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TRANSLATIONS ON USSR TRADE AND SERVICES  
(FOUO 8/79)

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ORGANIZATION OF MARITIME FLEET OPERATIONS

Moscow ORGANIZATSIYA DVIZHENIYA MORSKOGO FLOTA (Organization of Maritime Fleet Operations) in Russian 1978 signed to press 27 Apr 78 pp 10-13, 24-26, 36-38, 40-49, 160-162, 184-186, 189-192, 194-198, 206-208

[Selected sections from the book by S. M. Topchiy, G. F. Shulyanskiy and A. F. Mironenko, third revised and supplemented edition, Transport, 6,000 copies, 320 pages]

[pp 10-13]

[Text] §3. Purposes and Areas of Use of Maritime Transport

Maritime transport plays an important role in the economy of all maritime states. This role is determined by its advantages over other types of transport.

Maritime transport has natural lines of communications which are of enormous length. These lines do not involve expenditures on maintaining them in a navigable state, with the exception of the relatively small expenditures on dredging work in harbors, waterways and approach channels.

The throughput capacity of seaways is virtually unlimited. Thousands of small, large and giant seagoing vessels travel simultaneously in different directions over the sea and ocean routes.

Maritime transport uses large capacity vessels for transporting cargo. This provides a significant reduction in expenditures on the transporting of a ton of cargo in comparison with other types of transport. Maritime shipments are more economic than transporting by land and air types of transport.

The delivery speed for cargo in maritime transport is higher than by rail or river transport.

Labor productivity in sea shipments is several times higher than on the railroads.

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All these advantages have brought maritime transport among the leading types of transport in many states. Soviet maritime transport holds a firm second place in the cargo turnover of the nation, and first place in terms of the volume of foreign trade cargo shipments.

In developing as a national economic sector and in comprising a portion of the unified transport system of the nation, Soviet maritime transport during the years of the Eighth and Ninth five-year plans has significantly renewed and broadened its facilities. In the Ninth Five-Year Plan, the Soviet transport fleet for the first time received series-produced container carriers, horizontal loading vessels or rolkers, lumber and baled cargo carriers, universal semicontainer vessels, chip carriers, sinter carriers, large-tonnage bulk carriers, combined OBO vessels, super tankers, ferries and other modern highly efficient vessels.

The Ninth Five-Year Plan has become a five-year plan for the extensive introduction of automation in the production processes on ships, particularly for controlling propulsion units and the vessel as a whole from the bridge. A distinguishing feature of the dry cargo vessels built in the Ninth Five-Year Plan is the great openness of the decks, the box form of the holds, the highly productive cargo working equipment, the great cargo capacity and the increased speeds. A great deal has also been done in the area of using heavy and cheaper types of fuel on the vessels. Great attention has been given to improving the comfort of the vessels and to bettering the working and everyday conditions of the crews.

The 25th CPSU Congress for the Tenth Five-Year Plan confronted Soviet maritime transport with the task of more fully satisfying the growing demands of the national economy for foreign trade and coastal shipping, to improve cargo delivery to the regions of the Far North and Far East, and to increase the volume and efficiency of the exporting of transport services. In 1976-1980, cargo turnover of maritime transport should rise by approximately 1.3-fold. For solving the posed problems, there are plans to substantially increase the capacity of the maritime ports, to add to the fleet with highly productive, dry-cargo, tanker and combined vessels with a total dead weight of approximately 5 million tons, and to develop the ship repair facilities of maritime transport.

The basic directions for the development of the Soviet maritime fleet in the Tenth Five-Year Plan remain the directions by which tonnage was added in the Ninth Five-year Plan, namely:

- 1) Specialization of the transport fleet by types of cargo, shipping directions and lines;
- 2) A rise in the cargo capacity and an increase in the speed of the vessels;
- 3) The development of the most convenient cargo facilities for the greatest possible acceleration of ship processing;

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- 4) Automated control of the ship engines, mechanisms and systems and the ship as a whole;
- 5) Improving comfortability.

Within the transport fleet, there are plans to increase the proportional amount of the specialized dry cargo vessels including the lumber and baled cargo carriers, container carriers, roll-on, roll-off vessels, lighter carriers, bulk cargo vessels, and so forth. All the vessels under construction will have automated control of the propulsion units for classes A1 and A2. On tankers of the "Krim" class and the rollkers, the Breeze system will be used, and this also solves the questions of automating navigation (determining position, dead reckoning, the passing of vessels, and so forth).

Automation of cargo working on the vessels is also to be expanded.

The basic type of main engines for vessels being built in the Tenth Five-Year Plan will be the most economic, reliable and most easily maintained engines operating on heavy, cheaper grades of fuel under automatic conditions and using bridge control.

The areas of the use of maritime transport encompass both the domestic and overseas services.

Maritime transport is used for both domestic (coastal) cargo shipments in all regions of the nation's sea basins and in all directions where it is the sole type of mass cargo transport or its use is more efficient than the other types of transport.

Maritime cargo shipments between coastal points of the nation within one sea (short-distance coastal shipping), as a rule, is less efficient than rail shipments. They are advantageous only in the instance that here the cargo shipping distances are significantly reduced (as a consequence of the straightening out of the route by sea in comparison with rail shipments).

The transporting of cargo on seagoing vessels between the ports of the nation located in different sea basins is carried out, as a rule, over significantly greater distances than by rail. However, in a number of instances, these are more effective than rail due to the lower shipping costs.

The sea lines of communications are the only ones for delivering food and industrial cargo to the regions of the Far North and Far East and for transporting back lumber, coal, petroleum and other minerals. For this reason, the decisions of the 25th CPSU Congress emphasized the necessity of implementing measures to extend the navigation season on the Northern Seaway and in the ice-bound ports. For this the maritime fleet will receive powerful icebreakers in the Tenth Five-Year Plan. The third atomic-powered icebreaker "Sibir" has already been launched.

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In foreign shipping, maritime transport is used for developing and supporting the foreign economic ties of the USSR with foreign countries. In this area it holds the leading role in comparison with the other types of transport. Maritime transport is responsible for over one-half of the volume of the import and export shipments of the nation. USSR maritime transport also carries cargo of foreign charterers (fcc), thereby exporting transport services and earning foreign exchange on equal basis with the foreign exchange for sold export cargo.

The seagoing vessels of the MMF [Ministry of Maritime Fleet] make trips to foreign countries which do not have common land frontiers with the USSR as well as to countries located on other continents. In 1976, the MMF vessels visited 1,415 ports in 123 foreign countries.

In the foreign operations, the maritime transport of the USSR and the other socialist countries carries out important economic tasks:

- 1) It meets the needs of the nation for foreign trade shipments and helps to extend its participation in the international division of labor;
- 2) In providing maximum coverage for the shipments of import and export cargo of the nation, maritime transport saves foreign exchange and increases the efficiency of Soviet foreign trade;
- 3) In broadening the shipments of foreign charterer cargo, maritime transport increases the foreign exchange earnings and improves the balance of payments of the nation.

Soviet maritime transport plays an important role in ensuring the independence of the nation's foreign trade from foreign capital and the variable conditions of the charter market, and in providing aid in maritime shipments for the socialist and developing countries.

[pp 24-26] §10. Aims and Basic Directions for the Intensification of Maritime Shipments

At the present stage in the development of the nation's economy, the questions of improving the efficiency and quality of operations of all types of transport on the basis of intensifying the shipments are assuming ever greater significance. Along with handling the growing shipping volumes, transport is confronted with one of the basic tasks of improving the quality of the shipping process.

The quality of the shipments carried out by all types of transport is characterized primarily by an increase in the delivery speed, by the regularity and frequency of transport traffic, by the degree of continuity of the transport process and the rhythmical operation of the transport system, by the safekeeping of the transported cargo and by the prevention of environmental pollution.



