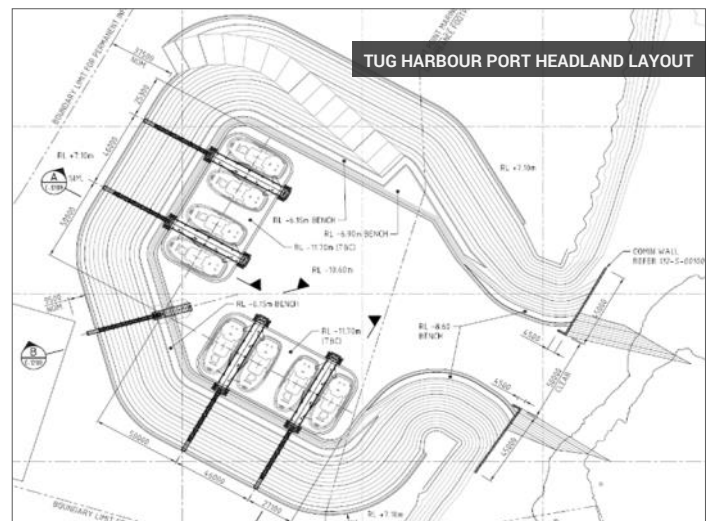




BHP TUG HARBOUR , AUSTRALIA

TUG HARBOUR PROJECT

Project Name	BHP Tug Harbour,
Project Owner	BHP Billiton Iron Ore Pty. Ltd
General Contractor	Lend Lease Engineering Pty. Ltd.
Project Location	Port Headland, Australia
Product	Pontoon / Steel Structure
Total Tonnage	3,200 MT
Year	2016



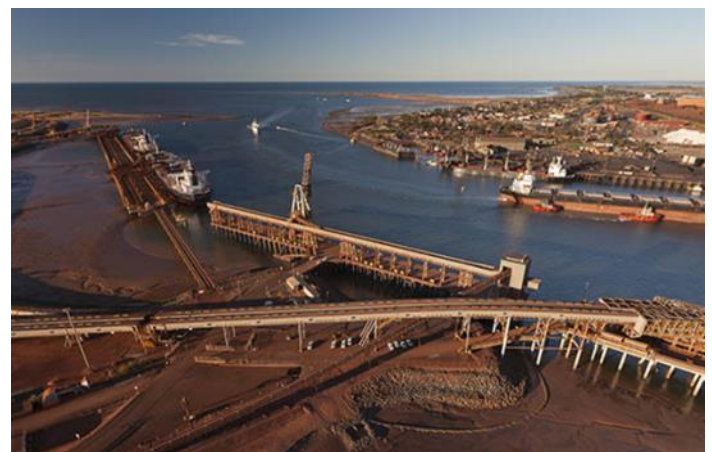
INTRODUCTION

BHP Billiton purchased an additional six tugs and therefore needed to construct a new eight pen Tug Harbour at Hunt Point and two small boat moorings at the existing Nelson Point Tug Harbour. This project will mitigate the risk of a channel blockage by ensuring the continued safe escort of

ESC SCOPE OF SUPPLY

PONTOONS

ESC has been awarded the contract to supply a total of 850MT of pontoons and gangways - 5 units of pontoons (the largest pontoon, Hunt Point tug mooring pontoon with a size of L52.55m x W6.8m x H5.2m), 6 units of gangway, 6 units of gangway platform, 1 unit of line berth, and 1 unit of line boat stair tower for BHP Tug Harbour Project in two different locations, namely Hunt Point and Nelson Point.



MATERIAL PREPARATION

CNC PLASMA CUTTING OF STEEL PLATE



WELDING OF COMPONENTS



All welding performed in accordance with AWS D1.1/D1.1M standard. Welding inspection with the following frequency:

- ▶ 100% VT
- ▶ 100% UT for full penetration butt weld.
- ▶ 10% MT for fillet weld.

WELDING & ASSEMBLY



ESC assigned a fulltime qualified inspector (AWS CWI and NACE II inspector) at the fabrication mill during the entire fabrication process to ensure the project meets the quality requirements as well as schedule.



PAINTING

The coating system varies depends on the application of the material. All materials are blasted to surface cleanliness level of Sa2.5 as per ISO 8501 before the coating application. All coated surface are tested with 100% of holiday test as per AS3894.1 at a test voltage recommended by the paint manufacturer.

► **Pontoon (Exterior and Interior)**

First coat: Sigmashield 880 (300 microns)

Second coat: Sigmashield 880 (300 microns)

► **Steelwork and Gangway above Water**

First coat: Sigmazinc 109HS (75 microns)

Second coat: Sigmacover 456 (200 microns)



► **Pile Cap Plates, Gangway Platforms, Pile Bracing or Components that are fixed to the Pile Structure**

First coat: Interzone 954 (250 microns)

Second coat: Interzone 954 (250 microns)

► **Handrails**

First coat: Hot dip galvanize as per AS4680.

