Bentley
Advancing Infrastructure

CASE STUDY

Clark Construction Delivers World-Class International Arrival Facility at Seattle-Tacoma Airport

SYNCHRO 4D Delivers Digital Construction Planning and Simulations to Optimize Installation of the World's Longest Pedestrian Walkway

DEVELOPING A LEADING TOURISM AND BUSINESS GATEWAY

To accommodate Seattle's growing demand for international travel through the Seattle-Tacoma International Airport, the Port of Seattle initiated a USD 968 million project to update the 1970s-era facilities and build a new, expanded 450,000-square-foot International Arrivals Facility (IAF). The project included designing and constructing a three-story grand hall building, a new connecting international corridor, and an 85-foot-high pedestrian aerial walkway connecting the new grand arrivals hall with the airport's South Satellite.

Having prior experience working on projects at 15 of the largest airports in the United States, Clark Construction Group was hired as the general contractor to deliver the expansion project, which included complex design and build standards that met LEED Silver Certification. Upon completion, the new IAF will more than double passenger capacity, reduce passenger connection times, provide additional access for international wide-body aircraft, and nearly triple baggage claim carousel sizes. It is the most complex development program in the history of the 71-year-old airport, expected to significantly enhance the international passenger experience and advance the Puget Sound region as a leading tourism and business gateway.

DELIVERING AN ICONIC WALKWAY AMID A BUSY AIRPORT

Clark faced significant technical and coordination challenges, compounded by strict requirements to avoid any impact to airport operations throughout construction. To keep the airport fully operational required remote preconstruction and transport of the structural components. The most complex of these components was the 3-million-pound, 320-foot-long center span of the world's longest pedestrian bridge, which would have to be installed over an active airport taxi lane. They needed to construct the bridge's center span at an airport cargo area three miles from the installation site, transport the massive structure to the installation spot amid a busy airport, and then hoist it 85 feet high and connect it to the piers to complete construction of the 780-foot-long iconic aerial walkway.

To meet these demands, Clark required accurate design plans and measurements of both the pier supports and the center-span, as well as a thorough understanding of the existing airport site conditions. They sought to digitally visualize the design, fabrication, transport, and installation to precisely sequence the entire execution—which happened to occur on a rainy night with airplanes taxiing in the area. "There was no room for error. We knew we had to get this right the first time," stated Brad McDermott, project executive at Clark. To achieve this goal, they knew that they needed to implement BIM, reality modeling, and digital planning and sequencing early in the design phase, as well as throughout construction and execution, to safely and efficiently deliver the bridge span while providing a data-rich digital twin to the client.

LEVERAGING 4D CONSTRUCTION PROVIDES DIGITAL SOLUTION

With no room for error possible, Clark used cutting-edge survey technology and Bentley's SYNCHRO 4D to visualize and analyze the existing site and bridge structure, and fully understand every detail needed to determine how to optimally plan and construct the aerial walkway. They modeled the site, remote assembly of the bridge span, and on-site pier supports using laser scanning and point clouds to ensure accurate bridge measurements and determine a safe transport route along the busy airport grounds.

PROJECT SUMMARY

ORGANIZATION
Clark Construction Group, LLC

SOLUTION
Digital Construction

LOCATION
Seattle, Washington, United States

PROJECT OBJECTIVES

- To deliver the world's longest elevated pedestrian bridge over a busy airport taxi lane.
- To generate a data-rich digital twin for facilities management of a world-class international arrivals facility.

PROJECT PLAYBOOK
SYNCHRO 4D™

FAST FACTS

- The Port of Seattle initiated a USD 968 million project to build a new International Arrivals Facility at Sea-Tac airport.
- Clark Construction had to remotely construct the 3-million-pound span structure, transport it three miles amid a busy airport, and hoist it 85 feet to connect to pier supports.
- The project required meticulous planning and sequencing with no room for error.

ROI

- Leveraging 4D construction workflows, Clark successfully achieved a narrow fit within three-eighths of an inch.
- They used SYNCHRO 4D to link the BIM model to the construction schedule, developing a digital twin for improved visualization.
- Through digitalization and visualization, the team delivered the world's longest aerial pedestrian bridge over an active airport taxi lane.