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Of particularly important significance is a rise in the quality of shipments carried out by the USSR maritime fleet as it hauls predominantly foreign trade cargo.

For improving the quality of the shipping process, it is essential to not only technically reequip all types of transport, but also reorganize the entire transport system on the basis of using progressive methods for organizing the delivery of freight with the extensive use of containers, pallets, bales and other methods for enlarging cargo areas.

Scientific and technical progress in Soviet maritime transport at the present stage and over the long run is determined by the development and broad introduction of progressive transport and technological systems (TTS) into maritime shipping practices.

A TTS is a complex of coordinated and interrelated technical, technological and organizational measures making it possible to transport cargo over definite routes with the greatest economic effect and the least labor intensive-ness. In developing the TTS, the seagoing vessels, port installations, the facilities and equipment, the rolling stock of related types of transport, warehousing and the transport equipment of the cargo dispatchers and recipients are viewed as component elements of a single TTS with the compulsory coordination of their parameters.

Modern TTS must provide, along with a reduction in transport costs, for a rise in the quality of cargo transporting and a continuous reduction in the demand of maritime transport for labor resources.

Pallet, container, rollker and ferry are the systems which have been most widely used in the operations of maritime shipments for coastal and foreign trade cargo on the vessels of the MMF. For operating these systems, the Soviet maritime fleet is receiving specialized transports such as bale or pallet carriers, container carriers, rollkers and ferries. Over the next few years there will be the broad use of lighter (on the basis of lighter carriers) and barge-tug (with pusher tugs and sectional barges) TTS.

There is also development of such promising TTS as sectional (with an articulated or rigid joining of the sections of seagoing vessels), cassette (with vertical and horizontal loading of the loaded cassettes), systems employing high-speed means of transport (air-cushion, hydrofoil vessels and trisections), systems for transport links with unequipped seacoast points (using helicopter carriers, amphibious vessels, and so forth).

For developing the highly efficient TTS, the following methods are used: The enlarging of cargo areas, the specializing of the means of transport and the standardizing of their components, the separating of their basic parts at anchor, the combining of the means of transport and new methods of propulsion.

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The enlarging of cargo places from 1.0-1.5 ton (a pallet with general cargo) to 30 tons (a large container) and 50-1,000 tons (a loaded lighter) is carried out for the purpose of sharply accelerating cargo operations and reducing their labor intensiveness.

Specialization of the means of transport and the standardizing of their components (for example, containers, lighters, transloading equipment, and so forth) provide a higher utilization of the cargo capacity of the vessels and the rolling stock of related types of transport, as well as convenience of cargo transloading and high intensiveness at the transport centers.

The separating of the basic parts of a seagoing cargo vessel at anchor (the cargo portion of the hull from the stern with the propulsion unit, crew quarters and vessel controls) presupposes a minimizing of the fleet operating expenditures on cargo operations. This principle is realized in the barge-tug and sectional systems.

The barge and the section during cargo-working operations function independently, without the expensive tug or section with the propulsion unit, auxiliary mechanisms and devices and propulsion units. The latter during this time can be used for moving other barges and sections.

The combining of the means of transport of different types of transport is carried out in ferry (a seagoing vessel and railroad cars) and lighter (a seagoing vessel and lighters which are removed from it for moving up a river as a sectional unit) systems.

The use of new types of propulsion (hydrofoil, air cushion, ram-wing craft and so forth) is advisable for sharply accelerating the delivery of valuable cargo and moving passengers over sea lines of communications. These principles of propulsion make it possible to increase the speed of transport vessels by 2-3-fold and more, in comparison with the present fastest conventional cargo and passenger vessels.

The development and effective use of new TTS in maritime transport requires the addition of specialized vessels of fundamentally new design equipped with powerful and compact propulsion units, including gas turbine and atomic. It is also essential to build highly productive, specialized transloading installations at the seaports, and develop various auxiliary equipment (containers, lighters, roll-on, roll-off trailers, flats, cassettes, and so forth).

The broad introduction of the progressive TTS in maritime transport will help to significantly increase the efficiency of maritime shipments and their quality, to improve the working conditions of the sailors and port workers (to raise carrying capacity, accelerate cargo delivery, reduce losses, eliminate manual labor, reduce the harmful influence of dust, gas, vapors and so forth at the cargo transloading areas, to ensure high work safety, and so forth).

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[pp 36-38]

CHAPTER IV. MANAGEMENT OF THE MARITIME SHIPPING PROCESS AND TRAFFIC OF THE USSR TRANSPORT FLEET

§15. The System for Controlling Maritime Transport

Maritime transport is a large and highly developed sector of the national economy. It brings together several thousand transport, service, auxiliary and technical vessels, over 60 seaports and more than 100 port points, around 40 ship repair yards, supply, commercial, design and scientific research organizations, schools and other facilities. The enterprises, organizations and institutions with their complex system are scattered over all the sea basins of the country and, in being separated by enormous distances, must still operate smoothly and continuously.

The coordinated operations of the fleet, ports and other shore enterprises and organizations of maritime transport are provided by an ordered management system which includes the organizational structure of management bodies set up according to a hierarchical principle, as well as management methods, equipment and personnel.

A distinguishing feature of maritime transport (like the other types of transport) is that the process of moving freight and passengers is simultaneously produced, consumed and realized. These phases of the transport process cannot be separated in time or isolated in space, as is done, for example, in industry. For this reason in the management of maritime transport, like the other types of transport, a large proportional amount is taken up by the functions of operational management of the shipping process (operational work, the organization of rolling stock traffic), and the principle of centralism is carried out more consistently and widely (centralization prevails over decentralization).

The general scheme for the management of maritime transport was established in 1973 and is three-tiered: The Ministry of Maritime Fleet (MMF)--the state self-financing association of maritime transport (GKhO)--the maritime navigation company (MP).

The MMF is the superior level of the sectorial system of state management for maritime transport in the nation. Its executive activities at present are concentrated predominantly on the basic problems of a general sectorial nature, tasks in the area of planning, the adding to the fleet and capital construction, labor and wages, financing, scientific research, material and technical supply, and personnel training. Planning, coordination and control are the main thing at present in the activities of the MMF. Its decisions are binding for all elements in the maritime transport management system.

The MMF focuses its efforts on solving the following fundamental questions in the long-range development of maritime transport as a whole and improving its efficiency:

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- 1) Improving planning and the management organizational structure and methods;
- 2) Carrying out a unified technical policy;
- 3) Accelerating scientific and technical progress;
- 4) Improving capital investment efficiency;
- 5) Improving the training, placement and utilization of specialists;
- 6) Raising labor productivity.

The routine, operational questions of maritime transport activities have been turned over to the GKHO.

The GKHO is a unified production and economic complex consisting of the navigation companies, the fleet administrations, design, planning and other organizations. There are three such associations in the maritime transport system: Yuzhflot [Southern Fleet], Sevzapflot [Northwestern Fleet] and Dal'flot [Far Eastern Fleet]. Each of them bears responsibility for the state and development of the production-economic complex, for scientific and technical progress, the technical level and high quality of the shipments, for the fullest satisfying of the demands of the national economy and the population for maritime shipments through the ports of the basin, and for fulfilling the quotas of the state plan and budget obligations.

The association operates on the basis of economic accountability, and provides full coverage of the expenditures on transporting, production and the support of the management personnel, as well as the receiving of a profit required for economic accountability activities. It has been granted the rights and bears duties in the area of planning, scientific and technical progress, capital construction, material and technical supply, labor and wages, finances, credit, accounting and so forth, and is a legal entity. The association management which consists of the leadership, the operational and functional departments carries out systematic control over all aspects of the production and financial activities of the enterprises and organizations comprising the association, and ensures a thorough analysis of their economic activities, the safekeeping of assets and the observation of thriftiness.

