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To Reduce Tariffs for Ultra-Long Distances

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Annotation*: The article deals with the issue of the relevance of using the methods of the Uniform Transit Tariff (UTT) and the International Transit Tariff (ITT) along the route station Stockholm (Sweden) - station Ust-Kamenogorsk (Kazakhstan). The comparison of freight charges was made when organizing container shipments. The analysis made it possible to identify critical points when comparing methods for determining the freight charge.*

Key words*: Uniform Transit Tariff (UTT), International Transit Tariff (ITT), freight charge, freight container, Rail-Atlas software package, Rail-Tariff.*

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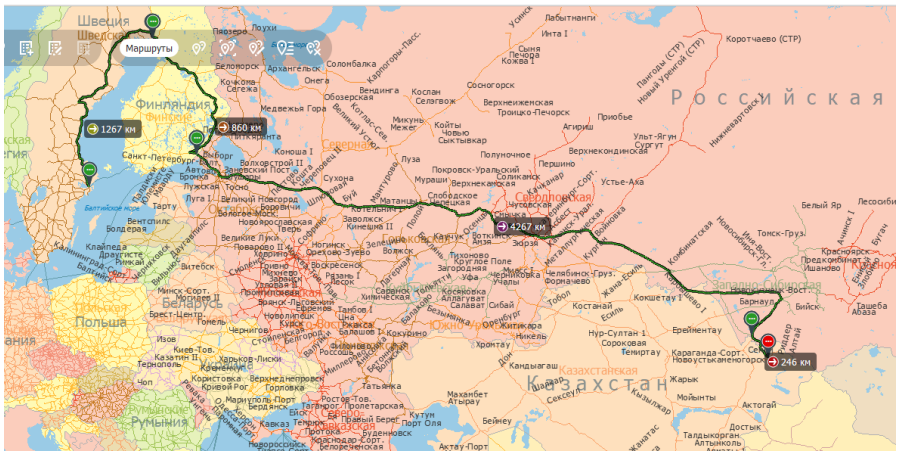
I. METHODOLOGIES FOR DETERMINING THE CARRIAGE FEE

Currently, tariffs for freight transportation in the main rail transport system are determined based on several methods: Rail Atlas and Rail Tariff; methodology of the unified transit tariff (UTT); methods of international transit tariff (ITT). These methods were created in the early 50-60s of the last century and reflected the economic situation of developed countries. With the development of production, the increase in freight turnover and the volume of transportation, adjustments were made to specific tariff rates. This eventually led to an increase in freight rates. This is a deterrent to the development of production, on the other hand, the need for freight transportation is increasing. As a result, we have a discrepancy between traffic volumes and freight rates. Since the methodology based on Rail Atlas and Rail Tariff cover the railways of the CIS countries, in this article we will present a comparison of tariffs using the UTT and ITT methods.

The Uniform Transit Tariff (UTT) contains: tariff rules for calculating carriage charges and additional fees, an alphabetical list and nomenclature of goods, distance tables and calculation tables. The Uniform Transit Tariff provides instructions on the application of the rules and rates of internal tariffs of railways participating in the SMGS in the cases provided for by the Agreement. The single transit tariff is applied in order to create the most favorable tariff conditions for goods transported in transit through countries whose railways participate in the SMGS. According to the Rail-Atlas software package, we choose the most optimal freight train route. The total length of the route was 6640 km, of which:

- Swedish railways – 1267 km;
- on the railways of the Republic of Finland– 860 km;
- on the railways of the Russian Federation - 4267 km;
- on the railways of the Republic of Kazakhstan - 246 km.

Imagine border stations along the route of a freight train. Border station of Sweden - Haparanda Gr.; Finnish border stations: Tornio (exp.) – Vainikkala (exp.); Border stations of Russia: Buslovskaya (exp.) - Lokot (exp.); Border station of Kazakhstan - Lokot (exp.)



Fig, 1. Freight train route Stockholm - Vertan (Sweden) station. – Ust - Kamenogorsk station. (KTZ)

Determination of the freight charge according to the method of the Uniform Transit Tariff (UTT) for container shipments

Departure station: Stockholm - Vertan (Swedish railway); Destination station: Ust - Kamenogorsk (KTZh); Transported cargo - cars; Cargo code - according to ETSG 381087; Sending - container.

