South Baltic Oversize Transport Strategy

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Introduction

Oversize cargo transportation is growing fast and requirements on oversize transport corridors and networks should be fulfilled by States, Regions and Local Authorities. Technical, organizational and legal problems should be solved on basis prepared by an oversize transport strategy. This strategy in South Baltic Countries should assist finding the right directions for the oversize cargo transportation inside countries and transit possibilities.

The Oversize Transport Strategy for SBSR includes a current analysis of the oversize transport, theoretical basis for the strategy, forecast of the oversize transport flows, oversize transport map, oversize transport corridors economic aspects, legal evaluation of the oversize transport corridors, barriers and penalties and some other additional aspects.

The oversize cargo is transported mostly by road, because it is treated as the cheapest way and most flexible mean of transportation even though road transport encounters difficulties, arising from infrastructure and law limitations.

New technological approach and the globalization implies new technologies, like transport of the whole complete production lines, so called “projects” where the whole compact production line or its part is being transported in the assembled form. After road/rail/maritime/inland shipping transport, projects are installed readymade in previously designated places accessible to the means of transport. Choice of transport means and route is generally very limited by parameters of cargo. The transport availability of production and delivery places are crucial as well.

Furthermore, some huge elements as transformers, turbines generators are also being transported by all available means of transport. Construction of wind farms cannot be exercised without oversize transport, since most of components of one wind turbine exceed standard dimension.

Road transport of oversize units (constructions, machinery) produces considerable problems. This is due to the on-going infrastructural expansion and renovations of roads, which result in the necessity to deviate from the assumed route. Another problem is connected with trees and shrubs that grow along the roads and hinder oversize movement.

There is not precise, and the only unique definition of the oversize cargo. This is due to the multiplicity of forms which that kind of cargo has, including heavy lifts, overwide, overhigh units and cargo, which exceeds axle load. Their parameters differ from each other, which effects in the multiplicity of means of transport engaged in the oversize transport. Sometimes even vehicles are specially designed to transport a particular type of oversize cargo. There are also special handling installations (terminals, factory sites, ports and docks) for oversize transport.

It could be said, that in all cases “oversize” determinants are:

1) cargo dimensions,
2) cargo weight,
3) available cargo space on the vehicle,
4) permissible pressure and stress on the loading surface,
5) permissible stress on surface of road/rails.

Additional important element is the shape of the cargo, because its irregular geometry could negatively affect static and dynamic stability of the vehicle. In every case handling, stowage and securing of such cargo must be done under the supervision of the surveyors, proper calculations should be made prior, and necessary permits and certificates should be obtained. All appropriate rules, i.a. issued by the International Maritime Organization, the Road Administration or Rail Administration, should be strictly respected.
1 Analysis of transport market

1.1 Transport means

1.1.1 Road
Roads are the transport means which allow a transport to almost every corner of the region. It is the most individual transport mean, however very expensive and less effective. The oversize transport on roads must be planned and organized very well since the same roads are used by the usual cargo transports and public transport, respectively passengers. Therefore most oversize transports are only allowed during off-times or on restricted parts of a route.

The road network in Sweden is divided into three bearing classes, BK1, BK2 and BK3. All roads in the main road network belong to the highest class BK1, which allows a maximum total weight of 60 ton. 96% of the entire state road network belongs to the BK 1 class. The total weight per axles or bogies is depending of the distance between axles and the total axle configuration. The maximum axles load, bogie load and triple axles load for different BK classes is shown in Figure 1.
Figure 1 The maximum axles load, bogie load and triple axles load for different BK classes

Table 1 Oversize cargo spread depends of the oversize cargo weight (data refer to February-June 2010)

<table>
<thead>
<tr>
<th>Weight</th>
<th>Number</th>
<th>% from total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 60 t</td>
<td>4411</td>
<td>47,9</td>
</tr>
<tr>
<td>From 60 t up to 100 t</td>
<td>4242</td>
<td>46,1</td>
</tr>
<tr>
<td>From 100 t up to 200 t</td>
<td>544</td>
<td>5,9</td>
</tr>
<tr>
<td>More than 200 t</td>
<td>4</td>
<td>0,0</td>
</tr>
<tr>
<td>Total</td>
<td>9201</td>
<td>100,0</td>
</tr>
</tbody>
</table>

The maximum total width of vehicle or cargo is 255 cm. (For some exemptions 260 cm is allowed.) The maximum total length of a vehicle train (truck and trailer) is 25.25 m. The maximum height in the main road network is 4.50 m. If it is only oversized depending on height there is no need of permission. It is the forwarders own responsibility that the planned route is eligible for the actual transport.

In Poland, road transport law regulations don’t concern cargo, but so-called "non-normative" vehicles, it means vehicles, that exceed maximal accepted dimensions or weight. According to "Road traffic law", a non-normative vehicle is the vehicle or combination of vehicles, which axle load, with or without cargo, exceeds permissible limits. Polish regulations are consistent with European law in this regard, especially with Directive96/53:

Maximum acceptable vehicle length:

• motor vehicle or trailer - 12.00 m,
• articulated vehicle – 16.50 m,
• road train – 18.75 m.

Maximum acceptable vehicle width:

• all vehicles – 2.55 m,
• superstructure of refrigerated vehicles – 2.60 m.
Maximum acceptable vehicle height – 4.00 m.

Maximum acceptable vehicle mass:

- road trains or articulated vehicles – 40 t,
- articulated vehicles loaded with 40-feet containers – 44 t.

The motorways in Mecklenburg-Vorpommern are very good prepared. Most of them are new built in the last years and fulfill all requirements for the newest transport density expectations. The following figure shows the cross section of a motorway in Germany. The motorways are divided into two separated directions by a central barrier. Each direction has minimum two lanes which allow a total width of the road of minimum 10.5 m including the emergency lane.

![Figure 2 Cross section of German motorway](image)

Furthermore, since the bridges of the motorways are new built in recent years, they are in good condition and can handle also very heavy transports. Only in rural areas some bridges are smaller and are not able to cope with heavy and oversize transports.

![Figure 3 Bridge over the Peene (A20)](image)

The heights of the bridges across the motorways are minimum 4.2 m plus a safety space of 0.3 m. However, most of the bridges have headroom of 5 m.
1.1.2 Rail transports
The transport via railways has its advantage in the efficiency since the trains can load heavy weights (axle load and load per meter) and transport it over long distances. However, the dimensions of oversize transport on railways are limited through bridges, tunnels, electric power supply cable (cargo profile).

Transport of goods via railways is often only possible in nighttimes because of the capacities of the rail tracks which are occupied by public transports during most of the daytime. The transports cause loud noise and do not lead to acceptance by the public. Even though the transport of oversize cargo is going slower than other cargo and therefore is noise reduced.

Trains can usually transport oversize cargo only with heavy weights but it is difficult to carry cargo with oversized dimensions because the rail tracks cannot be enlarged easily or combined if there are already double-track parts.

In Sweden, the normal standard of allowed axle load is 22.5 ton and 6.4 ton/m. Some parts of the rail network have increased standard of maximum 25 ton /axle and 8 ton/m.

Allowed cargo profile is shown in following figure.

Figure 4 Allowed cargo profile. Maximum width A and B: 340 cm. Maximum width C: 360 cm. Maximum height A: 480 cm.
In Poland, rail transport oversize cargo is treated as “extraordinary delivery”, which means, such transport can cause difficulties in rail transport. Therefore, it is necessary and to maintain special technical-operating conditions, taking into consideration:

1. cargo’s shape, size and weight,
2. way of loading, stowing and securing it on the wagon,
3. transport means to be used,
4. transit route.

Extraordinary deliveries are divided into extraordinary deliveries in national and international transport directions.

For the Lithuanian case, the railway transport route survey Klaipeda – Visaginas is shown.

Klaipeda – Šiauliai – Radviliškis;
Klaipeda – Pagėgiai – Radviliškis;
Radviliškis – Panevėžys – Obeliai – Daugpilis – Dūkštas – VAE.

Max. cargo width 8,1m.

The railways can be used for the oversize cargo transportation. Limitations are axel weight (up to 25 tons on one axle) and limitations of the geometrical parameters. Lithuania railways (LG) can use special vehicles from 8 axles up to 32 axles for the oversize cargo transportation that means maximum weight (gross), which can be carried by Lithuania railways, is up to 800 tons.

Geometrical parameters are limited by railways infrastructure such as bridges, viaducts, tunnels and so on. For the concrete oversize transport on railway the lines should be studied according to maximum possible weights and geometrical parameters.
Figure 5 Twenty-six transporter model

Figure 6 Eight axes transporter model
Figure 7 Sixteen axes transporter model

Figure 8 Sixteen axes transporter model
1.1.3 Inland waterways

Inland water vessels are due to their dimension very suitable for oversize transports. The vessel is often the only solution for the transport of very heavy or long cargo. An inland water vessel can hold up to 40 tons/m² or single pieces with a weight up to 1,000 tons without causing blockings or congestion on roads or other infrastructure means.

Also the transport is very safe against damage or loss. This is an advantage for the operator regarding insurances of the high-quality freight. The transport on inland water ways can cope with very heavy high-tech turbines or windmill blades up to 45 meters.²

There are two main commercial inland waterways in Sweden:

- The Trollhätte canal together with the Gota river
- The Södertälje canal

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¹ Polish Railways Administration
² Bundesverband der deutschen Binnenschifffahrt e.V. (BDB), 06.05.2010
The first one gives accessibility to ports in the lake Vänern via Gothenburg at the west coast. The second one gives accessibility to ports in the lake Mälaren via the Baltic Sea at Södertälje.

Table 2 Sweden inland waterways

<table>
<thead>
<tr>
<th></th>
<th>Södertälje canal</th>
<th>Trollhättte canal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>135</td>
<td>88</td>
</tr>
<tr>
<td>With</td>
<td>17-18</td>
<td>13.2</td>
</tr>
<tr>
<td>Mast height</td>
<td>40.5</td>
<td>27</td>
</tr>
<tr>
<td>Depth</td>
<td>6.5-6.8</td>
<td>5.4</td>
</tr>
</tbody>
</table>

In Poland, inland shipping oversize cargo is divided into two types.

1) 1st type of oversize cargo includes:

Ships, which at least one parameter is inconsistent with requirements given in appropriate regulations on shipping on inland waterways, that means:

- length, width, height of the highest indivisible part of a ship, draught, speed of a ship/combination of ships, are not corresponding with operating parameters of waterway, on which oversize transport is planned,
- ships’ maximum dimensions, the highest number of ships lashed together and either pushed or pulled by tugs, the permissible draught in relation to the transit depth, the permissible speed on the waterway, are not corresponding with requirements described in local law regulations,

6) 2nd type of oversize cargo includes:

- cargo protrudes from ships’ hold and exceed permissible height, taking into consideration the highest indivisible part of the ship, the infrastructural parameters of the waterway (bridge vertical clearance, lock gates) and helmsman’s limited visibility,
- cargo protrudes beyond the horizontal outline of the ship.

1.1.4 Maritime Transport

The Baltic Sea is regularly used for oversize transport in short sea shipping. “Short Sea Shipping refers to maritime transportation over relatively short distances where no oceans have to be crossed. The idea encompasses both domestic and international transportation, including pre-carriage and on-carriage, transportation along the coast, to and from islands and into rivers and lakes. [...] The most important advantages of Short Sea Shipping are the existence of cheap infrastructure, the possibilities of door-to-door shipments (since the vessels used are capable of reaching the interior via rivers and canals), the low cost of transport together with its high capacity and its environmentally-friendly nature. These must be set against a number of disadvantages, however. It is still a relatively new form
of transportation the capacity of which has yet not been thoroughly tested; at present speed and frequency leave something to be desired.”

Ro-Ro shipping lines in South Baltic region could be used as part of the OVERSIZE Transport network. Main port in South Baltic region are link by Ro-Ro shipping lines:

- Klaipeda – Karlshamn;
- Klaipeda – Sassnitz;
- Gdynia – Karlskrona;
- Szczecin – Istad;
- Rostock – Trelleborg;
- Etc.

Technical possibilities of the Ro-Ro ships and quay walls capacities could be used for the Oversize cargo transportation depends Oversize cargo and road or railway platform geometrical parameters and weight.

Typical Ro-Ro vessels mainly have few limitations regarding Oversize cargo geometrical parameters and weight:

- Ro-Ro ramp capacity, usually 50, 100 or 200 t, on some Ro-Ro ships and terminals used up to 280 t;

- Ro-Ro entrance gates has vertical size limitations and mainly has 4,8 m, but some of the Ro-Ro ships has vertical gates clearance up to 7,4 m.

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3 Blauweens et al., Transport Economics, p. 30
Figure 10 Ro-Ro ship with vertical gate clearance 7,8 m

Figure 11 Double container load system on Ro-Ro ship
In many cases Ro-Ro ships and terminals has minimum limitations regarding length and width of the Oversize cargo.

Ro-Ro shipping lines network should be study as part of the total Oversize cargo transportation network in South Baltic Sea Region. SBS Region and some places, which cannot be link by roads or railways in all SBSR, it is necessary look in to possibilities link by Inland waterways from concrete region up to ports and between ports could be used for transportation Ro-Ro or other ships.

Figure 12 Ro-Ro pontoon ramp with capacity 280 t in port
Ro-Ro shipping lines network in Baltic Sea density is higher as in any place in the world and in South Baltic works number of the Ro-Ro operators, such as DFDS, STENA, TT Line, FINLINE and other and this network could be used for the Oversize cargo transportation.

4 http://freight.dfdsseaways.com/dfds_ferries/
Figure 15 Roads, railway and Ro-Ro shipping lines network in South Baltic Sea region, which could be used for the Oversize cargo transportation.

Oversize cargo transportation cargo Strategy for the SBSR should include Ro-Ro shipping possibilities for the Oversize cargo transportation as part of the network.

The following figure shows a picture of river and short sea shipping in Europe.

Figure 16 European sea - river waterways

---

Oversize cargoes, often described as “heavy lifts”, 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.

The example of such is the Semi-Submersible ship (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 cargo remains on dry deck. Such system of loading is named Flo-Flo. Apart of the SEMI ships, to carry the oversize cargoes, there are also semisubmersible pontoons, standard pontoons and barges, or even classical ships.

The oversize cargo could be loaded by heavy crane (floating or shore) with load capacity from 100 to 2000 tons and over. That system of loading is named Lo-Lo. 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, it should be taken into account following safety factors:

2) distribution of the mass of the cargo,
3) centre of gravity and centre of inertia of mass,
4) transverse moments,
5) torsion and vibration,
6) stability of the loaded ship.

On the map below all 56 Swedish commercials ports are shown. A study has been made of capacity to handle heavy lifts in connection to transport of segments of windmills as well as of the ports connection to the road and rail network. Ten ports fill all necessary criteria. Through hiring mobile crane capacity a large number of other ports could handle this transportation and heavy lifts.
The main flow of goods from Germany on the Baltic Sea is eastwards, starting from Rostock or Lübeck to ports in the Baltic States, Russia or Finland. One of the experts in oversize short sea shipping is the shipping line Scandlines. Since 2007, they deliver heavy cargo to the Baltic States, for example, two 56 m long and 170 tons heavy truck trailer combination from Rostock to Ventspils, the hub of Scandlines in the Baltic States. They use the RoPax-Ferries on their regular lines.
Figure 18 Oversize transport on Scandlines ferry

Rostock is strategically well located since it has direct access via motorway and rail connections which are both almost suitable for oversize transports. Therefore the line Rostock-Ventspils will become the most important connection for oversize transport to the Baltic States.\textsuperscript{6}

The following figure shows the main ferry connections in the South Baltic.

Figure 19 Main ports and ferry connections in the South Baltic Region\textsuperscript{7}

\textsuperscript{6} ConTraiLo, 05.11.2007

\textsuperscript{7} www.balticgateway.se

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South Baltic Programme
### Table 3 Ferry connections of Poland

<table>
<thead>
<tr>
<th>Ferry connection</th>
<th>Shipowner</th>
<th>Ferry</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Świnoujście - Trelleborg</td>
<td>UNITY LINE</td>
<td>m/f Galileusz (truck-car ferry)</td>
<td>7 times a week</td>
</tr>
<tr>
<td>2. Świnoujście - Trelleborg</td>
<td>Euroafrica Shipping Lines</td>
<td>m/f Gryf (truck-car ferry)</td>
<td>7 times a week</td>
</tr>
<tr>
<td>3. Świnoujście - Trelleborg</td>
<td>UNITY LINE</td>
<td>m/f Wolin (truck-car ferry)</td>
<td>6 times a week</td>
</tr>
<tr>
<td>4. Świnoujście - Ystad</td>
<td>Polish Baltic Shipping</td>
<td>m/f Wawel (passenger–truck-car ferry)</td>
<td>7 times a week</td>
</tr>
<tr>
<td>5. Świnoujście - Ystad</td>
<td>UNITY LINE</td>
<td>m/f Polonia (passenger–truck-car ferry)</td>
<td>7 times a week</td>
</tr>
<tr>
<td>6. Świnoujście - Ystad</td>
<td>UNITY LINE</td>
<td>m/f Skania (passenger–truck-car ferry)</td>
<td>7 times a week</td>
</tr>
<tr>
<td>7. Świnoujście - Ystad</td>
<td>Euroafrica Shipping Lines</td>
<td>m/f Mikolaj Kopernik (rail-truck ferry)</td>
<td>7 times a week</td>
</tr>
<tr>
<td>8. Świnoujście - Ystad</td>
<td>Euroafrica Shipping Lines</td>
<td>m/f Jan Śniadecki (rail-truck ferry)</td>
<td>7 times a week</td>
</tr>
<tr>
<td>9. Gdańsk-Karlskrona</td>
<td>STENA LINE</td>
<td>m/f Stena Baltica (passenger-truck-car ferry)</td>
<td>6 times a week</td>
</tr>
<tr>
<td>10. Gdańsk-Karlskrona</td>
<td>STENA LINE</td>
<td>m/f Stena Vision (passenger-truck-car ferry)</td>
<td>6 times a week</td>
</tr>
<tr>
<td>11. Gdańsk-Helsinki</td>
<td>FINNLINES</td>
<td>several ferries (passenger-truck-car ferry)</td>
<td>3 times a week</td>
</tr>
<tr>
<td>12. Gdańsk - Nynäshamn</td>
<td>POLFERRIES</td>
<td>m/f Scandinavia (passenger-truck-car ferry)</td>
<td>6 times a week</td>
</tr>
<tr>
<td>13. Gdańsk - Nynäshamn</td>
<td>POLFERRIES</td>
<td>m/f Baltivia (passenger-truck-car ferry)</td>
<td>6 times a week</td>
</tr>
</tbody>
</table>

**Ferry and ro-ro terminals offering oversize cargoes handling**

**Ferry Terminal Gdynia**

The terminal has 1 berth offering double ramp of height/width clearance: 4.80/6.50 m.

**Ferry Terminal Świnoujście**

The terminal has 5 berths with adjustable ramps:
- 2 general purpose berths for railway ferries, rail-car ferries, passenger ferries, and ro-ro vessels,
- 2 berths for passenger/truck/car ferries,
- 1 berth for ro-ro vessels, convertible to handle lo-lo ships.

Ro-Ro Terminal Gdynia

Initiated on the 1st August 2001, it consists of the three modern ramps. It is the only terminal in Poland handling special heavy roll-trailers for oversize cargoes.