The setting up of the GKHO is an important measure in further improving maritime transport management. It brings the economic leadership bodies closer to basic operations, it provides a clearer delimitation of rights and duties between the elements of maritime transport management, and increases the flexibility and efficiency of managing the shipping process.

Along with the GKHO, the system of maritime transport management bodies includes a number of organizations which reflect the specific features of

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maritime transport. These are: The Sovfrakht V/O [All-Union Association for the Chartering of Foreign Tonnage], Sovinflot V/O [?Soviet Foreign Fleet Administration], Morpasflot V/O [Central Passenger Agency of the USSR Ministry of Maritime Fleet], Sovsodupod'yem V/O [?Soviet Ship Hauling Out], the Administration of the Northern Seaway, and others.

The basic administrative unit in maritime transport is the administrations of the maritime navigation companies. Since 1958 the maritime navigation companies have become comprehensive transport enterprises in the basins. Under the conditions of the economic reform, the maritime navigation companies are very similar to production associations being set up in industry. They are in essence head enterprises. The management personnel of the navigation company, along with the direct management of the fleet, provides economic leadership for the ports, ship repair yards and other enterprises and organizations under the navigation company.

[pp 40-49]

#### 517. The Maritime Transport Management System

The management principle, as a rule of guiding activity, is realized in maritime transport by employing diverse management forms and methods. By management methods one understands the methods and procedures for implementing management activities, the methods of effecting the collectives of the maritime transport enterprises, their subdivisions and individual workers for organizing and coordinating their activities. A method, as a means of achieving a set goal, is based upon a profound and thorough study and analysis of the state of the managed object.

A multiplicity of methods if used in the maritime transport management practices. They differ in terms of their content, focus and form of effect on the managed collectives (economic, organizational, executive, legal, social, psychological, indoctrinational, and others). Management methods do not exclude one another but are rather complementary, and for this reason they should be used jointly, in a combination.

Under present-day conditions, economic management methods have moved to the forefront, and these are based upon the extensive use of the economic laws of socialism in managing maritime transport, its associations and enterprises. Directive planning and economic incentive are the basis of the economic methods. In the planning process, specific addressed quotas are set for the collectives of the maritime transport enterprises, and with the aid of economic incentives, the interests of society are reconciled with the interests of the enterprise collectives, and the interests of the enterprises with the interests of the individual workers.

The economic levers and incentives (profit, prices, bonuses, credit and so forth) without orders and directives impel the individual workers, the collectives of shops, vessels and enterprises to act constantly and purposefully

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in the direction of achieving the highest production results with the least resource expenditures. Economic management methods provide the enterprises, subdivisions and individual workers with opportunities and rights to independently solve economic questions, to themselves determine the ways and means for carrying out the set planning quotas, in being responsible for the decisions taken and their consequences.

The economic management methods do not operate automatically. There must be great organizational work, the coordinating of the efforts of many workers in creating the corresponding conditions for carrying out production activities and developing the enterprises. The organizational management methods are employed in the form of various provisions, regulations, rules, instructions, and so forth. For an extended time they establish the organizational structure of the production and managerial subdivisions, and they regulate (by standards and quotas) the procedure, direction and content of the interaction among them.

Organizational methods create a foundation or skeleton for the management system of maritime transport enterprises and their subdivisions, and they basically regulate and direct the activities of the collectives.

In the process of operational activities at the maritime transport enterprises, it is essential to solve individual production problems and carry out specific economic measures. For this executive methods are used. They concretize and complement the forms of organizational action and are basically aimed at controlling and regulating production and at solving the economic problems which constantly arise.

The executive management methods are based upon the authority and right of the leaders to issue orders and to issue instructions which are binding for execution. The instructions and orders indicate what is to be done, by whom, when and how, as well as who should supervise their fulfillment and how.

The executive management methods widely employ the dispatcher personnel of the navigation companies, ports and other operational enterprises. The executive action of the dispatcher personnel of a navigation company is one of the most complicated types of management activity. The executive abilities of the dispatchers require not only a profound knowledge of the equipment, technology and organization of shipping, but also the ability to correctly feel one's way, to rapidly assess the situation and respond to changes occurring in fleet traffic, to logically think out, effectively prepare and issue orders and instructions, and ensure their fulfillment.

In providing for the proper organization of maritime transport management, legal and juridical means of influencing the production collectives of the maritime transport enterprises are of great significance. The legal management methods are the rules which have been legislated for a certain period and governing managerial activities. Their observance is compulsory.

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The legal standards used in the management of maritime transport can be divided into general rules or standards, quota standards, standards governing competence and recommendatory standards. They systematize the work of the management personnel of the enterprises and define the legal conditions of managerial activity.

Each maritime transport enterprise is not only a separate production cell of society but also a social organism. The activities of the enterprise collective do not come down merely to production activities. The collective of each enterprise is involved in the shaping, development and indoctrination of the workers, and in satisfying their growing needs and interests. "Only in the collective," pointed out K. Marx and F. Engels, "does the individual gain the means allowing him an opportunity to thoroughly develop his talents...."<sup>1</sup>

For regulating the social development processes in the collectives of the maritime transport enterprises, diverse means of influence are used, including:

- 1) The methods of controlling social activities (initiative and innovation, the exchange of experience, the socialist competition, criticism and self-criticism, and so forth);
- 2) Methods of controlling normative behavior (traditions, warning, discussion at meetings, and so forth);
- 3) Methods of social regulation (collective agreements, the seniority system, planning the social development of the collective, and so forth);
- 4) Methods of controlling individual behavior (a personal example, advice, request, and so forth).

The workers are the basic productive force in a socialist society. For this reason, in the management of maritime transport it is essential to make maximum use of knowledge governing the laws of human conduct, as well as a knowledge of their nature, temperament, emotions, abilities, and so forth. The leaders of all levels of maritime transport management must know and be able to unify the labor collectives, to create a normal moral and psychological climate in the collective, to humanize labor, and so forth.

The maritime transport enterprises make wide use of indoctrinational methods aimed at developing in the workers a conscious attitude toward the fulfillment of their duties, a feeling of duty and responsibility for the assigned job, and initiative in seeking out new opportunities for improving the work. The forms of indoctrination are diverse and include ideological, political and economic studies, social work, and improving professional skills.

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<sup>1</sup>K. Marx and F. Engels, "Soch." [Works], 2d edition, Vol 3, p 75.

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§18. Cargo Shipping Management Bodies and Fleet Traffic Control Bodies

The operational services of the maritime management bodies provide direct control over the process of maritime shipments and they regulate ship traffic of the transport fleet.

The organizational structure of the operational services has been changed and improved along with the development of the maritime fleet and the forms of organizing its traffic in the process of maritime shipments.

Thus, in the postwar years as part of the central system of the MMF, the functions of centralized leadership over maritime shipments and the control of transport fleet traffic on the scale of maritime transport during the various periods have been sequentially carried out by the following:

- 1) The main operational administrations of a territorial nature (Glavyuzhflot [?Main Administration of the Southern Fleet], Glavsevzapflot [?Main Administration of the Northwestern Fleet] and Glavdal'flot [Main Administration of the Far Eastern Fleet]);
- 2) Specialized operational main administrations (the main administration of the dry cargo fleet, the main administration of the tanker fleet, the administration of the passenger fleet);
- 3) A unified main administration for fleet and port operations (Glavflot) with territorial administrations (Sevzapflot, Yuzhflot and Dal'flot).

With the formation of the maritime transport GKHO in 1973, Glavflot and the other main administrations which had provided centralized leadership over the individual types of maritime transport operations using administrative and analytical methods were abolished. Functional administrations were set up in the central system, including the Fleet and Port Operations Administration.