Having chosen the optimal route for the transportation of goods, we will determine the freight charge, according to the ETT method, along the route station Stockholm station - Vertan - Ust – Kamenogorsk station. Tables 1 - 5 present the calculations of the freight charge for the specified route. Carriage fee Stockholm st.- Vertan - st. Haparanda Gr. St., CHF. The distance in Sweden is 1267 km. (Fig.2).

T = 899.0 + 450.0 = 1349.0 ChF

Table 1

Determination of the freight charge under the scheme with a tariff break, Stockholm station - Vertan - Haparanda Gr station., Swedish Railway

Distance, km	Loaded				Empty			
	container category				container category			
	10 feet	20 feet	30 feet	40 feet	10 feet	20 feet	30 feet	40 feet
	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,
1250 - 1349	450	**899**	1349	1798	225	**450**	674	899

Note: Unified tariff and statistical nomenclature of goods (UTSNG).

Fig.2. Freight train route

Stockholm station –Vertan–Haparanda Gr station, Swedish Railway

Carriage fee Tornio station (exp.) - Vainikkala station (exp.), ChF. Distance in Finland - 860 *km, (Fig,3)*

T = 594.0 + 297.0 = 891ChF

Table 2

Determination of the freight charge under the scheme with a tariff break, Tornio (exp.) st. - Vainikkala (exp.) st., railways of the Republic of Finland

Distance, km	Loaded				Empty			
	container category				container category			
	10 feet	20 feet	30 feet	40 feet	10 feet	20 feet	30 feet	40 feet
	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,
855 - 864	297	**594**	891	1188	149	**297**	446	*594*

Fig.3. Freight train route Tornio station (exp.) - Vainikkala (exp.) station, railways of the Republic of Finland

Carriage fee station Buslovskaya (exp.) st.– Lokoth st.(exp.) ChF. The distance across Russia is 4267 *km*, (*Fig. 4*).

T = 3970.0 + 1485.0 = 5455.0 ChF

Table 3

Determination of the freight charge according to the scheme with a tariff break, Buslovskaya (exp.) st., RZD – Lokoth st. (exp.), KTZ.

Distance, km	Loaded				Empty			
	container category				container category			
	10 feet	20 feet	30 feet	40 feet	10 feet	20 feet	30 feet	40 feet
	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,
4250 - 4349	1485	**3970**	4455	5940	743	**1485**	2228	2970

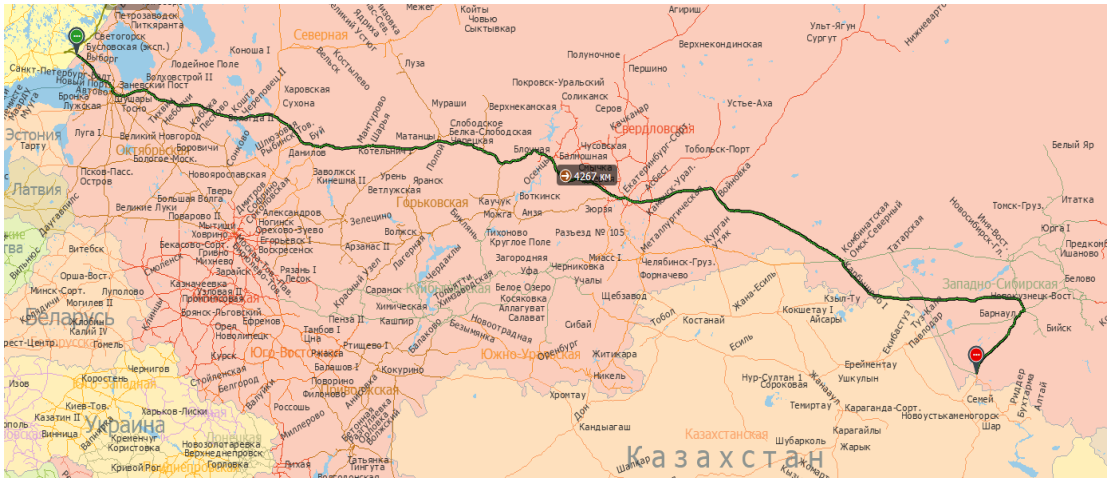


Fig.4. Freight train route
station Buslovskaya (exp.), RZD - station Lokot (exp.), KTZ