Westerplatte Ro-Ro Terminal in Gdańsk

The terminal has 3 berths, 1 swinging ramp (width 20.8 metres, capacity 40.7 tonnes), 2 floating ramps (35 metres in length and 21 metres in width, capacity 80 tonnes)

Table 4 The operating parameters of ferry berths in Ferry Terminal Świnoujście

<table>
<thead>
<tr>
<th>Parameters</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>ramp</td>
<td>L_r</td>
<td>-</td>
<td>-</td>
<td>15</td>
<td>20,4</td>
</tr>
<tr>
<td></td>
<td>B_r</td>
<td>-</td>
<td>-</td>
<td>14,83</td>
<td>17,32</td>
</tr>
<tr>
<td></td>
<td>W_r</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>H_r</td>
<td>-</td>
<td>-</td>
<td>3,77</td>
<td>4,36</td>
</tr>
<tr>
<td></td>
<td>H_i</td>
<td>-</td>
<td>-</td>
<td>0,655</td>
<td>0,4</td>
</tr>
<tr>
<td>railway ramp</td>
<td>L_r</td>
<td>61,81</td>
<td>35,08</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>B_r</td>
<td>10,1</td>
<td>9,6</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>H_r</td>
<td>3,92</td>
<td>3,9</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>H_i</td>
<td>0,78</td>
<td>0,1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ramp – upper deck</td>
<td>L_r</td>
<td>17,42</td>
<td>16,82</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>B_r</td>
<td>5,20/4,00</td>
<td>5,20/4,00</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>H_r</td>
<td>9,71</td>
<td>9,65</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>H_i</td>
<td>5,83</td>
<td>5,8</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

---

8 Ferry Terminal Świnoujście, www.sft.pl [25.11.2010]
Table 5 Special transport rolltrailers handled in the Ro-Ro Terminal Gdynia

<table>
<thead>
<tr>
<th></th>
<th>40' Rolltrailers</th>
<th>48' Rolltrailers</th>
<th>62' Rolltrailers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payload, tonne:</td>
<td>100-120</td>
<td>42-80</td>
<td>80-90</td>
</tr>
<tr>
<td>External dimensions: Length, m:</td>
<td>12.294</td>
<td>14.600</td>
<td></td>
</tr>
<tr>
<td>Width, m:</td>
<td>2.700</td>
<td>2.510</td>
<td></td>
</tr>
<tr>
<td>Height, m:</td>
<td>0.855</td>
<td>0.810</td>
<td></td>
</tr>
</tbody>
</table>

1.1.5 Air transport

Air cargo defines all cargo which is transported with an airplane. No other transportation mean has gained more growth in the last decades than the air transportation. One reason for this is the advanced global production of goods and the following transportation of more valuable goods over longer distances. The air transportation has some advantages against the other transport means:

- speed – the airplane has the shortest transportation time of all means
- safety – less risky transportation due to short transport times and low handling times
- reliability – very punctual schedules

However, air transportation has also some disadvantages. The transportation costs (e.g. due to the fuel consumption) are much higher than with rail transportation or short sea shipping. Furthermore, the airplane is not environmental-friendly and produces a lot of CO₂-emissions.

Because of the very high costs for the transportation the airplane is only used in extraordinary cases for oversize transport when the cargo is very special and valuable and needs to be transported very quickly. Oversize cargo can’t be transported by liner plane, in standard air container or air consolidation pallet, and that is the reason it has to be transported by airplane type Antonov An 225, L-382 Hercules or other cargo airplanes. In air transport cargo dimensions are limited by the size of the hold. The airplanes have a RoRo-ramp which allows the direct loading with no additional lifting of the oversize cargo. The oversize transportation with these airplanes is used only in exceptional cases, e.g. the transportation of an excavator to Siberia in Russia.

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\(^{10}\) RP online, “Schwertransport durch die Lüfte”, 23.11.2005
As it is describe above, the transportation of oversize cargo with an airplane is very individual and therefore this transport mean is of less importance for the regional transport strategy in South Baltic Sea Region.

1.2 Transported cargo

Oversize cargo can be divided on basis:

- weight;
- geometrical parameters.

Weight is very important, especially for the road and railway transportation. Existing road and railway structure in Lithuania regarding cargo weight can be spread in next groups:

- up to 100 tons (possible used biggest part of the road and rail network, just must be distribute on permit axes weight (on roads not more than 10 tons per axes);
- up to 200 tons (used special roads and rail lines with special vehicles);
- up to 250 tons, should be investigate and select special roads, or used inland waterways up to loading points;
- up to 500 tons, should be investigate, selected and prepared special transport corridors;
- more than 500 tons (together with transport vehicles up to 750 – 800 t), must be investigate, select and prepared special corridors.

Up today Lithuania has experience transporting oversize cargo which had weight 530 tons from Klaipeda port to Mazeikiai Oil Refinery plant, and other. Oversize cargo, which was transporting in Lithuania regarding weight, is presented in Table 6.

Table 6 Oversize cargo spread depends of the oversize cargo weight

<table>
<thead>
<tr>
<th>Weight</th>
<th>Number</th>
<th>%, from total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 50 t</td>
<td>1295</td>
<td>92,8</td>
</tr>
<tr>
<td>From 50 t up to 100 t</td>
<td>95</td>
<td>6,8</td>
</tr>
</tbody>
</table>
Geometrical parameters of the oversize cargo are very important as well, because a lot of oversize cargo regarding geometrical parameters are transporting in Lithuania or via Lithuania.

Geometrical parameters in Lithuania calculated as follows:

- length – up to 16 m; width – up to 3.5 m; high – up to 3.5 m (typical weight up to 40 tons);
- length – from 16 m up to 24 m; width – from 3.5 m up to 4.1 m; high – from 3.5 m up to 4.5 m (typical weight up to 70 tons);
- length – from 24 m up to 43 m; width – from 4.1 m up to 5.0 m; high – from 4.5 m up to 5.0 m (typical weight up to 180 tons);
- at least one of parameter bigger as mentioned above.

Oversize cargo distribution regarding geometrical parameters is presented on following tables.

### Table 7 Oversize cargo distribution depend length

<table>
<thead>
<tr>
<th>Length</th>
<th>Number</th>
<th>% from total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 14 m</td>
<td>99</td>
<td>7.1</td>
</tr>
<tr>
<td>From 14 m up to 24 m</td>
<td>1149</td>
<td>82.3</td>
</tr>
<tr>
<td>From 24 m up to 43 m</td>
<td>98</td>
<td>7.0</td>
</tr>
<tr>
<td>More than 43 m</td>
<td>50</td>
<td>3.6</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>1396</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Lithuania road transport inspection data

### Table 8 Oversize cargo distribution depend width

<table>
<thead>
<tr>
<th>Width</th>
<th>Number</th>
<th>% from total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 3,5 m</td>
<td>907</td>
<td>65,0</td>
</tr>
<tr>
<td>From 3,5 m up to 4,1 m</td>
<td>333</td>
<td>23,8</td>
</tr>
<tr>
<td>High</td>
<td>Number</td>
<td>% from total</td>
</tr>
<tr>
<td>----------------------</td>
<td>--------</td>
<td>--------------</td>
</tr>
<tr>
<td>Up to 4,5 m</td>
<td>1120</td>
<td>80,2</td>
</tr>
<tr>
<td>From 4,5 up to 5,0 m</td>
<td>242</td>
<td>17,3</td>
</tr>
<tr>
<td>More than 5,0 m</td>
<td>34</td>
<td>2,5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1396</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Lithuania road transport inspection data

Table 9 Oversize cargo distribution depend high

On the basis of the presented data in tables it is possible to conclude, that oversize cargo transportation is very important for Lithuania, and oversize transport corridors and network should be selected on basis of weights and geometrical parameters to main oversize clients as well transit transport corridors to Latvia, Belarus, Poland.

In Poland, there is no official statistic showing what sorts of cargo is transported by non-normative vehicles. According to carriers’ information the most common goods are:

- wind turbines (windmills),
- steel structures (building and for shipyard),
- construction machinery,
- agricultural machinery,
- industrial equipment (generators, transformer, production lines components)
- dutch houses,
- tanks.

The transport of windmills in Germany is described as an example for oversize cargo in the next paragraph.

**Windmills**

The transport of a windmill from the construction to the final location can cause some logistical problems regarding the dimensions and weight of the separate parts of the windmill. All roads, curves, bridges and bottlenecks must be proven even before starting the transport. Often even a road must be built only for the transport of windmills. The transport requires a large amount of bureaucracy to get all permits (for the transport itself, the reconstruction of bridges or roads, etc.).
The housing of the windmill is normally finished and can be transported completely on a truck. The problem with the housing is its weight. A housing of a small windmill weights 20 tons, of larger windmills even up to 70 tons. The dimensions and weight increases accordingly to the effective power so that the housing of the future ones can have a total weight of more than 100 tons. Most of the towers which are installed in Germany are steal towers. These towers are divided into single segments with a length of 20 to 30 meters each. A truck on the road can handle a length up to 22 meters. But anyhow roads cannot be used without any permission or blocking of the road. Another challenge is the dimension of the lower tower parts of large windmills. Normal bridges have a height of 4.0 to 4.2 meters for transport on roads, but the diameter of a tower is already about 4.0 meters. That makes the transport via road very complicated or even impossible.

One solution is the transport via waterways or if it possible (on-shore) the construction of such parts directly at the final location.

The transport of the blades is complicated due to the length of the blades. A blade can have a length of 30 to 35 meters. In that case all blades can be transported on a truck, but if the blades are even longer (for larger windmills up to 45 meters) the transport is nearly impossible especially in the mountainous parts of the region. Another challenge is the width of the blades which can be more than 4 meters. For example a 4.5 MW windmill has a width of its blades of 5.8 meters. These parts cannot be transported under bridges on roads. Some vehicles have a special construction to change the blade to the horizontal in order to make the transport possible.

### 1.3 Permitting statistics

Organisation of oversize transport is practically done by specialized transport companies, forwarders and logistics companies.

Polish state institutions engaged in road oversize transport include:

- General Directorate for National Roads and Motorways (Generalna Dyrekcja Dróg Krajowych i Autostrad - GDDKiA) – administration of main roads and highways, issuing permits for oversize vehicles; central division of the GDDKiA in Warsaw is responsible for servicing foreigners.

- Road Transport Inspection (Inspekcja Transportu Drogowego - ITD) - state authority, which started its activities in 2002 and is responsible for control of vehicles with a weight above 3.5 tonnes, as well as drivers and freight, and administration of any penalties.

- Police - is the central organ of government, competent in matters of protection of human security and the maintenance of public order and security; Police executes control, prosecution and punishment of both all vehicles and drivers; additionally, the police offers escort for the oversize transport.

On the Polish market there are a few dozen specialized companies offering oversize road transport appearing as a carrier and/or freight forwarder.

---

11 ADEV Windkraft AG, 06.05.2010

12 Bundesverband Windenergie. e.V. (1), 06.05.2010

Official website: www.transportoversize.eu
Phone number: +370 46 390 857
e-mail address: oversizebaltic@kmtp.lt

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Oversize Baltic

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EU Logo

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South Baltic Programme
In Poland there are no accurate statistics on the oversize transport by road, there is no central database to obtain that information. The only possible way to obtain data is the number of permits issued by the General Directorate for National Roads and Motorways (GDDKiA).

Table 10 The number of permits issued by GDDKiA

<table>
<thead>
<tr>
<th></th>
<th>Warsaw</th>
<th>Regions</th>
<th>Together</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>9 402</td>
<td>3 066</td>
<td>12 468</td>
</tr>
<tr>
<td>2002</td>
<td>7 733</td>
<td>11 244</td>
<td>18 977</td>
</tr>
<tr>
<td>2003</td>
<td>7 860</td>
<td>15 092</td>
<td>22 952</td>
</tr>
<tr>
<td>2004</td>
<td>7 441</td>
<td>13 566</td>
<td>21 007</td>
</tr>
<tr>
<td>2005</td>
<td>7 665</td>
<td>12 299</td>
<td>19 964</td>
</tr>
<tr>
<td>2006</td>
<td>10 211</td>
<td>12 000</td>
<td>22 211</td>
</tr>
<tr>
<td>2007</td>
<td>13 200</td>
<td>10 200</td>
<td>23 400</td>
</tr>
<tr>
<td>2008</td>
<td>15 958</td>
<td>14 763</td>
<td>30 721</td>
</tr>
<tr>
<td>2009</td>
<td>10 379</td>
<td>13 785</td>
<td>24 164</td>
</tr>
</tbody>
</table>

Figure 21 The number of permits issued by GDDKiA
PKP Polish Railway Lines SA Rail Traffic Management Branch in Szczecin issued in 2009 387 permits for extraordinary transport, every for period of 3 months. Among them there was 28 permits for shipments with substantial exceed of the standard gauge and/or axle load. Analysing the permits, domination of transport directions to/from the Port of Szczecin, Port of Świnoujście and border station Gumięńce can easily be noticed. From the Pomeranian Region oversize cargoes are transport by rail, i.a. to Poznań, Kraków, Wrocław, Warszawa, Gdynia and Rzeszów.

The most often transported oversize cargoes are engines to the Power Plant „Dolna Odra”, paper in bales and rails and until recently ship’s machinery to Shipyard Stocznia Szczecińska Nowa. Moreover:

1) containers 40’ i 45’ High Cube type,
2) vehicles and military equipment,
3) transformers with weight over 90 tons,
4) steel in sheets of width of 3 m,

Below are shown quantities of special transport units carried out by one of the rail carriers.

Table 11 Number of oversize cargoes transported by PKP CARGO S.A. in years 2007-2009

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of deliveries including:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Together</td>
</tr>
<tr>
<td>2007</td>
<td>10013</td>
</tr>
<tr>
<td>2008</td>
<td>13453</td>
</tr>
<tr>
<td>2009</td>
<td>17164</td>
</tr>
</tbody>
</table>

In years 2007-2009 the Inland Navigation Office in Szczecin issued 10 permits to carry large loads, and 21 permits associated with vessels of exceeded size:

1) Year 2007
7 permits related to the exceeded dimensions of ship,
8 permits related to oversize cargo,

2) Year 2008
7 permits related to exceeded dimensions of ship,

3) Year 2009
7 permits related to the exceeded dimensions of ship,

2 permits related to oversize cargo.

The Inland Navigation Office in Szczecin in Wroclaw issued, in the years 2007-2009, in total 50 permits, primarily related to the exceeded dimensions of ships.

In Sweden, the total number of applications of oversize transports in recent years 2005 – 2009:

![Figure 22 Total number of applications in Sweden in the years 2005-2009](image)
<table>
<thead>
<tr>
<th>Destination</th>
<th>Number</th>
<th>% of total</th>
<th>Origin</th>
<th>Number</th>
<th>% of total</th>
<th>Destination plus Origin</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gothenburg</td>
<td>582</td>
<td>6,3</td>
<td>727</td>
<td>7,9</td>
<td>1309</td>
<td>14,2</td>
<td></td>
</tr>
<tr>
<td>Malmö</td>
<td>207</td>
<td>2,2</td>
<td>323</td>
<td>3,5</td>
<td>530</td>
<td>5,7</td>
<td></td>
</tr>
<tr>
<td>Stockholm</td>
<td>251</td>
<td>2,7</td>
<td>169</td>
<td>1,8</td>
<td>420</td>
<td>4,5</td>
<td></td>
</tr>
<tr>
<td>Trellborg</td>
<td>207</td>
<td>2,2</td>
<td>229</td>
<td>2,5</td>
<td>436</td>
<td>4,7</td>
<td></td>
</tr>
<tr>
<td>Norrköping</td>
<td>180</td>
<td>2</td>
<td>106</td>
<td>1,2</td>
<td>286</td>
<td>3,2</td>
<td></td>
</tr>
<tr>
<td>Västerås</td>
<td>120</td>
<td>1,3</td>
<td>149</td>
<td>1,6</td>
<td>269</td>
<td>2,9</td>
<td></td>
</tr>
<tr>
<td>Helsingborg</td>
<td>112</td>
<td>1,2</td>
<td>118</td>
<td>1,3</td>
<td>230</td>
<td>2,5</td>
<td></td>
</tr>
<tr>
<td>Tjörn/Vallhamn</td>
<td>139</td>
<td>1,5</td>
<td>34</td>
<td>0,4</td>
<td>173</td>
<td>1,9</td>
<td></td>
</tr>
<tr>
<td>Gävle</td>
<td>62</td>
<td>0,7</td>
<td>63</td>
<td>0,7</td>
<td>125</td>
<td>1,4</td>
<td></td>
</tr>
<tr>
<td>Finspång</td>
<td>51</td>
<td>0,6</td>
<td>66</td>
<td>0,7</td>
<td>117</td>
<td>1,3</td>
<td></td>
</tr>
<tr>
<td>Kapellskär</td>
<td>34</td>
<td>0,4</td>
<td>76</td>
<td>0,8</td>
<td>110</td>
<td>1,2</td>
<td></td>
</tr>
<tr>
<td>Oskarshamn</td>
<td>44</td>
<td>0,5</td>
<td>58</td>
<td>0,6</td>
<td>102</td>
<td>1,1</td>
<td></td>
</tr>
<tr>
<td>Luleå</td>
<td>45</td>
<td>0,5</td>
<td>55</td>
<td>0,6</td>
<td>100</td>
<td>1,1</td>
<td></td>
</tr>
<tr>
<td>Kiruna</td>
<td>77</td>
<td>0,8</td>
<td>32</td>
<td>0,3</td>
<td>109</td>
<td>1,1</td>
<td></td>
</tr>
<tr>
<td>Borlänge</td>
<td>40</td>
<td>0,4</td>
<td>56</td>
<td>0,6</td>
<td>96</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Karlshamn</td>
<td>38</td>
<td>0,4</td>
<td>51</td>
<td>0,6</td>
<td>89</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Oxelösund</td>
<td>58</td>
<td>0,6</td>
<td>24</td>
<td>0,3</td>
<td>82</td>
<td>0,9</td>
<td></td>
</tr>
<tr>
<td>Sum</td>
<td>24,4</td>
<td>25,4</td>
<td>0</td>
<td>0</td>
<td>49,8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1/ Including the port

The table shows:

- the dominating role of Gothenburg and some other port towns.
- other destinations and origins are widely spread over the country.
Oversize transport in Germany needs to be permitted by an authority which is responsible for the transport; mostly it is the official road authority of the according federal State. However, due to the fact, that the transport normally does not only cross one federal State all other federal States are also involved in the permission process. Some years ago, the permission process was done manually but today there is a one-stop-shop for all oversize transports in whole Germany (see corresponding paragraph about VEMAGS for further information).

This VEMAGS system provides data about oversize transports in Germany and in every single federal State. But the transport operators are not bind to apply for permission at a specific authority (e.g. the starting point of the transport route or location of the business). So there are statistics about the applications and approved permission but no further statistics about detailed routings, destinations, and number of actual proceeded transports. Also, there are possibilities for multiple permissions or long-term permission for a transport operator which falsifies the numbers of actual transports as well.\textsuperscript{13}

\begin{table}[h]
\centering
\begin{tabular}{lcc}
\textbf{Federal State} & \textbf{Applications} & \textbf{Permissions} \\
Baden-Württemberg & 32689 & 28325 \\
Bayern & 15880 & 13778 \\
Berlin & 2589 & 2444 \\
Brandenburg & 4106 & 3568 \\
Bremen & 2591 & 2186 \\
Hamburg & 14069 & 13037 \\
Hessen & 4410 & 3726 \\
Mecklenburg-Vorpommern & 3413 & 3200 \\
Niedersachsen & 18540 & 15705 \\
Nordrhein-Westfalen & 27665 & 23969 \\
Rheinland-Pfalz & 7594 & 6920 \\
Saarland & 925 & 833 \\
Sachsen & 20201 & 17843 \\
Sachsen-Anhalt & 12428 & 12775 \\
Schleswig-Holstein & 8109 & 7763 \\
Thüringen & 3270 & 2975 \\
\textbf{Sum} & 178479 & 159047 \\
\end{tabular}
\caption{Number of VEMAGS permissions 2009}
\end{table}

Regardless the statistics about oversize transports in the Region Mecklenburg-Vorpommern also statistic about traffic density on regional motorways can be of importance. For this purpose the two main knots (Wismar and Rostock) were observed.

