

COMPARATIVE ANALYSIS OF THE COST OF PORT TUGS SERVICES

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ABSTRACT

The author presents a comparative analysis of tariffs for provision of tugs for berthing and deberthing of large-capacity vessels in the ports of Murmansk, Novorossiysk, Rotterdam. The situation is simulated, during which it is necessary to deberth the vessel with the specified parameters in the mentioned ports, the cost of such berthing is

calculated, the port is determined where the berthing service will be the cheapest. The summary table allows to draw a conclusion about the positive significance of competition among port companies servicing international and long sea routes for client ships, which, due to the availability of competing parties, receive more favorable tariffs for services in the port.

Keywords: international port, sea transport, tugs, cost, tariff, deadweight, berthing, deberthing, bulk vessel.

Background. Daily in the ports around the world there are tens of thousands of berthing and deberthing operations. Berthing is the process of placing the vessel to the berth, mooring buoys and other structures intended for moorage, as well as to another vessel. In turn, deberthing is departure of the vessel from the object to which it was berthed [1].

Berthing and deberthing of large-capacity vessels in ports is often impossible without the involvement of tugs belonging to private companies or port facilities. Traditionally, operations involving tugs are one of the most expensive for vessel owners when entering a port and placing to a berth for loading and unloading. In some ports, their cost can be 90 % of the cost of the whole vessel call.

From this point of view, I think it would be interesting to conduct a comparative analysis of tariffs for provision of tugs for berthing operations in three distinctive ports: Murmansk is one of the most developed ports of the Russian Arctic, Novorossiysk – the largest in Russia, and the port of Rotterdam – the largest in Europe and located in a cohort of world leaders.

Objective. The objective of the author is to provide comparative analysis of the cost of tugs services in the ports of Murmansk, Novorossiysk and Rotterdam.

Methods. The author uses general scientific methods, comparative analysis, evaluation approach, statistical method, graph construction.

Results.

1.

Among the economies in the port of Murmansk, only Murmansk Sea Fishing Port JSC can boast of its own tugs, there are two of them – «Bezootkazny» and «Bystry», with a capacity of 1600 hp each. (1176,82 kW) each. The price of providing one service for berthing and deberthing for both Russian and foreign vessels in cabotage and foreign shipping is 1,87 rubles per 1 cu. m of the conventional volume of a towed vessel (without VAT) in accordance with the Price List 11–01–50–02 [2]. The conditional volume of a towed vessel (in cubic meters) is calculated as the product of the greatest length, width and height of its side. However, such a tariff is applied only when tugs are operating in the water area of JSC MSFP. When berthing and deberthing outside its borders, the hourly tariff is 18000,00 rubles per hour (excluding VAT) [2].

It should be noted that JSC MSFP offers the best price for towing services in the port of Murmansk. However, it is clear that two tugboats are physically unable to meet the needs of vessels that require berthing, deberthing, rearrangement, and besides,

referring to Annex No. 2 to the Mandatory Regulations in the Murmansk seaport, approved by the order of the Ministry of Transport of the Russian Federation dated 12.08.2014 No. 222, the fact that only vessels with a certain deadweight can use the services of tugs with a capacity of 1600 hp will become obvious. For example, bulk carriers with deadweight from 14001 to 28000 tons while berthing operations necessarily need at least two tugs with a capacity of 1320 kW each [3], which limits for the tugs of JSC MSFP the possibility of their use.

What kind of tugs can the vessel owner use if he needs to berth the vessel in Murmansk with these characteristics?

The main provider of towing services in the port of Murmansk is the shipping company MASKO – the former port fleet of the Murmansk Commercial Sea Port [4]. At the disposal of CJSC MASKO since 23.03.2016 there are 10 tugs of different capacities. Tariffs are modular and hourly. For towing ships at berths No. 2–19 of PJSC Murmansk Commercial Sea Port modular tariffs are used, presented in Table 1.

For towing vessels under the flag of the Russian Federation in cabotage navigation at berths No. 2–19 of PJSC MCSP the tariffs shown in Table 2 are in force.

