LONG FREIGHT TRAINS IN POLAND, WHAT IS THE PROBLEM OF ITS USAGE?

Abstract: The article presents an analysis of possibility of usage of long freight trains in Poland for connection with the modern Silk Railway to China. The desire to use freight trains with a length of more than 600 meters in Poland encounters several problems on the existing infrastructure. Limitations of usage are found here. Also, it presents possible ways for long freight trains.

Keywords: long freight train, limitation, usage, Poland

1. INTRODUCTION

The first step to create a new connection to China was made in 1990 just before collapsed the Soviet Union. In next year, 1991, many countries retrieved the independence. The idea of reviving east – west trade on the old Silk Road was raised by the Minister of Foreign Affairs for the USSR, Eduard Shevardnadze in September 1990 at the Vladivostok International Conference. In several years was many conferences to create the new transport corridor Transport Corridor Europe–Caucasus–Asia (TRACECA) through Armenia, Azerbaijan, Bulgaria, Georgia, Iran, Kazakhstan, Kyrgyzstan, Moldova, Romania, Tajikistan, Turkey, Ukraine and Uzbekistan [47]. On 1999 Poland and Ukraine signed memorandum about creation the rail corridor Gdańsk - Odessa [49].

On 2014 was increased the tensions between Kyiv and Moscow. In spring 2014, Russia began a military invasion on the Crimea peninsula and military conflict in eastern Ukraine. Russia decided to create sanctions against Ukraine and began to limit the free transit for Ukrainian goods through its territory. On 2 January 2016 Russia banned all transit of Ukrainian goods [27], [41].

In 2014 the Ukrainian government decided to build a new competitor connection for the old known Trans-Siberian railway to China. Russian sanctions for transit of Ukrainian goods through its territory, the Trans-Caspian corridor is Ukraine’s only alternative for delivery of goods to Central Asia. For the creation of this new connection, the Ukrainian government searched the alliances. The political situation generated a second alliances against the Russian restrictions in free transit of Ukrainian goods on transit to Asia. This
new corridor may have connections by rails with Poland in three points Brześć, Sławków, Medyka and Slovakia in Michalowie and Romaniaby trucks.

In 2014, China started to seeks new possibilities to transit their cargo to Europe by the land transport but not only through the Russian territory. China’s Silk Road Economic Belt was likely the most pragmatic vision for the Eurasian space, and one most closely linked to the ancient version of the Silk Road by the Trans-Siberian railway to China [8].

On 16 November 2015, representatives of Ukraine Kazakhstan, Azerbaijan and Georgia met in the Ukrainian capital city Kiev. They signed an agreement about the development of a project of the Trans-Caspian International Transport Corridor China – Europe (in Russian: Транскаспийская международная транспортная маршрут) through territories of Kazakhstan across the Caspian Sea to the Azerbaijan and Georgia and later across the Black Sea to the Ukraine [46].

On 19 November 2015, the Trans-Caspian International Transport route China-Turkey-Europe agreement was signed in the Turkish capital city. On 28 November 2015, representatives from Turkey, Kazakhstan, Azerbaijan, Georgia and Lithuania, Mishgeng Logistics, Trans Caucasus Terminals, КТЖ Экспресс and Azerian company Karavan Logistics, signed a deal cementing the multi-national partnership to create a syndicate to transport cargo from China to Europe, bypassing Russia [3], [11].

This event was observed with big attention by Russian newspapers [44], [45].

For cooperation, Ukraine found Azerbaijan, Georgia and Kazakhstan. Another connection which was mentioned was one to the Indian port of Mumbai through Iran after a meeting in Azerbaijan on January 12 2016 [18].

On 15 January 2016, the first transport left the Illichivsk English Chornomorsk (Ukrainian: Чорноморськ) with a train of 10 rail wagons and 10 40 feet containers (some with metal blanks, some empty) [13].

Its route was through the Black Sea to the Georgian port of Batumi and later on the railway wagons to the Azerbaijani port of Baku. There, these wagons with gauge 1520 mm were unloaded onto a Caspian ferryboat to the Kazakhstan port Aktau. There, the wagons were unloaded and pulled onto railway through Aktogay to the border with China by Dostyk situated in the Dzungarian Gate. On 31 January 2016, this train arrived at the Chinese border where again it was reloaded for Chinese wagons where the standard gauge of 1435mm is used (Fig. 1).