\textsuperscript{13} Schwerlast-Spedition Hamburg GmbH, 12.05.2010
Table 14 Traffic density AK Rostock

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
<th>Traffic density [vehicle/24 h]</th>
<th>Amount of cargo traffic [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS Kessin (A19)</td>
<td>AK Rostock</td>
<td>26,900</td>
<td>14.3</td>
</tr>
<tr>
<td>AK Rostock</td>
<td>AS Kavelstorf (A19)</td>
<td>27,300</td>
<td>11.4</td>
</tr>
<tr>
<td>AS Rostock Südstadt (A20)</td>
<td>AK Rostock</td>
<td>28,400</td>
<td>10.7</td>
</tr>
<tr>
<td>AK Rostock</td>
<td>AS Dummerstorf (A20)</td>
<td>17,100</td>
<td>9.0</td>
</tr>
</tbody>
</table>

Table 15 Traffic density AK Wismar

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
<th>Traffic density [vehicle/24 h]</th>
<th>Amount of cargo traffic [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS Wismar Mitte (A20)</td>
<td>AK Wismar</td>
<td>25,700</td>
<td>9.1</td>
</tr>
<tr>
<td>AK Wismar</td>
<td>AS Zurow (A20)</td>
<td>24,900</td>
<td>9.8</td>
</tr>
</tbody>
</table>

Permitting statistics in Lithuania

Table 16 Main directions of oversize cargo

<table>
<thead>
<tr>
<th>Main directions</th>
<th>Permits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Klaipeda - Kaunas</td>
<td>55</td>
</tr>
<tr>
<td>Klaipėda - Kretina</td>
<td>44</td>
</tr>
<tr>
<td>Klaipėda - Gargzdai</td>
<td>5</td>
</tr>
<tr>
<td>Klaipėda - Taurage</td>
<td>137</td>
</tr>
<tr>
<td>Klaipėda - Vilnius</td>
<td>30</td>
</tr>
<tr>
<td>Klaipėda - Priekule</td>
<td>68</td>
</tr>
<tr>
<td>Klaipėda - Palanga</td>
<td>25</td>
</tr>
<tr>
<td>Kalvarijos PKP - Salociu PKP</td>
<td>26</td>
</tr>
</tbody>
</table>
### Table 17 Destination and size of oversize cargo

<table>
<thead>
<tr>
<th>Destination</th>
<th>Dimensions</th>
<th>Length (m.)</th>
<th>Width (m.)</th>
<th>High (m.)</th>
<th>Weight (t.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kretinga</td>
<td>Max. dimensions</td>
<td>39,8</td>
<td>5,00</td>
<td>5,33</td>
<td>63,2</td>
</tr>
<tr>
<td></td>
<td>Average dimensions</td>
<td>22,9</td>
<td>3,48</td>
<td>4,07</td>
<td>27,7</td>
</tr>
<tr>
<td>Smelėnės PKP</td>
<td>Max. dimensions</td>
<td>22</td>
<td>3,49</td>
<td>4,5</td>
<td>49,52</td>
</tr>
<tr>
<td></td>
<td>Average dimensions</td>
<td>17,71</td>
<td>3,06</td>
<td>4,3</td>
<td>18,82</td>
</tr>
<tr>
<td>Bukniauci PKP</td>
<td>Max. dimensions</td>
<td>22,45</td>
<td>3,94</td>
<td>4,5</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Average dimensions</td>
<td>17,47</td>
<td>3,23</td>
<td>4,15</td>
<td>16,75</td>
</tr>
<tr>
<td>Siauliai</td>
<td>Max. dimensions</td>
<td>22,45</td>
<td>4,95</td>
<td>4,76</td>
<td>66,5</td>
</tr>
<tr>
<td></td>
<td>Average dimensions</td>
<td>18,1</td>
<td>3,34</td>
<td>4,12</td>
<td>18,88</td>
</tr>
<tr>
<td>Visaginas</td>
<td>Max. dimensions</td>
<td>19,5</td>
<td>4,00</td>
<td>4,71</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Average dimensions</td>
<td>18</td>
<td>3,66</td>
<td>4,37</td>
<td>13,9</td>
</tr>
<tr>
<td>Raigardo PKP</td>
<td>Max. dimensions</td>
<td>22,00</td>
<td>5,40</td>
<td>5,85</td>
<td>36,55</td>
</tr>
<tr>
<td></td>
<td>Average dimensions</td>
<td>18,82</td>
<td>3,72</td>
<td>4,51</td>
<td>26,55</td>
</tr>
<tr>
<td>Kalviai PKP</td>
<td>Max. dimensions</td>
<td>21,50</td>
<td>3,90</td>
<td>4,5</td>
<td>77,00</td>
</tr>
</tbody>
</table>

Source: Lithuania road transport inspection data
<table>
<thead>
<tr>
<th>Location</th>
<th>Max. dimensions</th>
<th>Average dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Plunge</strong></td>
<td>31,00 4,00 4,7 96,00</td>
<td>19,14 3,17 4,01 15,80</td>
</tr>
<tr>
<td><strong>Kaunas</strong></td>
<td>35,80 4,90 4,9 93,50</td>
<td>19,79 3,37 4,25 24,80</td>
</tr>
<tr>
<td><strong>Gargzdai</strong></td>
<td>21,50 3,70 4,90 41,00</td>
<td>19,07 3,11 4,27 25,25</td>
</tr>
<tr>
<td><strong>Taurage</strong></td>
<td>45,00 4,99 5,33 63,20</td>
<td>24,37 3,52 4,26 28,16</td>
</tr>
<tr>
<td><strong>Vilnius</strong></td>
<td>24,95 4,60 4,94 145,05</td>
<td>18,72 3,22 4,04 22,66</td>
</tr>
<tr>
<td><strong>Prieikule</strong></td>
<td>44,00 4,99 4,70 60,00</td>
<td>20,59 4,05 4,63 33,07</td>
</tr>
<tr>
<td><strong>Palanga</strong></td>
<td>45,00 4,99 5,33 63,20</td>
<td>24,24 3,49 4,32 24,08</td>
</tr>
<tr>
<td><strong>Salociu PKP</strong></td>
<td>54,00 4,00 4,50 40,00</td>
<td>22,17 3,21 3,99 17,16</td>
</tr>
<tr>
<td><strong>Kalvarijos PKP</strong></td>
<td>38,00 4,47 5,00 96,00</td>
<td>19,4 3,17 3,99 21,11</td>
</tr>
<tr>
<td><strong>Panevezys</strong></td>
<td>22,50 5,10 6,30 42,00</td>
<td>18,12 3,56 4,32 15,76</td>
</tr>
<tr>
<td><strong>Medininku PKP</strong></td>
<td>24,45 4,25 4,60 72,00</td>
<td>18,21 3,09 4,06 22,77</td>
</tr>
<tr>
<td><strong>Butinges PKP</strong></td>
<td>34,00 4,30 4,95 66,00</td>
<td>18,61 3,14 4,17 21,28</td>
</tr>
<tr>
<td><strong>Klaipeda</strong></td>
<td>25,50 4,86 4,95 74,25</td>
<td>18,08 3,16 4,07 17,49</td>
</tr>
</tbody>
</table>

Source: Lithuania road transport inspection data
1.4 Regional Perspective

The outlook of the oversize transport in Poland cannot be limited to the northern region of the country. In this region, the dominating types of area are agricultural lands and forests. These areas are not highly populated and the industry is undeveloped there. Industrial centres are concentrated only in big cities, mainly Szczecin, Gdańsk, Gdynia, Bydgoszcz and Toruń.

The majority of industrial activity takes place in southern Poland. Analysing the types of entrepreneurial activity, we can notice that most of companies that would be the potential recipient or sender of oversize cargoes are located in either central or southern Poland. There are north-south and west-east transport corridors and the condition of road and rail infrastructure is a bit better than in the northern part of the country. In conclusion, it can be stated that Polish West and East Pomeranian Regions should be treated firstly as a transit region for oversize transport. Dominant transport directions are to/from sea ports and to/from several industrial areas.

Figure 23 Main industry in Poland

In upcoming years there are a few thousands of investments planned, in which oversize transport will be obligatory. Currently, due to the upcoming EURO 2012 event, quite new highways and expressways are
under construction, as well as new route nodes, bypasses, overpasses and bridges are prepared. The old road and rail infrastructure is extensively modernized or reconstructed.

Taking into consideration oversize transport perspective, the most substantial investments which will take place in the upcoming 10 years in Poland are:

- biogas plants – dozens,
- power units in existing biogas plants – 4,
- gas blocks in existing cogeneration plants – 2,
- power units in existing cogeneration plants – 1,
- reconstruction and modernisation of airports, mainly in Łódź, Wrocław, Warszawa, Poznan, Goleniów, Białystok, Katowice,
- stadiums (11 stadiums being built for EURO 2012 purposes, more being planned),
- gas power plants, including one in West Pomeranian Region,
- biomass power plants, mainly in northern Poland,
- cogeneration plants, e.g. in Police,
- wind farms – 13,
- hydroelectric plants - 2,
- factories – 50,
- breakwater in Świnoujście,
- LNG terminal in Świnoujście,
- production and storage halls – 25,
- sports halls – aprox. 50,
- entertainment and sports halls – 36,
- aluminium smelter in Nowa Sól,
- swimming pools,
- tramway lines,
- modernisation of railways,
- construction and modernisation of traction lines,
- wastewater treatment plants,
- Świnna Poręba water dam,
- thermal waste treatment plants – aprox. 20,
- cement production line,
- underground gas storage depots.

One of the most important investments in Poland in upcoming years is construction of nuclear power plant in Żarnowiec, 35 km from Gdańsk. This decision was approved in early 2010. There is also another nuclear power plant in plans, either in Kopań or Klempicz, however this decision was not yet approved in any way.
Another Polish very important invest is construction of gas power plants, gas blocks in existing power plants, biogas plants is strictly connected with necessity of diversification of natural gas sources, as well as the necessity of searching for sources of power other than coal or gas. There are also underground gas storage depots constructions being planned, as an important part of national system of Poland serving a gas transmission country.
Other enormous investments, which is strictly connected with oversize transport is planned modernisation of Polish waterways, which will allow to take advantage of inland shipping on a larger scale. Modernisation of border parts of Odra river is being planned with adapting the waterway from German port Schwedt up to Pomeranian Bay for sea-river ships. In purpose of making ports located in the estuary of Odra river more available for inland shipping, reconstruction of a railway bridge, located on Regalica river (km 733,7), as a part of Szczecin-Wrocław railway lines modernisation program, is being planned. On the Wisła river, there is planned a construction of water barrage in Nieszawa.
Furthermore, there is a conception of modernisation E-70 waterway up to class II, including Wisła- Odra waterway. Other project which is very likely to succeed is the construction of Odra–Dunabe–Elbe Canal.

There are several investments, connected with construction and modernisation of road and railway infrastructure, in purpose of improving accessibility of seaports Szczecin, Świnoujście, Gdańsk and Gdynia. In each of these seaports modernisation of old quays, as well as construction of new ones is being planned. In the Świnoujście seaport, a new LNG terminal is under construction.

Companies operating in Special Economic Zones, may also successfully serve as places of departure or destination of oversize cargoes (Fig. 20). Special Economic Zones work as isolated parts of country territory, where economic activity may work on preferential terms. That is, companies which operate in these areas are granted tax exemption, as a form of public assistance. Special Economic Zones were created for stimulating the economic development of some regions in Poland. For the oversize transport the most important Special Economic Zones are as follows: Kamiennogórska, Katowicka, Kostrzyńsko-Słubicka, Krakowska, Słupska and Starachowicka.

### Table 18 Industrial branches in Special Economic Zones

<table>
<thead>
<tr>
<th>Special Economic Zone</th>
<th>Voivodeship</th>
<th>Top Industries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kamiennogórska</td>
<td>Lower Silesian Voivodeship, Wielkopolska Region</td>
<td>metal, paper, automotive</td>
</tr>
<tr>
<td>Katowicka</td>
<td>Silesian Voivodeship, Malopolska Region, Opole Voivodeship</td>
<td>automotive, metal, structural</td>
</tr>
<tr>
<td>Kostrzyńsko-Słubicka</td>
<td>Lubuskie Voivodeship, Westpomeranian Region, Wielkopolska Region</td>
<td>paper, metal, logistics</td>
</tr>
<tr>
<td>Krakowska</td>
<td>Malopolska Region, Subcarpathian Voivodeship</td>
<td>IT, modern services as BPO, SSC</td>
</tr>
<tr>
<td>Legnicka</td>
<td>Lower Silesian Voivodeship</td>
<td>automotive, metal, plastics</td>
</tr>
<tr>
<td>Łódzka</td>
<td>Łódź Voivodeship, Wielkopolska Region, Mazovian Voivodeship</td>
<td>household articles, logistics, structural</td>
</tr>
<tr>
<td>Mielecka</td>
<td>Subcarpathian Voivodeship, Malopolska Region, Lublin Region</td>
<td>no data</td>
</tr>
<tr>
<td>Pomorska</td>
<td>Pomeranian Region, Kuyavian-Pomeranian Region, Westpomeranian Region</td>
<td>electronic and electrical, metal, paper</td>
</tr>
<tr>
<td>Słupska</td>
<td>Pomeranian Region, Westpomeranian Region, Wielkopolska Region</td>
<td>metal, automotive, plastics</td>
</tr>
</tbody>
</table>
The location of wind farms, i.e. wind power plants, is mainly determined by meteorological conditions (Fig. 21). Investors are going to allocate wind turbines mainly in zones I and II. West Pomeranian Region is considered as the most attractive of all regions, where over 50% of investments will be allocated. On the second place stands, with 33% of investments, Pomeranian Region.

The plans of constructing enormous wind plant in the Baltic Sea are particularly noteworthy. Project, being implemented by Baltex-Energia company assumes construction of 260 wind turbines in the sea area approx. 90km north from Port of Ustka. The overall power of turbines is going to stand on 1560 MW level, which is approximately three times more than the power of all already implemented wind turbines in Poland (approx. 538 MW). Project developers are currently seeking for project approval in the Ministry of Infrastructure.
Figure 26 Potential wind energy map

Most frequent places as origin or destination for oversized transports in Sweden is Figure 27.
Most of the places are also an important port. For example, Gothenburg, Trelleborg, Tjörn/Vallhamn and Helsingborg, the port function is the main reason for the frequencies of oversized transports.

Industrial companies identified as frequent users of oversize transports are shown in Figure 28.
Volvo Construction Equipment

Volvo Construction Equipment have two manufacturing plants with needs of oversized transports, one in the south of Sweden (Växjö) and one in the south west (approx. 350 km) Karlshamn in the town Arvika. The plant in Växjö are producing big dumpers from a number of 2000 up to 4000 per year mostly of the biggest model 3,5 meter wide and 35 ton. Most of them are exported and transported via Gothenburg. Some of them are transported via Malmö or Trelleborg to the European continent by road transport. Some dumpers are transported via Karlshamn-Klaipeda. The other Volvo manufactory plant (Arvika) is producing wheel loaders. Also these products are mainly exported and mainly via Gothenburg. The transports use mainly main roads for example E-road E6, highway 25 and 45.

Cargotech Sweden AB / Kalmar industries

Another machinery producing company in the south of Sweden is Cargotech Sweden AB / Kalmar industries. They are manufacturing different kinds of terminal trucks (a.o. reach stackers). This plant is situated in Lidhult about 100 km north west from Karlshamn. The total number of manufactured units is approx. 300 to 400. Most of them about 90 % are exported. Three ports are used Gothenburg, Vallhamn and Helsingborg all in the south west of Sweden. The biggest truck is 4,60 m wide and the weight is about 60 ton. The transports use mainly the main roads for example E-road E6 and highway 25.

ABB Sweden AB, Västerås and Ludvika

The company is producing big electrical machineries e.g. power transformers, generators and components to windmills. Several hundred of units are produced and many are exported.

Siemens Sweden AB

The company is producing big turbines. The cargo weight varies from 10 up to 150 tons. The total weight can be over 200 ton. The number of produced units per year is about 100. Most of them are exported via port of Norrköping.

EWP Windtower Production AB

The company is producing steel towers for wind mills.

Frequent used corridors for transports to or from these companies are shown in Figure 29.
Mecklenburg-Vorpommern is situated in the Northeast of Germany directly at the Baltic Sea and in the centre of Europe. Between European centers like Berlin, Hamburg, the Øresund region (Copenhagen), the Baltic States or St. Petersburg, the shortest transport routes for goods are through Mecklenburg-Vorpommern. Mecklenburg-Vorpommern is located at the intersection of two European transport axes: from Scandinavia to the Adriatic in the North-South direction and from the regions adjoining the North Sea to the Baltic States and on into Russia in the East-West direction.

Because of its excellent location at the Baltic Sea, Mecklenburg-Vorpommern benefits from the efficient ports and well-built land connections in the West-East and North-South corridor. This does not only apply to the oversize transports and special cargo transports but also to the main flow of goods and cargo.\(^{14}\)

In Mecklenburg-Vorpommern 17 large-scale industrial locations and sites for maritime logistics (e.g. shipbuilding yards\(^ {15}\), offshore pipeline construction companies\(^ {16}\), and construction companies for ship’s engines\(^ {17}\)) have been established. These locations are dominant users of oversized cargo transports. The

\(^{14}\) Mecklenburg-Vorpommern – der Logistikstandort an der Ostsee, October 2009, p. 3

\(^{15}\) Neptunwerft, 13.07.2010

\(^{16}\) EEW Special Pipe Constructions GmbH, 13.07.2010

\(^{17}\) Mecklenburger Metallguss, 13.07.2010
sites in Mecklenburg-Vorpommern for maritime logistics are located mainly close to the ports and have a large space capacity already today. According to the maritime transport forecast for 2025\textsuperscript{18} prepared on behalf of the Federal Ministry of Transport, total goods handling in the four ports included in the study, Rostock, Sassnitz/Mukran, Stralsund and Wismar, will more than double from just under 30 million tons in 2004 to over 73 million tons by 2025. The assumption is that also the demand for handling oversize cargo will increase in this period.

The infrastructure of the ports will be adjusted to the growing cargo handling numbers as required. At the port of Rostock, for instance, the amounts handled will grow by 4.4 % annually. To accommodate this growth the state government is developing additional areas of 660 hectares in total in the vicinity of ports: 70 hectares for handling and storage areas, 160 hectares for the establishment of service, commercial and logistical enterprises and 430 hectares for the establishment of port-related industry.\textsuperscript{19}

Furthermore, Mecklenburg-Vorpommern has three commercial airports for freight traffic. The modern airports at Rostock-Laage, Parchim and Neubrandenburg still have free storage and handling capabilities. Apart from their function as logistics hubs they also offer sites for industrial development (e.g. for oversize transports) as large-scale industrial locations.\textsuperscript{20}

In Lithuania, main regional perspectives regarding oversize cargo are link with energy companies development: Ignalina nuclear power station, Orlen Lietuva oil refinery company renovation and improvement, Elektrenai electricity power station development and renovation, Kaunas power station construction, other energy companies development: big chemical plants renovation and development, such as Jonavos “Achema”, Kedainiu “Lifosa”, cement production company “Akmenes cementas” and other.