Specialized and territorial operational departments were formed for coordinating maritime shipments and for the efficient maneuvering of the fleet over the basins as part of the management system of each GKHO. For example, as part of the management system of the Yuzhflot association there are: The Department for Line and Container Shipments, the Department for Dry Cargo Shipments of the Black Sea and Azov Basin, the Danube Basin Department, the Tanker Shipments Department, and others.

The operational services have also been reorganized in the maritime navigation companies. In the postwar years, the operational services were transformed into shipping and fleet traffic services and port services. In individual periods within the large navigation companies the fleet administrations, the regional fleet administrations, the fleet departments, the international line administrations and others were made into independent operational commercial subdivisions.



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The present structure of the management personnel of a maritime navigation company includes services and departments. The basic services of a maritime navigation company are:

- 1) The shipping and fleet traffic service (organizes shipping and fleet traffic);
- 2) Commercial service (carries out commercial work);
- 3) Port and seaways service (coordinates the operation of ports and provides dredging work);
- 4) The ship system service (provides technical operation of the fleet);
- 5) The ship repair yard service (provides the repair of the fleet);
- 6) Navigation service (provides safe navigation for the fleet);
- 7) Communications service (provides and monitors the technical state and operation of communications and electronic and radio navigation equipment);
- 8) The material and technical supply service (supplies the fleet with all types and articles of material and technical supply);
- 9) The fleet servicing service (organizes comprehensive servicing of vessels in ports).

Within the management system of a navigation company there is a series of functional departments (economic planning, the organization of labor and wages, financial and foreign exchange, and others).

The shipping and fleet traffic service is the leading service of management in a maritime navigation company. It directly organizes and controls the traffic of the transport fleet and the entire process of maritime shipments carried out by the fleet of the navigation company. The service performs the following basic tasks:

- 1) It studies the economy of the regions in the sphere of transport services for the navigation company and works out measures to develop maritime shipments on the operating lines and in new areas of fleet operations;
- 2) It organizes the work of the fleet on cargo lines and as consecutive trips;
- 3) It continuously and effectively directs the fleet operations of the navigation company according to the traffic graphs and schedules;
- 4) It detects deviations of the vessels from the graphs and schedules, and eliminates the arising obstacles in fleet operations;

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- 5) It discovers and utilizes reserves of carrying capacity in the fleet during the shipping process;
- 6) It provides day-by-day planning, accounting and analysis of fleet operations;
- 7) It calculates the fulfillment of the trip plans by the vessel crews;
- 8) Together with the crew committee of the navigation company it organizes the socialist competition of the ship crews;
- 9) It studies, generalizes and disseminates advanced work experience of the ship crews;
- 10) It works out and introduces new shipping methods into ship operating practices.

The structure of the shipping and fleet traffic service in each navigation company is determined by the scale and by the types of maritime shipments as well as by the composition and specialization of the transport fleet.

Under the conditions of significant development of scheduled line navigation, it has been necessary to separate the function of directing fleet operations into the independent functions of managing the scheduled line, trip [?tramp] and passenger fleets. For this purpose in the individual navigation companies (Black Sea, Baltic, and others), as part of the shipment and fleet traffic services specialized fleet administrations were set up (an administration of international lines, an administration of the trip [?tramp] fleet and the administration of the passenger fleet) with the incorporation of an independent department of operational planning, analysis and accounting of fleet operations within their management system.

Under the new conditions of fleet operations (the development of scheduled line navigation, the rapid expansion of container and pallet shipments, the chartering out of the vessels of the navigation company and the chartering of foreign vessels), it has also been necessary to bring the management system of the navigation company as close as possible to the solving of fleet shipment and operations questions. For this purpose in all the maritime navigation companies, self-financing operational ship groups (KhEGS) were organized in 1973-1974.

The KhEGS were assigned vessels according to the production principle, that is, according to their work in a group of parallel lines or on the shipping lines and routes within the limits of a certain geographic area. The KhEGS operates on internal economic accountability, it works under an annual production and financial plan which is adjustable by quarterly plans and monthly schedules, and bears responsibility for their fulfillment and the efficient use of the fleet.

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The basic functions of the KhEGS include:

- 1) The organization of ship operations on regular lines and consecutive trips, and in transporting cargo of foreign charterers;
- 2) The introduction of container and pallet cargo shipments;
- 3) The elaboration of measures to attract cargo, the organizing of new lines and sequential trips;
- 4) Ensuring the operation of the vessels under optimum conditions on the basis of a comprehensive solution to the questions of the economic accountability activities of the ship group;
- 5) The development of creative initiative, social activeness and socialist entrepreneurship of the ship crews and KhEGS workers;
- 6) The organization of the socialist competition of ship crews;
- 7) The organization of political indoctrination.

The KhEGS is headed by a chief. The management system of the KhEGS includes specialists from various areas. Some of them are directly and permanently involved with the operation of the vessels of the KhEGS and are part of the management system of the fleet (line or trip). These include: Group dispatchers, instructor captains, instructor engineers, economists for accounting and analyzing ship operations, economist engineers for commercial work, and economists for financial work. Other specialists are indirectly or periodically employed in servicing the KhEGS vessels and are part of the functional management bodies of the navigation company: Group mechanical engineers of the ship service, engineers of the material and technical supply service, and inspectors of the personnel department.

Under the KhEGS chief, a consultative body, the production council. Its membership includes the leading specialists of the KhEGS, the captains, first mates, the senior engineers of the group's vessels, the representatives of the party organization and the crew committee. At its regularly held sessions (at the navigation company and on the vessels) the production council reviews the most important questions related to the economic activities of the group (the annual and quarterly plans, the distribution of the allocated funds for repairs, material and technical supply and separation materials, the plans of measures to improve shipping efficiency, the captain's reports, and so forth).

The KhEGS is a new organizational form of fleet management capable of fully solving the questions of fleet operations, providing the fulfillment of the plan quotas by each vessel, improving the economic and foreign exchange efficiency of the fleet, the trouble-free operation of the vessels and the maintaining of them in the proper technical state, and the strengthening of

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the initiative and responsibility of the navigation company specialists and ship crews for the results of their production and financial activities and commercial work.

The shipping and fleet traffic services are the most developed and mobile in those navigation companies which provide direct leadership over shipping and fleet operations through specialized administrations. Thus, the Shipping and Fleet Traffic Service of the Black Sea Maritime Navigation Company includes a number of departments which perform general functions related to managing shipping and fleet traffic: The Department for the Organization of Fleet Operations; the Schedulers Group; the Fleet Chartering Department; the Container Shipment Department; the Department for Operational Planning, Analysis and Accounting of Fleet Operations; the Dispatcher Department.

The shipping and fleet traffic service coordinates and directs the activities of the specialized fleet administrations (line, trip and passenger) to fulfill and overfulfill the shipping plans set for the navigation company and to continuously improve the economic and foreign exchange efficiency of fleet operations.

In those navigation companies where line navigation holds a comparatively small proportional amount, the shipping and fleet traffic services provide leadership over the line fleet equally with the trip fleet directly through the KhEGS.

§19. The Automated Maritime Transport Management System (Morflot ASU)

The constantly growing scale of maritime shipments, particularly foreign shipments, the high development rate of the physical plant of maritime transport on the basis of the achievements of scientific and technical progress, and the tasks of improving the utilization of productive capital and raising the efficiency and quality of operational activities have necessitated a fundamental improvement in the management of maritime transport.

Under present-day conditions, the required improvement in the management of maritime transport on all its levels (from the ship up to the sector as a whole) is possible only on a modern technical base using mathematical economics methods and a systems approach to solving long-range, current and operational management problems.

