The Boeing Company approached Bastian Solutions with requirements for a custom, automated vertical storage unit. The Boeing Company needed to store (20) preplied, uncured, composite laminates on aluminum storage trays in a freezer operating at -20°F. The product and trays combined are 40’ in length, 3’ in width, and weigh approximately 1,000lbs. The unit is required to automatically retrieve/unload the aluminum tray, containing the composite, from/to one of the customers handling carts. Not only did the system need to retrieve the part but in addition was required to convey the trays on and off customer provided carts. Along with the challenging environmental requirements the system had to limit deflection to less than 0.1” over the 40’ length of the product.

Bastian’s solution to this project was a two tower vertical lifting system with a custom, pivoting carriage between the two towers. Electronically synchronized lifting motors at the top of each tower raise and lower the carriage by means of freezer rated timing belts. Integrated into the carriage are (8) telescoping conveyors which interface directly with the products. Each telescoping conveyor is synchronized to each other and is able to extend over 4’ to either side of the carriage. In addition to the telescopic axis of motion, the top surface of these devices incorporate a forward and reversible conveyor used to power the product in and out of the system. Each product is stored within a rack which consists of custom leveling features required to satisfy the minimal deflection requirement necessary for this system. System control is by means of an integrated HMI which monitors system status and incorporated maintenance functionalities.

This project presented two very unique challenges. The first was specifying each mechanical and electrical component to able to satisfy the operational requirements of the system while also achieving high levels or reliability at temperatures less than -20°F. The second was minimizing the overall footprint of the system to limit the volume of the freezer while allowing the customer to maximize their space claim benefits from implementation of a vertical storage unit.
Applications

- Custom vertical storage units of all sizes and capacities

Specifications

- Overall dimensions: 46’ long x 22’ high x 8’ wide
- (20) unique storage locations
- 1,000 lbs. lifting capacity / 20,000lbs. storage capacity
- 20’ of vertical travel
- Synchronized telescoping actuators with integral conveying surfaces

Features

- Automatic storage and retrieval of the product in less than 3 minutes
- Smooth and level lifting by means of synchronized electric motors
- Lift carriage and storage rack minimize part deflection to less than 0.1” over 40’
- (8) electronically synchronized motors power telescoping actuators

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