

## Erratum to: Offshore port service concepts: classification and economic feasibility

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### Inaccessible ports: Surabaya, Indonesia

Details and alternate options were omitted from this section of the Original Publication. The corrected Sect. 5.4.3 follows.

MHs can be used in mode M4 at the Tanjung Perak port in Surabaya, Indonesia, discussed in Sect. 2.2.2, where accessibility is limited. For ships greater than 2,500 TEU, a new access channel must be dredged (see Table 5) and the port must be upgraded. An alternate solution is to use S26 structures with 250 TEU capacity (MHs with onboard cranes) and serve the incoming ships at sea.

The port served about 1,800,000 TEU in the year 2010. JICA (2007) anticipates the throughput in the year 2015 to be 2,059,100 TEU, of which 456,350 TEU is

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contributed by ships with the capacity of 2,500 TEU or greater. Based on the cost for berths and cost for S26 structures with 250 TEU capacity (MHs with onboard cranes) from Table 8, we compare the cost of four possible solutions as follows: (1) expand the channel and build deep water berths for all traffic; (2) expand the channel, build new deep water berths to serve ships larger than 2,500 TEU capacity and use existing berths for the other ships; (3) do not expand the channel, use existing berths and purchase S26 structures (MHs with onboard cranes) to serve all traffic; and (4) do not expand the channel, use existing berths for ships less than 2,500 TEU capacity and purchase S26 structures (MHs with onboard cranes) to serve larger ships at sea. We calculate the number of resources using  $n_i^*$  of Sect. 5.2.1 because there are not many resources required. The resulting yearly costs are US\$103.78, 32.72, 113.27 and 25.17 million for options (1), (2), (3) and (4), respectively. Clearly, the MH solution (4) is significantly cheaper.

### Concluding remarks

Important interpretation of our results was omitted from the Concluding Remarks in the Original Publication. Additional interpretation follows.

The economic model and study is limited by its assumptions and data. Numerous features such as flexibility of a resource are difficult to quantify and not included in the discussion. The safety factor used to determine the number of resources required was constant. Resource operation speeds are approximate. Costs are pulled from diverse sources in the literature. Monetary conversion rates are based on a single point in time. A constant inflation rate of 4% was used throughout. The resulting cost estimates should be considered as within, perhaps, 10–20% of their true value.

The results should be interpreted with such caveats in mind. As our rough calculations show a relatively small cost difference between the 250 TEU mobile harbor S27 and the traditional port in Hong Kong, the MH may be competitive in this market. In Surabaya, using S26 structures with 250 TEU capacity (MHs with onboard cranes) to serve ships greater than 2,500 TEU appears superior to expanding the existing channel and building deep water berths (the MH solution is more than 20% cheaper). The S19 structure with 1,200 TEU capacity (MH with only RORO capability) appears feasible for use as a feeder ship for distances within 100 km. A collection of small ports with less than 660,000 TEU/year throughput may benefit from the use of S27 units. The economic models suggest that the other applications considered are not as favorable for the 250 TEU mobile harbor S27. Additional viable operational modes may be determined in the future.

Our results should be considered as a way to screen which options may be viable and which are less likely to be competitive. More precision may be obtained with detailed construction estimates.

Despite the fact that S27 units may introduce an additional step in the port process, our results suggest that they are economically viable in certain markets. Our results are based on the number of resources required and not cycle time. Due to fast RORO (un)loading and high-speed cranes onboard the S27 units, we anticipate that container or ship cycle time will not be much increased.