MARINE INDUSTRIAL DESIGN

"Vallejo"

Case Study
Number 5

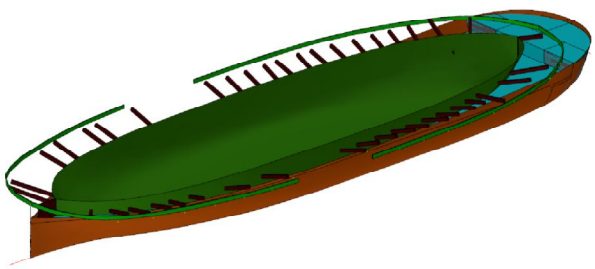
Vallejo Preservation Project

The Vallejo was originally built in 1890 as a side wheel paddle steamer operating in US waters. The hull was originally riveted plate construction and the superstructure has been extensively modified over the years. From the 1950's onward the vessel was laid up in a tidal mud berth as a house boat, it became well known in the artistic community especially during the 1950-60's beatnik era.

Over time the hull steelwork suffered from extensive corrosion and attempts were made to repair by concrete patches and epoxy coatings etc. The hull plating and repairs have now reached the end of their useable life and a solution was sought. Access to the sea from the mud berth is restricted due to adjacent moorings and jetties. Due to this restriction and for other reasons the Owner preferred not to dock the vessel in a dry dock to undertake any repairs. An on-site solution was required and this required a novel approach to find an answer.

Project

Preliminary design reviews examined various options with the Owner, these included permanently mounting the vessel on piles, patching the hull in situ, construction of an inner hull. Design requirements included a dock shape that closely resembled the original hull shape, the ability to move the vessel in the harbour, additional dock structure aft to allow extension of the superstructure, restricted water depth during installation, located in a mud berth that dries out at low tide, provide structural support to the original hull, practical solution for ease of installation using divers and salvage equipment. The final solution selected comprised the design of a second hull (or dock) that surrounds the original hull up to just above the load waterline (and just below beams that support a wooden overhanging deck).



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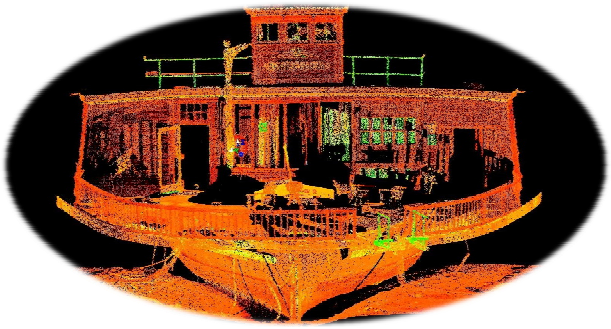
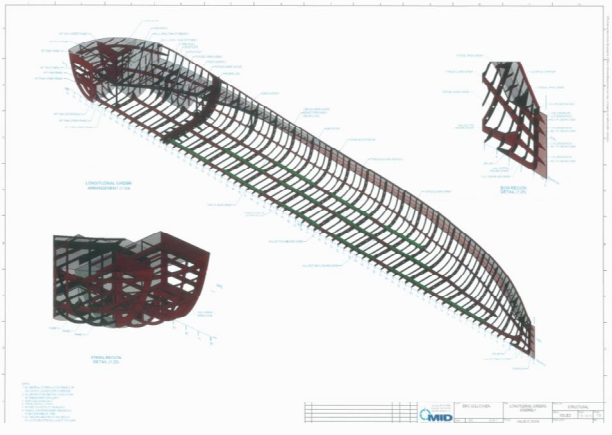
This second hull (or dock) was about 450mm offset outboard from the original hull. The installation method comprised sinking the dock to the seabed, floating the Vallejo over and allowing the Vallejo to settle into the dock as the tide falls. Due to water depth restrictions in way of the mud berth it was necessary to split the dock into two parts, an aft section was detachable to allow the Vallejo to be floated into the dock. Divers would then re-attach the aft dock part through the use of guides and pulling wires, and bolt the dock parts together. The Vallejo would then settle and the dock would be pumped out. The incoming tide floats the combined structure.



No original drawings of the Vallejo were available. Therefore in order to determine the hull shape and dimensions an on-site survey and a 3D laser survey of the hull were undertaken. The Vallejo hull was scanned from the outside and from the inside and the two sets of data married together. The laser survey was not able to scan the final bottom part of the hull so additional diver survey's were undertaken to determine the bottom and keel shape. The data from these survey's was imported to MID's hull surfacing software (Maxsurf and Rhino) and the Vallejo hull shape was defined. From this hull shape the final dock shape and dimensions could be determined.

Design engineering of the dock structure commenced and strength calculations were undertaken.

The bolted dock joint between the two halves of the dock sections went through several iterations until a practical solution was found. MID collaborated with the Owners and their site installation team of divers and salvage experts to ensure on-site operations can proceed smoothly in the narrow tidal windows that are available. A transversely framed steel structure was selected with longitudinal girders.



Current Situation

For construction of the dock a shipyard in China was selected and the Owner contracted the dock construction with yard. MID provided assistance to prepare the build specification and construction drawings.

On completion of the structural design drawings cut file parts of the primary structure were generated for use by the Owner selected shipyard.

At the time of writing construction of the dock has completed with a projected site install date towards the end of 2011.