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Anna GALOR[1]
Wiesław GALOR [2]
Andrzej KRYŻAN [3]

OVERSIZE CARGO IN SEA TRANSPORT IN SOUTH BALTIC REGION

The non-standard cargo (oversize) creates non-standard problems. The oversize transport contains the transportation of different turbines, reactors, and other construction structures with non-standard parameters (dimensions, weight, and also available cargo space on the transport craft, permissible pressure and stress on the loading deck). Oversize transportation is a important part of industry, energy, infrastructure development. This transportation has big impact to economical development in every country but it is still very differently organized in separate countries. In South Baltic Region (SBR), the development of common oversize transportation strategy could increase develop the links to common transport infrastructure. The paper presents same problems of sea transport of oversize cargo.

ŁADUNKI PONADNORMATYWNE W TRANSPORCIE MORSKIM W REGIONIE POŁUDNIOWEGO BAŁTYKU

Niestandardowe ładunki (ponadnormatywne) kreują niestandardowe problemy. Transport ładunków ponadnormatywnych (ŁPN) obejmuje różnego rodzaju turbiny, reaktory, i inne konstrukcje o niestandardowych parametrach (wymiary, waga, także dostępną przestrzeń ładunkową na pojazdach transportowych, dopuszczalne naciski i obciążenie pokładów ładunkowych). Transport ten ma duży wpływ na rozwój ekonomiczny każdego kraju, lecz jest różnie organizowany w każdych z nich. W regionie południowego Bałtyku opracowanie wspólnej strategii ŁPN powinno poprawić rozwój wspólnej infrastruktury transportu. W artykule przedstawiono zagadnienia związane z transportem morskim ŁPN.

[1]Maritime University of Szczecin, Faculty of Economics and Transport Engineering, Henryka Pobożnego 1 Str., 70-500 Szczecin, tel. +48 91 4809 650, fax. +48 09 535, -mail: a.galor@am.szczecin.pl
[2] Maritime University of Szczecin, Faculty of Navigation, Wały Chrobrego ½ Str., 70-500 Szczecin, Poland, tel.: +48 91 4891 514, fax: +48 91 4809 535, e-mail: w.galor@am.szczecin.pl
[3] Maritime Experts Association,Wały Chrobrego ½ Str., 70-500 Szczecin, Poland, tel.: +40 91 4891 514, fax: +48 91 4809 535, e-mail: shipadvicers@wp.pl

1. INTRODUCTION

Oversize transportation is a big part of industry, energy, infrastructure development. Oversize transportation has big impact to economical development in every country but it is still very differently organized in separate countries of South Baltic Region (SBR), development of common oversize transportation strategy using the good practice and creating new policies could increase SBR economical competitiveness develop the links to common transport infrastructure [4]. Oversize transport is usually a very important part of every development project so it supposes to be free of any, bureaucracy, miscommunication or possibly infrastructural issues that would really ad an economical competitiveness to SBR in many industry sectors: energy; industry; transport. When we are talking about oversize transport we are talking about transportation of different turbines, reactors, construction structures, that is very important parts of any construction or development project, if we would be able to narrow the time tables, and reduce the bureaucratically and infrastructural complications, possibly prices of this type of transportation projects, that would add an enormous impact to the regions economical development:

- industry - industrial project would be easily developed, territory for the industrial production could be spread, production of big industrial parts would be available far from the port and it would decrease a price of development and operation of such businesses in the region;
- transportation -making the SBR region more open for oversize goods would make in more competitive in the global transportation market. Oversize goods transportation streams to Russian; Ukrainian, Kazakhstan could be organized throe the Sought Baltic region. Development of oversize transportation infrastructure would improve the regular transportation and make it safer;
- energy - development of alternative energy sector is huge in the SBR. The wind power is a leading energy development sector in the region. Every aspect of wind power farms is involved with the oversize transportation it is the second most important issue after the wind. The development and spread of the alternative energy sources is directly connected to the affectivity of regions oversize transport system.

Understanding that the oversize transportation may be the key issue for the regions industry and energy sector development Klaipeda Science and Technology Park is developing the project “Oversize Baltic”.

Long term cooperation with partners among the Baltic Sea region and qualification in transportation project development, makes this new project very promising and developed issues effective.

The main Oversize Baltic project objects:

1. to develop a new oversize transportation strategy increasing regions economical attractiveness;
2. to develop an SBR oversize transportation information network to improve transport operations (One stop shop for transportation permits, study and routes);
3. develop a regions oversize transportation study marking the routs, transportation infrastructure and intermodality improving oversize transportation affectivity;
4. transforming the oversize transportation improvement solutions to the regions policy;

5. improving the business and infrastructure cooperation developing regions competitiveness in global transportation market.

2. OVERSIZE TRANSPORTATION MARKET ANALYSIS

Infrastructure of oversize transport contains the following kinds:

- road transport,
- rail transport,
- inland waterway transport,
- sea transport,
- air transport.