\textsuperscript{18} Seeverkehrsprognose 2025, April 2007
\textsuperscript{19} Mecklenburg-Vorpommern – der Logistikstandort an der Ostsee, October 2009, p. 5
\textsuperscript{20} ibid., p. 7
1.5 Transit market for oversize transport

Because the geography of the Scandinavian peninsula with all neighboring countries as coastal countries there are no main reasons for transiting oversize cargo by road or rail transport through Sweden. An exemption is the northern part of Norway. In some cases there are essential shorter road routes for Norway domestic transports via Sweden. For rail transports from the Narvik area to southern parts of Norway the only alternative is via Sweden. For International transports from Norway to eastbound countries road and rail transport via Sweden is usually the most effective transport.

Main corridors for transit road transports from Norway are shown in Figure 31.
Despite all fluctuations in the economy, all forecasts\textsuperscript{21,22} predict a growing amount of goods carried for the next decades in Germany. As a result of the increasing transport volume and the partly high haulage cost it is becoming more and more important to remove bottlenecks in the transportation systems. The regions of Skåne, the eastern German federal states, the Adriatic ports as well as numerous other regions in Central Europe therefore offer with their Baltic-Adriatic corridor an attractive alternative to other North-South connections.

The Baltic-Adriatic corridor will offer a modern, versatile, low-congestion infrastructure. Especially intermodal transport benefits from such an efficient supply chain. Apart from ferry and RoRo connections from the ports of Rostock and Sassnitz to Gedser and Trelleborg onward carriage is performed by freight trains for instance from Rostock to Verona and Basel.

Through cooperation in the Baltic-Adriatic corridor further logistical solutions and optimizations will be produced. The logistical offers are to become more efficient, lower in cost and more sustainable, the range of logistical services is to be extended.

In the years 2009 to 2012 the initiative is supported by the two EU projects SCANDRIA\textsuperscript{23} and SoNorA\textsuperscript{24}. Both projects are co-financed by the European Fund for Regional Development and focus on the development of the North-South transportation axes in Europe.\textsuperscript{25}

\begin{flushleft}
\textsuperscript{21} 2025 Forecast for Transport Interdependencies across Germany, 14.11.2007

\textsuperscript{22} Seeverkehrsprognose 2025, April 2007

\textsuperscript{23} Scandria Project, 13.07.2010

\textsuperscript{24} SoNorA Project, 13.07.2010
\end{flushleft}
Oversize transit market in Lithuania mainly link with Belarus productions (heavy mining equipment), planning nuclear electricity plant construction, Poland North–East part windmills construction and development plans, Latvia South part windmills construction plans and some factories in Daugaviplis, Jelgava, Liepaja and other places construction and development. Last years oversize transportation statistics presented on Figure 32.

Figure 32 Transit corridor Klaipeda – Medininkai (Belarus)

<table>
<thead>
<tr>
<th>Transit corridor</th>
<th>Permits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Klaipėda - Medininkai PKP</td>
<td>69</td>
</tr>
</tbody>
</table>

Source: Lithuania road transport inspection data
Figure 33 Transit corridor Klaipeda – Butinge (Latvia)

<table>
<thead>
<tr>
<th>Transit corridor</th>
<th>Permits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Klaipėda - Butinges PKP</td>
<td>172</td>
</tr>
</tbody>
</table>

Source: Lithuania road transport inspection data
Figure 34 Transit corridor Kalvarija (Poland) – Salociai (Latvia)

<table>
<thead>
<tr>
<th>Transit corridor</th>
<th>Permits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kalvarijos PKP - Salociu PKP</td>
<td>33</td>
</tr>
</tbody>
</table>

Source: Lithuania road transport inspection data
1.6 Examples of oversize transport

1.6.1 Transport of a windmill

It is estimated that 6-9% of the funds designed for investment in a wind turbine is spent for its transport and assembling. In some cases it is even up to 20% of the total investment costs. It should also be noted that, according to the German Wind Energy Institute, four of the five wind turbines produced in German in 2007, are exported to other countries. The wind turbines are being transported on more regular terms, than other oversize products, e.g. bridge elements, steel tanks, ships sections. Therefore, the importance of proper planning and executing the transport of wind turbines is crucial for that industry.

The below example shows the particulars of the wind power turbine of type Gamesa G90/100 power of 2.0 MW, transported from Spain to wind farm located in the city Margonin in Wielkopolska Region (Table 19).
Table 19 Description of wind turbine Gamesa G90/100 segments

<table>
<thead>
<tr>
<th>Lp.</th>
<th>Segments</th>
<th>Length [m]</th>
<th>Width [m]</th>
<th>Height [m]</th>
<th>Mass [t]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>fundament</td>
<td>4,44</td>
<td>4,44</td>
<td>3,20</td>
<td>16,00</td>
</tr>
<tr>
<td>2</td>
<td>section 1</td>
<td>15,60</td>
<td>4,10</td>
<td>3,90</td>
<td>65,00</td>
</tr>
<tr>
<td>3</td>
<td>section 2</td>
<td>17,00</td>
<td>3,90</td>
<td>3,90</td>
<td>65,00</td>
</tr>
<tr>
<td>4</td>
<td>section 3</td>
<td>17,00</td>
<td>3,90</td>
<td>3,50</td>
<td>58,00</td>
</tr>
<tr>
<td>5</td>
<td>section 4</td>
<td>23,90</td>
<td>3,50</td>
<td>2,80</td>
<td>56,00</td>
</tr>
<tr>
<td>6</td>
<td>section 5</td>
<td>24,40</td>
<td>2,80</td>
<td>2,80</td>
<td>52,00</td>
</tr>
<tr>
<td>7</td>
<td>gondola</td>
<td>10,10</td>
<td>3,30</td>
<td>4,35</td>
<td>75,00</td>
</tr>
<tr>
<td>8</td>
<td>hub</td>
<td>3,30</td>
<td>3,30</td>
<td>3,46</td>
<td>24,00</td>
</tr>
<tr>
<td>9</td>
<td>rotor blade</td>
<td>44,00</td>
<td>3,40</td>
<td>2,00</td>
<td>7,00</td>
</tr>
</tbody>
</table>

All of the elements listed in the table must be regarded as oversized cargo. The most convenient and most widespread technology of transport is by road. The transport of wind turbine segments is pre-planned weeks before the date of travel, and all possible variants are analysed. Very important step is to request permit for oversize transfer. In the case of wind turbine components such requests must be submitted at least a month earlier, even though the statutory time for obtaining permit is 2 weeks. The issued permit designated the route and pointed out several mandatory preparatory works, including dismantling road signs, trimming branches of trees, raising the telecommunications cable, road works and small repairs etc.

The survey of access routes to the wind farm shall be made, with detailed photographs and drawings for each crossing, railroad crossing or other points that could produce problems. Survey is made by the pilot company or a road carrier itself. In the case of the wind farm in Margonin, the route chosen by road carrier proved to be identical to the route designated by the road administration issuing the permit. Sometimes, the route designated in the permit, turns out to be impossible for oversize transport. In such a situation, the carrier has to designate an alternative route himself, i.e. prepare detailed description of a detour and submit it to the road administration. Usually, the new route is accepted. However, this prolongs the waiting time for permits, and thus the time of the investment.

Elements of the farm were transported to Margonin from the following places of departure:

- fundamentals from Schwerin in Germany,
- tower segments from Fürstenwalde in Germany or from Chrudim in Czech Republic,
- gondola, hub and rotor blades from Spain (maritime transport).
The designated from the town of Schwerin in Germany to Margonin will be presented as example. Vehicles traveling from Germany (two vehicles in the convoy - the greater the number of vehicles is, the less convenient it is, because of the need to be escorted by the Police) have crossed the border in Świecko, and then passed through the Road N°2 through Świebodzin and Nowy Tomyśl, where motorway A2 starts. Further, through Poznań and Oborniki to the Road N°11, and then by voivodeship roads through Podstolice, Radwanki to destination Margonin. Transfer through the route Świecko-Margonin lasted approximately 5 hours. A detailed itinerary is included in the permit for oversize transit (Figure 36 Map of the oversize transport route).

Throughout the route oversize vehicles follow pilots. Due to the better knowledge of roads, the pilot companies are usually employed in the country of passage and the overtaking of the oversize vehicles is at the state border. For drivers, the detailed guide, that contains description of access routes to the wind farm, is prepared.

After about two weeks after the end of the journey the road administration sends attachment to the permit by mail, which specifies the number of kilometres travelled on different roads during the oversize transit, and charges arising from this. In above mentioned example, the weight excess of 52.84 tonnes was charged a fee in the amount of 3.995,00 PLN.
Sweden is facing a substantial expansion in the use of wind power. The Swedish parliament has decided on a national planning framework for the expansion of wind power. The goal is to enable the production of 30 TWh of electricity per year by 2020, 20 TWh from wind power plants on land and 10 TWh from wind power plants at sea. In 2008, Sweden's 1 138 wind power plants produced about 2 TWh (an average of 1 750 MWh per plant). This corresponds to 1.4 per cent of the country's net electricity production.

A further 3 000 to 3 500 new wind power plants will be needed on land in order to comply with the framework decided by parliament if the average effect of each is taken as about 2.3 MW (assumed production 5 300 MWh per year). The planning framework is, however, not a strict expansion goal. A realistic assessment puts the figure at 15-20 TWh of electricity produced by wind power by 2020.

Construction of a wind power mill is usually made by pre manufactured modules of big size and some elements are not divisible e.g. the propeller blades. Due to this an ordinary wind power mill need about 10 -30 oversized transports depending on if the tower is produced by steel or concrete. In addition to this there will be need of transports of electrical transformers and heavy cranes. See Figure 37 - Figure 39.
Figure 40 Dimension of an ordinary wind power mill
Expansion in line with the planning framework will entail some 3 300 vehicles with dispensation per year, which is to say nine per day up to and including 2020 if the towers are in steel. If they are concrete elements some 30 vehicles per day with dispensation will be called for up to and including 2020. It is estimated that about half as many exempted vehicle columns would be called for. Transportation is normally arranged in columns, each consisting of two or three exempt vehicles.

Since the permit issues is raising and the Sweden’s energy sector development strategy is indicating that there will be numbers of oversize cargo growing it is necessary to take the actions for improving transportation efficiency ensuring safe transportation.

For support to administrate all coming oversize transports a handbook is presented by the former Road Administration. The handbook includes an overview over conditions for oversized transports and advises and recommendations for this type of transports. Analysis of a transport case from Denmark to the middle of Sweden is also presented. Three different logistic solutions are evaluated. The result of this study is a strong recommendation to seek for a logistic solution based on most possible sea transport.

### 1.6.2 The mega truck trials by heavy and/or long vehicle

There is an increasing demand for mega truck trials in Sweden. At present two trials is on-going:

1. Timber transports in the north (one pile more). Length and total weight are exceeded.
2. Timber transports in the south/west. Total weight is exceeded.

Five cases are proposed as trials and are in a preparation process:

1. Heavy vehicle for steel transports
2. Long vehicle for bulky goods (Mexi cube)
3. Duo trailer
4 and 5. Heavy vehicle for paper bale
The current legislation does not permit exemption for divisible goods. The only possibility to get permission for a trial project with oversized transports of divisible goods is if there are innovation contents in the project which will be evaluated. Permissions can only be approved for a certain period and for certain routes. For permanent permissions the legislation must be changed.

The vehicle type used in the running projects in the north, the Ett project, is shown in Figure 42.

![Figure 42 The vehicles used in the running projects in the north, the Ett project](image)

The total length of the vehicle train is 29.4 meter and the gross weight is at the maximum 90 ton. The main benefit by using this vehicle train is less number of transports. Two new vehicle train transports replace three by using ordinary vehicles. A consequence of this is less energy consumption and less emission of greenhouse gas and also better cost-effectiveness.

For the timber transport trial in south west the vehicles have an increased number of axles from ordinary seven up to nine and the total weight is at maximum 74 ton. The maximum axles load, bogie load and triple axles load does not exceed the limit.

In the centre of Mecklenburg-Vorpommern the market leader for metal ship propeller constructions is located. The company MMG (Mecklenburger Metallguss) builds round 180 propeller each year and has a market share of around 25 %, with large propellers with a weight over 80 tons even 60 % and with more than 100 tons over 93 %. Since the reunion of the German State and the development of the ship construction in Mecklenburg-Vorpommern also the capacities of MMG were continuously enlarged. The company can know melt up to 200 tons of metal and build a propeller with a diameter of 10 meters and more.

Due to the disadvantageous location of MMG the transport of the heavy ship propellers is difficult. They need to be transported to the port of Rostock or to the port of Hamburg in order to be shipped further or set in directly in the new ships on shipbuilding sites. The ship propellers are transported via the B 192 to the motorway A 19 and further in direction to the port of Rostock or on the A 24 in direction to Hamburg or Berlin. The regional location of MMG can be seen in Figure 43.
Until 2006, the B 192 was a parkway lined with large trees and had a width of only 8.5 meters. Since the propellers become wider than this MMG designed a new construction to be able to shift the propeller. Today the trees are cut over and are no longer a barrier for the transport. However, the increasing weight of the propellers might become a problem since the B 192 as well as the motorways have some bridges which might not be able to cope with such weights.

### 1.7 Evaluation of bottlenecks

Bottlenecks are very individual and vary between different regions and different transport means. They can be of legal, technical and organizational/political nature. The following paragraphs describe some typical bottlenecks which were discovered by analyzing the previous examples and their possible solution.

#### 1.7.1 Technical

Basic technical limitations are associated with buildings and objects along the route and with bad condition of roads. The restrictions are including the following:

- bridges and flyovers limiting allowable pressure on axle/axles,
- too low and narrow bridges,
- too small width of the road,
• roundabout with too small turning radius, that unable to travel straight ahead,
• the poor state of roads, even not correspond to the values of the design for the road category (up to 11.5 tons per drive axle at national roads, 10 tons per drive axle for regional roads and 8 tons for other public roads),
• sharp turn in forests,
• stable objects in the urban area, such as lamps, road signs, advertising,
• electric traction, traction over the street,
• traction, electrical, telephone nets placed over the carriageway,
• carried out repairs of roads etc.

In accordance with the provisions, the road oversize transport may be safely performed if the road conditions allow such transport. This mean, transport will not endanger the construction of bridge, viaducts and other buildings located near the route, does not undermine the road, nor threaten its security.

In many cases, when planning a safe route of oversize cargo, tests should be made for resistance of buildings located along the route. Sometimes, tests confirming the maximum permissible load of the road are needed. If necessary, removal or upheaving power/telecommunication/traction lines should be arranged, road signs and others obstructions should be dismantled, roundabouts threatening the safety of transport should be disassembled. Currently there is no fast accessible information about the up-to-date technical parameters of roads, including bridges, flyovers, roundabouts etc. As a result, the unplanned prolongation and delay of the oversize transport operations is very often.

Very important issue is the need to take into account the oversize transport when designing, building and approving the road infrastructure. Especially road facilities, such as bridges, roundabouts, intersections, islands, signs, etc. On main roads roundabouts should be constructed in such a way, that makes possible to drive straight ahead, e.g. after opening a road barrier using a smart card. Following the example of Denmark, each opening of the roundabout could result in a fee (the amount of a specific issue to discuss). Use of the card would also leave trace on monitoring system, so that in case of any damage of labelling or other elements of the road, it would be much easier to find guilty oversize vehicle. The indicated company will cover the costs of the damage with the help of carrier’s obligatory insurance. Another problem is the vertical road signs, which should be placed on the road in the way to avoid disassembling and re-assembly during transport of oversize cargo, as it is in some Western Europe countries. Moreover, the arms of hanging signs should be swinging to avoid disassembling and then assembling them for the passage of the oversize vehicle.

In rail transport limitations are mainly related to the following factors:

• the loading gauge,
• construction gauge,
• pressure on one meter of the rail,
• the value of truck curves and side inclination of the tracks,
• permissible load of bridges and overpasses,
• dimensions of the tunnels and other infrastructure facilities,
• permissible transport speed.
Such elements as semaphores, signs, switches, towers, kiosks of the railway watchmen, train stations and platforms, the distance between platforms etc., should be also taken into consideration.

One of the technical obstacles of transport is the height of traction network wires. The standard suspension height is 5600 mm. Table below shows the examples of height deviations from the standard value in the West Pomeranian District (Table 20 Examples of traction wires reductions.

<table>
<thead>
<tr>
<th>No.</th>
<th>Route or station</th>
<th>lines km</th>
<th>Height of reduction at place</th>
<th>Kind of object resulting in a reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Białogard - Czarnowęsy Pomorskie</td>
<td>224,818</td>
<td>4900</td>
<td>rail viaduct</td>
</tr>
<tr>
<td>2.</td>
<td>Station Krzyż</td>
<td>238,342</td>
<td>5140</td>
<td>road viaduct</td>
</tr>
<tr>
<td>3.</td>
<td>Station Krzyż</td>
<td>238,260</td>
<td>5100</td>
<td>nearby road viaduct</td>
</tr>
<tr>
<td>4.</td>
<td>Station Kostrzyn</td>
<td>255,550</td>
<td>4990</td>
<td>road viaduct*</td>
</tr>
<tr>
<td>5.</td>
<td>Station Szczecin Wzgórze Hetm.</td>
<td>2,092</td>
<td>4960</td>
<td>road viaduct at Milczańska Street</td>
</tr>
<tr>
<td>6.</td>
<td>Station Szczecin Wzgórze Hetm.</td>
<td>1,750</td>
<td>5170</td>
<td>pedestrian bridge</td>
</tr>
<tr>
<td>7.</td>
<td>Szczecin Port Centr. SPB</td>
<td>2,500</td>
<td>5050</td>
<td>rail viaduct by SPB 14</td>
</tr>
</tbody>
</table>

The following restrictions are specified in local law that is issued by the Inland Navigation Office in Szczecin. Limitations are related to the dimensions of the navigable routes, locks and clearance under bridges, pipelines and other devices crossing the waterway, the width of the bridges and the depth of the shipping route.

In the administration ordinances are given such particulars as the dimensions of vessels and towing trains permitted to navigate on specific sections of waterways.
The following hindrances are observed in oversize air transport:

- volume and capacity of freight plane,
- airport's ability to take the plane (the length of runway),
- the possibility of transporting oversize cargo to the nearest airport fulfilling technical conditions,

The below mentioned weight restrictions refer to the airplanes Antonov:

- Antonov An-124 - 171 tons
- Antonov-225 Mriya "Cossack" - 250 tons
- Airbus A300-608ST - 47 tons.

1.7.2 Organizational

Bottlenecks of organizational nature are regulations from the government which constrain the oversize transport cross-border difficulties due to customs regulations or different permission procedures and requirements.

For the region Mecklenburg-Vorpommern which is mainly a transit market for oversize cargo the different national application and requirement standards are a big constrain. Transport operators who e.g. would like to transport a good from Scandinavia to Italy need a new permission for every country the route passes through. It is not possible to gain only one permission which allows the oversize
transport from the starting point to the final destination. This procedure causes a lot of bureaucracy and a loss of time and money for the transport operator but also for the industry, the customer.

Another organizational bottleneck is the limited usage of motorways for oversize transports. Of course an oversize transport would cause huge congestions on the motorways, negative both for the transport of other cargo and public transport, but it means for the oversize transport operator and the customer that they can only work during night times. This can lead to delays in the deliveries, higher safety requirements and higher personal costs.

