

Custom Battery Loading Tools

Scope: Design, fabrication, test, certification and deployment of custom tool solutions

Location: Multiple locations

Overview

Battery energy storage systems (BESS) are used to enhance the existing grid and are a key enabling technology for the renewables industry. Over the next decade, many gigawatts of storage capacity will be brought online. New methods, procedures, and tools will be needed to safely install the batteries.

“Li-ion batteries present significant hazards and must be handled with care.”

Challenge

It is common for a 40-ft containerized BESS to hold upwards of 350 lithium-ion (Li-ion) battery modules, weighing more than 150-lb each. Large sites can have dozens of containers while building based solutions have aisles of racks that hold thousands of batteries. Li-ion technology presents significant hazards and battery modules must be handled with care. Safe, repeatable, efficient, and sustainable battery loading solutions must be developed to protect the people and property involved with this work.

Solution

IPD leveraged our rare combination of engineering, battery storage, and field service expertise to design, fabricate, test, certify, and deploy custom, battery loading tool solutions for a global BESS integration leader. The goal was to provide standard tools and methods for use across their entire portfolio of containerized products. IPD led a cross-functional team of engineers and Installation & Commissioning (I&C)



personnel to determine the critical-to-quality (CTQ) characteristics for the tools. For example, no tool could weigh more than 100-lb (liftable by 2 people) and the tools must be compatible with any terrain or container elevation. Furthermore, each of the preferred battery OEMs had different packaging, size, weight and lift requirements for their modules. Concepts were modeled, simulations reviewed and critical components were 3D printed for evaluation prior to design release. Prototypes were tested and improvements cut-in prior to production. All items were designed, tested and documented in accordance with ASME B30.17, ASME B30.20 and ASME BTH-1. Our field professionals worked with the client team to create and document the methods, procedures and training materials needed for people to safely and properly use the tools and load batteries. This included site-level receiving and handling strategies to get batteries from the delivery trucks to the enclosure, for loading.

Result

IPD solved a unique, and critical problem that the client faced on every installation. In addition to providing a safer and more repeatable solution, we were able to reduce battery loading time by upwards of 50% - this will deliver significant cost and schedule reductions.

