



**Client:** Marine Construction Company

**Project Title:** Port Jetty Facility

**Completion:** Ongoing

**Location:** Western Part of the Indonesian Archipelago

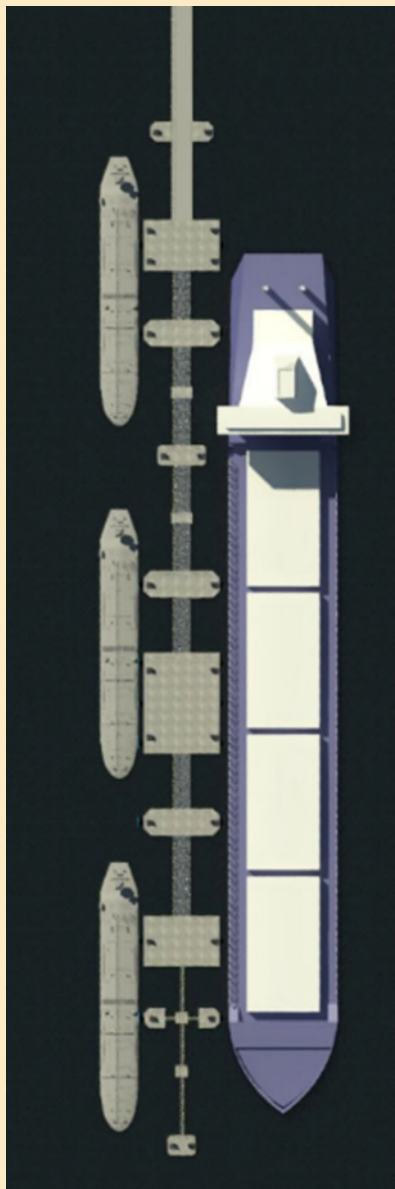
**Services:** Specialist Studies, Detailed Engineering Design and Tender Support

One of the world's largest producers and distributors of agricultural products plans to develop a port in the western part of the Indonesian archipelago. The port will have a jetty capable of handling up to six 80m-long oil barges at a time, three on either side. The jetty will also be capable of handling two Handy to MR2-size tankers at a time, one on either side.

The developer hired a local marine construction company to carry out the detailed engineering design of the jetty structures, and to assist with the tender process to appoint a jetty construction contractor. The local marine construction company, in turn, hired Paaras Marine Solutions as its consultant.

Paaras Marine Solutions' scope of services consisted of:

1. Specialist studies to support the detailed engineering design of the jetty structures, including:
  - Metocean survey and study to determine the mean, operational and extreme environmental conditions (winds, waves, currents, and water levels) that the structures will need to withstand.
  - Berthing analysis to determine:
    - Fender arrangement; and
    - Fender capacity; and
    - Fender type and size.
  - Mooring analysis to determine:
    - Mooring layout;
    - Mooring equipment requirements; and
    - Safe mooring conditions.
  - Desktop navigation simulation study to:
    - Review and assess the adequacy of the proposed approach channel and manoeuvring areas;
    - Determine limiting environmental conditions for safe approach, berthing, turning and departure of design vessels;
    - Assess the number and size of tugs required to handle design vessels; and
    - Address potential emergency scenarios arising during operations.



- Liquefaction potential analysis, using Standard Penetration Test (SPT) data, to evaluate the potential of the foundation soils at the project site to liquefy during the design seismic event.
- Site-specific response analysis, using the equivalent linear method (SHAKE), to derive seismic design criteria for the jetty structures.
- Safety and risk studies to:
  - Identify potential hazards, assess associated risks, and propose appropriate control measures to reduce these risks to as low as reasonably practicable (ALARP) levels;
  - Define a marine exclusion zone for the jetty considering both risk-based and consequence-based criteria; and
  - Classify the environment to facilitate proper selection, installation, and operation of equipment within that environment.

## 2. Detailed engineering design of the jetty structures, including:

- Development of a basis of design for the jetty structures.
- Development and evaluation of alternative layout options.
- Design of approach channel and manoeuvring areas, and determination of the number, type, and location of navigation aids.
- Civil and structural design of access trestle, platforms, dolphins, catwalks, and pipe racks.
- Geotechnical design of steel pipe pile foundations for access trestle, platforms, and dolphins.
- Preparation of detailed engineering design drawings, design reports and calculations and technical specifications.

## 3. Preparation of tender documents for construction of the jetty, including bill of quantities, cost estimate and construction schedule.

## 4. Support during the tendering and evaluation process.