Fig. 1. Map of trains bypassing Russia. Own work based on [42]
The present technological characteristics allow sending up to 40 wagons on the 80 20 feet or 40 wagons with 40-feet containers. The train can transport goods without exception. This route has interested domestic senders cardboard, stone, ceramic tile, rubber products, hardware, furniture, food and agricultural products [43].

Expected length of the regular trains is 108 rail wagons with 2 20 feet containers on each wagon. The expected time of travel is 9-10 days [35]. It is limited by the capacity of the ferry which is capable of carrying 108 railcars [13]. It is expected to be able to send up to eight pairs of trains per month with a capacity of 20,000 tons of cargo in one direction. The ferry transport capacity is 5 million tons per year today, per 2.5 million tons in one direction [9].

For protection of the economic benefits, Azerbaijan, Kazakhstan, Georgia and Ukraine signed in Baku January 14 2016, a protocol on setting competitive preferential tariffs for cargo transportation via the Trans-Caspian International Transport Route [2].

By analysis of the transport expert and deputy editor of the Rynek Kolejowy magazine, Michał Grobelny, the territory of Poland is very attractive to passing for this long train with cargo on the west Europe. It is shown that the route through Romania could be an option, but it does not have a sufficient infrastructure. This can help to initiative this train to the Polish territory to the Slawków by PKP LHS broad-gauge track. The route from Slawków through Ukraine is the easiest and most convenient, the expert said. However, this option has its drawbacks [5].

If this train had the start point from West Europe on this route the cargo needs two changes of reloading to the different rail gauge (1435/1520mm on Polish – Ukraine border and 1520/1435mm on Kazakhstan – China border) and four reloading for changes the modes of transport (from rail to the ferry and from ferry to the rail on the Black Sea on the Ukraine- Georgia route also from the rail to the ferry and from the ferry to the rail on the Caspian Sea on the Azerbaijan- Kazakhstan route).

The costs of transport on this corridor was shown by the Chinese Xinhua press agency. They compared the costs of the new connection to the costs of shipping by sea ships. They showed that costs of shipping a 40-foot container by train (and ferry) costs about $8,900, according to Ukraine’s State Railway Service. The costs of entirely by sea were about 30 percent lower [40].

On 8 February 2016, the second freight train consisting of 32 cars with the cargo consists of food and drugs officially known as Trans-Caucasus-Asia transport corridor or New Silk Road left the Ukrainian port of Illichivsk and arrived in Georgia on February 10. On 11 February 2016, it arrived at the Baku in Azerbaijan. There, after separation of one wagon from the Baku port it will be sent to Aktau the rest of 31 wagons will be sent to Turkmenbashi [1], [28].

2. DEFINITION OF THE PROBLEMS

Suppose, a priori, that one day a customer will request the Polish State Railways PKP to move through the territory of Poland with the train with 108 wagons to the Ukrainian port at the Black Sea.
As the start point, we should analyze the rolling stock use for this transport. Based on the images from the first and the second trails of the containers trains, we see that platform container wagons type S were used. This kind of wagon is capable of carrying a combination of 3 20-foot containers, or 1 40-foot container and 1 20-foot container, or a single 45-foot container. The length of this wagon is 19740 mm with bumpers [30].

A short analysis shows that if all 108 wagons will be included in one freight train, its length will be 2332 meters and with the length of the longest locomotive type in Poland PKP class ET41 31,860 m it will give us the total length of 2163,78 m.

The next problems are bad conditions to crossing the borders and bad conditions of the intermodal terminals. Very long time of waiting at borders and bad existing multimodal infrastructure limited capacity of this corridor [48].

Very important are conditions of the existing limitations of the axle load on analyzed Gdańsk Odessa. The maximal load per axle on Polish Railroads are 225 kN, on Ukrainian Railroads is 250 kN. These parameters had in 2004 only 30% of length of the railways on this corridor [49].

Another problem is the law regulations on the Polish Railroads. The Instruction of moving the trains on the PKP railroads, later called Instruction R-1, from 29 May 2001 in paragraph § 28.pkt 4. limits it to 600 meters and is possible to use longer but no more than 750 meters with special conditions [25].

