POLYGON SENSORS MONITOR WOOD MOISTURE CONTENT ON TRUEBECK'S MASS TIMBER PROJECT

Source: Polygon US Corporation; Credit: Kevin Lockard

CASE STUDY: TIMBERVIEW VIII

MOISTURE MITIGATION FOR MASS TIMBER IN AFFORDABLE HOUSING PROJECT

PROJECT OWNER: C & J PROPERTY DEVELOPMENT LLC

PROJECT LOCATION: 540 NE 99TH AVE., PORTLAND, OR 97220

COMPLETION DATE: OCTOBER 5, 2024

ARCHITECT/DESIGNER: ACCESS ARCHITECTURE

MASS TIMBER ENGINEER/MANUFACTURER: KALESNIKOFF (MASS TIMBER MANUFACTURER), CARPENTRY PLUS (INSTALLER)

GENERAL CONTRACTOR: TRUEBECK CONSTRUCTION

STRUCTURAL ENGINEER: DCI ENGINEERS

MECHANICAL, ELECTRICAL, AND PLUMBING: CALIBER PLUMBING/MECHANICAL (DESIGN-BUILD), SDC (SYSTEMS DESIGN CONSULTANTS)

OTHER CONTRACTORS: POLYGON US CORPORATE (MOISTURE AND CLIMATE MANAGEMENT)

TRUEBECK CONSTRUCTION, A large general contractor on the West Coast, was responsible for building Timberview VIII, an 8-story, mixed-use, multifamily development in Portland, Oregon. The team was determined to ensure that the project was delivered with exceptional quality, so they made moisture mitigation for the construction materials and mass timber products a priority.

CHALLENGE

The design called for its primary structure to be constructed of glulam columns and beams, with Cross-Laminated Timber (CLT) floor/ceiling panels supported by steel brace frames. The team had 2 main concerns. One, the Pacific Northwest's weather

POLYGON CLIMATE CONTROL EQUIPMENT (DESICCANT DEHUMIDIFIER AND INDIRECT FIRED HEATERS) TREAT INTERIOR CONDITIONS OF TIMBERVIEW VIII

Source: Polygon US Corporation; Credit: Kevin Lockard

could slow the drying schedule for materials like paint, drywall, and gypcrete. Two, the climate conditions coupled with incoming moisture-laden materials could affect the mass timber. Overdrying the mass timber could lead to cracking, checking, and delamination, whereas underdrying, or excessive moisture, could extend timelines and lead to staining and mold.

The team considered manually recording moisture content (MC) levels with handheld meters and adjusting climate equipment daily. However, that would have required a dedicated person and been wrought with risk and inefficiency. "It would have been a nightmare to have to do that manually across the entire building," said Jack Doman, project engineer for Truebeck.

SOLUTION

Truebeck consulted Polygon about a climate control system. "It was really important for us to work with a climate control partner who had mass timber experience," said Patrick Valdefiera, project manager at Truebeck. "It was critical to us and the owner to ensure we avoid any issues."

Polygon's engineered solution included sensors and equipment capable of maintaining conditions of 6,575 degrees Fahrenheit and 45 percent to 55 percent relative humidity (RH). Twenty sensors measured and alerted on ambient T/RH with continuous readings of wood moisture content. Data was used to automatically turn on and off a desiccant dehumidifier and indirect fired heaters to optimize drying and heat with the least energy consumed.

The system delivered the conditions, data, and alerts needed to manage moisture for the buildings. "We are tracking conditions every day," Doman said. "I am closely watching humidity fluctuations in the building and planning ahead with activities to make sure things are trending down in an appropriate amount of time. That's the goal: make sure that there isn't a problem, and if the data indicates there could be one in the future, we can minimize it ahead of time—before it impacts the project."

BENEFITS

Efficient approach: Digitizing the moisture reading and piping data to high-performance equipment eliminates manual processes and human error and reduces energy use. It also provides a more comprehensive solution, linking conditions to climate control equipment.

Instant and constant visibility: Continuous monitoring of multiple zones and mass timber points provides a record of changes over time and vital information to manage daily activities and compress the schedule without compromising materials.

Peace of mind: The project team and owner have increased confidence in the quality of the building, knowing that conditions were properly managed and that they have a partner with experience behind them.

This case study has not been fact-checked, but it has been edited for length, clarity, grammar, and style.