Container Terminal Planning towards optimizing Supply Chains Logistics

Supply chains need competitive and efficient container port terminals that are up to the challenge of the dynamic cargo flows passing through them. Consequently, port terminal planning and its associated engineering strategies are the tools that let them achieving high operational competitiveness and leadership for any possible complex situation on land and on water side.

Furthermore, it is important to stress that each container terminal presents restrictions due to the geography where it is located. These site conditions can either influence the available operational areas or the connections to the hinterland resulting in potential inefficiencies for the supply chains that they support.

Thereafter, the following analysis focuses on solutions developed by container terminals located on the riverbanks of the City of Buenos Aires and its neighbouring Dock Sud, both located upstream of the River Plate estuary in Argentina. Moreover, the latter presents greater restrictions. Especially, on its harbour approach channel and its side-dock that limits the passage of ships. Hence, to overcome these physical constraints, it is required to develop creative engineering solutions that must be sought through optimizing the planning of the terminal and all the involved logistics.

Besides, to provide a larger picture, it is also essential to note that navigation on the River Plate presents complexities due to its low water depth with an available draft of 34 feet (using tidal windows) and where navigational channels must be permanently dredged. Despite this situation, main container terminals of Argentina are located in this area for historical reasons, but also because most of the origin-destination of the containerised merchandises are located within the Metropolitan Area of Buenos Aires, an urban conglomerate with more than 14 million inhabitants.

Therefore, this paper elaborates on how port terminal planning is implemented in a practical way, and under complex scenarios, to develop efficient operational management strategies towards designing all logistic processes and cargo flows from the containerships to the delivery out of the terminal and on the other way around. The port terminal planning strategies are defined for the three largest groups of containers: export, import and empties, which include the following processes: entry of export containers and their distribution on the yard, Verified Gross Mass (VGM), controls with scanner, unloading of import containers and those for transshipment, delivery of import containers, delivery and reception of empty containers, and at last but not least, adequate yard layout distribution of containers, loading and unloading strategies of containerships and the allocation of every operational resources. Thus, the optimal combination of all these planning and management strategies can make a container terminal extremely efficient and a case of success or not.

Different capacity models, tools and software, in combination with state-of-the-art engineering know-how, are required for optimising each of the aforementioned processes in order to achieve a successful planning and efficient operational management strategies.

As a direct result, a very high cost-effective business model is obtained to avoid any possible misuse of resources and to achieve maximum utilization factors.

To summarise, it can be concluded that appropriate port terminal planning allows the integration of various value-added services to enable a container terminal to be developed as a multimodal operations platform serving and optimising supply chains logistics that cross it. In this way, minimising operational times, through planning and management strategies in the short-, medium and long-term, positions a container terminal as a dynamic node of connections accompanying the development of more competitive markets in the region, increasing its economic value and strengthening the prosperity of the region that it serves.