Further, the freight train passes to the railways of the Republic of Kazakhstan. The fare on the route Lokot st. (KTZ) - Ust-Kamenogorsk st. (KTZ) is determined in Swiss francs, ChF. The tariff distance on the railways of the Republic of Kazakhstan is 246 km (*Fig. 5*).

T = 174.0 + 87.0 = 261.0 CHF

Table 4
Determination of the freight charge according to the scheme with a tariff break, Lokoth st. (KTZ) - Ust - Kamenogorsk st. (KTZ)

Distance, km	Loaded				Empty			
	container category				container category			
	10 feet	20 feet	10 feet	20 feet	10 feet	20 feet	10 feet	20 feet
	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,
245 - 254	87	**174**	261	348	44	**87**	131	174

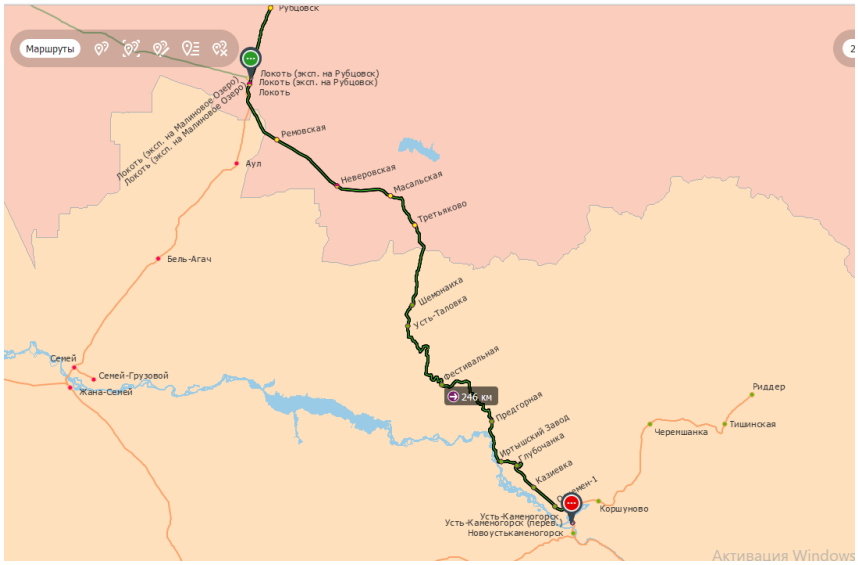


Fig.5. Freight train route
Lokot station (KTZ) - Ust - Kamenogorsk station (KTZ)

Then the total freight charge according to the scheme with a tariff break according to the method of the Uniform Transit Tariff, along the route Stockholm station - Vertan station (Swedish railway) - Ust - Kamenogorsk station (Kazakhstan temir zholy) will be:

T = 1349.0 + 891.0 + 5455.0 + 261.0 = 7956.0 ChF

Table 5
Determination of the carriage charge according to the through-handling scheme according to the Uniform Transit Tariff (UTT) method

Distance, km	Loaded				Empty			
	container category				container category			
	10 feet	20 feet	10 feet	20 feet	10 feet	20 feet	10 feet	20 feet
	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,
6601 - 6800	2316	**4631**	6947	*9262*	1158	**2316**	3473	*4631*

Carriage fee according to the scheme of a through shoulder along the route, Stockholm station - Vertan station - Ust – Kamenogorsk station, *ChF*. The total transportation distance is 6640 km.

T = 4631.0 + 2316.0 = 6947.0 ChF

Determination of the freight charge according to the methodology of the International Transit Tariff (ITT) for container shipments

This Tariff applies to shipments of goods transported by railways - participants of this Tariff on the basis of the Agreement on International Rail Freight Transport (SMGS). of the Uniform Rules for the Agreement on International Carriage of Goods by Rail (CIM) or other transport law, with the exception of the transportation of goods to (from) the Socialist Republic of Vietnam, China, the Democratic People's Republic of Korea, Mongolia in transit by rail, which are simultaneously participants in the International Transit Tariff (ITT).