Modular tariffs for tug services (per one operation) are charged per 1 cu. m of the vessel's conditional volume. In addition, when berthing operations are performed at berths that do not belong to the berths of PJSC MCSP, hourly tariffs are applied in the road, road stead and shore

Table 1
Modular tariffs for tugboat services for vessels at berths No. 2–19

Type of operation	Tariff (USD per 1 cu. m)
Berthing	0,095
Deberthing	0,095

Table 2
Modular tariffs for tugboat services for vessels under the flag of the Russian Federation in cabotage navigation at berths No. 2–19

Type of operation	Tariff (RUB per 1 cu. m)
Berthing	5,45
Deberthing	5,45



Table 3

Hourly tariffs for tugboat services for berthing operations at other berths (including at the berth of the Maritime Station «Rosmorport»), in the road, road stead and shore terminals of the Murmansk seaport water area

Tugs		Tariff (rub./h)
Name	Capacity	41 880
«Helios», «Grumant»	3729 kW / 5070 hp	
«Pak»	3374 kW / 4500 hp	
«Bizon», «Mechanic Frolov», «Kapitan Shebalkin»	3132 kW / 4200 hp	
«Kildin», «Kanin»	2550 kW/ 3420 hp	38 710
«Buran»	1854 kW/ 2520 hp	31 840
«Kovdor»	1180 kW / 1600 hp	24 574

Table 4

Tugboat services of JSC NCSP Fleet at a cost depending on the conditional volume of the vessel entering the port for loading and unloading [6]

Name of services	Vessel's flag		Note
	Russian	Foreign	
	USD per 1 cu. m of the conditional volume of the vessel		
Vessel's berthing or deberthing	0,060	0,075	The conditional volume of the vessel is determined by the product of its largest length, width and height of the side in meters.
Vessel's shifting within one cargo area of the port	0,092	0,115	
Vessel's shifting from one cargo area of the port to the other area	0,120	0,150	
Vessel's deberthing, following to the recess area	0,060	0,075	
Vessel's berthing, following from the recess area	0,060	0,075	

terminals of the port of Murmansk, the size of which depends on the capacities of the tugboats involved. A full list of tariffs and corresponding capacities is presented in Table 3.

Suppose that the bulk carrier going after the loading in Murmansk to the Netherlands, on 01.04.2016, should be berthed at the berth of JSC MSFP. Characteristics of the vessel: length –

180 m, width – 30 m, height of the side – 15 m, deadweight – 25000 tons. We will calculate how much should be paid by the vessel owner for tugboat services for berthing the vessel at the given berth. So, according to the deadweight of the vessel for its berthing, it is required to attract at least two tugboats, each with a capacity of not less than 1320 kW. That is, it is not possible to use

Table 5

Tugboat services of JSC NCSP Fleet with hourly pay*

Name of services	Capacity of tugs	Vessel's flag	
		Russian	Foreign
		USD per 1 hour of service provision	
1. Shifting of a vessel or other floating object along the berth (without changing the berth's number).	Up to 300 hp (220 kW)	202,00	252,00
2. Tug services to vessels entering the port for purposes not related to loading / unloading (ships of the Navy, passenger ships, as well as vessels going to repair, which are under repair, coming out of repair).	301–1200 hp (221–882 kW)	336,00	420,00
3. Tug services for towing non-self-propelled floating objects (floating cranes, floating laboratories and workshops).	1201–2700 hp (883–1985 kW)	538,00	672,00
4. Tug services for setting, removal, towing of bars, not related to emergencies.	Above 2701 hp (above 1986 kW)	1156,00	1444,00
5. Tug services, uncompleted not through the fault of the contractor, other services.			
6. Tug services, including in the roadstead, bunker vessels.			