Science and modern computers make it possible to create a fundamentally new system for managing maritime transport, an automated management system which for short is called Morflot ASU. This system will make it possible not only to utilize high-speed computers for collecting, processing, storing and transmitting enormous flows of all sorts of information, but also to work out optimum solutions for managing the complex multisector system of maritime transport and its dynamic cargo shipping and transloading processes.

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The creation of the Morflot ASU opens up broad opportunities for solving completely new management problems, for a new approach to solving the traditional economic and operational problems, and for finding and taking optimum decisions in coordinating the operation of numerous enterprises and organizations in maritime transport. The use of modern computers and communications makes it possible in a different, more flexible, efficient and effective manner, to manage maritime transport and above all its most complex and dynamic shipping process.

The new maritime transport management structure under the conditions of the automated management system provides effective control over all processes which comprise the basis for the functioning and development of maritime transport as a sector. The MMF as the superior management body for maritime transport, has concentrated its efforts on working out and solving fundamental questions relating to the development of the sector, while the GKHO and the navigation companies concentrate on managing the cargo shipping and transloading processes as well as maintaining the equipment in working order.

The Morflot ASU is an automated system for managing maritime transport using mathematical economics methods of planning, accounting and analysis of production and economic activities in maritime transport as a whole and its associations and enterprises on the basis of modern computers and office equipment, as well as up-to-date communications. It is a "man-machine" complex, and consists of a series of functional subsystems and standard production systems which are separated into independent blocks but are closely interrelated.

The functional subsystems provide automatic solution to groups of problems relating to the basic management functions (planning, organization, coordination and control) for all maritime transport management levels from the bottom to the top. These are divided into controlling and support. The Morflot ASU has nine controlling subsystems.

The production systems aim at solving problems relating to the controlling functional subsystems on the level and in the sphere of activities of the navigation companies, ports and ship repair yards, as well as the solving of problems related to the direct management of the basic production processes. These systems are being worked out and function as standard ones for the same types of enterprises. They include: The Navigation ASU [automated management system], the Port ASU and the Ship Repair Yard ASU.

In addition to the groups of problems of the controlling functional subsystems, the main group of problems in the production system of the Navigation ASU is the problems relating to the organizing of the execution of specific trips: Forecasting the position of the vessels, calculating the trip plans, supervision over the course of carrying out the trip assignments, analysis of the fulfillment of the trip plans, and so forth.

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By the end of the Tenth Five-Year Plan maritime transport will have in operation 34 information computer centers (IVTs) (including a Main Computer Center). All of the IVTs will have third-generation computers of the ES series. Information computer subdivisions will be set up at 22 ports and ship repair yards with the installation of minicomputers and computational equipment at them for solving operational problems.

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#### CHAPTER X. OPERATIONAL INDICATORS OF FLEET OPERATIONS

##### §57. The System of Operational Indicators for Fleet Operations

The operation of the maritime transport fleet in hauling cargo and passengers has a quantitative and qualitative aspect. The quantity of fleet operations, the expenditures of time and money on carrying out the operations, as well as the conditions for the operations are determined by absolute amounts. The quality and the degree of fleet utilization and its productivity under certain operating conditions are expressed by average and relative amounts.

The quantitative and qualitative operating indicators are both planning and report. They can be determined as follows: For each vessel, group of vessels and the entire fleet; for types of shipping, for the individual lines and shipping directions, for the navigation companies and for the MMF as a whole.

Each of the operating indicators expresses one most essential aspect of the process of sea shipping. All of them in their aggregate represent a single system in which they are closely interrelated. The system of operating indicators expresses the process of sea shipments as a whole, and it makes it possible to determine the reasons and the direction of changes in the transport process, and to establish the actual state of sea shipments at each given moment.

An analysis of the operational indicators makes it possible to detect deviations from the planned conditions of fleet operations, the reasons for the nonfulfillment or overfulfillment of the shipping plan and its individual indicators, to discover reserves and plan measures to improve the operation of the navigation company and its units. The system of operational indicators is widely used by the navigation companies for planning sea shipping and fleet traffic. Using them control is provided over the fulfillment of the plan quotas by each vessel and by the fleet.

The indicators make it possible to thoroughly study, analyze and assess the quality of using the production capacities of the fleet for the purposes of a continuous rise in its carrying capacity.

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Table 15

Indicators	Unit of Measurement	Symbols
Quantitative Indicators		
Planned cargo-carrying capacity	T	$D_n$
Passenger capacity	persons	$\Sigma P$
Ship-days	ship-day	T
Tonnage-days	tonnage-day	$D_n T$
Miles of voyage	mile	L
Tonnage-miles	tonnage-mile	$D_n L$
Passenger-place-miles	passenger-place-mile	$P_m L$
Tonnage-trips	tonnage-trip	$D_n r$
Volume of cargo shipments	T	$\Sigma Q$
Cargo turnover in ton-miles	ton-mile	$\Sigma Q L$
Passenger shipments	persons	$\Sigma P$
Passenger-miles	passenger-mile	$\Sigma P L$
Calculated ton-miles	ton-mile	$\Sigma Q L + \Sigma P L$
Qualitative Indicators		
Weighted cargo-carrying capacity of fleet	T	$\Sigma D_{nw}$
Operating coefficient	T	$\frac{k_o}{D_n}$
Average cargo-carrying capacity of vessel	T	$\frac{T_o}{D_n}$
Average duration of operating period	days	T
Ship loading coefficient		$\alpha_l$
Use factor of net cargo-carrying capacity		$\frac{\alpha_c}{v_o}$
Operating speed of vessel	miles/day	$\epsilon_r$
Running time coefficient		$\epsilon_r$
Productivity of 1 ton of cargo-carrying capacity	$\frac{\text{ton-mile}}{\text{tonnage-day}}$	$\mu_p$
Average length of trip	mile	$l_p$
Coefficient of ballast run		$k_b$
Average distance of transporting 1 ton of cargo	mile	$l_c$
Shift factor		$\beta$
Net rate of cargo handling work	ton/day	$\frac{M_n}{M_g}$
Gross rate of cargo handling work	ton/day	$M_g$
Coefficient for rate spread		$\frac{k_m}{t_t}$
Average duration of trip turnaround	day	$t_t$

The system of operational indicators in use in Soviet maritime transport includes numerous and diverse-content indicators (Table 15).

The planning and accounting of maritime cargo and passenger shipping is carried out in terms of departure.

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The operational qualitative indicators, with the exception of  $\Sigma D_{NW}$ ,  $k_0$  and  $T_0$  are planned solely for completed trips, and the quantitative indicators necessary for calculating them in each calendar breakdown and in terms of departure.

The qualitative indicators for the availability and use of tonnage ( $\Sigma D_{NW}$ ,  $k_0$  and  $T_0$ ) are planned and accounted for in a calendar breakdown.

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§63. Operating Expenditures of Seagoing Vessels

The operating expenses of the fleet are the expenditures of money on the upkeep of the seagoing transport vessels.

The expenditures on the upkeep and running of each transport vessel R are determined from the following consolidated items: Crew wages; amortization deductions; routine repairs; fuel and lubricants; material and technical supply; ship fees; agent services; navigation expenses; general operating expenses; administrative and management expenses.

The general operating and administrative-managerial expenses are related to the operation of the transport fleet of the navigation company as a whole, and are termed indirect. They are not directly linked to the operation of each vessel. The amount of them does not depend upon the volume of work performed by the transport fleet of the navigation company. All the remaining items of operating expenses are directly linked to the maintaining of the vessels in a proper operating and technical state and their operations of transporting cargo and passengers. These are the direct expenses of the transport vessels.

In making trips overseas, the transport vessels, along with operating expenses under all the listed items in Soviet currency, also bear additional expenses in foreign currency (wages of the crew, fuel and lubricants, material and technical supply, ship fees, agent services, stevedore expenses and navigating expenses).