Another problem is the maximal mass. The limit of mass on Polish railways for a single train is 3000 tons gross mass. Bigger trains need a special route planning procedure.

That is a great problem for a network of Polish Railroads.

The infrastructure of the Polish Railroads is not ready to follow the move the freight trains with a length of more than 750 meters. That could decrease the competitiveness of the Polish economy.

3. THE POSSIBLE SOLUTIONS

The desire to use freight trains with a length of more than 750 meters in Poland allows the proposition of some solutions to this problem. As the first I propose to analyze the necessity of using the super length freight trains.

In Poland, the main directions of moving the cargo on the railroads are on the direction south- north (Fig.2). The concentrated point is the region of Upper Silesia linked with sea ports (Szczecin, Świnoujście, Gdynia, Gdańsk) and the capital city of Warsaw and others Wrocław and Poznań and also to the main border cross point for cargo to the east site Malaszewice through Dębliń. This linked with the positions of the five transport transit corridors, four of which have their starting point on the Upper Silesia [21].

1) State border – Chałupki – Gdańsk Port Północny/Gdynia Port – Chałupki → State border,
2) State border – Chałupki – Świnoujście – Chałupki – State border,
3) State border – Kunowice – Malaszewicze – State border – Kunowice – State border,
4) State border – Medyka – Zebrzydowice – Granica Państwa – Medyka – State border,

We should remember that there are two main international corridors in Poland based on the railway lines from west to east. E-20 from German capital city Berlin to Minsk on Belarus through Poznań and Warszawa and also E-30 from German city Dresden to Ukrainian city Lvov through Wrocław, Katowice, Kraków and Przemyśl. These rail lines are preparing for the fast trails of passengers and freight trains.

Another possibility to use the long freight trains is the creation of new transport corridors:

Fig. 2. Medium numbers of freight trains per one day in 2012 [15]

Amber Rail Freight Corridor No 11 linked the Port of Koper in Slovenia, through western Hungary to Slovakia and Poland’s industrial centers and border with Belarus by Terespol [22], [26], [29], [31].

Via Carpathia, international transport corridor through the Carpathians from the Baltic to the Aegean Sea based on the road transport. Ukraine joined this Polish initiative [23], [36].
However, the quick view for the map shows that if the Via Carpathia is based on the road transport rail lines are placed parallel to the road. That opens the possibility in the future to create a new rail corridor. Economic benefits from both these new corridors strongly depend on the interest of the partnerships of several countries.

For the opposite site, we must take into account the traffic of passengers. On this map (Fig. 3), we see that the most popular are several directions from Upper Silesia to the capital city of Warsaw, and to east site by E039 rail line to Przemyśl and later to Poznań and Szczecin through Wroclaw. Each big city agglomeration in Poland is the concentration point for its region.

Fig. 3. Medium numbers of passengers trains per one day in 2012 [15]

To use freight wagons with the maximal payload on board, it is necessary to have a good axle load on the tracks (Fig. 4). In Poland, the maximal axle load is 225 kN/axle. Only the highest parameters of the axle load on the tracks can help to use the full payload on the rail wagons. All lower needs reduction of the cargo on the wagons.
Another point for analysis is the opinion of autonomous cargo transport companies out of the PKP PLK. On 2011, the PKP PLK directories asked the licensed autonomous cargo transport companies out of the PKP PLK about those preferences of maintenance and the repair of the railway lines in Poland (Fig. 5). The autonomous cargo transport companies shown a several rail lines as the priorities for betterment of their properties.

Fig. 4. The maximal axle load on Polish railways [24]
4. DISCUSSION

The European Union suggests using long freight trains but the problem is the real possibilities of the rail tracks. In 2005, there was a pilot trail of the long train, 1000 meters with 101 containers, from China to Germany through Poland [20]. To prepare the passage for this train a special timetable was made. After this journey, it was never repeated. In 2013, the FERRMED a non-profit multisectoral association to improve rail freight transportation and industrial competitiveness in Europe [38] presented in the EU Parliament the proposition to
implement the FULL FERRMED Standards in the whole EU, with freight trains reaching 1,500 m length and 3,600 to 5,000 tons, with UIC-C loading gauge and 22.5 ÷ 25 tons per axle [12]. That was analyzed in Poland on the trade fair “Infrastruktura” 24-25 December 2013 in Warsaw and later in 2014 [19], [34]. In 2015, tests were completed for the MARATHON test train operating with a diesel locomotive that had a total length of 1 524 m – the longest freight train in Europe [14].