* The time for rendering the services of each tugboat is taken into account separately. It is calculated from the moment when the tug begins to move to the place of service or when the tugboats are operating according to Table 4 with the time when the tugboat is at the side of the serviced vessel exceeds 3 hours, and ends with the moment of return of the tugs to the base berth or the moment when the tugboats start to move to another place of service.

the services of tugboats of JSC MSFP. Among the tugs of PJSC MASKO at a minimum price, it is possible to use the tugboats «Kildin» or «Kanin» and «Buran». We will designate the berthing time as 2 hours. Since the berth to which berthing is planned to be made does not belong to the berths of PJSC MCSP, in this case, when calculating the cost of tugboats, the specialists of MASKO will apply not modular, but hourly tariffs. We will take operational time. Then the cost of berthing will be:
 $2 \cdot 31\,840 \text{ rub.} + 2 \cdot 38\,710 \text{ rub.} = 63\,680 \text{ rub.} + 77\,420 \text{ rub.} = 141\,100 \text{ rub.}$

If the proposed vessel is to be berthed at the berth of PJSC «MCSP», then the modular tariff for foreign navigation will apply (for the terms of the task the vessel goes after loading abroad), while the cost of berthing will be:

$(180 \cdot 30 \cdot 15) \cdot \$0,095 \cdot 67, 8552 \text{ rub. (USD exchange rate as of 01.04.2016)} = 522\,145,76 \text{ rub.}$

If the vessel goes after loading in the port of Murmansk to the port of Sabetta for unloading, then the cabotage tariff equal to 5,45 rub./ 1 cu. m will be applied to its berthing. Thus, the cost of berthing:

$(180 \cdot 30 \cdot 15) \cdot 5,45 \text{ rub.} = 44\,1450 \text{ rub.}$

Table 6
Tariffs of towing companies in Rotterdam for berthing / deberthing of vessels 180 m long

Company's name	Tariff per 1 tug, euro
Fairplay Towage	1475
SMIT	1605
Kotug	1560
Svitzer	2332

It should be noted that the vessel should be berthed after loading, which means an increase in the indicated values by about 2 times.

How much are the prices of the port of Murmansk comparable to the prices of Russia's largest port, Novorossiysk?

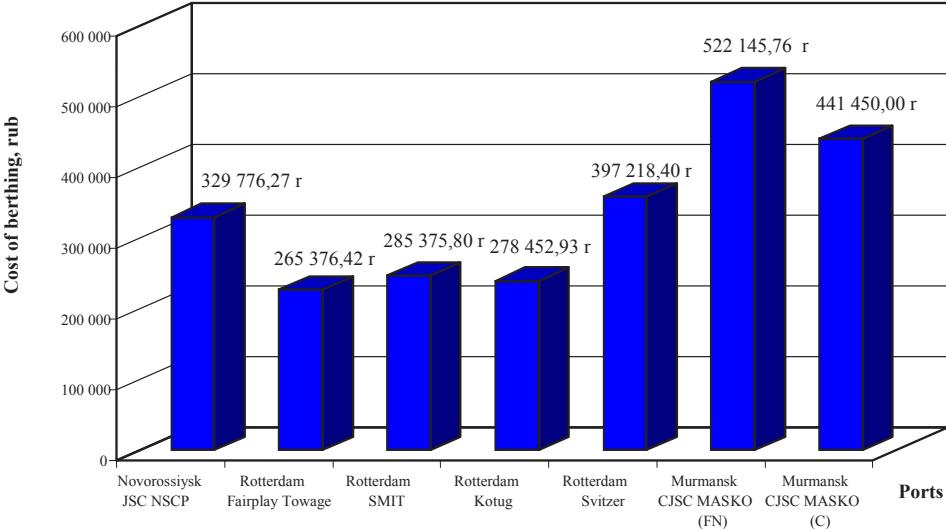
2.

In the port of Novorossiysk, one of the suppliers of towing services, as well as one of the largest port companies of Russia, is JSC Novorossiysk Commercial Sea Port Fleet (JSC NCSP Fleet), which has 24 tugboats, ranging from 208 to 5712 hp. [5]. For its clients, NCSP Fleet offers both modular and hourly tariffs for tugboat

Table 7
Comparative analysis of the cost of providing tugs in the ports of Murmansk, Novorossiysk, Rotterdam

Port	Towing company	Cost of berthing
Murmansk	PJSC MASKO	Foreign navigation: 522145,76 rub. Cabotage: 441450 rub.*
Novorossiysk	JSC NSCP	329776,27 rub.
Rotterdam	Fairplay Towage	265 376,42 rub.
	SMIT	285 375,80 rub.
	Kotug	278 452,93 rub.
	Svitzer	397 218,49 rub.

