, set out to build a comprehensive cancer center with state-of-the-art technology, they turned to POINTCORE Construction and their elite team of experienced healthcare construction experts. As a national construction company that focuses exclusively on healthcare, POINTCORE Construction serves clients by providing industry-leading program management, planning, design and construction services.

One of the hallmarks of the OSF HealthCare Cancer Institute project was proton beam therapy. This targeted radiation therapy can reduce treatment times and decrease complications for patients. During the early planning phases of the project, the team faced the challenge of constructing the proton containment vault for the Varian ProBeam 360 Proton Therapy System. This vault needed to meet Varian's strict specifications while successfully balancing the budgetary, scheduling and logistical concerns of the overall construction project.

The following case study will illustrate the complexity of this project, the steps taken to ensure proper installation of the machine, and the results of creating a successful containment vault for the therapy system.

CHALLENGE

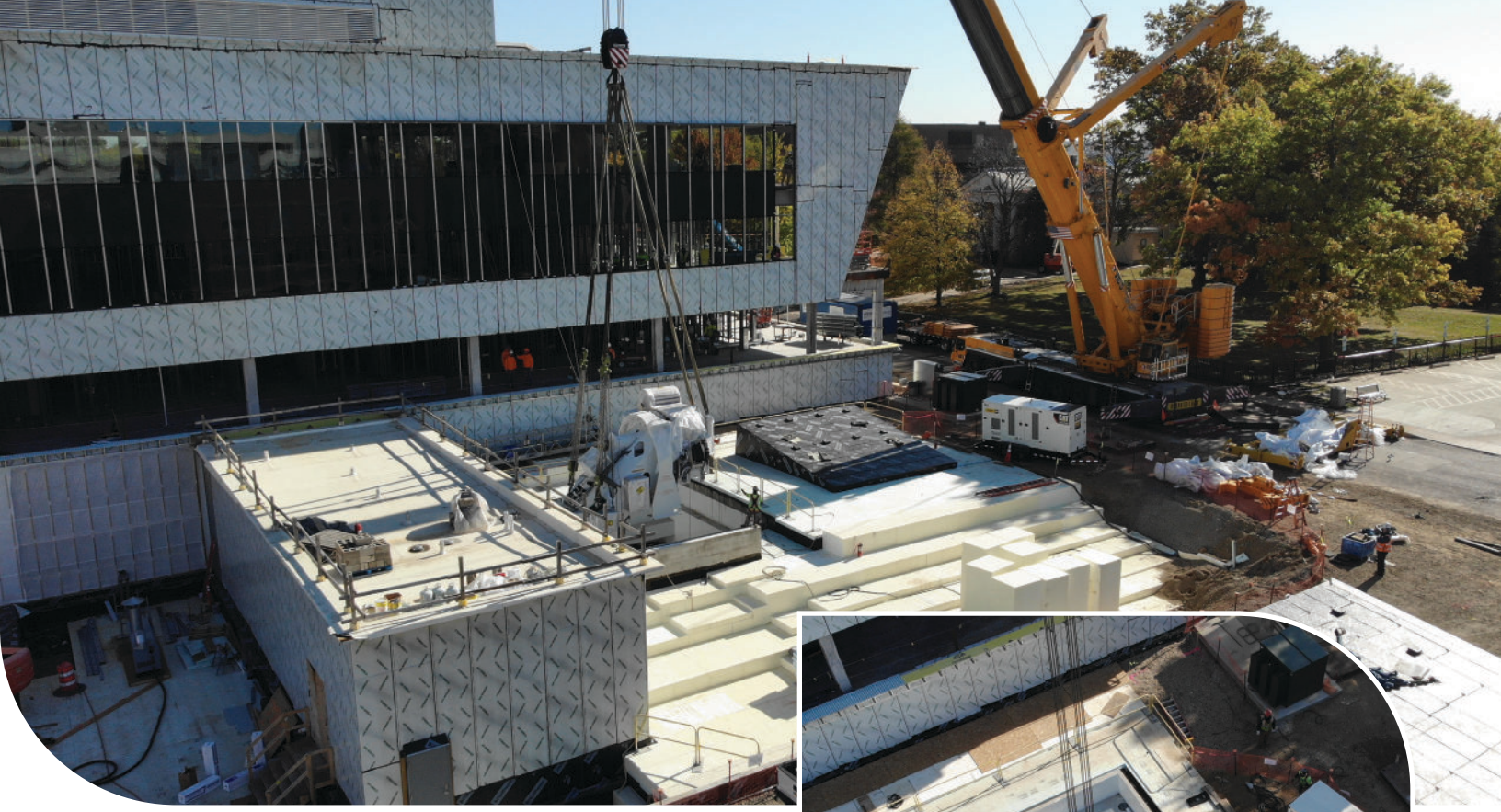
Creating a concrete vault to support the Varian ProBeam 360 came with specific complications that needed to be solved for. The construction team's challenge came in three parts:

1. A concrete mix needed to be developed that met the strict performance specifications of the proton therapy vault, due to the energy that was generated from the therapy and the necessity to contain it. The concrete mix design had to address the following specifications:
   - The mix needed to have a minimum dry density of 147.1 lbs/ft^3 at 56 days.
   - The mix needed to have a minimum of 3,000 psi compressive strength.
   - A complete elemental analysis needed to be completed on the concrete, including testing for trace metals such as cobalt and europium.
   - The mix needed to have a percentage of bound water.
   - The mix's maximum temperature could have a differential of only 50 degrees.
   - A thermal control plan needed to be developed to monitor and control the vault's temperature.
   - A backup plan needed to be developed in case of plant failure during the vault's pouring.

2. The containment vault implementation and placement needed to be planned with precision in order for it to safely contain a superconducting cyclotron, a beam transport system, a gantry and a patient treatment room. The concrete placement and finish of the vault had to address the following specifications:
   - The vault's maximum temperature could have a differential of only 50 degrees.
   - A thermal control plan needed to be developed to monitor and control the vault's temperature maximums and gradients during concrete pouring.
   - A pour sequence needed to be developed to manage the heat of hydration and conform with the concrete temperature maximums.
   - Systems needed to be put in place and logistics needed to be planned in order to pour concrete walls up to 15 feet thick.
   - 3D BIM modeling needed to be performed for all the items in the concrete, including the Mechanical, Electrical, Plumbing, Processed Water and Concrete Form ties and accessories.

3. A concrete supplier and concrete contractor needed to be partnered with that had a high degree of technical experience as well as experience in mass concrete, preferably in proton vaults.

This 3-part challenge required significant preconstruction effort to determine a plan to meet these requirements, while keeping budget and timeline in mind.



SOLUTION

- POINTCORE Construction carefully evaluated several concrete suppliers and contractors. After thorough assessment, Roanoke Concrete Products of East Peoria, IL was selected for the concrete material and Tarlton Concrete of St. Louis, MO was selected for the forming, placement and finish of the concrete.

- After the trade partner selection process, next steps included complex planning and coordination, including developing a mass concrete placement plan, thermal control plan, pour sequence plan and quality control plan, plus BIM modeling coordination. A complete thermal control plan was essential to construction efforts, as it allowed for monitoring and controlling the temperature of the concrete.

- Roanoke worked on several concrete mix designs and tested them for over 6 months. Ultimately, a mix design was arrived at that used granite aggregates imported from Missouri to achieve the density requirements. Less cement and more fly ash were also in the mix to drive down the heat of hydration.

- Tarlton, a company who had previously built a proton vault for BJC Health, executed mockup concrete pours for the vault walls in June of 2022 to prepare for installation later that summer. Once onsite, Tarlton poured the mud mat and mat slab in September, then the wall concrete was poured in October.

RESULTS

By combining effective partnerships with Pointcore's expertise and healthcare experience, the construction team was able to collaboratively complete the proton beam therapy containment vault for the OSF HealthCare Cancer Institute. The proton containment vault that was successfully installed met or exceeded the specifications of the Varian ProBeam 360 Proton Therapy System. During this project, POINTCORE Construction was able to facilitate collaborative project coordination, control costs and adhere to healthcare construction quality requirements.

POINTCORE Construction's transformative work on this project will help OSF HealthCare focus on patient wellness and care for the communities they serve for years to come. This advanced and innovative new technology is making Peoria a regional destination for cutting-edge treatments and services, as well as a national leader in cancer care.

PEORIA

REGIONAL DESTINATION FOR CUTTING-EDGE TREATMENTS & SERVICES

POINTCORE Construction leverages an elite team of healthcare construction experts who guide clients to success by using a thorough understanding of the industry. Pointcore offers design-build services, owner representation, master facility planning and more.

Contact a Pointcore representative to see how we can help transform your healthcare organization and bring the best care possible to your patients.

ABOUT POINTCORE

Pointcore is an innovative healthcare services company who aims to transform health care in the communities we serve by working in five key service areas: Technology, Supply Chain, Healthcare Technology Management (HTM), Construction and Business Services. Pointcore works exclusively in healthcare, which sets us apart from other consulting operations. We work with healthcare organizations to determine their unique areas of need, then use our extensive healthcare expertise to develop a custom solution for each operation.

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