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(rayon of country). The allotment for the ship crew's food exceeds the normal allotment by 30-40% where vessels travel outside of territorial waters as well as in arctic waters.

(d) The cost of fuel, lubricating and cleaning materials used by the vessel in operation, while en route as well as moored.

(e) The cost of expenditures for ship's supplies, ie, the cost of materials used while the vessel is in operation.

(f) Navigational expenses, ie, expenses connected with servicing the vessel while in operation (ship fees, radio communications, water supply, tugboat service, pilot fees and others).

(g) Amortization, ie, deductions made for restoring worn out ships.

(h) Other non-scheduled expenditures.

(i) Cost of work carried out in order to maintain the vessel in adequate technical condition (running and average repair).

(j) Expenses incurred in connection with the management of the fleet (administrative, management and general expenditures) and training of personnel.

2. The above-listed expenditures are usually broken down into fixed and changing expenditures. "Fixed expenditures" are those expenditures having nothing to do with the volume of the transportation output. Some of these expenditures are: Amortization, general administrative-management expenditures and training of personnel.

3. "Changing expenditures" are those expenditures the extent of which is determined by the volume of the transportation output. Changing expenditures, to a greater or lesser degree, are all other types of expenditures included in the net cost of the transport output.

4. The composition of expenditures for the maintenance of the fleet is more or less determined by the following details:

(a)	Basic and additional wage bill, including charges against wages and cost of food	_____	23-26%
(b)	Fuel, lubricating and cleaning materials	_____	23-25%
(c)	Running and average repair	_____	20-22%
(d)	Ship supply	_____	5-6%
(e)	Amortization	_____	8%
(f)	Navigational expenses	_____	11-13%
(g)	Administrative-management and general expenses, training of personnel	_____	6-8%

5. In addition these same expenditures should be broken down into straight and into additional expenditures. Straight expenditures are those which represent expenditures for wages, charges against wages, food for the crew, fuel, lubricating and cleaning materials, ship supply, navigational

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expenditures, amortization and others. Additional expenditures are expenditures incurred for running and average repair, general, administrative-management expenditures and expenditures for training of cadres.

- 6. The financial and production activities are closely interrelated. Besides the production plan every transport vessel has a plan for profits and expenditures, as well as an assignment (plan) to cover the net cost of the transport (ton-mile) output, that is to say the financial plan.
  - (a) A transport vessel's basic item of revenue is the freight charges paid for cargo. In order to make the vessel's operations profitable it is necessary that the amount of revenue obtained be greater than the vessel's expenditures.
  - (b) The net cost of ton-mile output is determined by comparing the expenditures of the vessel for a given period with the volume of shipping output handled for the same given period. The net cost may be scheduled and actual, but also per voyage, per month, per three-months and per year (navigational).
- 7. The planning of the vessel's productive-financial activities is made per year (navigational year), per three months, per month and per voyage. For vessels going on voyages which last over one month, productive-financial activities are planned for a three-months' period. Consequently, in order to gauge the efficiency of a transport vessel's operations, it is necessary to know its scheduled transport mission in tons and ton-miles, its scheduled quota of revenues and expenditures as well as the net cost of its ton-mile output and the actual results of its production-financial activities.
- 8. The principle of non-financing by the State (cessation of State subsidy) was introduced on vessels of the USSR merchant fleet on a wide scale [redacted] most of the transport fleet had lost the State subsidy. It may be noted that this measure provides a very healthy effect on output and profit. Besides as a special incentive a captain's fund is set aside to provide for paying premiums to workers and improving cultural and living standards of the crew.
- 9. The results of production-financial activities of the crew of a given vessel are usually determined on the basis of the following schedule:

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	Unit of Measure	According to Plan	Actually
1. Shipments:			
(a) in tons,			
(b) in ton-miles			
2. Working time:			
(a) while vessel is en route			
(b) while vessel is moored			
3. Expenditures:			
(a) Regular			
(b) Additional			
<b>All expenditures</b>			
4. Revenues			
<b>All revenues</b>			

