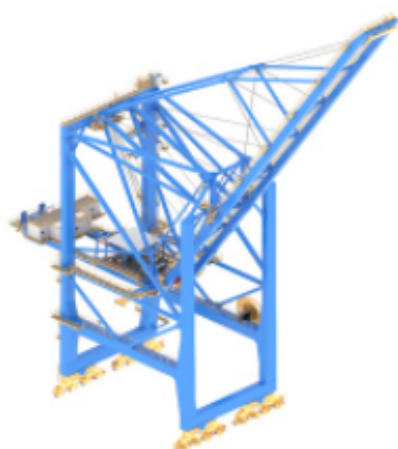


Balance Crane STS Design now available from ZPMC

News 24 May 2022 by Paul Avery

ZPMC and Liftech consultants have completed a detailed design of a prototype STS Balance Crane.



The Balance Crane is a concept Liftech unveiled in 2019 (WorldCargo News January 2019, P. 1). It features an elongated boom that extends back to the landside legs of the crane, with a shorter crane girder section that remains horizontal as it is lowered, as the boom rotates into the raised position for vessel clearance and stowage.

ZPMC and Liftech's analysis of the prototype design now completed shows that the Balance Crane design reduces operating wheel loads at waterside by 10% and storm wind wheel loads at landside by 20%. This is especially beneficial to terminals within high wind zones. Tie-down loads in storm condition are reduced by 20% at waterside and 25% at landside. The total weight of the crane is about the same as existing designs.

Other advantages of the Balance Crane include smoother operation as the boom to rail joint is now located at the landside instead of the waterside rail, so the trolley does not travel over a rail joint for in gauge operations. The boom hoist system is also simplified as it now lowers the landside part of the crane to raise the outer boom. The load on the hoist is reduced, the wire ropes are shorter and boom hoist time is reduced to 3.5 minutes.

ZPMC and Liftech also note that clearance to ships is increased because the boom is shallower than on existing cranes and rotates about a hinge directly in line with the waterside leg. The waterside leg can be inclined above the portal beam to increase clearance, if required. "A shallower boom structure is possible because the boom is supported by a system of pipes and cable stays at five points instead of the customary two points along the boom length. The system is designed to allow pre-stressing of the cables, to reduce sag and improve the structural stiffness. The stiffness of the crane is comparable to existing STS cranes," they note.

Another new feature of the current version of the design is that the machinery house is open on the sides and equipped with a movable roof. The critical electrical parts are located in a separate e-house that is fully enclosed. In comments to WorldCargo News Liftech said the main reason for removing the walls is to reduce the wind area in the gantry rail direction where wind loads have the most effect. This helps to reduce wheel loads and tie-down forces in a high wind area, but is not a requirement of the Balance Crane design.

Although it is common on yard gantry cranes, some terminals will be concerned about opening the machinery house to the elements. Liftech notes there are significant advantages if the terminal environment permits. The service crane now runs in parallel to the trolley travel direction extending to the landside of the main hoist. Equipment is lowered between the two main girders between the machinery and electrical houses, eliminating the need for a hatch in the machinery house deck. Furthermore, the houses are much closer to the ground when the boom is stowed, so ground-based cranes can be used to handle components like drums and gearboxes, allowing for a smaller service crane. Access for maintenance personnel is also faster and simpler.

<https://youtu.be/xQYmrtWxOi0>

