

## STUDY ON THE ENVIRONMENTAL CONDITION OF INDONESIA'S PORTS ANCHORING AREA

M. A. Kurniawan, D. R. Mauliani, S. Anggara, M. Sodik and M. Irfan

Research and Development Division

Biro Klasifikasi Indonesia, Yos Sudarso 38-40, Tg.Priok, Jakarta, Indonesia, 14320

E-mail : [arif.kurniawan@bki.co.id](mailto:arif.kurniawan@bki.co.id)

### SUMMARY

The anchor's weight and its chain length are determined based on the classification society rules by using the prescriptive formula. This prescriptive formula are considered the vessel's principle dimension and assumed that the maximum current speed is 2.5 m/s, maximum wind speed is 25 m/s. It is assumed that those conditions occurred in the severe ocean location, it might be on the North Atlantic Ocean. This conditions may give substantial different if compare with the area that the vessels will be lay-off the anchoring equipment. Those area are specifically called as 'port's anchorage area'. Since that the assumed condition of applicable ocean condition of maximum current speed, maximum wind speed and maximum significant wave height are considered for determination of anchoring equipment, it is needed to investigate the special applicable ocean condition based on the port's anchorage area. This work will investigate 16 location of port in the Indonesian territory. The three parameters of maximum current speed, maximum wind speed, and maximum significant wave height are collected from several zones, those are 5 nautical miles, 10 nautical miles and 15 nautical miles from the shore and the anchorage area of each chosen port. Moreover, the depth of each those zones are also identified. All parameters are analysed and the reference parameters that could be used to applicable on Indonesia's port anchorage area will be introduced.

**Keywords:** Anchoring equipment, port's anchorage area, environmental condition

### 1. INTRODUCTION

The anchoring equipment is an important component in the operation of vessels. It is mandatory to follow the design according to Classification Rules and should be in maintenance by Classification Society. This is because the safety of the anchoring equipment affects the safety of the vessel. The anchoring equipment consist of anchors, anchor chains and other supporting equipment for vessel mooring. The anchoring equipment in this analysis focuses on the anchor and its chains.

The anchor's weight and its chain length are determined based on the Classification Society Rules by using the prescriptive formula. This prescriptive formula are considered the vessel's principle dimension and assumed that the anchoring equipment used in sheltered area for condition a) and semi-sheltered or unsheltered anchorages for condition b). It is assumed under the following condition:

- a) Wind speed 25 m/s, current speed 2.5 m/s, no waves, for:
  - maximum possible water depth maintaining a scope of six
  - shallow water depth with maximum possible scope
- b) Wind speed 11 m/s, current speed 1.54 m/s and significant wave height 2 m, for maximum possible water depth maintaining a scope of six.

It is assumed that those conditions occurred in the severe ocean location, it might be on the North Atlantic Ocean. This conditions may give substantial different if compare with the area that the vessels will be lay-off the anchoring equipment. Those area are specifically called as 'port's anchorage area'. Since that the assumed

condition of applicable ocean condition of maximum current speed, maximum wind speed and maximum significant wave height are considered for determination of anchoring equipment, it is needed to investigate the special applicable ocean condition based on the port's anchorage area.

This work will investigate 16 location of port in the Indonesian territory. The three parameters of maximum current speed, maximum wind speed, and maximum significant wave height are collected from several zones, those are 5 nautical miles, 10 nautical miles and 15 nautical miles from the shore and the anchorage area of each chosen port. Moreover, the depth of each those zones are also identified. All parameters are analysed and the reference parameters that could be used to applicable on Indonesia's port anchorage area will be introduced.

### 2. INDONESIA'S PORT DEPTH

The environmental conditions used for analysis are reference to the condition in the Indonesia's port. Depth data is analysed from the port map by dividing the area into 4 which is 5 miles, 10 miles and 15 miles from the coastline coupled with the anchoring area. Then identified for minimum, intermediate and maximum depths. There are 16 ports selected for analysis considering many vessels that classed by BKI operate in the area as follows:

- Belawan
- Teluk Jakarta
- Semarang
- Surabaya
- Banjarmasin
- Pontianak
- Batam
- Balikpapan
- Bitung
- Ujung Pandang
- Pekalongan
- Samarinda
- Asahan
- Tegal
- Cirebon
- Ambon