Oversize transportation market wasn't researched so far. Currently most of the cargo of that type is transported by the road, while it is the cheapest way and the most flexible one.

New technological approach and the globalization implies new technologies like transportation of the whole complete production line (so called “projects” where the whole compact production line or its part is being transported in the assembled form on the barge, sub-ship etc to be installed readymade on the off shore, industrial site near sea shore etc.)

Furthermore some huge elements as transformers, turbines generators are also being transported either on rail, or/and on the barge on the inland, and at sea.

Due to the roads infrastructural expansion, ongoing renovations, roads repairs, necessity of by-pass, detour, transportation of oversize units (constructions, machinery) produces considerable problems. Another problem appears routing through construction sites, housing and sporting areas where the road traffic is considerably limited. Construction and existing of wind farms cannot be exercised without oversize transportation- most of its components, like towers, wings, transformers, exceed standard dimension [3].

There is not precise, and the only unique definition of the oversize cargo, because the forms of heavy lifts (called generally oversize cargo) differs from each other. In effect we encounter also the different means of the transportation and the different installation to handle that cargo (terminals, factory sites, ports and docks).

It could be said, that in all cases "oversize" determinants are: cargo dimensions, weight, also available cargo space on the transport craft, permissible pressure and stress on the loading deck. Additional element is the shape of the cargo, because its geometry can overcome the limits of the craft, could negatively affect static and dynamic stability. In every case handling, stowage and securing of such cargo must be done under the supervision of the surveyors, proper calculations should be made, and certificates issued. All following the precisely defined rules: either by IMO or The Road Regulations.

Cargo is considered as the oversize on the road or rail transport when its dimensions or its weight exceed maximal permitted perimeters of standard road (or rail) vehicle or vehicle with trailer [4] and also permissible axle load of this vehicle (Fig. 1 and 2).

Fig.1. Tank unloading (1100 m^3)

Fig.2. Silo transportation

In rail transport oversize cargo is to be described as the transportation of the heavy units however fulfilling all permissible regulations and not exceeding any dimensions of the rail/road etc. (Fig. 3 and 4).

Fig.3. Transportation of machine unit for refinery

Fig.4. Unloading 330 ton generator from wagon type NORCA

In inland shipping oversize cargo is cargo, that overcomes the vessel in length or/and width or which overcomes the standard air draft of the watercraft in relation to the parameters of the waterway (vertical clearness of bridges, gates etc.). We have to bear in mind also the restricted visibility of the helmsman (Fig. 5).

Fig. 5. Transport of pressure reactors with diameter 5,80m for Szczecin-Schwedt refinery

The sea transportation of the oversize cargo is defined by the following forms of cargo:

1. Countable units (which are not liquids, nor loose bulk) defined simply as break bulk or general cargo,
2. Their parameters overcome the average size of the general cargo units: weight of hundreds or even thousands of tons, measurement counted in tens or even hundreds of meters.

They could be oversized either by the dimensions or by the weight, independently, or by both parameters jointly. The example of such oversize cargo could be the Oil rig , heavy crane, whole ship hull, ship's sections, yachts, turbines, transformers, wind turbine blades, yachts (Fig. 6, 7).

Fig.6. Transport of the oil rig

Fig.7. Transport of the damaged warship

In air transport oversize cargo is such cargo, which cannot be located in air container or on special consolidation unit. The only way to transport it is to use the special transport airplane, e.g. Antonov An 225 or L382 Hercules type (Fig. 8).

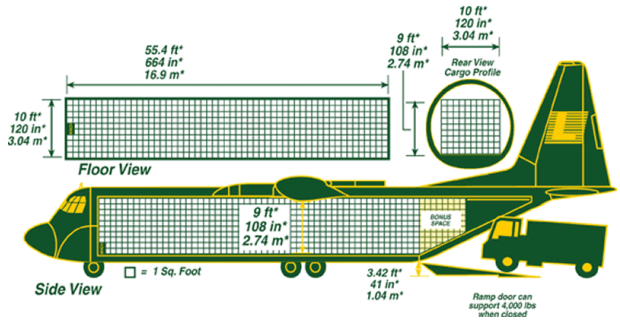

Fig.8. Antonov An-225 loading

3. CARGO IN SEA TRANSPORT

The oversize cargoes (often described as Heavy Lifts) are those measured from tens to hundreds of meters and weight hundreds or even thousands of tons [2]. Some of Extra Large oversize units are being transported on special, unique ships, built on purpose. The example of such is the Semi Submersible ship, shortly SEMI. The floating oversize cargo (on barge or by itself) is positioned on deck which is flooded and submerged underwater. When the ballast is pumped out, the deck comes up and oversize remains on dry deck. Such system of loading is named Flo-Flo.

The oversize (this time not floating) could be loaded by heavy crane (floating or shore) with load capacity from 100 to 2000 tons and over [5]. That system of loading is named Lo-Lo. Apart of the SEMI ships, to carry the oversize cargoes (Heavy Lifts), we have also semisubmersible pontoons, standard pontoons and barges , or even classical ships.