Expenses on the wages of the ship crew  $R_{cr}$  include the wages according to the salary rates, the various additional payments and bonuses, payment for vacation, unused days off and overtime, deductions for social security, the value of the free food and the portion of wages paid in foreign exchange. Crew expenses are determined both for the period of the vessel's operations as well as for the time of its overhaul.

The size of the ship crews, the salaries as well as the procedure for figuring wages are determined by the orders of the MMF.

The value of the free food is determined according to rates differentiated for the home ports of the vessels and in terms of types of service.



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Amortization deductions  $R_{am}$  are determined according to an overall rate in percent using the initial or replacement value of the vessel, differentiated in terms of the types of the fleet and types of ship propulsion units:

$$R_{am} = \frac{D_a K_c}{100}, \quad (125)$$

where  $D_a$ --rate of amortization deductions, %;  
 $K_c$ --initial or replacement cost of vessel, rubles.

The overall amortization deduction rate  $D_a$  consists of the rate for the full replacement of the vessel  $D_r$  and the rate for the major overhaul and modernization of the vessel  $D_m$ .

Expenses on the routine repair of the vessel  $R_{rm}$  represent the expenditures on carrying out preventive and repair work regardless of who performs this work (ship repair yards, the navigation repair facilities or the ship crews). They include expenditures on motor and boiler cleaning, preventive docking, navigation, intertrip, preventive and maintenance overhauls, regardless of whether this work requires withdrawing the ship from operation or not. The periodicity of routine repairs is determined by the Technical Operating Rules and the Regulation Governing the Repair of Maritime Fleet Ships. The amount of expenses on routine repairs depends upon the purpose of the vessel, the type and power of the main engines, the level of technical operations, the operating conditions of the vessel, and other factors. Expenses on routine repairs increase as the ship ages and are determined by estimates. Expenses on fuel and lubricant  $R_{fl}$  depend upon the type, grade and amount of fuel and lubricant required by the vessel in running and stopped, their ex-refinery prices and the bunkering expenses. In contrast to all the items of ship operating expenses, fuel and lubricant expenses are determined not for the year, but per day of ship operations and separately for running and while moored.

The amount of consumed fuel is set by the current rates. The fuel prices are set in accord with the price lists.

Expenses on lubricating and wiping down are determined in percent of the fuel expenses.

The expenses on material and technical supply of the vessel  $R_{su}$  include expenditures on the purchasing of inexpensive ship supplies and operating consumed materials (articles of ship rigging, paints, washing compounds, and so forth) necessary for maintaining the vessel in proper technical condition. This expenditure item is determined from an estimate.

Expenses on paying ship fees  $R_{sf}$  include all the fees which are collected from the ships in Soviet and foreign ports as well as canal fees.

Ship and pilot fees are the basic fees in Soviet ports.

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In foreign ports the ship fees are extremely diverse in terms of purpose, amounts and method of calculation. For overseas ships, they can be determined only by calculation upon each entry into a foreign port.

The agent expenses  $R_{ag}$  are related to the paying for the services of a maritime agent who serves the ships in the port of entry.

The navigation expenses of the vessel  $R_{nav}$  are numerous types of expenditures including for: Freshwater, cleaning out of tanks, gas decontamination, rodent control, disinfection, technical inspections, washing of ship laundry, payment for tugs and much else. The amount of these expenses is set by a rate per tonnage-day in operation as calculated from the report data.

The list of expenses and their grouping by items are determined by the instructions on compiling the planned costing of costs for maritime shipments as worked out by the MMF. The calculation of the planned operating expenses of a vessel is carried out using the individual items on the basis of the standards which are set by government decrees, by orders of the MMF or are determined by analyzing the actual expenses and the technical testing data considering local conditions.

The planning and calculating of direct operating expenses are carried out for each transport vessel separately, and for the indirect ones, for the navigation company as a whole.

The indirect expenses are distributed proportionally to the total direct operating expenses of each vessel.

Expenses in foreign currency are planned in a total amount for all the expenditure items with the separating only of the foreign currency portion of crew wages.

Operating expenses for all items of direct expenses are considered separately in Soviet and foreign currency.

Among the unplanned operating expenses are expenses on emergency repairs, the eliminating of the consequences of emergencies, and certain others.

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§65. Operating Expenses of a Vessel on a Voyage

For assessing the operation of a vessel, it is essential to know the planned and actual operating expenses on each trip. The planned expenses are determined from the planned operating cost of the vessel underway and at anchor  $K_r$  and  $K_s$  and the duration of the running and anchoring time of a vessel on the trip  $t_r$  and  $t_s$  according to the formula

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$$R_p = K_r t_r + k_s t_s \quad (139)$$

The actual expenses of the vessel related to the transporting of cargo are determined after the cargo has been transported and unloaded at the destination point, when the actual expenditures of running and anchoring time are known.

Example.

To determine the planned cost of a voyage of a vessel from the following data:

1) Planned cost of a ship-day, rubles;

for running  $k_r = 2,400$ ;

for anchoring  $k_s = 1,800$ ;

2) Planned duration of trip, days;

running time  $t_r = 21$ ;

anchoring time  $t_s = 8$ .

Solution.

$$R_p = (2,400 \cdot 21) + (1,800 \cdot 8) = 50,400 + 14,400 = 64,800 \text{ rubles.}$$

#### §66. The Cost of Maritime Shipments

The full cost of moving cargo by maritime transport is formed of three parts: expenses on loading the cargo onto the vessel at the port of departure; expenses on transporting the cargo in the vessel; expenses on unloading the cargo from the vessel at the destination point. The second portion also comprises the cost of the maritime shipments.

The cost of maritime shipments is an indicator which reflects all aspects of the economic operations of a navigation company. Thus, the fuller use of the carrying capacity of the vessels in a navigation company helps to increase the volume of maritime shipments with the same composition and time budget of the fleet and is accompanied by a relative reduction in the transport expenditures. The thrifty expenditure of fuel, lubricants, and materials on the vessels brings about a reduction in material expenditures. The costs of maritime shipments are influenced by the organization of traffic and the handling of vessels, by improving the organization of labor of the ship crews, by simplifying the structure of the administrative and managerial personnel of the navigation company, and by other factors. For this reason under the conditions of the new system of planning and economic incentive, the costs of maritime shipments remain a most important indicator for navigation company operations. A correct accounting of the operational

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expenses and the accurate costing of maritime shipments after the conversion of the navigation companies to the new management system are assuming even greater significance.

The operating expenses per ton of transported cargo and per ton-mile are termed the costs of maritime shipments. This is determined from the following formulas:

The cost of transporting 1 ton of cargo

$$S_t = \frac{ER}{EQ} ; \quad (140)$$

Costs of 1 ton-mile

$$S_{tm} = \frac{ER}{EQ\ell} . \quad (141)$$

where ER--total operating expenses;  
EQ--quantity of transported cargo;  
EQℓ--quantity of completed ton-miles.

The financial indicators  $S_t$  and  $S_{tm}$  are widely used for comparing the operating economic efficiency of the individual vessels on certain shipping lines and routes.

The cost is calculated by the types of service (short- and long-distance coastal shipping and foreign shipping). For each of the types of services, the costs are calculated separately for the transporting of dry cargo, tanker cargo, lumber in rafts and passengers. Moreover the average cost for all types of shipments is determined.

Calculating the cost of maritime shipments is called costing. Two types of costing are distinguished: planned and report.

Planned costing determines the volume, direction, standards and limits of expenditures on the forthcoming shipping, and it sets the planned cost quota for each vessel. The costing is compiled before the start of the trip or planning period on the basis of progressive ship use rates in terms of time, loading and speed, and scientifically based expenditures of materials and money.