The present condition of the political and the economic relationships in the world suggest to analyze the impact of the financial crisis from 2008. The crisis caused the so-called slow floating, free flowing, and the suspension of ordering of large container ships. This crisis changed the numbers of companies in marine transport. They started to build bigger container ships. One of the reasons was a slight increase in demand for cargo containers from China, by about 3-5 percent as compared to the double-digit rate in previous years. In this way, the market experienced a slowdown in that country's economic growth and exports as well as the government-pursued policy of greater sales on the internal market. In mid-2012, one can observe the suspension of supply of new container ships with a capacity of over 10 thousand TEUs, which should be delivered in the second half of the year. The analyses of the trade press emphasized that many owners delayed the introduction of these units to service, both because of the bad financial situation, as well as little increase in the demand for freight in a situation where there was already a relative balance between the supply and demand [32].

Their capacity was increased to 20,000 TEU. Another clear trend in the last few years was the creation of alliances aimed at improving efficiency through better filling of mega-container ships [10].

Since 2010, we have seen a lot of alliances of marine container carriers for better use of space on vessels serving the same routes. They started to build bigger and bigger container ships. Very shortly, the capacity of container ships was extended to 20,000 TEU. The alliances of the container ship owners were used to make better use of space on vessels serving the same routes [10].

In March 2015, the Maersk Line’s chief executive, Søren Skou, said: “I’m personally more towards the low end of that. Growth from a historical perspective is quite sluggish. It has a huge impact for us as an industry” [17]. In August 2015, information was obtained from China that a depression started on the stock exchange market [6]. In October 2015, it was confirmed according to official data, China’s GDP grew in the third quarter. 6.9 percent. - The worst result in six years [7]. The opinion of Mr. Skou was confirmed in October 2015. In this time was symptoms of small (?) problems to find a cargo for these big ships. Maersk decided to stop the use of one of 20,000 TEU container carriers [33].

The last news suggests that the condition of the economics of China data signal deepening slowdown that can potentially being the third leg of the global financial crisis [4],[37]. This is confirmed by information from the shipping company Maersk Line. In February 2016, Maersk Line warned that the combination of factors was producing market conditions “significantly worse” than during the 2008-09 financial crisis [17]. Today the capacity of the whole fleet in the world of the big container ships have created excess capacity. It means that obsession to build the biggest container ships could be ending [39]. This means that will be increasing the competition about the cargo between the shipping companies and increasing the cartelization process [10].
5. CONCLUSION

The desire to use the super long freight trains in Poland needs to change a law condition for this, reconstruction of several stations to obtain capacity for the long train. The first step should be a study of possibility and analysis of the demand. If there is enough demand, it should be started to change the law regulation and prepare the infrastructure.

Based on the suggested connections of the trains bypassing Russia in Brześć, Sławków and Medyka [42], we see that there are the possible the final points for the long freight trains from the west Europe or the possible start points from the east Europe to the west.

The map shows that is one more possible border point for reloading the cargo from standard gauge wagons to the wide gauge wagons. It is placed in Werechata where is the border checkpoint with Ukrainian city Rawa Ruska (ukr. Рава-Руська) near Hrebenne on the Polish side.

Here, it is possible to choose a new route for this long freight train the main properties which should have this line should have:

1) A chosen route should protect the normal traffic of the rest of the freight and passenger trains on the network of the railroads with the minimal disturbances. There could be a competition for moving of the long freight train on the main rail tracks.
2) A good axle load on the whole route,
3) A sufficient length of the tracks on the railway stations to be capable of 108 wagons in one train,
4) A chosen route should protect the network of the railroads against possible disturbances after the failures under the time of the thoroughfare of this long freight train,
5) A chosen timetable for this long freight train should evoke the minimal the possible disturbances after the failures under the time of the thoroughfare of this long freight train,

But the fundamental question is: Is there a sufficient volume of the cargo to form the long freight train to pass through the territory of Poland?

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