The shape of the oversize often exceeds the dimension of the carrier which must be carefully taken into account when passing narrows.

In every case (during loading and the sea passage) we have to take into account such properties of the load as:

1. distribution of the mass of the cargo,
2. centre of gravity and centre of inertia of mass,
3. transverse moments,
4. torsion and vibration,
5. stability of the carrier, cargo included.

In Poland the law defining the sea transportation taken as the whole, is The Polish Maritime Code issued on 18 of September 2001. There is not any particular law regarding oversize cargoes , therefore carrying such type of cargo, apart of the ship's Loading and Stability Instructions , one must follow the standards of Safe Practice for cargo Stowage and Securing , and other safety procedures enforced by the IMO Conventions. The institution of Maritime Code, however in different forms, is enforced in all Maritime Countries.

The following International Regulations will be observed when carrying the oversize cargoes

- International Convention for the Safety of Life at Sea (SOLAS), 1974,
- International Convention on Load Lines, 1966,
- International Convention for Safe Containers, 1972 (CSC),

- International Regulations for Preventing Collisions at Sea, 1972 (COLREGs),
- Code of safe practice to cargo stowage and securing (CSS IMO Code),
- Regulation of the local Maritime Administrations.

Regarding the oversize cargoes transportation, the local law imposes on the Administration the duty to monitor and supervise the movement of such cargoes. In practice it is limited to one time permission given to the water crafts carrying oversize cargoes, for entering the port and to navigate on the waters under jurisdiction of the said administration. It applies however to all ships deferring from the standard parameters for draft, dimensions and maneuverability.

Due to the variability of the oversize cargoes, apart from General Regulations originated from the Port Regulations, the regulations referring the oversize cargoes alone are not defined, and the permission for movement is given for one passage only. It should be emphasized that in every case the additional tugboat assistance should be given and frequently, second pilot. The terms of the additional insurance coverage for the carrier will be produced.

In case of the polish ports such Port Regulations origin from the Directives, Announcements and Orders of the Director of the Maritime Office.

4. THE SPECIALIZED PORT INFRASTRUCTURE IN POLISH PORTS

Transport of the oversize cargoes by the sea crafts, i.e. ships or sea barges, demands the specialized port infrastructure. This is the main factor defining the port's capability to perform the oversize cargo handling operations. In Poland that kind of services could be provided in Port of Szczecin-Świnoujście, Port of Gdańsk and Port of Gdynia. All ports are easily accessible by the road and rail and, additionally, Port of Szczecin-Świnoujście is a river port.

In Szczecin, the oversize cargo is handled either by mobile crane „Gottwald" of 100 tons load or by floating crane of 200 tons load. Due to that, oversize cargoes could be handled at almost every quay, but most often such a cargo is handled at the Ewa Terminal or at the Duty Free Zone, where as a rule blocks of granite are loaded.

In Port of Gdańsk oversize cargoes are handled at the Port Free Zone by mobile Crane of 100 tons load. The other port operator owns floating crane of 63 tons load. Additionally, Gdańsk Shipyard "Remontowa" owns floating crane of 200 tons load, and Polish Ship Salvage Company (Polskie Ratownictwo Okrętowe –PRO) owns the biggest floating crane "Maja" of 300 tons capacity.

In Port of Gdynia oversize cargoes are handled by the Baltic General Cargo Terminal Gdynia Ltd. with the aid of the ship's gear or mobile cranes and floating cranes chartered from outsiders.

Polish owners do not operate any specialised ships for heavy lifts. However the oversize cargoes are incidentally carried on board, mostly as deck cargo. Polish forwarding companies as Morska Agencja Gdynia Sp. z o.o., C.Hartwig Szczecin, C.Hartwig Gdynia and Rhenus Port Logistic S.A cooperate with owners specialized in oversize cargoes transport.

The oversize cargo operations in Polish ports, are provided by the stevedore companies, i.a. DB Port Szczecin Sp. z o.o. and Port Gdański Eksploatacja.

5. CONCLUSIONS

The transport of non-standard cargo (oversize) creates non-standard problems. This transportation has big impact to economical development in every country but it is still very differently organized in separate countries. The oversize transport is accomplish by different kind of infrastructure: road transport, rail transport, inland waterway transport, sea transport and air transport. The oversize cargoes in sea transport are those measured from tens to hundreds of meters and weight hundreds or even thousands of tons. Some of Extra Large oversize units are being transported on special, unique ships, built on purpose.

In every case (during loading and the sea passage) we have to take into account such properties of the load as distribution of the mass of the cargo, centre of gravity and centre of inertia of mass, transverse moments, torsion or vibration and stability of the carrier included. These problems are different than in other kind of transport. Thus many international regulations are observed when carrying the oversize cargoes.

The above paper is based on results of research in Oversize Baltic project in South Baltic Program.

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