The report costing is drawn up after the end of the trip or at the end of the report period. With this costing the actual operating expenses are set for transporting 1 ton of cargo and the expenses per ton-mile, the degree of fulfilling the planned cost quota is determined, and a qualitative evaluation of the operations of the ship (fleet) is given. An analysis of the report costs makes it possible to show the reasons for an increase or

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decrease in the costs and to work out measures for reducing costs, as well as to improve profitability of fleet operations.

The costs of maritime shipments change under the influence of many factors which reflect the financial and operating aspects of a ship's operation. This is not difficult to see if we determine the costs of maritime shipments over a trip.

The cost of transporting 1 ton of cargo and 1 ton-mile in a trip is defined as the ratio of the operating expenses on the trip  $R_p$  to the amount of cargo transported during the trip  $Q_p$  and to the number of completed ton-miles  $Q_p l_c$ :

$$S_c = \frac{R_p}{Q_p}; \quad (142)$$

$$S_{tm} = \frac{R_p}{Q_p l_c}. \quad (143)$$

Let us transform formula (142), having substituted in it the corresponding values in the place of  $R_p$  and  $Q_p$ :

$$R_p = k_r t_r + k_s t_s; \quad Q_p = \alpha_c \beta D_n;$$

$$S_t = \frac{R_p}{Q_p} = \frac{k_r t_r + k_s t_s}{\alpha_c \beta D_n}.$$

Let us substitute  $t_r$  and  $t_s$  by their values:

$$t_r = \frac{L_p}{v_0}; \quad t_s = \frac{2Q_p}{M_g} = \frac{2\alpha_c \beta D_n}{M_g},$$

then

$$S_t = \frac{k_r t_r + k_s t_s}{\alpha_c \beta D_n} = \frac{k_r}{\alpha_c \beta D_n} t_r + \frac{k_s}{\alpha_c \beta D_n} t_s = \frac{k_r}{\alpha_c \beta D_n} \frac{L_p}{v_0} + \frac{k_s}{\alpha_c \beta D_n} \frac{2\alpha_c \beta D_n}{M_g}.$$

Having shortened  $\alpha_c \beta D_n$  in the second member of the equation, we obtain the final expression for the cost of transporting 1 ton of cargo:

$$S_t = \frac{k_r}{\alpha_c \beta D_n v_0} L_p + \frac{2k_s}{M_g}. \quad (144)$$

In the same manner let us transform formula (145), having substituted additionally the expression  $\alpha_c \beta D_n l_c = \alpha_c \beta D_n (L_p / \beta)$  in the place of  $Q_p l_c$ ,

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$$S_{tm} = \frac{R_p}{Q_p l_c} = \frac{k_r t_r + k_s t_s}{\alpha_c \beta D_n l_c} = \frac{k_r}{\alpha_c \beta D_n} \frac{L_p}{\beta \bar{v}_0} + \frac{k_s}{\alpha_c \beta D_n} \frac{L_p}{\beta} \frac{2\alpha_c \beta D_n}{M_g}$$

Finally

$$S_{tm} = \frac{k_r}{\alpha_c D_n \bar{v}_0} + \frac{2\beta k_s}{M_g L_p} \quad (145)$$

From the last expressions of  $S_t$  and  $S_{tm}$ , we can see that their value depends primarily upon the daily rates of ship operating expenses in running  $k_r$  and anchoring  $k_s$ . If the actual daily running and anchoring operating expenses of the vessel decline, then  $S_t$  and  $S_{tm}$  decline correspondingly.

The cost of shipping 1 ton of cargo rises and the cost of 1 ton-mile declines with the lengthening of the ship's run in a trip. Of great significance for the value of  $S_t$  and  $S_{tm}$  are the net cargo-carrying capacity and the degree of its use on the trip, the amount of the average daily cruising speed of the vessel and the intensity of cargo and auxiliary operations of the vessel in ports.

A reduction in the costs of maritime shipments can be achieved by:

- 1) Savings in the individual items of the vessel's operating expenses;
- 2) Increasing the net cargo-carrying capacity of the vessel by freeing it of "dead cargo" and strict setting of the trip consumption supplies;
- 3) The fullest utilization of the net cargo-carrying capacity of the ship on each trip by the rational selection of cargo, as well as by attracting cargo on the return routes by the correct positioning of the vessels;
- 4) Increasing ship speed by improving the methods of technical operation and navigation;
- 5) Accelerating cargo-handling operations, combining auxiliary operations with cargo-handling operations and eliminating stoppages.

Example.

To determine the cost of transporting 1 ton of cargo and the cost of 1 ton-mile on a trip from the following data:

$k_r = 1,400$  rubles per day;  $k_s = 1,100$  rubles per day;  $t_r = 20$  days;  
 $t_s = 12$  days;  $Q_p = 5,000$  tons;  $Q_p l_c = 25$  million ton-miles.

Solution.

1. Let us determine the expenses of the vessel on the trip:

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$$R_p = k_{rtr} + k_{stg} = 28,000 + 13,200 = 41,200 \text{ rubles.}$$

2. Let us determine the cost of transporting 1 ton of cargo:

$$S_t = \frac{R_p}{Q_p} = \frac{41,200}{5,000} = 8 \text{ rubles } 24 \text{ kopecks}$$

3. Let us determine the cost of 1 ton-mile

$$S_{tm} = \frac{R_p}{Q_p l_c} = \frac{41,200}{25,000,000} = 0.132 \text{ kopeck.}$$

[pp 194-198]

### §68. Profitability of Ship and Fleet Operations

Under present-day conditions, the most important generalizing indicator for the economic and financial activities of a navigation company, as a self-financing enterprise, is profitability. It describes the level of the economic efficiency in the operational activities of a navigation company, and is of important significance for its development.

Under socialist conditions, the profitability of the maritime navigation companies is stable and continuously increases, but not at the expense of or to the detriment of the activities of other enterprises. The profitability level of each navigation company is determined on a planned basis considering the freight and chartering rates, shipping costs, the financial requirements for operating activities and material incentives for the workers. In the annual plan the total profit and the profitability level are set for the navigation companies.

Profit presently holds the central place in the system of economic levers to manage the economic activities of the navigation companies. However it is not any universal means for managing the operations of a navigation company as an enterprise. It cannot be considered an automatic regulator which is capable by itself of directing the development and activities of a navigation company. Under socialist conditions the main thing is not the profit but rather production of the product needed for a maximum satisfying of society's needs. However, profit is of important significance as an indicator for the efficiency of economic operations at each enterprise, including a maritime navigation company. If the navigation company did not earn a profit but rather operated at a loss, this would mean that it did not add to but merely consumed social assets and existed at the expense of other enterprises. Profit makes it possible to most correctly determine the actual merits of the collective of a navigation company and to establish its contribution to the accumulation of funds for the further development of the national economy.

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In a generalized manner the profit indicator reflects all the major aspects and results of economic operations: The growth of the volume and the quality of maritime shipments, the reduction in costs, the rise in labor productivity, the saving of material resources, and the improvement in the organization of shipments and fleet traffic.

The so-called balance sheet profit reflects the end operating results of the navigation company, including unrealized income and loss. The fulfillment of the profit plan is assessed by comparing actual profit from the report balance with the balance sheet profit approved in the plan.

Along with total profit, the profitability level is also determined as the ratio of profit  $P_p$  to the value of the fixed productive capital and normed working capital of the navigation company  $F$ :

$$p = \frac{P_p \cdot 100}{F} \% \quad (148)$$

Plan profitability of a navigation company is calculated from the balance sheet profit approved in the annual plan, and actual profitability from the profit in the report balance.