The distance by railways in Sweden is 1267 km. Stockholm station - Vertan station - Haparanda Gr station.

Table 6
Determination of the freight charge according to the tariff break scheme according to the ITT method, Stockholm station - Vertan station - Haparanda Gr station, ChF.

Distance, km	Loaded				Empty			
	container category				container category			
	10 feet	20 feet	10 feet	20 feet	10 feet	20 feet	10 feet	20 feet
	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,
1251 - 1300	984	**1966**	2752	3538	492	**982**	1376	1769

Carriage charge according to the tariff break scheme according to the ITT method along the route Stockholm station - Vertan station - Haparanda Gr. station in Swiss francs will be

1966.0+987.0=2948.0 ChF.

Railway distance of the Republic of Finland Tornio station (exp.) - Vainikkala station (exp.) – 860 km.

Table 7
Determination of the freight charge according to the tariff break scheme according to the ITT method, Tornio station (exp.) - Vainikkala station (exp.), ChF

Distance, km	Loaded				Empty			
	container category				container category			
	10 feet	20 feet	10 feet	20 feet	10 feet	20 feet	10 feet	20 feet
	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,	ChF/ cont,
851 - 860	814	**1628**	2279	2930	407	**814**	1139	1466

Carriage charge according to the tariff break scheme based on the MTT methodology along the route Tornio station (exp.) - Vainikkala station (exp.) in Swiss francs will be

1628.0+814.0=2442.0 ChF.

Similarly to the previous calculation, the fare for the route station Buslovskaya (exp.) - station Lokot (exp.) in Swiss francs will be 3855.0 ChF. On the railways of the Republic of Kazakhstan – 700,0 *ChF*. Carriage charge according to the tariff break scheme based on the ITT methodology along the route Stockholm station - Vertan station - Ust – Kamenogorsk station, *ChF*.

T = 2948,0 + 2442,0 + 3855,0 + 700,0 = 9945,0 ChF

Carriage charge according to the through shoulder scheme according to the ITT method along the route Stockholm station - Vertan station - Ust – Kamenogorsk station, CHF. Total transportation distance - 6640.0 km

T = 3047.0 + 1524.0 = 4571.0 ChF

Boundary conditions according to the Common Transit Tariff methodology: Sweden (st. Stockholm - st. Vertan - st. Haparanda Gr.) - 1349.0*ChF*; Finland (station Tornio (exp.) - station Vainikkala (exp.) - 891.0*ChF;* Russia (station Buslovskaya (exp.), Russian Railways - station Lokot (exp.), KTZh) – 5455,0*ChF* ; Kazakhstan (st.Lokot (KTZh) - st.Ust - Kamenogorsk (KTZH) – 261,8*ChF*. Total – 7956,0*ChF*. Critical points on the graph according to the ETT method: the minimum freight charge - 1360.0 ChF, at a distance – 664,0 km; the maximum fare is

13894,0 ChF, at a distance of 6640,0 km; The difference between the minimum and maximum fares is 12534,0 ChF.

Boundary conditions according to the methodology of the International Transit Tariff: Sweden (st. Stockholm - st. Vertan - st. Haparanda Gr.) – 2948,0*ChF*; Finland (station Tornio (exp.) - station Vainikkala (exp.) – 24242,0*ChF*; Russia (station Buslovskaya (exp.), Russian Railways - station Lokot (exp.), KTZh) – 3855,0*ChF* ; Kazakhstan (st. Lokot (KTZ) - st. Ust - Kamenogorsk (KTZ) – 700,8*ChF*. Total – 9945,0*ChF*. Critical points on the graph according to the MTT method: the minimum minimum carriage charge – 3798,0*ChF*, at a distance – 664,0 km; maximum fare – 9142,0*ChF*, at a distance – 6640,0 km; the difference between the minimum and maximum fares is – 5344,0*ChF*. The calculation results are shown in Table 6, which show the efficiency of determining the freight charge using the through-arm method.