The following inadequacies apply for the Polish oversize road transport:

Recently we observe some practices of illegal or unofficial oversize traffic, especially to/from the ports or directly abroad. In such cases, when the oversize transport is not reported and no evidence of such is registered, the carriers avoid the charges for the operation.

Lack of the perception and awareness among road managers of the importance of the oversize transport for the local and national economy.

In every from 16 divisions of GDDKiA responsible for issuing permits and agreeing the route is only one person.

The Code of Administrative Procedures applies to the process of issuing permits and the persons who are doing all paperwork are government employee. Following strict procedures takes time and prolongs all the process.

Numerous GDDKiA divisions have different application forms.

Lack of updated maps with gauges and pressures for all national and provincial roads in Poland.

There is always high anxiety on the positive settlement of the applications for permits. There is formal and informal pressing by the local governments for whom the supply of the oversize cargo is frequently associated with the investments, and labour market boom. There is also anxiety of the carriers and shippers, who have already signed a contract of carriage, and must fulfil the terms.

The lobby of the truckers is very influential. Organizations such as ZMPD (Association of International Road Carriers - Zrzeszenie Międzynarodowych Przewoźników Drogowych) and OZPTD (National Road Transport Employers’ Association- Ogólnopolski Związek Pracodawców Transportu Drogowego) have a very strong influence on politicians and on the execution of the law. They provide a large amount of voters.

1.7.3 Legal

Legal bottlenecks arise through constraints by law either for the industry, the transport service provider or the public.

As for all oversize transports the main barrier for the transport operator is to get the permission for the oversize transport and the applied route. The application for the permission must be handed in at the responsible authority. This is proved and checked by the authority and can be permitted then. This
procedure can take up to two to three weeks which might require a good planning beforehand by the transport operator. A solution for this bottleneck was the implementation of the online one-stop-shop VEMAGS in Germany. Furthermore the transport operators have the possibility to gain permanent permissions which allow oversize transports for a certain period on certain routes without any further applications.

In Poland, the following barriers and hindrances could be observed:

The interpretational differences of existing provisions between the managers issuing road permits. The most common discrepancies concern excess of the permissible axle loads. There is no regulation in this respect and there are different practices for issuing licenses, e.g. the Szczecin Division of GDDKiA accepts axle load exceeded by 2 tonnes. There is theoretical possibility that the carrier, after receiving refusal issued by one division of GDDKiA, will obtain it in another division.

The legal changes are necessary to enforce the highway concessionaire to accept the oversize vehicles on his road. Actually the highway operators could refuse the oversize vehicles on his road.

There are no legal ways for enforcing forwarder and cargo operator to prefer rail or inland waterway as the medium of oversize transport instead of the road.

The lack of Polish regulations of precise requirements on cargo securing. The Law on Road Traffic defines cargo securing in general terms and it is difficult to prove that the cargo is not properly fitted.

The price list for the permit to carry oversized cargo is not published and the applicant does not know how much to pay before he applies.

Existing regulations specify the permissible parameters: length, width, height limit of vehicles and permissible axle load, but there is no practical control for the turning radius of vehicles.

Lack of licensing requirements (completed training, experience, insurance) for companies involved in the piloting.
2 Theoretical basis for the South Baltic oversize transport strategy

2.1 Oversize market forecast methods

For the oversize transport corridors investigations, Oilier method can be used which allows checking passenger or cargo flows at important fixed points and subsequently finding out requested parameters [4]. As such main fixed points can be taken ports on one side of the sea. For more detailed investigations multi criteria investigation methods can be applied [1, 6].

According to Oilier method, in fixed points quantities are checked by field formulas that can be shown as below [4]:

\[ Q_1 = q_1(x, y, z, t), \]
\[ Q_2 = q_2(x, y, z, t), \]
\[ Q_3 = q_3(x, y, z, t). \]

here: \( Q_1, Q_2, Q_3 \) - investigated quantities in concrete fixed point on concrete directions; \( q_1, q_2, q_3 \) - commodities in fixed points; \( x, y, z \) - fixed point coordinates; \( t \) - time.

Based on this method it is possible to find the investigated cargo flow parameters for the actual directions or concrete transport corridors. In order to check the development perspectives of the transport market for the forecast horizon, a forecast method based on the specific elasticity (multi criteria) method for each commodity groups can be used [1].

The basic elements for the multi criteria forecasts for oversize cargo are these [5]: GDP forecasts for the countries concerned; European export and import forecasts (values at constant prices) for the relevant countries; calculation of import and export for the different commodity groups for each country; projection of trade flows based on that calculated for all commodities and all countries (volumes), differentiated for exports and imports; technical possibilities on selected directions; geographical, hydro meteorological and other conditions on concrete directions.

Based on the existing cargo flow and dynamic of the development of different merchandise, especially those of importance to the oversize cargo transport corridors, it is possible to note tendencies and forecast regions which could be developed.

Run time of ships sailing between ports is very important for the sea transportation in order to maintain proper compatibility with other transport corridors, like for instance in the Baltic region - with inland transport corridors via Poland. Full constant (liner) ship voyage time can be calculated as follows [4]:

\[ T = 2 \cdot T_r + T_{rec}, \]
here: $T_s$ - ship’s time for sailing and port operations, between leaving one quay wall to other quay wall; 
$T_{re}t$ - reserve time that depends on the distance between ports.

Ship’s sailing and port operations times can be calculated as follows:

$$ T_s = \frac{S}{v} + T_p + T_l, \quad (5) $$

here: $S$ - distance between the ports; $v$ - average sailing speed in-between the ports; $T_p$ - time necessary for sailing within port and port formality arrangement; $T_l$ - time necessary for discharge and loading.

Time factor is very important for the transportation regarding possibilities to operate optimal timetable based on week schedule with minimum number of ships, especially on first stage.

Safety factors in transportation compared to other transport corridors play very important role because oversize cargo units are usually carried as expensive goods. Safety factor in transportation can be calculated as follows [7]:

$$ P = \frac{1}{\eta}((1-Q)(1-Q^2)(1-Q^3)(...)) \quad , \quad (6) $$

here: $P$ - positive probability; $Q$ - opposite probability; $\eta$ - correlation coefficient.

Safety is calculated as a positive probability.

For the comparison between transport corridors as well as between oversize transport corridors a complex evaluation method can be used that can be calculated for the concrete oversize transport direction as follows:

$$ E = \frac{1}{\eta_k} \sum (k_i \cdot M_j) \quad , \quad (7) $$

here: $M_j$ - factors like costs, time of delivery, safety, environmental impact, navigational conditions, ice conditions etc; $k_i$ - weight of the factors to depend on the type of cargo, transportation possibilities etc that can be found on the basis of multi criteria analysis; $\eta_k$ - correlation coefficient that depends on number of factors used in evaluations.

On the basis of methodologies presented in this report it is possible to make evaluation of the concrete oversize transport corridor together with other parts of the whole transport corridor and find the difference between transport corridors as follows:

$$ \Delta = \frac{E_i}{E_0} \quad , \quad (8) $$
here: $E_i$ - investigated transport corridor; $E_0$ - basic transport corridor, to be taken as standard.

On the complex evaluation basis, it is possible to establish more accurately all the advantages and disadvantages that would enable to take final decision and provide correct explanations for investors and other market players on an existing concrete transport corridor as well as oversize transport corridors potential possibilities.

For the transport corridors evaluation is taken Gauss distribution and there are three the main factors: costs of the transportation, time of the delivery and cargo safety.

In case of Gauss distribution [1, 2, 3], the main factors’ dependences can be expressed as follows:

\[
\begin{align*}
\sum P &= \lim_{i \to n} \text{opt } \sum_{i \in n} P \\
\sum T &= \lim_{i \to n} \text{min } \sum_{i \in n} T \\
\sum S &= \lim_{i \to n} \text{max } \sum_{i \in n} S
\end{align*}
\]

Where: $P, T, S$ - main factors (cost, time, safety);

\[p_i, t_i, s_i\] - costs, time and safety in separate transport corridor elements $n$.

Unified evaluation on basis dependences (1) – (3) can be expressed as follow [4, 7]:

\[
G = k_p \sum P + k_t \sum T + k_s \sum S
\]

Where: $k_p, k_t, k_s$ - main factors weight coefficients.

Weight coefficients depend of the type of cargo (goods) and can be calculated as matrices (in case, if enough data) or can be found on basis of experts’ evaluation. For the typical inter modal cargo [6, 7] cost factor weight coefficient could be 0.30 – 0.45, time factor weight coefficient could be 0.20 – 0.30, safety factor weight coefficient could be 0.10 – 0.20. In any cases sum of the weight coefficients must be equal to 1.

### 2.2 Corridor and network preparation methods

Oversize transport corridors and network could be prepared just as possible (corridors) or on competition basis in case network situation. In case of just possible corridors takes in account mainly technical possibilities and just for the some sections could be used economical evaluation methods. For the possible different corridors or different sections of corridors evaluation could be used adopted to methodology presented in paragraph 2.1.
2.3 Possible links

Oversize transport corridors links mainly oriented on transport means changes places, such as ports, railways stations, terminals and sometime logistic centers. Main links for oversize cargo are ports, in which oversize cargo are load or unload from ships or on ships to road, rail or inland waterways transport units.

Ports evaluation regarding oversize cargo should take in account ports quay walls payloads, axes the port terminals and possibilities maneuvering deferent type of ships and floating cranes for the lifting oversize cargo and especially very heavy cargoes.

In the case of Mecklenburg-Vorpommern there are two corridors: North-South and West-East. To complete the picture also the inland logistic centers for oversize transports, inland ports in Germany, are introduced even though they do not play a very important role in the region of Mecklenburg-Vorpommern but for oversize transports.

Ports

Mecklenburg-Vorpommern provides the shortest and fastest routes between Scandinavia, Russia and the Baltic states and central and southern European economic centers all the way to the Mediterranean and the Adriatic. The growing transport volumes by road, rail and across the Baltic Sea are a challenge for the entire port and logistics industry. Mecklenburg-Vorpommern will benefit from this dynamic growth market to a considerable degree. The Baltic Sea is not a separating element but rather an outstanding connecting link.

The ports are an efficient transport interface of national and international transport chains and an attractive location for shipping companies, port-related industries and commercial enterprises. As Europe grows together, the ports in Mecklenburg-Vorpommern meet the challenge of growing cargo figures, also for oversize cargo. From 2004 to 2007, the total cargo handling in these ports increased from around 34 million tons to around 40 million tons. Until 2025, the tonnage at just the four ports of Rostock, Sassnitz/Mukran, Stralsund and Wismar will almost double, reaching 73 million tons.²⁶

Rostock port

Very well developed interior traffic connections ensure uncomplicated road and rail transport. The Rostock port is connected with the German motorway network; the North-south motorway A 19 and west-east motorway A 20 provide a direct access to the port.

There are currently trains from and to the South and West of Europe, cleared weekly at the combined cargo terminal. The ferry and RoRo-lines of the Rostock seaport provide rapid connections in the Baltic Sea Region.

With these facilities, Rostock has everything it needs to continue developing its solid position as a ferry hub for the Baltic Sea and logistics centre for the region Mecklenburg-Vorpommern. Therefore it is

²⁶ Häfen in Mecklenburg-Vorpommern, August 2008, p. 5
assumed that Rostock is also the most important link to the Baltic States and Scandinavia for maritime oversize transports.

Due to the worldwide financial crises the greatest decrease in 2009 was recorded in the general cargo segment, down 35 % to 411,000 tons compared to the figures of 2008. In contrast, increases were exhibited in the handling of oversize cargo, namely large pipes, cranes, and wind energy generators, primarily driven by local production. The pier for general and oversize cargo handling has cranes with a loading capacity of up to 100 tons. In total, the Rostock seaport has 600,000 m² open storage as well as 120,000 m² covered storage available for general cargo goods. 

\[ \text{Figure 45 Road Connections Rostock Port} \]

\[ \text{Rostock Port, 10.05.2010} \]
Ferry Port Sassnitz / Mukran

The Port of Sassnitz is situated on the eastern side of the Isle of Ruegen and is thus the easternmost deep-water port in Germany. This geographical position provides the shortest sea connection from Germany to Sweden, Denmark/Bornholm, Finland, Russia and the Baltic States. However, since Sassnitz is located at the Island of Ruegen the hinterland connection is limited. So all transport flows need to pass the Ruegen bridge combining the continent and the island.

Due to its optimal and spacious track installation the Port of Sassnitz has become a specialist port for combined rail ferry traffic. As the only port location of Western Europe the Port of Sassnitz has track and transshipment facilities for rail cars of the Russian broad gauge and is also well-known as "the westernmost cargo station of the Trans-Siberian railway".

These facts lead to the assumption that the ferry port Sassnitz has the potential to become the logistics center for rail transports also in the oversize transport segment.

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28 Rostock Port, 10.05.2010
Table 21 Distances offshore and ashore of Ferry port Sassnitz

<table>
<thead>
<tr>
<th>offshore</th>
<th>ashore</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trelleborg</td>
<td>Berlin</td>
</tr>
<tr>
<td>Rønne</td>
<td>Hamburg</td>
</tr>
<tr>
<td>Køge</td>
<td>Bremen</td>
</tr>
<tr>
<td>Oulu</td>
<td>Antwerp</td>
</tr>
<tr>
<td>Turku</td>
<td>Frankfurt/Main</td>
</tr>
<tr>
<td>Hamina</td>
<td>Dresden</td>
</tr>
<tr>
<td>Helsinky</td>
<td>Prague</td>
</tr>
<tr>
<td>Baltijisk</td>
<td>Vienna</td>
</tr>
<tr>
<td>St. Petersburg</td>
<td>Munich</td>
</tr>
<tr>
<td>Tallinn</td>
<td>Budapest</td>
</tr>
<tr>
<td>Riga</td>
<td>Milan</td>
</tr>
<tr>
<td>Klaipeda</td>
<td></td>
</tr>
<tr>
<td>Kaliningrad</td>
<td></td>
</tr>
</tbody>
</table>

29 Ferry port Sassnitz, 10.05.2010
Inland ports

The transportation on inland waterways is the most reliable and safe transport possibility for oversize cargo. Unfortunately, there are no inland ports in the region Mecklenburg-Vorpommern. The nearest connection to an inland port is in Hamburg or the region Berlin/Brandenburg. However, since the inland ports in Germany play an important role in the transport chain of oversize cargo in whole Europe, some of them are described here and the logistical position is explained.

In Germany there are more than 60 inland ports, most of them have also the possibility to load and unload oversize cargo. Figure 48 shows the most important waterways in Germany and the location of two examples for inland ports. The other inland ports of Germany are located almost all along these waterways.

![Figure 48 Inland waterways in Germany](image)

Mannheim

The inland port of Mannheim is combined with Ludwigshafen and is in numbers the biggest in Europe. The port is well located on the rivers Rhein and Neckar with the connection to the ARA ports (Amsterdam, Rotterdam and Antwerp). Next to the bulk, general and combined cargo the port of Mannheim handles also oversize cargo. It is planned that this port becomes the logistical centre in South

---

30 Elektronisches Wasserstraßen-Informationssystem, 06.07.2010
Germany for oversize cargo. This cargo should be bundled here and transported to the large ports in the North or to ports on the Black Sea in the Southeast of Europe. Recently, a new terminal for oversize cargo with crane capacities of 400 tons was opened\textsuperscript{31}. This terminal allows further reductions in transport times and costs for transport operators.

**Duisport**

The port of Duisburg is located in the West of Germany on the river Rhein and Ruhr. There are four container terminals, five terminals for bulk cargo and two RoRo-terminals. Additionally they opened the new Heavy Lift Terminal Duisburg (HLTD) in 2010 which can handle oversize cargo with capacities of up to 500 tons. This terminal is operated by the same transport operator as the oversize terminal in Mannheim and therefore the transport routes to the northern European ports and the ports in the Southeast are connected to Duisport\textsuperscript{32}. The connections to the other transport means motorways and railways are excellent and allow the oversize transport to and from the port. Duisport is the northernmost logistics centre for inland waterway transportation in Germany.

### 2.3.2 Logistic centers

A logistic center is defined as “a centre in a defined area within which all activities relating to transport, logistics and the distribution of goods-both for national and international transit, are carried out by various operators on a commercial basis”\textsuperscript{33}. For the region Mecklenburg-Vorpommern it means that the ports on the shore of the Baltic Sea are the logistic centers. They function as intermodal hubs and logistic platforms in the international transit market. Especially for oversize cargo it is necessary to have the equipment and location to handle abnormal goods which is not given in any other freight village in Mecklenburg-Vorpommern. The ports and their transportation possibilities for oversize cargo are the most important strategic locations on the oversize transport chain in this region.

**Location of Lithuanian oversize terminal**

Heavy lifts handling experience in Klaipeda Seaport:

- 93,5 t weight reactor at KLASCO terminal;
- 100 t weight, 45 m length gas turbine at Klaipedos Smelte terminal. Possibilities up to - - 180 t weight, and 50 m length (working with to heavy lift cranes);
- 534 t weight reactor, length 34 m at Malku Ilankos Terminalas;
- 3000 t construction from quay to barge at Vakarų krova terminal.

\textsuperscript{31} Schwer gutlager Mannheim, 06.07.2010
\textsuperscript{32} Duisport, Ein Magazin der Duisburger Hafen AG, 01/2010, p. 20
\textsuperscript{33} Bentzen et al., Best Practice Handbook for Logistics Centres, 2003, p. 18
So there are two possibilities of heavy lifts transportation from Klaipeda Seaport – mostly from southern part (Malku Ilankos Terminalas, Vakarų krova terminal, Klaipedos Smelte terminal) and northern part (KLASCO terminal). So heavy lifts classes up to 250 t and up to 500 t might be handled with existing facilities. However quays should be reinforced in order to handle heavy lift classes up to 750 t, and 1000 t. Besides reconstruction of Silutes av. Baltijos av. junction and Jaku junction might block oversize cargo transportation from southern part. Technological pipelines of Klaipedos Nafta terminal affect transportation of oversize from KLASCO terminal.

Thus new quay suitable for oversize operation should be analyzed.

Territory near northern breakwater might be suitable for this purpose. First of all this port area is not used at the moment. Secondly it might be connected to Giruliav. without obstacles. Then via Karkle oversize cargo might be transported to Palanga direction.

**Terminal parameters**

Basic for the selection of the terminal parameters are terminal functions and prototype vessels. For reliable oversize operation two alternative routes are necessary. In case of Klaipeda - Seaport by road and inland waterway. Road rout might be closed due to repair or reconstruction. Inland waterway might be closed due to ice in the winter or shallow waters in the summer.

Thus oversize terminal should:

- accept vessels with oversize cargo;
- discharge oversize cargo by means of vessels heavy lift derricks or by heavy lift ring crane or mobile crane;
- store oversize cargo upon arrival of bare or trailer;
- load oversize cargo on barge or trailer.

Due to proximity of navigation canal and limited water are floating crane option was not analyzed.

Heavy lift vessel with lifting capacity 1000 t is taken as prototype.
MV JUMBO CHALLENGER (1000 ton lift capacity)

- Length 110,02 m
- Beam 19.45 m
- Draft 7.29 m
- Cargo gear 2 derricks 500 t each/ 1000 t combi.

As 1.5 m clearance is defined in Klaipeda Seaport so 8.8 m depth should be at the quay.

