MODES OF TRANSPORT IN DELIVERY PROCESS OF OVERSIZED CARGO

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The main objective of the unified technological process of the port and related modes of transport is to reduce the time of processing vehicles, increase the direct transshipments, accelerate cargo delivery, reduce material and labor costs based on the coordinated work of the transport hub as a whole.

The overwhelming majority of foreign trade operations carried out by intermodal or combined system of transportation of goods in seaports from one mode of transport to another by direct variant and through the warehouse has fundamental differences. Consideration of issues related to delivery and handling of oversized cargoes always requires additional lighting and is an essential task.

The volume of world trade, which serves water transport, is 80% in all international seaports. According to UNCTAD, the growth in demand for maritime transport outstrips the growth in availability of freight capacity and therefore the implementation of new technologies will help to ensure efficiency by integrating issues of cost, timing and environmental performance.

Freight, including raw materials and industrial goods, transported mainly from developing countries in the Far East to the rest of the world. In the general classification, all types of goods can be divided into four categories. These are container, general, dry and liquid cargoes. The comparison analysis shows the percentage of each of these types of cargoes in the total volume of goods transported by sea. (Fig.1) The proportion of general cargo is very significant and has a tendency to increase in recent years alongside with the development of infrastructure projects and construction.

![Sea trade by cargo type](Fig.1. Sea trade by cargo type. Source Worldtradia)
Transportation of oversized or “out of gauge” (OOG) cargoes, as part of general cargo, requires key strategic decisions on the way of cargo delivery, selection of vessel type for shipment, intended port of loading and discharging and its cargo handling techniques, technology of cargo operations and maritime transportation technology.

**Fig. 2. Various stowage combinations of oversized cargo**

The method of selecting the type of vessel for carriage of oversized cargo depends on the type and characteristics of the cargo, primarily its weight and dimensions. In accordance with that, ship cargo characteristics must be thoroughly studied and analyzed. It includes specific cargo capacity, coefficient of structural non-uniformity of holds, number and size of hatches, hatchway ratio, number of decks and their area, permissible load on decks, number and cargo capacity of ship’s gears, all of this is crucial before the process of determining ports of loading and discharging and subsequent cargo operations. (Fig.3)

**Fig. 3. General Arrangements plan of 40K bulkcarrier**

Another important point at stage of planning of the sea transportation of oversized cargoes is the selection of loading port. Since seagoing vessels do not
have the possibility to enter inland waterways due to restrictions on draught, air draft limitation under the bridges, state administrations ban on foreign traffic etc. Thus oversized cargoes can be delivered by river vessels and barges (which have low draught and practically have no restrictions on the height of the cargo) inland waterways from port points or river ports located near plants to hub ports of departure. The process of delivery of oversized cargo predetermines the need for proper study and elaboration of the route of movement from the manufacturer's warehouse to the transportation hub. It is undoubtedly difficult to overestimate the role of railway transport in the transportation of oversized cargo, where the carrying capacity reaches 500 tons with indicators of transshipment of goods over 80% through seaports. In cases of ordinary weight of cargo units and in comparison with the cost of transportation between railway-water and water-vehicle traffic will be more profitable the latter option. An additional option of delivery process can be use of inland water transport if there are navigable waterways and if workable to use such option. However, in some cases, the manufacturer-shipper does not have direct access to inland waterways, or the nearby river ports do not have transshipment facilities with sufficient cargo gears capacity, and the dimensions of cargo units can limit the spans under bridges. For reasons that some cargo units may exceed the permitted load on railway bridges by weight, road transport may be an alternative.

For transportation of oversized and heavy cargoes with the use of automobile transport, the most common is the use of truck haulers with low-frame trailers to transport units weighing about 100 tons, with a minimum safe speed using bypass routes to transport oversized cargo to the port. Along with the existing method of cargo stowage on a long storage area prior to loading, a more acceptable direct loading under the scheme transport-vessel (Cross-docking) avoiding storage and additional costs for transshipment and storage of cargo in the port. Complexity of a direct loading consist in coordination of schedules of traffic of both types of transport. Nevertheless, at the same time such option reduces labor costs, provides conditions of cargo preservation, and accelerates delivery process and more economical than warehouse transshipment.

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