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- 5. Financial result
- 6. Net-cost of 1 ton-mile
- 7. Revenue from 1 ton-mile

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10. Before citing a concrete example it is necessary to be somewhat familiar with the method practiced in the USSR whereby a vessel's transport capacity and the average duration of the vessel's return trip are determined. The transport capacity of a vessel for the period of a year is determined in the following manner:

$$S = D \cdot M_k \cdot Z \text{ where}$$

- D = net tonnage of vessel,
- M<sub>k</sub> = coefficient of cargo-capacity utilization on trip (M<sub>k</sub> =  $\frac{M}{M_0}$ )
- Z = number of trips, determined as

$$Z = \frac{24 \cdot T}{T_v + T_s} \text{ where}$$

- 24 = length of operational period in 24-hour periods,
- T<sub>v</sub> + T<sub>s</sub> = duration of vessel's round trip (one trip)
- T<sub>v</sub> = length of time spent en-route
- T<sub>s</sub> = length of time vessel is moored

Duration of return trip T<sub>v</sub> + T<sub>s</sub> is determined in the following manner:

$$T_v = \frac{L}{V} \text{ where}$$

- L = average run of vessel in miles
- V = average 24-hour speed of vessel in miles

$$T_s = \frac{2D \cdot M_0}{M_k} \text{ where}$$

- M<sub>0</sub> = average 24-hour gross quota of loading operations in tons.

Example: A vessel of 5800-ton deadweight, net capacity of 5000 tons, operates transporting general cargo for a distance of 500 miles under the following operational conditions:

- (a) Operational speed 200 miles for a 24-hour period en route,
- (b) Net cargo-capacity loaded (on way out) is 100%,
- (c) Vessel's 24-hour gross quota of loading operations is 1000 tons per 24-hour period
- (d) Operational period 300, 24-hour periods,
- (e) Repair 65, 24-hour periods.

In this case the vessel can make the following number of trips:

$$Z = \frac{300}{\frac{2 \times 500}{200} + \frac{2 \times 5000 \times 1}{1000}} = 20 \text{ trips.}$$

Transport capacity in tons will be equal to 5000 x 20 = 100,000 tons and 50 million ton-miles will be attained.

11.  a formula to determine the average duration of a vessel's return trip was adopted in the USSR merchant fleet system. This formula works as follows:

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$$T_{od} = \frac{2L}{V} + \frac{4DK_2P}{M} \quad \text{where}$$

- $T_{od}$  = average duration of return trip in 24-hour periods,
- $L$  = average distance of run for 1 ton of cargo in miles,
- $V$  = average operational speed of vessel en route in miles per 24-hour periods,
- $D$  = average cargo-capacity of vessel,
- $K_2P$  = co-efficient of cargo-capacity utilization,
- $M$  = average gross quota of loading operations in tons per 24-hour periods

Example: Average duration of return trip of a vessel in accordance with the above indices will be equal to

$$= \frac{2 \times 500}{200} + \frac{4 \times 5000 \times 0.5}{1000} = 15 \text{ 24-hour periods}$$

12. In tables 1, 2, and 3 [below]  the make-up of expenditures for the maintenance of a tanker (motor vessel) with a net tonnage of 10,000 tons, of a dry-cargo motor vessel with a net tonnage of 10,000 tons and a dry-cargo motor vessel with a net tonnage of 5,000 tons. The expenditures listed by me are based on operating conditions of these vessels in coast-wise trade. In case vessels operate outside of national waters or in long-distance coast-wise trade the make-up of expenditures differs as follows: 50X1-HUM

- (a) The expenditures for wages paid to the crew are higher because of the fact that on departure for foreign ports the crew is paid in foreign exchange.
- (b) Expenditures for food for the crew are higher by approximately 30 - 40%.
- (c) Navigational expenses are higher when the vessel stops over at foreign ports.
- (d) Other non-scheduled expenditures are higher.