Layout of the terminal taking into account technical features of the equipment:

- minimum turning outer radius of heavy lift RoRo platform 30 m;
- 24 m outreach of heavy lift ring crane (prototype Mammoet T30) for lifting capacity 1000 t.
However new terminal dedicated just for oversize cargoes might be economically unfeasible. Due to proximity of oil terminal Klaipedos Nafta terminal might be used as additional oil jetty. As it was established in Feasibility Study of Quay No 0 (Klaipeda University, 2004) vessels up to 35000 dwt and 10.5 m draft might be accommodated in this port area.

Characteristics of 35000 dwt tanker:

- Length 185 m
- Beam 27.5 m
- Draft 10.5 m

Characteristics of 35000 dwt tanker:

- Length 185 m
- Beam 27.5 m
- Draft 10.5 m

![Figure 52 Layout of combined terminal (oversize cargo terminal and oil jetty)](image_url)

**Terminal price estimation**

In the 2008 average construction cost of 1 m of 12 m depth quay comprises 35 thousand EUR. Construction of bank reinforcement is twice cheaper. Beside dramatic decrease of construction prices has been observed in 2009-2010. Thus approximate terminal construction price including minimum dredging might be 5 – 6 mio EUR.
3 Forecast of oversize transport flows

There are no official statistics on oversize transport in Poland. The only background for forecasting gives available data on issued permits. There are two possible sources of data: General Directorate for National Roads and Motorways and PKP Polish Railway Lines Company. Both institutions are responsible for issuing permits in road and rail oversize transport.

Generally speaking, in Polish circumstances any oversize transport forecasting must be regarded as a highly imperfect, due to the large unregistered road market. Experts assume that from 10% up to 30% of all oversize transport operations are carried out without the required permits. The short transports, up to 100 km, which do not require the use of national roads and motorways, are very often illegal. The most difficult for unregistered market operators are international transports, which are almost 100% legal.

In road transport data shows ever sustained increase in the number of permits issued, on average, more than 10% yearly in 2001-2009. Therefore, the forecast shows future increase in permits number up to 2015. The registered road market will grow up over 40% compared to the best so far 2008 year (Figure 53).

In rail transport data available data concerning short period 2007-2009 shows dynamic growth of the permits issued, above 30% yearly. This number is the more significant that there was a significant decline in overall rail freight transport in that period. The forecast up to 2011 implies a high increase in oversize rail traffic (Figure 54).
<table>
<thead>
<tr>
<th>Year</th>
<th>Number of permits</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>12468</td>
</tr>
<tr>
<td>2002</td>
<td>18977</td>
</tr>
<tr>
<td>2003</td>
<td>22952</td>
</tr>
<tr>
<td>2004</td>
<td>21007</td>
</tr>
<tr>
<td>2005</td>
<td>19964</td>
</tr>
<tr>
<td>2006</td>
<td>22211</td>
</tr>
<tr>
<td>2007</td>
<td>23400</td>
</tr>
<tr>
<td>2008</td>
<td>30721</td>
</tr>
<tr>
<td>2009</td>
<td>24164</td>
</tr>
<tr>
<td>2010</td>
<td>progn.: 30111</td>
</tr>
<tr>
<td>2011</td>
<td>progn.: 32288</td>
</tr>
<tr>
<td>2012</td>
<td>progn.: 34622</td>
</tr>
<tr>
<td>2013</td>
<td>progn.: 37125</td>
</tr>
<tr>
<td>2014</td>
<td>progn.: 39809</td>
</tr>
<tr>
<td>2015</td>
<td>progn.: 42687</td>
</tr>
</tbody>
</table>
Main oversize cargo users are very important for the selection oversize transport corridors. Main users in Lithuania can be named as:

- energy industry (electrical power stations such as Visaginas nuclear power station, Elektrenai electrical power station, Vilnius power station, Kaunas power station etc.);
- chemical industry such as Kedainiu “Lifosa”, Jonavos “Achemia” etc;
- other industry such as “Akmenes cementas”, Marijampole plants, Alytus plants, etc.;
- Other industry.
Main oversize cargo users could be constant or temporary; temporary means industry plants, which request oversize cargo during renovation or repairing period and in other temporary situations.

Constant oversize cargo users mainly link with production processes that mean products of the concrete company. Over size goods in Lithuania product some Alytus, Kaunas and Klaipeda companies, but users located in North port of Lithuania or outside of the Lithuania (Poland, Belarus, Latvia) and in this cases it is necessary transporting over size cargo via Lithuania.

According Lithuania companies information regarding over size cargo, which has received in companies or from companies information sources, it is possible spread companies as, follows:

- Elektrenai electrical power station planning over size cargo transportation with weight up to 300 t for period 2010 – 2013 (reconstructions);
- Kedainiai “Lifosa” periodical transportation, weight up to 250 tons (reconstruction);
- Jonavos “Achema” periodical transportation, weight up to 250 tons (reconstructions);
- Akmenes “Cementas” should be renovate plant and over size cargo flow could be in period 2011 – 2014, weight up to 250 – 350 tons (renovations);
- Some other places, as example windmills electricity power stations in West part of the Lithuania.

In same time it is necessary take in account big cities, to which times at time it is necessary delivery over size cargo. As example, Lithuania is divided in zones, which are or could be over size cargo users (possible Windmill construction places and main cities and other users).
Figure 55 Possible Windmills construction places
3.1 Transit directions

Oversize cargo corridors are important not just for the local (Lithuania) users but for the transit as well. More important country regarding oversize transit cargo is Belarus, North port of Poland and South port of Latvia.

Belarus is very important, because this Country planning build nuclear power station, renovate chemical and industry companies, and develop new plants like cement, in different ports of the Country. Part of the planning works is located close to Lithuania border or has best access via Lithuania.

In same time Belarus produced a lot of oversize products, like big lorries, tractors, mechanizes for the mining industry. Oversize product Companies located in Minsk, Vitebsk, Grodno and Molodecno regions, from which are shortest ways to Klaipeda port.
North part of Poland is important for oversize cargo transportation via Lithuania, because for the oversize cargo, which has weight up to 200 tons, can be used motorway from Klaipeda to Kaunas and later could be used Via Baltica road up to Poland border.

South port of the Latvia is important for Lithuania oversize transportation, because Latvia cross three rivers: Venta, Lielupe, and Daugava and these three rivers are biggest bottleneck rich South part of Latvia such as industrial cities like Jelgava, Daugavpils and some other places. In same time Lithuania oversize transport corridors for heavy cargo (more than 200 tons) goes clause to Latvia border (oversize corridor to Mazeikiai and Visaginas).
3.2 Oversize transport network
Lithuania oversize transport network link all transport means: Maritime, Inland waterways, roads, railways. Combination of the network for cargo, which has size parameters: \( L = 16 \text{ m} \), \( B = 3.5 \text{ m} \), \( H = 4.5 \text{ m} \) and weight up to 100 tons.
Figure 59 Oversize transport network: $L = 16\, \text{m}$, $B = 3.5\, \text{m}$, $H = 4.5\, \text{m}$ and weight up to 100 tons
For size parameters $L = 24$ m, $B = 4.1$ m, $H = 4.5$ m and weight up to 100 and 200 tons presented on Figure 60.

Figure 60 Oversize transport network: $L = 24$ m, $B = 4.1$ m, $H = 4.5$ m and weight up to 200 tons
Oversize cargo transportation network with parameters: \( L = 43 \text{ m}, \ B = 5.0 \text{ m}, \ H = 5 \text{ m} \) and weight up to 100 tons and 200 tons are presented Figure 61.

Figure 61 Oversize transport network: \( L = 43 \text{ m}, \ B = 5.0 \text{ m}, \ H = 5.0 \text{ m} \) and weight up to 200 tons
4 Oversize transport map

4.1 Oversize transport clients
In order to be able to adjust the developed strategy of oversize transports to the demanding business sector this sector should be analyzed. Transport clients in Mecklenburg-Vorpommern are numerous since not only local manufactures use oversize transport in or from or to the region but also the transit market in Mecklenburg-Vorpommern is large. Two of the largest players in the oversize transport market are the wind power energy sector and the maritime industry.

Wind power energy in Mecklenburg-Vorpommern
The ministry for environment of Mecklenburg-Vorpommern expects a complete power supply through renewable energy sources until 2050. The region has excellent requirements for wind energy and up to 1,800 sun hours every year which is one of the highest numbers for German regions. This leads to the assumption that the demand for windmills will increase in the following decades.

However, not only the demand for windmill installations in Germany will increase but also in other regions of Europe (East Europe and Baltic States) which might be not regarded by the wind energy sector so far. This means Germany will become one of the most important locations for construction and export of windmills. To ensure the smooth transport chain, especially the East-West connections needs to be efficient.

The maritime industry in Mecklenburg-Vorpommern
The maritime industry, as an industry with a positive future and international focus, is an important structural characteristic of the economy and the economic backbone of the federal state of Mecklenburg-Vorpommern. The maritime shipping and port industry segments are significant drivers of maritime economic growth. The shipbuilding industry set a milestone in the maritime economic growth as the dominant core branch of the maritime economy. The shipyards in Mecklenburg-Vorpommern focused on specialized constructions and innovative solutions. Specialized shipbuilding is very technology intensive, has a high potential for development and, with its innovative strength, it can be globally successful.

The ports in the region with their connected logistics industry are important growth impulses and in addition to shipbuilding, shipping and port industries, the federal state is extremely competent in maritime technology sectors. Offshore technologies are considered to be sunrise industries where the close integration of research and production represents the driving force of their development. Companies manufacturing floating drilling, manufacturing, storage and loading systems are predicted to experience dynamic growth.

34 Bundesverband der Windenergie e.V.(2), 14.05.2010
35 MV Invest, 17.05.2010
Oversize transport clients are a very large group of companies, operators and state institutions. Locations of the departure and destination places in oversize transport are not so much the location of these entities. Transportation operations take place mostly between the place of production and investment location. Numerous examples of the locations of various industrial areas and locations of existing and future investments are presented in chapter “Regional perspective”. Figures below show the most important locations in terms of the South Baltic Oversize Strategy. The analysed area included the northern Poland, taking into account the transport corridor Berlin-Moscow. The presented locations include:

1) current and future locations of wind farms (Figure 62),
2) current and future locations of special economic zones and power plants (Figure 63),
3) current and future locations of main investments (Figure 64).
Figure 62 Wind intensity areas and windmills
Figure 63 Special economic zones and power plants
Figure 64 Main investments

- Powerplants
- Inland ports
- River shipyards
- Machinery production
- Gantry cranes
- Power transformers
- Refinery
- Ship’s engines
4.2 Oversize transport corridor

In Poland, for transporting oversize cargo generally available public infrastructure is used. Permits of oversize transport, in the first place, indicate such routes, which run the main transit routes, i.e. east-west and north-south corridors. In the case of road permits, are motorways, expressways and national roads. In the case of railway permits, the preferred routes are main railway lines indicated in AGC and AGTC agreements.

Intermodal oversize transport, taking advantage of more than two modes of transport is very rarely used. However the standard transhipment points are seaports, river ports and airports. Oversize cargo is transhipped between ship and trailer/wagon or very rarely between plane and trailer. Practically, there are no transhipments between wagon and trailer. In other words, any change of transport mode is enforced by
transport possibilities of origin-destination route and road transport acquires the vast majority of oversize cargo in the land transport directions. Rail transport is treated as less attractive alternative, which is used when road transport is impossible.

The South Baltic Oversize Strategy postulates greater use of sea transport, inland shipping and rail. Infrastructure of these modes of transport has been taken into account when creating the concept of oversize transport corridors. Hence, the corridors planning process began with the preparation of map of existing road, rail, and inland shipping infrastructure, including sea and river ports. The map reflects the future state of infrastructure, in 2020 perspective, which will be used for oversize transport (Figure 67).

The oversize corridors should be based on the existing corridors of the TEN-T network (Trans-European Transport Network). Unfortunately, in the analysed area of Poland, their run mainly in North-South direction. Therefore, oversize transit around the Baltic Sea have to use the Berlin-Moscow corridor, which is about 200-300 km from the coastline (Figure 68 and Figure 69). The South Baltic Oversize Strategy postulates increasing the number of rail and road connections to enable efficient oversize transport around the Baltic Sea, i.e. using Berlin-Szczecin-Koszalin-Słupsk-Gdańsk corridor. Very important are connections to sea and river ports, which are treated as main transhipment points. Map of oversize transport corridors shows alternative possibilities of origin-destination transport services based on usage of two or more modes of transport. The most important ports and railway nodes may play a role of oversize transport terminals (Figure 70 and Figure 71).

The oversize transport corridors for South Baltic Region are demonstrated in Figure 66.
Figure 67 Transport infrastructure
Figure 68 Road TEN-T corridors
Figure 69 Rail TEN-T corridors
Figure 70 Oversize transport corridors
The oversize transport corridors in Mecklenburg-Vorpommern can be divided along the main transport routes into the North-South corridor and the East-West corridor.

The North-South corridor lies on the axis of the Scandria (Scandinavia – Adria) corridor of the EU. Mecklenburg has a good infrastructure to serve this corridor. It is the motorway A 19/ A 24 from Berlin to Rostock and A 24/ A 14 from Berlin to Schwerin/Wismar, the railway between Berlin and Rostock which will be extended to a double track in the next years. Furthermore the connection to the Danish Islands, South Sweden and Finland through the regular ferry lines from Rostock and Sassnitz ensure the link to Scandinavia.

The East-West corridor ensures the connection to the east European countries and Baltic States. In Mecklenburg-Vorpommern a new motorway A 20 from Hamburg to Stettin was built as well as extended railways. Sassnitz is the only ferry port which can handle the Russian railway trains and is so the most important link to the Baltic States and Russia.
4.3 Oversize transport network

The oversize transport network can be divided into different parameters, namely the transport mean and cargo classes. The usage of the suitable transport mean depends on the weight and dimensions of the oversize cargo. Some cargo does not fit on a road truck, some need to be transported to some location where no other access than by road is simply possible. In some cases where a high increase of oversize transports is expected it might be efficient to build new transport connections, either road reconstructions or new railways (e.g. in the seaport hinterland connections in order to supply the offshore wind parks).

If such a need for new transport connections is decided on it also seems to be reasonable to cluster oversize transport clients in Mecklenburg-Vorpommern. The conditions for a transport permit are the same for every business, disregarding the sector, company size or transport volume. Despite the transport in every case is very individual a combined transport or something similar would be possible. So a business cluster seems to be economical here.

Locations of clusters for oversize transport in the region Mecklenburg-Vorpommern could be the ports as logistics centers described above.

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36 Mecklenburg-Vorpommern – der Logistikstandort an der Ostsee, October 2009, p. 6
5 Oversize transport corridors economic aspects

A comprehensive economic analysis of the transport of oversize is practically impossible. Financial data related to operations are very difficult to obtain. In railway transport sector procedure for financial disclosure is long and quite complicated. In road transport sector the situation is a bit better but any request of transportation costs must be supported by detailed explanations for their usage. This follows the general fear of carriers and shippers of disclosure their data before the competition. Additionally, it is associated with a large share of illegal oversize road transport.

The following comments relate to compliance costs of road infrastructure, on the example for the transport of cargo which is the turbine. Analysed oversize cargo is wind turbine that has been transported from the Port of Szczecin to the wind farm in Pobłocie Wielkie, in the West Pomeranian Region. Detailed description of oversize cargo and laden semitrailers shows following table. The biggest cargo unit is the rotor blade of a 45 m length; instead section 1 is the heaviest cargo unit (Table 24)

<table>
<thead>
<tr>
<th>Sections</th>
<th>Description of cargo</th>
<th>Description of laden vehicle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 1</td>
<td>15,809</td>
<td>4,220</td>
</tr>
<tr>
<td>Section 2</td>
<td>18,610</td>
<td>4,033</td>
</tr>
<tr>
<td>Section 3</td>
<td>19,980</td>
<td>3,803</td>
</tr>
<tr>
<td>Section 4</td>
<td>23,822</td>
<td>3,485</td>
</tr>
<tr>
<td>Section 5</td>
<td>24,367</td>
<td>2,771</td>
</tr>
<tr>
<td>Gondola</td>
<td>10,321</td>
<td>3,450</td>
</tr>
<tr>
<td>Hub</td>
<td>3,983</td>
<td>3,650</td>
</tr>
<tr>
<td>Rotor blade</td>
<td>44,157</td>
<td>4,219</td>
</tr>
</tbody>
</table>
The technical limitations of the road transport on above mentioned route was associated with:

- too small width of the road,
- roundabout with small turning radius, that unable to travel straight ahead,
- the poor state of roads,
- sharp turn in forests,
- several objects in the urban area, such as buildings, lamps, road signs,
- trees and bushes along the road,
- permissible axle load on local roads of 8 tons.

These last two limitations were most were the most difficult to overcome and were associated with additional costs for the carrier. Statement of compliance costs of road infrastructure to transport the oversize cargo is given in the table (Table 25).
Table 25 Compliance costs of road infrastructure to transport the oversize cargo

<table>
<thead>
<tr>
<th>No.</th>
<th>Description of operations</th>
<th>Location of operations</th>
<th>Costs [PLN]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Survey of the route, preceding oversize transport</td>
<td>the whole route</td>
<td>3.500</td>
</tr>
<tr>
<td>2</td>
<td>Police escort (three convoys were needed for one wind turbine)</td>
<td>the whole route</td>
<td>3 times 3.000</td>
</tr>
<tr>
<td>3</td>
<td>Tree pruning</td>
<td>Several locations mainly on local roads (last 15 km)</td>
<td>4.500</td>
</tr>
<tr>
<td>4</td>
<td>Timber shielding performance of curbs on the road turns</td>
<td>3 locations</td>
<td>3 times 1.000</td>
</tr>
<tr>
<td>5</td>
<td>Lining the road with concrete slabs</td>
<td>last 2 kilometres (60 slabs)</td>
<td>28.000</td>
</tr>
</tbody>
</table>

**Total** 48.000 PLN (c.a. 12.000 EUR)

As every transport the oversize transport should be as economical as possible. For the transportation firm it is necessary to know and maybe to be able to reduce the time costs (e.g. working hours for vehicles and staff, insurances and wages) and distance cost (e.g. fuel consumption, maintenance costs, fines and damage liabilities) of their business\(^{37}\). Most of the fixed costs (e.g. motorway tolls, permission fees and drivers expenses) are external costs which cannot be influenced by the transportation firm itself but by optimized legal regulations and policies.

One way could be a bundling of transports, either of the same products (e.g. windmill blades or ship engines) or with the same size or weight (e.g. port cranes and offshore cranes) in order to reach economies of scale. However, most of the oversize cargo is so over-dimensional that a further bundling with other cargos or cargo types is practically not possible. It seems only reasonable to define certain routes for certain dimensions of cargo which allow an uncomplicated and fast transport on these routes. These routes are called corridors where the bundled transports are then delivered. The transportation firm Kübler\(^{38}\) in Germany defined some of these corridors already for the inland waterways in Germany and also the connections to the inland ports Mannheim, Duisport and other ports in South Germany. The corridors connect the North Sea and the ARA-ports through whole Europe with ports in the Black Sea. Kübler owns special legal permissions for the transport of oversize cargo on these corridors and has checked all possible bottlenecks (e.g. bridges and curves) according to the dimension of the cargo. Now they can offer a fast and very economical transportation of oversize cargo to their clients.\(^{39}\)

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\(^{37}\) Blauwens et al., Transport Economics, pp. 73

\(^{38}\) Kübler Spedition, 14.07.2010

\(^{39}\) Kran- & Hebetechnik, 26.11.2009
6 Legal evaluation

This chapter describes the existing legal basis for oversize transports. There are regulations of the EU which should apply to all member states; however, every member state realizes these regulations in a different way.