"Bentley's SYNCHRO 4D, in conjunction with industry expert knowledge and leading construction technologies, helped us digitally plan the successful remote assembly, transport, and install of the world's longest pedestrian walkway over an active airport taxi lane."

- Brian Krause, Vice President, Clark Construction Group

By leveraging BIM and reality modeling technology with SYNCHRO 4D, Clark linked the model with the construction schedule to develop a digital twin to fully visualize the construction sequencing.

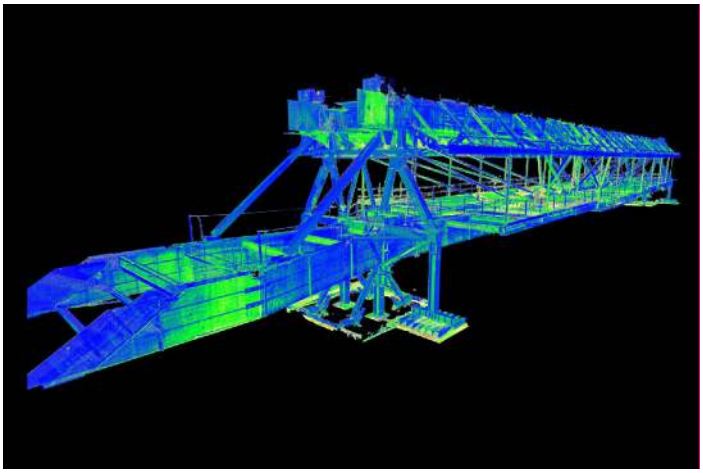
The team implemented 3D digital BIM and virtual reality solutions to review their designs and used SYNCHRO 4D to visualize every step of the construction sequence, including schedule simulations, site utilization optimizations, and logistics planning. Using Bentley's cutting-edge solution, they were able to animate the transport plan and details of the hoist and final pier support connection. "We used a lot of digital tools—from laser scanning to Bentley's SYNCHRO 4D—for development of the sequence of activities, schedule simulation of construction, and animation of the transport and erection of that center span," commented Brian Krause, vice president at Clark. After many digital iterations, Clark had an exact plan of how they were going to move the bridge from the remote prefabrication area on airport property, down the correct taxi lanes and runways, all while avoiding active airport traffic and parked airplanes to get the structure lifted into place.

ESTABLISHING A DIGITAL BENCHMARK

Innovative planning and the use of state-of-the-art construction technology helped the IAF project team successfully execute the technically complex maneuver that demanded meticulous planning. The digital applications provided accurate measurements and visualization to safely transport and install the 3-million-pound span structure three miles through an active airport. By leveraging SYNCHRO 4D, Clark was able to install the world's longest elevated pedestrian walkway despite the numerous challenges, achieving the final fit within three-eighths of an inch on a late rainy night without any airport interruption. The SYNCHRO animation helped the team establish and test their sequencing logic in advance, ensuring that they minimized airport impact and could provide a tool to communicate their plan in real-time to project stakeholders. "Thanks to advance planning, technology, and collaboration among all stakeholders, the structure came together seamlessly without need for further adjustment," said McDermott.

Additionally, to meet the Port of Seattle's request for a data-rich BIM deliverable, Clark began incorporating the necessary digital tools and data from the very beginning of the design process. Using interoperable applications early in the project, they seamlessly delivered a digital twin with 18 standard attributes per asset, that the client will also later use for facilities management and ongoing operations of the airport. This world-class expansion project sets a benchmark for digitalization in the industry. "The USD 968 million Sea-Tac International Arrivals Facility is a model for how digital tools can enhance the design and construction of our nation's most critical and complex infrastructure projects," concluded Krause.

Clark Construction had to remotely construct the 3-million-pound span structure, transport it three miles amid a busy airport, and hoist it 85 feet to connect to pier supports.



Leveraging 4D construction workflows, Clark successfully achieved a fit within three-eighths of an inch.

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