On the average one may figure that expenditures incurred for maintenance of vessels when they make trips to foreign countries or when they engage in long-distance coast-wise trade are approximately 30% higher than expenditures in normal coast-wise trade.

Table 1

Make-up of monthly expenditures incurred for the maintenance of a tanker-motor-vessel of a net tonnage of 10,000 tons and a crew of 48-50 persons.

Make up of Expenditures	Amount of Expenditures in Rubles	Amount of Expenditures in Dollars (for the official rate of exchange)

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Make up of Expenditures	Amount of Expenditures (in rubles)	Amount of Expenditures (in dollars)
<b>A. Regular Expenditures</b>		
1. Basic and additional wage bill for the crew	74,000	18,500
2. Extra charges against wage bill	5,000	1,250
3. Food for the crew	15,000	3,750
4. Fuel, lubricating and cleaning materials	102,000	25,500
5. Ship's supply	20,000	5,000
6. Navigational Expenses	50,000	12,500
7. Amortization	35,000	8,750
8. Other non-scheduled expenditures	4,000	1,000
Total of Regular Expenditures	\$ 305,000	\$ 76,250
<b>B. Additional expenditures</b>		
1. Running and average repair	85,000	21,250
2. General administrative-management expenditures, training of personnel	30,000	7,500
Total of additional expenditures	\$ 115,000	\$ 28,750
All expenditures	\$ 420,000	\$ 105,000

In this example the official exchange rate of the ruble is one US dollar for four rubles.

Table 2.

Make-up of monthly expenditures incurred for the maintenance of a dry-cargo motor vessel with a net tonnage of 10,000 tons having a crew of 45 to 50 persons and operating in the coast-wise trade.

Type of Expenditures	Amount of expenditures in Rubles	Amount of expenditures in Dollars (for the official rate of exchange)
<b>A. Regular expenditures</b>		
1. Crew wage bill	58,000	14,500
2. Extra charges against wage bill	4,000	1,000
3. Food for the crew	15,000	3,750
4. Fuel, lubricating and cleaning materials	85,000	21,500
5. Navigational expenses	45,000	12,000
6. Ship's supply	18,000	4,500

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	(in rubles)	(in dollars)
7. Amortization	28,000	7,000
8. Other non-scheduled expenditures	5,000	1,250
<b>Total of regular expenditures</b>	<b>262,000</b>	<b>65,500</b>
<b>B. <u>Additional expenditures</u></b>		
1. Repair	75,000	18,750
2. General, administrative expenses, training of personnel	23,000	5,750
<b>Total of additional expenditures</b>	<b>98,000</b>	<b>24,500</b>
<b>Total expenditures</b>	<b>360,000</b>	<b>90,000</b>

Table 3.

Make-up of monthly expenditures incurred for the maintenance of a dry-cargo motor-vessel with a tonnage of 5,000 tons and a crew of 40 operating in the short-distance coast-wise trade.

Type of Expenditures	Total of expenditures in Rubles	Total of expenditures in dollars
<b>A. <u>Regular expenditures</u></b>		
1. Crew wage bill	44,000	11,000
2. Extra charges against wage bill	3,000	750
3. Food for crew	13,000	3,250
4. Fuel, lubrication, cleaning materials	70,000	17,500
5. Ship's supply	16,000	4,000
6. Navigational expenses	28,000	7,000
7. Amortization	18,000	4,500
8. Other non-scheduled expenditures	2,000	500
<b>Total of regular expenditures</b>	<b>194,000</b>	<b>48,500</b>
<b>B. <u>Additional expenditures</u></b>		
1. Repair	54,000	13,500
2. Administrative expenditures, training of personnel	18,000	4,500
<b>Total of additional expenditures</b>	<b>72,000</b>	<b>18,000</b>
<b>Total of expenditures</b>	<b>266,000</b>	<b>66,500</b>