6.1 Legal basis

There are a number of legal requirements concerning oversize transportation in Germany. Such transportations diverge from the norm of “Straßenverkehrs-Zulassungs-Ordnung (StVZO)”. It is a regulation based on § 6 “Straßenverkehrsgesetz”, enacted by the Ministry of Transport, Building and regional Development.

Oversize transportation comprises of four types:

1. large measurements and small weight,
2. heavy haulage (small measurements but very high weight),
3. combination of 1. and 2. and
4. transport of long freights (more than twenty meters).

They cause immoderate using of roads and so they need a permission according to § 29 (3) StVO. Basis for this permission is an exception permit pursuant to § 70 StVZO. Depending on size and freight escort vehicles or police escort are required.

Above that, such transports are just allowed at specific periods. During holidays using of several motorways is principally not allowed. These periods are called „off-time“. Oversize transports are allowed to proceed only between Monday and Friday 9 a.m. and 3 p.m. Nearly all transportations with a width above 3.2 meters have to be realized during the night between 10 p.m. and 6 a.m.

Oversize transports must have a valid permit which has to be obtained from the responsible authority. For this purpose a request with addressee, receiver, measurements of loads, weights, vehicle registration number, axial distances and axle loads, number of wheels per axle and description of the route have to be conveyed. The agency gives this request to consultation and waits for agreement and issues the permission, which is valid until the end of the following month. In Germany it is common, that oversize transport companies have a continuous permit for one year.
Table 26 Permissible vehicle heights, widths and lengths

<table>
<thead>
<tr>
<th>vehicle type</th>
<th>height</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>motor vehicles and trailers</td>
<td>4 m</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>vehicle type</th>
<th>width</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>vehicles generally</td>
<td>2.55 m</td>
<td></td>
</tr>
<tr>
<td>refrigerated vehicles</td>
<td>2.6 m</td>
<td></td>
</tr>
<tr>
<td>implements, special vehicles</td>
<td>2.55 m</td>
<td>3 m with accessory equipment for agriculture</td>
</tr>
<tr>
<td>tractor units</td>
<td></td>
<td>and forestry or road maintenance, e.g. sowing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>machine</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>vehicle type</th>
<th>length</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>single vehicles</td>
<td>12 m</td>
<td></td>
</tr>
<tr>
<td>trailers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>towing vehicle with one or two</td>
<td>18 m</td>
<td></td>
</tr>
<tr>
<td>trailers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>towing vehicle and trailer</td>
<td>18.75 m</td>
<td></td>
</tr>
<tr>
<td>(with adherence of partial length)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>articulated vehicle (tractor +</td>
<td>15.5 m</td>
<td></td>
</tr>
<tr>
<td>trailer)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>articulated vehicle (with</td>
<td>16.5 m</td>
<td></td>
</tr>
<tr>
<td>adherence of partial length)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 27 Permissible axle loads

<table>
<thead>
<tr>
<th>Axial Structure</th>
<th>Axle Load</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single axle load</td>
<td>10 t</td>
<td>Generally</td>
</tr>
<tr>
<td></td>
<td>11.5 t</td>
<td>Powered</td>
</tr>
<tr>
<td>Double axle load</td>
<td></td>
<td>Axial distance</td>
</tr>
<tr>
<td>Towing vehicle</td>
<td>11.5 t</td>
<td>&lt; 1 m</td>
</tr>
<tr>
<td></td>
<td>16 t</td>
<td>≥ 1 m and &lt; 1.3 m</td>
</tr>
<tr>
<td></td>
<td>18 t</td>
<td>≥ 1.3 m and &lt; 1.8 m</td>
</tr>
<tr>
<td></td>
<td>19 t</td>
<td>≥ 1.3 m and &lt; 1.8 m drive axle airsprung or double wheeled (2 x 9.5 tons)</td>
</tr>
<tr>
<td>Double axle load</td>
<td></td>
<td>Axial distance</td>
</tr>
<tr>
<td>Trailer</td>
<td>11 t</td>
<td>&lt; 1 m</td>
</tr>
<tr>
<td></td>
<td>16 t</td>
<td>≥ 1 m and &lt; 1.3 m</td>
</tr>
<tr>
<td></td>
<td>18 t</td>
<td>≥ 1.3 m and &lt; 1.8 m</td>
</tr>
<tr>
<td></td>
<td>20 t</td>
<td>≥ 1.8 m</td>
</tr>
<tr>
<td>Treble axle</td>
<td></td>
<td>Axial distance</td>
</tr>
<tr>
<td></td>
<td>21 t</td>
<td>≤ 1.3 m</td>
</tr>
<tr>
<td></td>
<td>24 t</td>
<td>&gt; 1.3 m and ≤ 1.4 m</td>
</tr>
</tbody>
</table>
### Table 28 Permissible total weights (single vehicles)

Permissible total weights (single vehicles):

<table>
<thead>
<tr>
<th>vehicle type</th>
<th>weight</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>generally 2 axes</td>
<td>18 t</td>
<td></td>
</tr>
<tr>
<td>motor vehicles or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>trailers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 axes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>motor vehicle:</td>
<td>25 t</td>
<td>2 double axes distance</td>
</tr>
<tr>
<td>trailer:</td>
<td>24 t</td>
<td>centre at least 4 m</td>
</tr>
<tr>
<td>4 axes</td>
<td>32 t</td>
<td></td>
</tr>
<tr>
<td>from 4 axes on</td>
<td>32 t</td>
<td></td>
</tr>
</tbody>
</table>

### Table 29 Permissible total weights (vehicle combination)

Permissible total weights (vehicle combination):

<table>
<thead>
<tr>
<th>vehicle type</th>
<th>weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>less than 4 axes</td>
<td>35 t</td>
</tr>
<tr>
<td>4 axes</td>
<td>36 t</td>
</tr>
<tr>
<td>from 4 axes on</td>
<td>40 t</td>
</tr>
</tbody>
</table>
Table 30 Permissible dimensions of vehicles with load

<table>
<thead>
<tr>
<th>vehicle type</th>
<th>dimensions</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>vehicles with load generally</td>
<td>width: 2.55 m</td>
<td>route until 100 km up to</td>
</tr>
<tr>
<td></td>
<td>height: 4 m</td>
<td>3 m</td>
</tr>
<tr>
<td></td>
<td>length: 20.75 m</td>
<td>at a height of 2.5 m</td>
</tr>
<tr>
<td></td>
<td>load overhang backwards: 1.5 m</td>
<td></td>
</tr>
<tr>
<td></td>
<td>load overhang forwards: 0.5 m</td>
<td></td>
</tr>
<tr>
<td>vehicles for agricultural and forestry purposes</td>
<td>width: 3 m</td>
<td>at agricultural and</td>
</tr>
<tr>
<td></td>
<td>height: 4 m</td>
<td>forestry products or</td>
</tr>
<tr>
<td></td>
<td>length: 20.75 m</td>
<td>implements</td>
</tr>
<tr>
<td></td>
<td>load overhang backwards: 1.5 m</td>
<td>route until 100 km up to</td>
</tr>
<tr>
<td></td>
<td>load overhang forwards: 0.5 m</td>
<td>3 m</td>
</tr>
</tbody>
</table>

The costs for a permit of an oversize transport are very different. In some regions they vary between 26 € and 102 € depending on route and vehicle, in other regions from 10.20 € and 767 €. The same applies to a permanent permit, but at least they are as double as much as the single permits.

Additionally to the costs for the permission the actual transport includes also some fees. These are for example the fees for the accompanying of police during the whole transport. The fees for the police vary in every municipality. The average price is around 5 € per every kilometer of transport.

Regulation describing oversize transport in Poland can be divided into two groups:


41 [http://amt24.sachsen.de/ZFinder/verfahren.do;sessionid=C5C12110DC32A0C58BAC3FC55ABE06C2.worker_zf1?action=showdetail&islandesimpressum=false&modul=V8&id=39992126277#kosten](http://amt24.sachsen.de/ZFinder/verfahren.do;sessionid=C5C12110DC32A0C58BAC3FC55ABE06C2.worker_zf1?action=showdetail&islandesimpressum=false&modul=V8&id=39992126277#kosten), 26.08.2010
regulations concerning safety of vehicle’s construction, which result from technical-strength and stability documentation and law regulations, for example International Maritime Organization resolutions and codes, acts of law and administration regulations of local authority concerning oversize transport, for example territorially proper Inland Waterway Transport Director orders.

Law regulations in road transport

Oversize cargo transport is regulated by many acts of law issued by the Ministry. The most important are:

- Act of June 20th 1997 - Road traffic law (section II - Road traffic; chapter 5: Order and traffic safety on roads; chapter 4: Conditions for use of vehicles on the road - Art. 61 – 64, Dz. U. z 2003 r. Nr 58, poz. 515);
- Act of March 21th 1985, about public roads (Dz. U. z 2007 r. Nr 19, poz. 115);
- Act of September 6th 2001 r. about road transport (Dz. U. 2004 r. Nr 204 poz. 2088);
- Decree of the Minister of December 31st 2002 on vehicles technical conditions and range of their necessary equipment (Dz. U. z 2003 r. Nr 32, poz. 262 ze zm.)
- Decree of the Minister of December 16th 2004 r. on special conditions and permits issuing procedure for oversize vehicles transit (Dz. U. Nr 267, poz. 2660);
- Decree of the Infrastructural of July 26th 2004 about costs connected with transit route defining (Dz. U. Nr 170, poz. 1792);
- Decree of the Home Affairs and Administration of December 30th 2002, about road traffic control (Dz. U. z 2003 r. Nr 14, poz. 144 ze zm.);
- Decree of the Infrastructural Minister of April 26th 2004 about vehicles which make pilotage (Dz. U. Nr 110, poz. 1165).

Abundance of documents don’t foster easiness and coherence of law applied to carriers, forwarders and institutions that operate oversize vehicle transport. Currently there could be observed some effort to change and simplify existing Road Traffic Law and other acts with the aim to reorganize existing legal order in discussed area. New act is being widely discussed and opened for public consultation.

Law regulations in rail transport

Conditions of cargo transport by rail are identified in:

- Decree of June, the 7th 2006 (with later changes) on kind and conditions on transporting cargo, that can cause transport difficulties in rail transport (Dz. U. nr 108, poz. 746).
- Cargo delivery regulation (RPT) PKP Cargo S.A. (text codified with changes from the 1st of January 2010)
- Ch5 Instruction how to transport extraordinary delivery PKP Cargo S.A.

Law regulation in inland water transport

In inland water transport oversize cargo transport is regulated by:

- Ordinance of Infrastructure Minister of April, 28th 2003 on regulations for shipping on inland waterways,
• Local law regulations published by appropriate territorial Inland Navigation Office Directors. For example for lower section of the Odra river there are:
  • Ordinance of Inland Navigation Office Director in Szczecin from June, 7th 2004 regarding local law on inland waterways.
  • Ordinance of Inland Navigation Office Director in Szczecin from December 4th 2009 regarding shipping on the border waters of Oder, West Oder and the river Lusatioan Neisse.

Law regulations in maritime transport

In Poland the Law defining the sea transport 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 from 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 transport, 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 permit 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 manoeuvrability.

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 permit 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.

Law regulations in air transport

The public road network in Sweden is divided into three weight classes: Weight Class 1 (BK1), Weight Class 2 (BK2) and Weight Class 3 (BK3). The highest weights are permitted on the BK1 road network, whose weight regulations apply on some 94 % of the public road network.

General Directorate for National Roads and Motorways\(^\text{42}\) and Directors of Customs are responsible for issuing permits for carriers and forwarders transporting oversize cargo. The permits include:

- permit for single transit of oversize vehicle in appointed time (no longer than 7 days) and route, issued by the General Directoriate for National Roads and Motorways,
- permit for single transit in appointed time (72 hours) for oversize vehicle crossing the Polish border, issued by the Customs Director, for vehicles satisfying minimum one of following conditions:
  - height, total weight are normative,
  - total width doesn’t exceed 3 m,
  - total length exceeds permissible value not more than 2 m,
  - axle loads exceed permissible value not more than 15 %.

Carriers and forwarders contact authority, which is issuing the permit, by telephone, fax or e-mail. Application is usually available on the website. Fulfilled and signed application can be send by fax or e-mail and original paper can e delivered afterwards. There is application generator available on the internet website of the General Directorate for National Roads and Motorways, Central Department in Warsaw (www.gddkia.gov.pl), which is also available in German and English. Usually customers prefer to get the permit personally, because they are in a hurry, but there is possibility to send it by post at the expense of the applicant.

Application to get permit for oversize cargo transit has to include:

- name and address of the entrepreneur and the person acting on behalf of him,
- term and addresses of the beginning and the end of transit , and in case if transport starts or ends outside borders of the country - the place of border crossing,
- type of cargo and its total weight.
- unladen vehicle data: brand, registration number, weight, permissible cargo capacity, number of axles and number of wheels on every axle (in case of combined transport, this data is given separately for motor vehicle and trailer),
- dimensions and total weight of single vehicle/road train with and without cargo,
- wheel base and each axle load of laden vehicle,
- scheme of cargo stowing on the vehicle/trailer.

\(^{42}\) http://www.gddkia.gov.pl/
There are no corridors dedicated for oversize vehicles and every time transit route is agreed with road directors of community, region, voivodship and divisions of GDDKiA. Transit route is appointed on the principle "the shortest way that fulfils requirements on width, accessible load per axel/axles". Most of the time, if it is possible, the applicant’s wishes are met. Sometimes the shortest distance between two waypoints is to be elongated due to the obstructions on the shortest planned route. If detour is enforced, not rarely, tree times longer distance has to be worked out.

If road transport of one cargo unit is impossible, it is suggested to divide it or to change the mean of transport. Practically no refusal is observed, because applications are fulfilled after phone conference and customer knows beforehand if the transport operation could be done. Frequently, preplanning of the route is needed so the carries analyze the chances for the best passage. In some extreme cases, the additional expertise for permissible pressure on the road surface is to be done at the expense of an applicant.

According to the regulations, the maximum period for issuing the permit is 30 days, but practically the administration needs not more than two weeks. In some cases the permit is issued in 2 days. Issuance fee is established by a special computer program, which is used in the General Directorate for National Roads and Motorways. The longer route and the greater dimension excess the more expensive issuance fee is. Maximum price could be over 10.000 PLN.

Permits in rail transport

Decision on oversize transport, called extraordinary delivery, if there are technical and operational possibilities, is made by rail infrastructure managing institution, PKP Polish Railway Lines Company S.A 43 The decision is usually made within 30 days and is containing conditions given by all appropriate PKP Polish Railway Lines Company Local Departments.

Permits in inland water transport

In regulations for shipping on inland waterways is described, that oversize carriages in inland shipping are special deliveries, which can take place only on the base of permit. It is issued, upon request of shipowner, by the Inland Navigation Office 44 appropriate for the place of the beginning of the route. For every special transport requirements for ship’s crew should be given. The crew member has to comply with the appropriate requirements of shipping regulations and requirements on professional qualification.

Special transit routes in inland shipping are identified in the application submitted to the Inland Navigation Office appropriate for the place of the beginning of the route. Before issuing the permit, the administration checks shipowner proposal taking into consideration shipping traffic safety. Eventually, if it is possible, route is optimally adapted to the operating parameters of the ship/combination of ships and to parameters of the waterway.

Documents needed to apply for the permit are enlisted below:

- valid navigability certification,
- ship’s dimensions.
• cargo stowing and securing plan and information about ship’s stability,
• the watertight test for the hulls transported from the shipyard.

The official period to obtain permit for inland shipping oversize transport is 2 weeks, in practice:

the Inland Navigation Office in Wrocław – 3-7 days,

the Inland Navigation Office in Szczecin – without delay if the permit requires an inspection of the vessel and the inspector cannot perform it on the day of application - then 2-3 days.

The period of validity of the permit - a permit is issued depending on the length of the route planned for the boat and the final date is given always in considerable extension. The weather conditions, the state of water, possible delay due to breakdowns of facilities are always taken into consideration.

Abnormal transports within Sweden require an exemption (permit) from the traffic regulation (trafikförordningen, SFS 1998:1276). If the transport concerns only one municipality the application must be sent to that municipality (the local authority). If the transport route concerns more than one municipality the application must be sent to the Swedish Transport Administration (Trafikverket). Certain wide transports can be performed without a permit (the wide load does not exceed 3.1/3.5 m), if certain conditions are fulfilled (Swedish Transport Administration Regulation VVFS 2005:102).

The application must contain information on the applicant, the desired transport route (including loading and delivery site), the vehicle or vehicle combination, type of load, the axle loads, the gross vehicle weight and the dimensions of the vehicle or vehicle combination including load. For heavy transports (with load) a consignor’s affirmation must be attached to the application. The consignor’s affirmation contains information on the consignor, dimensions and total weight of the load, and includes a statutory declaration on the accuracy of the data provided. For heavy transports or transports which exceed the maximum authorized lengths, vehicle registration documents must be included, if the vehicles not are registered in Sweden.

The Swedish Transport Administration can make the following types of permits:

1. a specific permit for one transport on a certain route (valid for one month),
2. a specific permit for repeatedly transports on a certain route (valid for one month, or up to one year), or
3. a long term permit (general permit) for a certain road network (valid for one year).

The period of validity of the permits and type of permits varies depending on the dimensions and weights.

Every permit contains the conditions which are valid for the actual transport. When carrying out the transport, conditions for the marking of overwide and overlong vehicles must be observed. These conditions also deal with the use of private escort vehicles and traffic directors. Furthermore, it is the driver’s responsibility to assess whether the route is passable for his transport with respect to road construction sites and road clearance (height). If signs or other road equipment must be removed for the passage of the transport, permission must be requested from the respective owners.

Sometimes escort may be required for the transport. In these cases licensed traffic directors must be contacted before the transport starts in order to make preparations. Sweden has this system with private
traffic directors since 2005. They have the legal right to direct, stop and give instructions to other road-users. Other road-user must obey a traffic director. In some cases the police may overtake an escort, but that is rare nowadays.

The application procedure usually takes three workdays. However, a longer processing period is required if the permit can only be issued in connection with a police escort. Permits are normally valid for a one-month period. In the case of regularly repeated transports, permits can be issued with a validity period of up to one year. The application fee ranges from 600 to 1200 SEK (55 to 110 Euros), depending on the width, length and weight of the transport.

A new regulation is approved from 1st of October 2010 which allows exemptions from regulations of maximum width and length. (TSFS-nr 2010:141, Färd med bred odelbar last, and Färd med lång odelbar last). The new regulation allows:

- transports with wide indivisible cargo up to 350 cm
- transports with long vehicle (long indivisible cargo) up to 30 meter if certain specifications of the vehicle are fulfilled

Combination of exceeding of both width and length is not allowed. The conditions regarding route checking’s, signs on the vehicle etc. are the same as before.

There is also an updated regulation concerning road assistance approved from 1st of October 2010. (TSFS-nr 2010:139, Föreskrifter och allmänna råd om vägtransportledare). In the new regulation are some clarifications and some simplifications made.

In Lithuania, both permit provision and charges are established and framed by the Ministry of Transport and Communications of the Republic of Lithuania. The issue of permits falls to the State Road Transport Inspectorate under the Ministry of Transport and Communications.

Inspectorate issues permits to drive on the state roads vehicles (their combinations), the dimensions and (or) axle(s) weight and (or) vehicle weight with or without load exceed the maximum authorized.

Loads can be carried by over-dimensional or heavy goods vehicles (their combinations) on the state roads having paid the fee for the use of the state roads and obtained a permit. The permit can be issued only for carriage of an indivisible load and if such load may not be carried by other type of vehicles or there is not point to carry them by other types of vehicles.