* For comparison, the author found it possible not to consider the cost of berthing /deberthing to the berths, which do not belong to PJSC MSFP, as often bulk carriers are unloaded / loaded at the berths of this company.



Pic. 1. Cost of berthing in the ports of Murmansk, Novorossiysk, Rotterdam.

services, however, the basis for the tariff provision is not the location of the berth on a given water area, but the operations performed at these berths and the types of vessels calling at the port. Modular tariffs as of January 1, 2016 are presented in Table 4.

Hourly tariffs for provision of certain services involving tugs are shown in Table 5.

Let's return to the task of berthing the vessel on 01.04.2016 (under the Russian flag) with the specified characteristics, but already in the port of Novorossiysk, and find out where for vessel owners it's cheaper to berth the vessel in Murmansk or Novorossiysk ports. In accordance with mandatory regulations in the sea port of Novorossiysk, with wind forces of up to 10 m/s, two tugs of 1350 kW each are required for berthing operations [7]. However, in view of the fact that the vessel goes for loading, the number of tugboats for our calculations is not of principle, since modular tariffs will still be applied. So, the cost of berthing will be:

$(180 \cdot 30 \cdot 15) \cdot \$0,060 \cdot 67, 8552 \text{ rub. (USD exchange rate as of 01.04.2016)} = 329776,27 \text{ rub.}$

Recall that in Murmansk, such berthing costs 522145,76 rubles, and when the vessel is in cabotage – 441,450 rub., which is 1,5 and 1,3 times more than in Novorossiysk.

Now let's see how comparable are the Russian prices for tug services to European ones. For example, as planned, we consider berthing in the port of Rotterdam.

3.

So, in Rotterdam, vessel owner can use the services of various towing companies, for example, Fairplay Towage, SMIT, Kotug, Svitser. Let's quote the prices of these towing companies for berthing, deberthing the vessel 180 m long (Table 6).

Thus, vessel's berthing in Rotterdam port on 01.04.2016, with the indicated parameters of the vessel using two tugboats, if the operation lasts 2 hours and the «bunker supplement»¹ is 500 euro, will cost:

- Using tugs Fairplay Towage:

$(1475 \text{ euro} \cdot 2 + 500 \text{ euro}) \cdot 76,9207 \text{ rub. (euro exchange rate as of 01.04.2016)} = 265376,42 \text{ rub.}$

- Using tugs SMIT:

$(1605 \text{ euro} \cdot 2 + 500 \text{ euro}) \cdot 76,9207 \text{ rub. (euro exchange rate as of 01.04.2016)} = 285375,80 \text{ rub.}$

- Using tugs Kotug:

$(1560 \text{ euro} \cdot 2 + 500 \text{ euro}) \cdot 76,9207 \text{ rub. (euro exchange rate as of 01.04.2016)} = 278452,93 \text{ rub.}$

- Using tugs Svitser:

$(2332 \text{ euro} \cdot 2 + 500 \text{ euro}) \cdot 76,9207 \text{ rub. (euro exchange rate as of 01.04.2016)} = 397218,49 \text{ rub.}$

It turns out that the highest price for tugboat services in Rotterdam is from Svitser, the lowest – from Fairplay Towage.

Let's summarize in the general table the data on the cost of berthing / deberthing, obtained by us in the process of the operations performed.

¹ In invoices of tug companies, rendering services in European port usually there is one additional position, so called «bunker supplement», which is applied if the price for fuel, used by tugs, exceeds a certain price limit. For the research purpose we take it equal to 500 euro.

For clarity, we will present the data of Table 7 in the form of a volumetric histogram (Pic. 1).

Conclusions. As follows from the comparative analysis, the cost of berthing in the port of Murmansk is the highest among all considered in this article, and in the port of Rotterdam is the lowest, provided by the company Fairplay Towage, and the most expensive, provided by the company.

Apparently, the cost of services of towing companies, their number, the possibilities in each port are their own. However, the desire of vessel owners to find ways to reduce the cost of servicing vessels everywhere looks the same. There are not many such ways, and one of the most reliable, in the author's opinion, is the level of competition among the towing companies operating in the port. When it really is, the client is known to win.

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