Table 6

Comparison of methods for determining the freight charge, ChF

№	The country	Stations participating in the transporta-tion process	Tariff distance, km (round trip)	Methodology of the Common Transit Tariff (UTT)		International Transit Tariff Methodology (ITT)	
				according to the scheme with a tariff break	through-shoulder scheme	according to the scheme with a tariff break	through-shoulder scheme
1	SWE	Stockholm - Vertan Haparanda gr.	1267,0	1349,0	-	2948,0	-
2	FIN	Tornio (exp.) Vainikkala	860,0	891,0	-	2442,0	-
3	RU	Buslovskaya (exp.) Lkot (exp.)	4267,0	5455,0	-	3855,0	-
4	KAZ	Lokot (exp) Ust – Kameno-gorsk	246,0	261,0	-	700,0	-
5	**Total:**		6640,0	**7956,0**	**6947,0**	**9945,0**	**4571,0**

The through-shoulder methodology will reduce the tariff or freight charge for customers by (6947.0 – 4571.0) **2376.0***ChF*, which makes it possible to attract customers to the railway and increase the competitiveness of rail transportation. Calculations were made for one platform, on which two heavy-duty 20-foot containers are placed.

The author of the article received a security document for the supranational currency EuroNur (*Fig.6*). The proposed currency, for theoretical reasons, is used to determine the freight charge in the system of intermodal and multimodal transportation. For example, when determining the tariff for freight transportation along the route Dostyk station (Kazakhstan) - Bandar-Abbas station (Iran) (*Fig.7*). Nursultan Nazarbayev believes that the world needs a reform of the monetary system - in his opinion, the dollar cannot "hold on for so long", he said on the air of the documentary film "Qazaq: the story of the golden man", NUR.KZ correspondent reports. Figure 6 shows the label of the supranational currency and the route from China to the station and the port of the same name Bandar Abbas (Iran).

Fig.6.Label (trademark) EuroNur

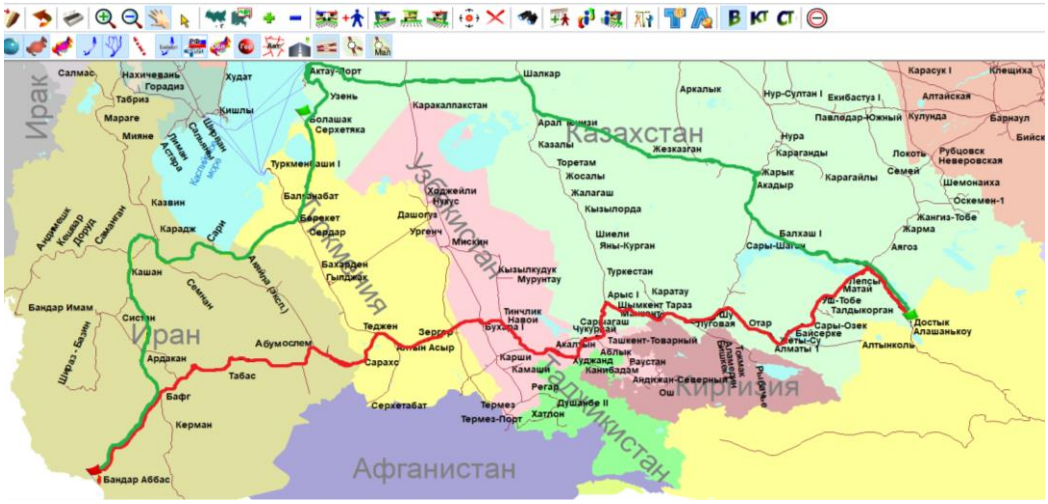


Fig.7. Label and Route scheme Dostyk st. (Kazakhstan) –Bandar-Abbas st. (Iran)

Calculations show that the use of the through-arm method along the route station Stockholm - station Vertan - Ust-Kamenogorsk station gives a significant economic effect. Let's go into more detail about what we are talking about. The introduction of the through shoulder method reduces the tariff for freight transportation, which means it creates more favorable conditions for railway customers. At the same time, it should be noted that the proposed methodology allows, if necessary, to increase the tariff and receive additional revenues to the budget. It depends on the specific conditions of the organization of transportation of bulk cargo. Let's imagine calculations using the supranational currency EuroNur, table 7.