Second coat: Sigmacover 280 (50 microns)



INTERNAL AREA OF PONTOON

The entire internal surface of the pontoon is coated. The beams and stiffener plate welded inside the pontoon serve to reinforce the overall strength of the pontoon (prevent deformation of the pontoon during its application).

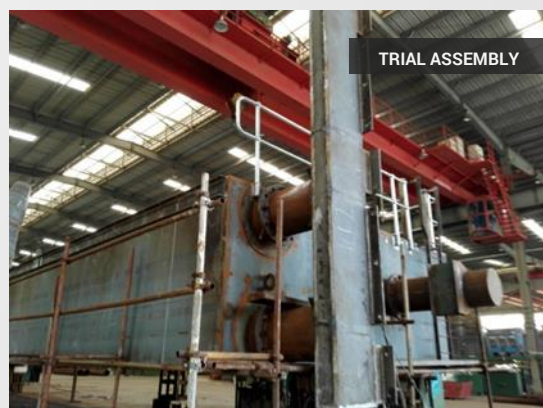


FINISHED PRODUCTS & COMPONENTS

Fiberglass reinforced plastic grating (FRP) is selected due to the advantages that it is rustproof, slip-resistant, lightweight, and easy to install.



All loose components including fender component are trial assembled before packing and delivery to ensure that the site assembly process is smooth without any quality issues.



COMPONENTS



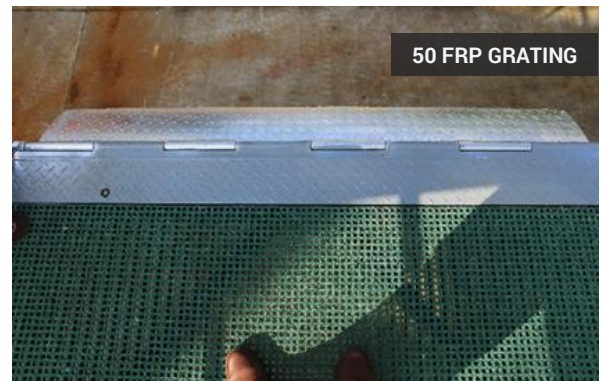
GANGWAY PLATFORM



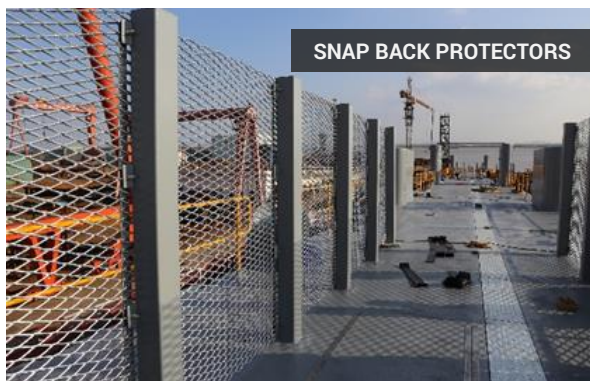
FENDER COMPONENTS



NAVIGATION AIDS PLATFORM



50 FRP GRATING



SNAP BACK PROTECTORS



GANGWAY ROLLER BEARING



MOORING CHOCKS



CRANE JIB



ANODE BLOCK



ANTI-SKID DRESSING

Anti-skid dressing is applied to the entire pontoon deck surface for personnel safety purpose (anti-skid).



BOLLARD

SHIP LOADING

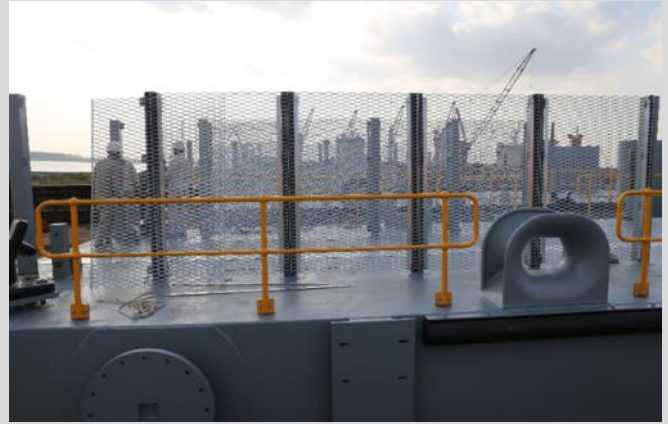
ESC inspectors are assigned full-time in the port and performing loading inspection to ensure each components are properly handled,



Lifting slings are used to prevent deformation as well as paint damage. The lifting point for each product and component have been properly analyzed to ensure not only a safe lifting process but also to ensure the product will not deform during the lifting process. The surface underneath the pontoon is padded to prevent direct the contact of painted surface with a hard surfaces. No hard surfaces are in



SHIP LOADING



PONTOON AT SITE