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13. In the above tables [redacted] expenditures for three types of vessels figured in rubles as well as dollars for which the officially established exchange rate of four rubles for one dollar was accepted. A realistic exchange rate for the rubles would be considerably lower, approximately five to eight cents, at any rate no more than 10 cents. However, the expenditures incurred for maintenance of vessels listed by me cannot be figured entirely at a realistic rate of exchange. The realistic exchange rate can apply only to the wage and food bill for the crew, that is, to put it in plain English, expenditures for the maintenance of people. The other expenditures for subsistence purposes (for maintenance of people) do not belong to this category. They are expenditures connected with the transport output, expenditures which are not subject to turnover-taxes and other types of taxes. Therefore the following principle should be followed for applying the proper exchange rate: Expenditures which are incurred for the maintenance of people should be estimated at a realistic rate of exchange while expenditures connected with transport output should be estimated at the official rate of exchange. In this manner the results will be pretty close to what they should be.

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14. In tables 1, 2, and 3 [redacted] tentative expenditures for the maintenance of vessels. In order to have a full understanding of the nature of the financial output activities of these vessels one should be familiar with their detailed operating conditions. [redacted] some concrete examples of how these vessels operate.

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A. Operations of a tanker, 10,000-ton capacity engaged in long distance coastal trade. [redacted] a tanker (motor vessel) with a 10,000 ton cargo of lighting kerosene goes on a trip from Batum to Vladivostok via the Suez Canal. The distance of such a trip would be about 9,500 miles. The trip of this tanker will be made up of the following phases:

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- (1) Anchorage in Batum for loading (mooring, casting off, connecting hoseline, disconnecting hoseline, pumping, additional operations, customs inspection) - 40 hours.
- (2) Running time from Batum to Vladivostok including stopovers at ports of call and loss of speed in transit for various reasons - 1400 hours (58, 24-hour periods).
- (3) Anchorage in Vladivostok while unloading (mooring, casting off, connecting hoseline, disconnecting hoseline, pumping out fuel, additional operations, customs inspection, repair) - 120 hours.
- (4) Running time from Vladivostok to Odessa in ballast (tankers returning from long trips usually go to Odessa) - 1200 hours (46, 24-hour periods).

The time spent for the return trip of this tanker is therefore 2,760 hours or 115, 24-hour periods. During this time the tanker carried 10,000 tons of cargo and attained 95 million ton-miles.

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The production financial figures for the operations of this tanker in the above example are broken down into the following data:

## (a) Shipments:

(1) tons	10,000
(2) ton-miles	95 million,

(b) Duration of trip	2760 hours,
of this time: running	2600 hours,
at anchorage	160 hours,

(c) Expenditures for this trip taking into account the fact that the vessel had to stop at foreign ports	2.1 million rubles,
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(d) Net-cost of one ton-mile on this trip	2.21 kopecks
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B. Operation of a tanker, 10,000 tons capacity, engaged in short distance coastal shipping. [redacted] a tanker (motor vessel) of the same type as above with a capacity of 10,000 tons operates on the Odessa-Batum run. The distance between ports is about 580 miles. [redacted] review the operations of this tanker for a one-month period. [redacted] this tanker had been scheduled for this given month to carry from Batum to Odessa 40,000 tons of petroleum products and thereby attain 23.2 million ton-miles. Provided that the crew of this tanker had been in a position to fulfill this plan, the results of the production-financial activity would be reflected by the following data:

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## (1) Shipments

(a) Tons	40,000,
(b) ton-miles	23.2 million

(2) Expenditures incurred for maintenance of vessel for a month	420,000 rubles,
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(3) Net-cost of one ton-mile	1.8 kopecks
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C. Operation of a dry-cargo motor-vessel, capacity 10,000 tons, engaged in long-distance trade. [redacted] a dry-cargo motor vessel, net capacity 10,000 tons general (crated) cargo makes the Leningrad-Murmansk run. The distance between ports is 2,250 miles. [redacted] the coefficient of cargo capacity utilization in this hypothetical case is equal to 1. The trip of this motor-vessel would be broken down into the following phases:

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(1) Anchorage in Leningrad Harbor, loading and other operations - 240 hours,
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(2) Running time from Leningrad to Murmansk considering stopovers at ports of call and loss of speed caused by various reasons - 320 hours.
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(3) Anchorage in Murmansk, unloading and other operations including repair - 300 hours.
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(4) Anchorage in Murmansk loading 5,000 tons of cargo. In this case [redacted] it is possible to supply the motor-vessel with suitable cargo for 50% of its carrying capacity. Anchorage time - 200 hours.
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- (5) Running time from Murmansk to Leningrad with a cargo of 5,000 tons, considering stopovers at ports of call and loss of speed for various reasons - 300 hours.

Consequently, the time for the roundtrip of the motor-vessel in this hypothetical case came to 1,360 hours or 57, 24-hour periods. In this period the motor-vessel carried 15,000 tons of cargo and attained 33, 75 million ton-miles. The results of the production-financial activity of the motor-vessel for this trip would be reflected by the following data:

## (a) Shipments

(1) tons	15,000,
(2) ton-miles	33.75 million,

- (b) Expenses incurred for maintenance of vessel on this trip 890,000 rubles

- (c) Net-cost of one ton-mile on this trip 2.7 kopecks

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In this case a reduction of the net cost of shipping was made possible by the fact that the motor-vessel was also loaded on the way back, in other words, the coefficient of cargo capacity utilization on the way out and back was equal to  $3/4$ .

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D. Operation of a dry cargo motor-vessel, capacity of 10,000 tons, engaged in short distance coastal trade.

a dry cargo motor-vessel with a capacity of 10,000 tons carries cement from Novorossiisk to Odessa. The distance between ports is 380 miles. The results of the operations of this motor vessel for a one-month period. the motor vessel was scheduled to make two trips during this month and to carry 20,000 tons of cargo - from Novorossiisk to Odessa and thereby attain 7,600,000 ton-miles.

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Provided that the crew of this motor-vessel was able to fulfill the plan, the result of the vessel's production-financial activity would be reflected by the following data:

## (1) Shipments

(a) Tons	20,000
(b) ton-miles	7,600,000

- (2) Expenditures incurred for maintenance of vessel 360,000 rubles.

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- (3) Net cost of one ton-mile 4.7 kopecks.

E. Operation of a dry-cargo motor vessel with a capacity of 5,000 tons, engaged in short-distance coastal trade.

a dry cargo motor vessel with a capacity of 5,000 tons operates transporting general cargo from Baku to Krasnovodsk. The distance between ports is 185 miles. The plan provides that the cargo capacity of the motor-vessel will be utilized only on the way out (to Krasnovodsk) and the utilization coefficient of the motor-vessel's cargo capacity while it carries cargo (on the way out) is equal to 1.

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Provided that the crew of the motor vessel was able to fulfill its monthly quota, the results of the vessel's production-financial activity will be reflected by the following data:

- |   |                |
|---|----------------|
| (1) Shipments                                   |                |
| (a) tons  | 20,000         |
| (b) ton-miles                                   | 3.7 million    |
| (2) Expenses incurred for maintenance of vessel | 266,000 rubles |
| (3) Net cost of one ton-mile                    | 7 kopecks      |

The above data show that the net cost of shipping by these different types of vessels depends on a great many factors such as the nature of the cargo shipped, the length of the navigational season, the vessel's cargo capacity utilization, speed of vessel's running, standard of loading operations, extent of mooring time, the crew's observance of financial discipline, etc. In principle the following stands out:

- (a) The net cost of oil cargo shipments will be lower than the net cost of dry cargo shipments. The net cost of oil shipments for one single vessel will, on the average, fluctuate approximately from 1.5 to 3 kopecks for one ton-mile.
- (b) The net cost of dry cargo shipments will on the average fluctuate from 3 to 6 and still more kopecks for one ton mile.

The principal item of revenue for vessels and transport organizations is freight charges for cargo and services in ports rendered to their customers. For the crews of vessels the cost of services in ports is one of their items of expenditure.

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