Таблица 7

Comparison of methods for determining the freight charge, €N

№	The country	Stations participating in the transporta-tion process	Tariff distance, km (round trip)	Methodology of the Common Transit Tariff (UTT)		International Transit Tariff Methodology (ITT)	
				according to the scheme with a tariff break	through-shoulder scheme	according to the scheme with a tariff break	through-shoulder scheme
1	SWE	Stockholm - Vertan Haparanda gr.	1267,0	1304,983	-	2851,809	-
2	FIN	Tornio (exp.) Vainikkala	860,0	861,927	-	2362,319	-
3	RU	Buslovskaya (exp.) Lokot (exp.)	4267,0	5277,008	-	3729,215	-
4	KAZ	Lokot (exp.) Ust – Kameno-gorsk	246,0	252,483	-	677,159	-
	Итого		6640,0	**7696,403**	**6720,326**	**9620,504**	**4421,85**

In the tariff policy for determining freight charges, there are three schemes for differentiating tariffs. One of the key places is to determine the location of the critical point, allowing to encourage or deter freight traffic. The proposed article explores the theoretical provisions of the critical point, which will reduce the tariffs for freight transportation in the organization of ultra-long-distance transportation (the system of intermodal and multimodal transportation).

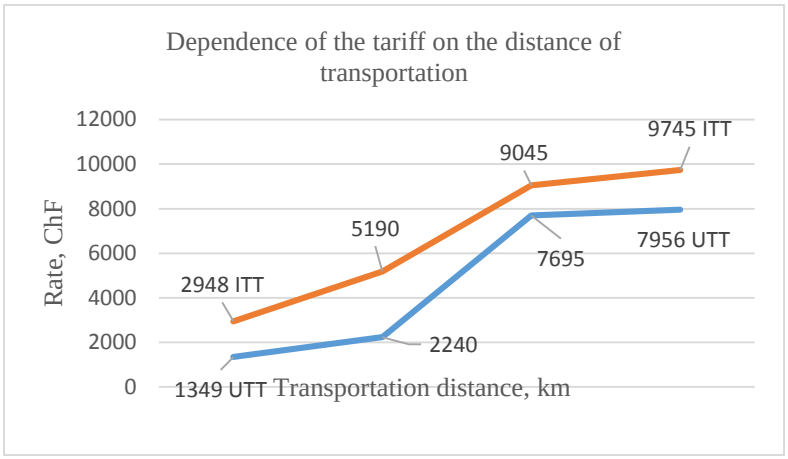


Fig. 8. Dependence of the tariff on the distance of transportation according to the methods of UTT and ITT

The presented graphs clearly show that the tariffs for freight transportation according to the International Transit Tariff method are much higher than the tariffs calculated according to the Uniform Transit Tariff method. The following scheme for determining the freight charge based on the presented methods is proposed (Fig. 8-9).

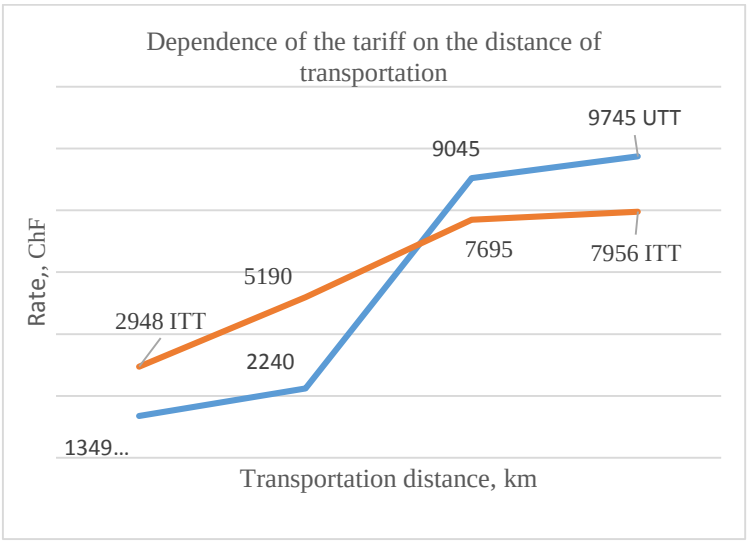


Fig.9. Influence of the average transportation distance on the tariffs according to the UTT and ITT methods.

