6. Deck machinery

As one of development of new technology in the field of deck machinery, a research on high efficiency quay crane corresponding to ultra-large container vessels was carried out. Outline of this crane is stated below.

6.1. Research on high efficiency quay crane corresponding to ultra-large container vessel

Container vessel is becoming larger year by year to improve transportation efficiency. From 1990, instead of former Panamax vessel, 4,000~6,000 TEU (Twenty feet Equivalent Unit; used for showing number of containers to be carried converted to 20 feet container) container vessels called as Post Panamax came to major stream, and nowadays 7,000 TEU, and in 2004, 9,000 TEU container vessels will go into service. Shipbuilders are investigating Suez max (12,000 TEU class) to pass through Suez Canal and Malacca max (18,000 TEU class) to pass Malacca Channel. If ratio of such large container vessel is increased, existing container terminals will inevitably need improvement of handling facilities. Therefore, PACECO Corp. analyzed existing handling facilities in container terminals, drew problems and investigated countermeasures, and then developed quayside handling facilities with high handling ability. Ultra-large container vessels of Suez max or larger is longer in length by about 15% than conventional vessels, but larger by 70~157% in carrying capacity, and accordingly much more containers must be handled within limited length of quay. However as a result of analysis, it was noted that quay cranes (Refer to Figure 6.1) were bottleneck due to limit of structure and mechanical ability of crane, as well as limit of crane operation work, in the conventional container terminals, and that simple increases of size and speed of crane could not afford higher handling efficiency than existing 30 containers/h, and that there was a limit of increasing handling efficiency. For this reason, concept of evolutional cargo handling corresponding to ultra-large container vessel, not on the line of conventional quay crane style, was necessitated. PACECO made analysis simulating the case that cargo handling of ultra-large container vessel was carried out at the conventional container terminal (stacking with yard crane), and drew out problems. Next the company made analysis simulating the case that the buffer station and the...
super-tainer were introduced (Refer to Figure 6.2), and compared handling efficiency with that of quay crane. As a result, it was clarified that handling efficiency needed for ultra-large container vessel could not be obtained if numbers of cranes and yard carriers were increased in the conventional container terminal, and on the contrary the traffic jam at the yard could be caused. On the other hand, it was clarified that newly developed the buffer station and the super-tainer could increase handling efficiency to 1.6 times (48 containers/h) or maximum 2.0 times (60 containers/h) of existing, and that this system could sufficiently respond to future appearance of such ultra-large container vessels. Accordingly, even if large sizing of container vessels appears and shorter mooring period are requested, conventional berths and cranes need no conversion, and increase of handling efficiency is expected only with introduction of the buffer station, and further introduction of the high efficiency super-tainer of semi-automatic operation brings about much more efficiency.

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