In order to obtain a permit to drive on the state roads over-dimensional and heavy goods vehicles (their combinations) the application should be submitted to the State Road Transport Inspectorate. The applications can be at submitted to:

**Service administration division of Department of Vilnius region**, Švitrágailos St. 42/31, phone: +370 5 278 5634;

**Service administration division of Department of Kaunas region**, M. K. Čiurlionio St. 12, phone: +370 37 22 98 18;

**Service administration division of Department of Klaipėda region**, Pilies St. 12, phone: +370 46 31 05 26;
Service administration division of Department of Panevėžys region, J. Biliūno St. 3, phone: +370 45 43 38 93;

Service administration division of Department of Šiauliai region, Aeruosto St. 9, phone: +370 41 54 20 13.

Time and costs

A permit shall be issued or refused on certain grounds within 5 working days from the date when the application has been received. In case of driving a over-dimensioned vehicle (their combination), when the vehicle (their combination) becomes dangerous for safe traffic, i.e. when the maximum authorized dimensions are exceeded more then: height - 50 cm, (or) width - 100 cm, and (or) length - 500 cm, and (or) a heavy goods vehicle (their combinations, when the authorized axle weight exceeds 8 tons, when the weight of a loaded vehicle (their combination) exceeds the authorized weight by two or more times, the permit shall be issued or refused on certain grounds within 20 days from the date when the application has been received.

Upon receive the permit two different documents confirming payment of the state fees should be presented:

1) Which is for issue of permit

2) Fee for use of the state roads. State fees must be paid when a decision to issue a permit is taken, in accordance with rates effective on the day of payment and before issuing the permit. 45

The fees for the permit and roads range depending on the width, length and weight of the transport, thus every case is calculated individually.

6.2 Experiences with one stop shop

The Swedish system TRIX

In Sweden there is a new system in operation since the beginning of this year. The system is called TRIX - Transport exemption management system for internal and external users. Until now the system only exist in a Swedish version. An English version is planned for introduction later this year. The system gives access to the entire application system and also offers simulation possibilities. The system has following options:

- Simple application
- Advanced application
- Possibility to simulations

Frequent applicants will after education get authorisation as user of the entire system.

The system gives the customer an overview over conditions for their transport in respect to vehicles, routes, bridges and over restrictions.

Benefits for the user are a better understanding for the permitting system, faster and more simplified process to get transport permission.

Benefits for the permitting authority, the Swedish Transport Administration, are less phone calls and a more cost effective permitting system.

**VEMAGS – Operations Management of oversize Transport**

The VEMAGS-system is a tool which was developed to simplify and quicken the permission process of oversize transports all over Germany. It was initiated by the European Union aiming to provide a comprehensive system for oversize transport in the whole EU-region. Germany took the chance and established this VEMAGS-system even before the agreed deadline.

VEMAGS replaces the earlier telefax-method which had long waiting times and high transfer costs and was not economical anymore. The new system provides the whole process beginning with the application up to the approval and the actual transport in the road in real time. Important industries like construction industry and the energy sector asked strongly for such a new system.

**Content**

All stakeholders of the permission process for oversize transports in the Federal Republic of Germany benefit from the implementation of the VEMAGS-system. These stakeholders are applicants, permission authorities, administrations, road traffic authorities, responsible road enterprises and the police.

The applicants can simply submit their application via the VEMAGS-system to the responsible permission authorities. They are supported by a routing planning tool and a template system which stores their previous submitted data.

The VEMAGS-systems covers following aspects:

• structure of a operations management tool (internet instead of telefax/phone)

• communication platform und distribution of application data

• status tracking

• filing

• cooperation with existing systems (e.g. of the German military)

• training concept

• collection of data of bridges and buildings
For using the VEMAGS-system only a simple internet access and a browser are necessary. The huge servers which keep the systems running are located in middle Germany and bundle and spread the relevant information to the responsible permission authorities in the federal states. There is no admission fee.

The approval of the application according to the German legislation and guidelines is very complicated and comprehensive. The delivery of the approval is still possible via telefax, post mail or by personal pick up at the authority. If the applicant has the opportunity of a digital signature which itself has some technical requirements he can use it and gets the approval digitally as well. In Germany, this digital signature is the only way to circumvent the official signature with stamp of an authority.

The user who would like to submit an application for the transport of oversize cargo in Germany needs to register at the VEMAGS homepage. Some business data and formal information like name, address and so on are required. After the registration the user can fill in the application form. The user must define the route he wants to travel, the information about his transport vehicle and of course the dimensions of his cargo (weight, height, length, etc.) and can also attach additional files. If everything is filled in he can submit the application. The VEMAGS-system automatically scans the application for mistakes or missing information. This application is now transferred in real time to the responsible authorities. The user can decide on his own, to which authority he might submit the application. It can be the location of the business, the starting point of the traveled routes or any other authority in Germany.

The application is now handled by the permission authority.

The permission authority which is responsible for the submitted application proofs again if the application is complete and worth further approval. If so, the authority sends the application to the other authorities which are affected through the route of the transport. They have to decide whether the transport is possible on the suggested roads or whether there are some limitations. In this case the authority can suggest another route for the oversize transport and send this suggestion back to the responsible authority and further back to the applicant.

As soon as all other involved authorities assign the approval of this transport the applicant gets his approval back and can start the transportation.

Safety

The safety concept is designed according to the BSI-Standard 100-2 and other relevant standards of the Federal Republic of Germany. In the process the following issues are considered: Analysis of the structure of the application process, the required safety levels for different data, defined in three levels (normal, high and very high) and categories (availability, confidentiality and integrity). According to these results the demand for safety of the single components is assessed. These assessments must be also in accordance to the privacy data protection laws and the transport laws.

Statistics

Since August 2007 more than 100,000 applications are submitted by around 1,500 applicants via VEMAGS to the permission authorities all over Germany. And more than 3,000 partners take part in VEMAGS. These partners are commercial applicants, the Bundeswehr (federal military), road traffic authorities and road
enterprises, the German railway company (Deutsche Bahn) and all relevant authorities for waterway- and sea-transport.

In 2007, VEMAGS won the “Artus Award against bureaucracy” and was nominated for the “UN Public Service Award” in 2008.

Advantages

The most important motivation for the implementation of the VEMAGS-system was the enormous cost and time savings not only for the applicants but also for the permission authorities and road traffic authorities. Since the applicants already use the computer for the commercial correspondence and the editing of bookings and purchase orders it seems to be reasonable to use it also for the application for transport permission. Earlier they had to fill in an application form manually and fax or send it via post mail to the responsible permission authority. This step is redundant with VEMAGS. They can simply transfer the application via internet directly to the permission authority. The permission authority distributes the application further to other relevant authorities via internet. Through this digital correspondence the whole permission process can be shortened by half of the time. Earlier the process took about five working days and today the average process takes two or three days. Cost savings are next to the cuttings of personnel costs for the manual editing the abolition of the mailing costs for telefax, phone or by mail delivery.

<table>
<thead>
<tr>
<th>Applicants</th>
<th>Supported with</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport business, Bundeswehr, agricultural businesses, travelling carnes</td>
<td>• Editing formal data (name, address,...)</td>
</tr>
<tr>
<td></td>
<td>• Editing data about the vehicles (technical data)</td>
</tr>
<tr>
<td></td>
<td>• Submitting of applications</td>
</tr>
<tr>
<td></td>
<td>• Status tracking of the applications</td>
</tr>
<tr>
<td></td>
<td>• Editing of changes</td>
</tr>
<tr>
<td></td>
<td>• Receiving of the permission</td>
</tr>
<tr>
<td></td>
<td>• Quickening the application process</td>
</tr>
<tr>
<td></td>
<td>• Technical data are stored once and can be used again</td>
</tr>
<tr>
<td></td>
<td>• Details of routes can be stored once and used again</td>
</tr>
<tr>
<td></td>
<td>• Individual status tracking – no time consuming telephone calls</td>
</tr>
<tr>
<td></td>
<td>• Typing mistakes in applications are reduced</td>
</tr>
<tr>
<td></td>
<td>• Reduction of communication costs</td>
</tr>
<tr>
<td></td>
<td>• Higher competitiveness</td>
</tr>
</tbody>
</table>
Table 32 Advantage for the permission authorities of VEMAGS

<table>
<thead>
<tr>
<th>Permission authorities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cities, counties, towns</td>
</tr>
</tbody>
</table>

Supported with

- Pre-proofing of the application
- Ordering of additional approvals
- Monitoring and tracking of the application
- Setting of additional restrictions
- Digital submitting of the approval
- Evaluation

- Quicker and simple approval procedure
- Less effort for additional communication
- Applications have less mistakes
- Reduced data collection

Table 33 Advantage for the police

<table>
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<tr>
<th>Police</th>
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</table>

Supported with

- Uniform approvals and permissions
- Online-access
- Information on actual processes

- Uniform approvals allow better controls
- Unsecure businesses can be tracked nationwide

Outlook

The VEMAGS-system was developed accordingly to EU expert group “Abnormal Road Transports”. The EU member states agreed to establish a nationwide service system for oversize transports. The German solution is the VEMAGS. VEMAGS is strengthening the relationship to other countries and their systems, e.g. Scandinavian countries, Austria, and Switzerland. An international approach is complicated though and almost not possible due to high price differences of the transport and the bureaucracy in individual countries.

VEMAGS itself shall be developed further. An additional route mapping shall be implemented to increase the efforts for the individual route mapping for the applicants. This can be done through the implementation of a road database including bottlenecks like bridges, railways, etc.
6.3 Penalties
The regulations of chapter 0 describe the requirements on cargo transports and oversize transports. If the dimensions of the cargo or the vehicle exceed the standard dimensions a transport permission is necessary. If the truck driver or the operator does not apply for such a permission or did not get an approved permission and conduct the transport anyways he will risk a penalty. The penalties are defined under the list of traffic offence penalties (German: Bußgeldkatalog) no. 104 and 193. They vary from 40 € to the immediate stop of the transport and the suspension of the driver’s license. If the vehicle with illegal dimensions leads to an accident or damage of the road or any other construction the penalties will be much higher since they will be treated by court.
7 Optimization and Barriers

To optimize the oversize road transport in Poland, changes mainly in the regulatory framework are proposed:

- to standardise and simplify procedures for issuing permits for oversize transport,
- to define the standard for oversize cargo not only the standard oversize vehicle,
- to introduce uniform permit application,
- to shorten time needed for issuing permit to several days, which would reduce the illegal transport without permits,
- to introduce a clear system of license fees,
- to increase the penalties for transport without permits, and carriage of goods not complying with the authorization, including ban for oversize transport operations for the specified period,
- to create standards for securing cargo and to force carriers to use them,
- to create a database containing constraints on cargo routes,
- to introduce licensing of pilot companies,
- the change of rules for the design and construction of roads, which move oversize vehicles.

To simplify the procedure for obtaining a permit for oversize transport, it should be possible to submit applications electronically. The form should be in Polish, English and German. After its completion, the program should automatically guide the application to the appropriate office issuing the permit. It also should include the option to automatically check and inform the applicant whether it is possible to obtain a permit for the proposed journey, and how much will it cost.

To restrict the road transit of oversize and redirect it to the other modes of transport, it would be advantageous:

- to promote water transport as safer, energy sparing and environment friendly,
- to promote water transport as the alternative for oversize transport, where the limits, at least the weight limits, are easier to follow,
- to award the carriers shifting their cargo from the road to the water, e.g. with tax deductions (for CO\textsubscript{2} reduction, environment protection, etc.).

The problem of barriers in oversize transport should be analysed in each mode separately. Looking for possibilities of ensuring safety for all transport users and reducing losses resulting from oversize transportation, one can easily find that the most difficult situation is in road transport. The rest of transport modes has natural features to facilitating surveillance of the oversize traffic:

7) in sea transport - the regulations and principles related to the oversize cargoes on board the ships are strictly controlled by the IMO (International Maritime Organisation) and the Class Societies (Lloyd, GL. GL .PRS etc.); no ship could receive the insurance coverage without appropriate certificates and positive results of inspections;
8) In inland shipping – the most important limitation is associated with waterway parameters (draft, air draft, breadth of canals and bridges, etc.); so the physical limits of the ship and waterway are playing effective role in ensuring the security of oversize transport;

9) In the rail transport – rail administration is very vigilant and will not easy permit any overweight knowing the size and capacity of the wagon and train; it is not possible to exceed railway gauge because the wagon will not come through;

10) In air transport - the oversize transportation is extremely limited by the capacity of an airplane; nothing could come on board without the precise cargo list complying with the technical data of plane;

The road transportation is quite different and not easy to control. Although the operators are obliged to report any oversize cargo to be transported, some of them escape this duty.

The penalties on carriers for the exceeded dimensions are not imposed and executed. The general practice is to stop a vehicle on the parking lot and wait for authorization. Larger problems arise through overweighted vehicles. We could observe two situations:

- Truck is overloaded against its own capacity
- Truck is overloaded against the permissible capacity of the particular road.

Polish law does not permit any excess over the permissible gross vehicle weight or permissible axle load. In both cases efficient check points on the road to control such illegal traffic are needed. Another need is continuity and thus the inevitability of punishment. Current situation that state inspectors are limited with working hours, because they work only 8 hours daily. Therefore by night much of the overweighted vehicles are being transported.

From time to time some inspectors catch the carriers overcoming the limits, but the penalties re not too much tiresome for them. In effect, it could be profitable to break the rules. Simply: it is cheaper to risk low penalty then to lose the freight.

The problems associated with illegal oversize road transport can be named as follows:

- The central database of the issued permits is not exercised and remains at the stage of the project and conception only.
- Road administration officials issuing permits do not inspect cargoes and the information stated by the applicants are accepted in bona fide.
- Information on permits issued is not being supplied to the Police and the Road Transport Inspection ITD. Administrators and GDDKiA are not informed about criminal records of the carriers by the ITD and the Police.
- The ITD has limited ability to control vehicle at night, and most transport takes place just by night. Because the ITD is a civil service and must observe the Labor Code, and its employees have restrictions to work at night, while doing inspections. With too many hours worked at night, the Labor Inspectorate may impose a penalty on the ITD. The only situations permitting to make inspections at night are "night actions" or denunciation of illegal transport.
- Financial penalties are not much tiresome for the carriers. The maximum penalty is currently 60 thousand PLN and seems not to be big enough to enforce the change the behavior of certain carriers.
- The ITD does not have access to data from the Central Register of Vehicle and Drivers. The ITD can only provide data, and then has not access to them.
- The ITD can only work on public roads. Anyone stopped on a private field or property cannot be controlled there without the permit of the owner. Positive example of cooperation on such areas ports where managers always welcome the inspectors.
- There is no direct cooperation between Police and ITD.
- Only 577 ITD inspectors in 2010 were employed in Poland.

**Effective inspections and penalties**

To achieve increase of the controls efficiency and to eliminate 100% carriers breaking the law frequently, the following solutions should be implemented:

1) the simple system of the execution of the penalties,
2) to increase the frequency of the control,
3) to introduce the controls by night,
4) to implement strict penalties for carriers who frequently overcome do not obey the law,
5) high number of the check points.
6) to allow to penalize the carriers following the measurements from the dynamic weights (WiM systems),

The last possible solution is worth of farther explanation. Automatic control devices type WiM (Weight in Motion) allows to weight the vehicle moving with the velocity up to 140 km/h. It is very useful because it does not disturb the standard road traffic. Information of the weight and axle load is transmitted to the road administrator.

Currently, the execution of the penalty based on the data from that system is not possible. The measurement is too much influenced by the external circumstances, such as rain, temperature, wind, car speed and acceleration. Producers declare maximum accuracy of 10%, while in Poland the law permits only error of less than 2%.

In Poland the WiM system in road transport is at the initial state of construction. All said above made WiM systems useful only to preselect the vehicles and to stop those supposed to be overweighed for further static weighting. Now, we can only say about limited number of preselecting posts. Such system installed in Wroclaw prevents the city roads from overloaded vehicles.

The system could be easily extended by the modems for measuring the external dimensions of the vehicles (length and height). Such extended pre selection system consists of the following elements (Fig. 41):

1) the camera to measure the length and height,
2) induction loops to switch off/on the weighting sensors,
3) over-view camera,
4) camera to identify the plates number,
5) weighting sensors,
6) the boards with the information for driver.

Figure 74 The system of pre selection the vehicles In motion

When the state control institution will have effective tools, like WiM systems, the situation on Polish roads will improve.

The oversize transport is mostly done on roads and railways in Mecklenburg-Vorpommern. Inland waterways do not play an important role in this region, because there is no direct access to the Baltic Sea. However, capacities of the roads are often limited due to congestions and construction works. The width of the roads is constraint and no oversize transport is possible on these parts. Construction works on bridges do not allow oversize transports as well. These construction works must be optimized in order to reduce the amount of works and the time frame for limitations. New construction work management systems can help to manage these limitations. The systems can regulate the tender requirements or contract parameters of every construction. The objective is to find the most effective construction company, to define contractual time schedules for the construction period (through holiday working times) and to find a better coordination of the different construction locations.

The freight transport on railways which has already capacity constraints will further increase, especially in the hinterland connections of the sea ports also in this region. Furthermore the different safety systems of the railways in the different EU countries lead to missing capacities and make a smooth transport flow complicated or even impossible. However, the transport on railways is one of the most environment friendly and efficient transport means and therefore should be supported and improved. Since Mecklenburg-Vorpommern is mainly a transit market for railway transport the various disadvantages of the railway transport makes this mean very unattractive for foreign operators. The solution is a European Train Control System (ETCS) which enables uniform safety standards and international transports. This is very important especially for oversize transports because oversize cargo is very difficult to charge and reload on different transport means. Once the cargo is on a train it will be transported until the final destination.
The sea ports play an important role in Mecklenburg-Vorpommern. Many of the oversize transport are shipped around the globe from these ports. But the structure of the ports and the hinterland connections are lacking. One of the most important tasks is now to improve the connections to the important industry locations in Germany. The roads and railways will be enlarged and new built. Furthermore the network cooperation of the single sea ports should be improved. They can build cluster and share opportunity costs. Since oversize cargo is going to be shipped even over long distances, the transport of oversize cargo on inland vessels or feeder vessels in the Baltic Sea becomes more and more important and efficient. Short sea shipping should be more feasible than long distances in railways or even roads across Europe. This applies especially to transports on the North-South corridor from the Mediterranean Sea to the North of Europe.

Due to the fact that the capacities of the existing transport connections in Mecklenburg-Vorpommern and in Germany are already overloaded, especially during holidays and summer time, it should be economical to separate the passenger transport and the freight transport (incl. oversize transport) more effectively. Oversize transports are often not possible, on North-South railway connections, because they are already busy with the regular freight and passenger transports. Through a separation of these different transports the risk of congestions will be reduced, the safety will be improved, and the capacity will be increased. A good sign for this positive development is the truck ban also on Saturdays\textsuperscript{46}.

However, in order to change the transport time and enable more transports on night time the transport means must be environmental friendly. The trains must have new technology which reduce the noise and allow an operation also in urban areas at night time.

A great barrier in inter-regional transports are still the lacking links between the European countries, especially the eastern countries and Baltic States. Regarding the railway transport the interoperability of the different railway security systems is a problem which is already known and on which is worked on from the international and national perspectives.

The objective to establish an inter-regional approach of such a one-stop permission system for oversize transports seems to be difficult since different legal requirements for the permission procedure exist in every single country: different transport fees and transport times (working times, bank holidays, etc. ...).

\textsuperscript{46} time-news.de, LKW-Fahrverbot, 30.06.2010