We purposefully changed the dependence of the tariff on the transportation distance: at a distance of more than 3000.0*km* and 5000.0*km*, the tariff should decrease, since with an increase in the distance above the average transportation distance, the tariff decreases. This is shown in Chart 9. According to calculations, for an average transportation distance of more than 4,000.0*km*, unit tariff rates decrease and this is reflected in the tariff value. The intersection of the graphs of the dependence of the freight charge on the distance of transportation indicates the value of the average distance of transportation of bulk cargo and gives grounds for adjusting tariffs for freight transportation (Fig. 10).

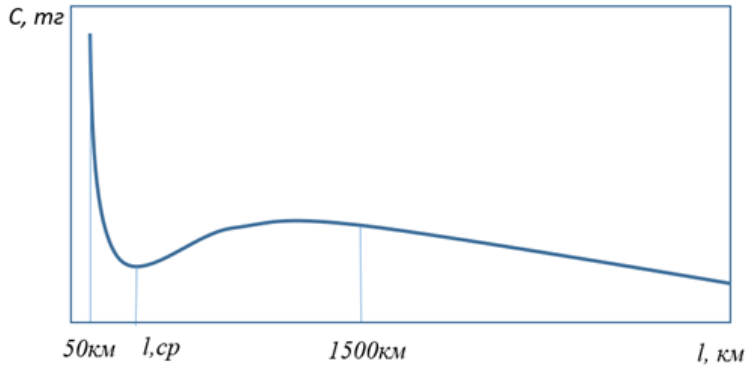


Fig.10. Scheme of the second type of differentiation

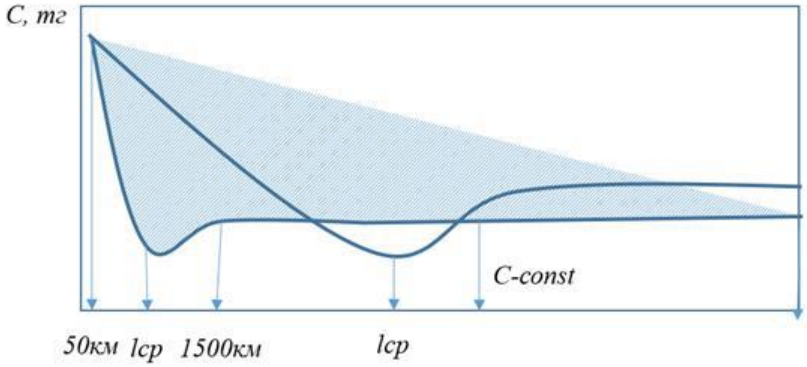


Fig.11. Change in tariff rates from the average distance of transportation

From the presented figures 10-11 it can be seen that an increase in the average distance of transportation of various bulk cargoes significantly changes the distribution of unit tariff rates, and therefore, freight charges in the international transportation system. On the one hand, the cost of transportation increases with the distance of transportation, up to the average distance of transportation. On the other hand, it decreases significantly when the transport distance exceeds the average transport distance. If possible, when calculating the tariff for freight transportation, it is proposed to use the supranational currency EuroNur.

The presented graphs of changes in freight charges according to the methodology of the Uniform Transit Tariff (UTT) and the International Transit Tariff (ITT) show the position of the critical point (Fig. 11). If, a priori, we assume that this position of the critical point corresponds to the average transportation distance, then in the scheme of the second type of differentiation, changes in the unit rates can be introduced. Then the unit tariff rates will decrease at a transportation distance of 3600 km; in case of exceeding the specified average distance of cargo transportation, unit tariff rates will remain constant. Such a change in the schemes of the second type of differentiation contributes to the reduction of the tariff (freight charge) in the organization of ultra-long hauls.

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