For determining the deductions into the production development fund and the material incentive fund of the workers and the collective of the navigation company, adjusted profitability is used and in determining this the payment for productive capital, rent payments and interest on bank credits are deducted from the balance sheet profit.

The basic indicator for the fulfillment of the shipping plan and for evaluating fleet operations in foreign shipping is the net foreign exchange income which is calculated as the difference between the income and expenditures in foreign exchange rubles:

$$EF_{nc} = EF_c - ER_c, \quad (149)$$

where  $EF_c$ --fleet income from foreign shipments, foreign exchange rubles;  
 $ER_c$ --foreign exchange expenditures of the fleet related to foreign shipments, foreign exchange rubles.

Under the conditions of the socialist planned economic system, the volume, composition and direction of maritime shipments are set by a state plan, and the shipping rate is the planned price of the shipments. Consequently, in order to increase the profitability of the operations of the seagoing transport vessels, it is essential, on the one hand, to raise the income of the vessel  $F_p$  or  $EF_c$ , and on the other, to reduce as much as possible the operating expenses  $R_p$  and  $ER_c$ . An increase in income with a constant shipping fee can be achieved by improving ship utilization in loading, speed and time which involve a rise in the carrying capacity and an increase in the shipping volume. The strictest observance of savings is the basic means for reducing operating expenses.



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## Example 1.

Diesel vessel A has made a trip Kaliningrad--Leningrad--Kaliningrad with a load of logs weighing 2,675 tons taken on in Leningrad.

The operating costs of the vessel are: in running  $k_r = 1,190$  rubles per day; in anchoring  $k_a = 857$  rubles per day.

Trip time: in running  $t_r = 108$  hours; in anchoring  $t_a = 96$  hours.

Let us determine the financial result of the trip.

## Solution.

1. The expenses of the vessel during the trip are

$$R_p = 1,190 \cdot 4.5 + 857 \cdot 4 = 5,355 + 3,428 = 8,783 \text{ rubles.}$$

2. The rate for transporting 1 ton of logs from Leningrad to Kaliningrad (Price List No 11-01).

$$f_t = f_{sl} + f_m + f_{su} = 51 + 3.44 + 3.09 = 7.04 \text{ rubles.}$$

3. The income of the vessel for the trip will be

$$F_p = f_t Q_p = 7.04 \cdot 2,675 = 18,832 \text{ rubles.}$$

4. The financial result of the ship's operations on the trip will be

$$\Delta F_p = F_p - R_p = 18,832 - 8,783 = 10,049 \text{ rubles.}$$

## Example 2.

Diesel vessel B has made a trip Dubrovnik--Split--Kherson, having taken on 3,950 tons of cement at the port of Split.

The rate for transporting 1 ton of cement from the port of Kherson will be  $F_c = 4$  rubles 84 kopecks.

Total ship expenditures on the trip were  $R_c = 4,596$  foreign exchange rubles.

To determine the net foreign exchange income of the ship on the trip.

## Solution.

1. Let us determine the total income of the ship in foreign exchange rubles:

$$F_c = 4.84 \cdot 3,950 = 19,118.$$

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2. Let us determine the net foreign exchange income of the ship on the trip:

$$\Delta F_c = F_c - R_c = 19,118 - 4,596 = 14,522 \text{ rubles.}$$

### §69. Indicators of Income and Foreign Exchange Effectiveness of Ship Operations

Along with the total income of a vessel, the proportional income of a vessel per ton of transported cargo and per ton-mile is also determined:

Average income rate per ton

$$f_t = \frac{\Sigma F}{\Sigma Q}; \quad (150)$$

Average income rate per ton-mile

$$f_{tm} = \frac{\Sigma F}{\Sigma Q L}. \quad (151)$$

For planning calculations of income earnings for transporting various cargo in vessels, average weighted income rates are set:

$$\bar{f}_t = \frac{f_{t1}Q_1 + f_{t2}Q_2 + \dots + f_{tn}Q_n}{Q_1 + Q_2 + \dots + Q_n}; \quad (152)$$

$$\bar{f}_{tm} = \frac{f_{tm1}Q_1L_1 + f_{tm2}Q_2L_2 + \dots + f_{tmn}Q_nL_n}{Q_1L_1 + Q_2L_2 + \dots + Q_nL_n}, \quad (153)$$

where  $f_{tm}$ --the shipping rate for 1 ton of given cargo;  
 $f_{tmn}$ --the shipping rate for 1 ton-mile for the given cargo;  
 $Q_n, Q_nL_n$ --tons and ton-miles of each cargo.

The absolute amount of the financial result in coastal shipping cannot completely describe the operation of the different vessels or even the operation of one vessel in different seasons of the year. For a fuller description of the economic efficiency of operating each vessel on the various routes and in transporting different cargo by the vessels, it is essential to use a proportional financial result which indicates the profit or losses per ruble of ship operating expenses:

$$k_p = \frac{\Sigma F - \Sigma R}{\Sigma R}. \quad (154)$$

The operation of the ships on different routes and in transporting different cargo in foreign shipping also cannot be fully described just by the indicator of net foreign exchange income. The indicator for the efficient operation of the fleet in foreign shipping is the net foreign exchange income per ruble of operating expenses of the fleet in Soviet currency:

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$$k_c = \frac{\Sigma F_{nc}}{ER}, \quad (155)$$

where  $ER$ --total operating expenses of the fleet in Soviet currency, rubles.

The net foreign exchange income per trip hour is the foreign exchange indicator for evaluating ship operations during the trip in overseas shipping:

$$f_{nc} = \frac{\Sigma F_{nc}}{t_p}, \quad (156)$$

where  $t_p$ --the duration of the ship's trip, hours.

The indicator  $f_{nc}$  can be used for comparing the operating results of an individual vessel or vessels of the same class in different overseas trips.

But for comparing the operating results of vessels of different classes in different overseas trips during a certain period it is essential to use another indicator, the net foreign exchange income per tonnage-day of ship operations:

$$\Delta f_{nc} = \frac{\Sigma F_{nc}}{D_n T_o}, \quad (157)$$

where  $D_n T_o$ --tonnage-days in ship operations over the given period (quarter, year).

Example.

Diesel vessel C has made the trip Liverpool--Rotterdam--Riga with a cargo of metal.

Cost of operating ship (ruble/day):

running  $k_r = 1,120$ ;

anchoring  $k_a = 960$ .

Time of trip (hours):

running  $t_r = 156$ ;

anchoring  $t_a = 96$ .

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Total  $t_p = 252$  hours (10.5 days)

Ship expenditures for trip  $R_c = 2,650$  foreign exchange rubles

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Ship income for trip  $F_c = 12,730$  foreign exchange rubles.

To determine the foreign exchange indicators of ship operation in the trip.

Solution.

1. Let us determine the net foreign exchange income of the vessel in foreign exchange rubles:

$$\Delta F_c = F_c - R_c = 12,730 - 2,620 = 10,080.$$

2. Let us determine the net foreign exchange income per vessel-hour:

$$f_c = \frac{\Delta F_c}{t_p} = \frac{10,080}{252} = 40 \text{ rubles/ship-hour.}$$

3. Let us determine the ship's expenses for the trip:

$$R_p = 1,120 \cdot 6.5 + 960 \cdot 4 = 7,280 + 3,840 = 11,120 \text{ rubles.}$$

4. Let us determine the net foreign exchange income per ruble of ship operating expenses for the trip:

$$k_c = \frac{\Delta F_c}{R_p} = \frac{10,080}{11,120} = 0.90 \frac{\text{foreign exchange rubles}}{\text{rubles}}.$$

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#### §74. Cargo Vessel Traffic on Scheduled Lines

On lines with the scheduled operation of the vessels, the movement of one or several vessels is carried out according to a previously announced schedule, and this provides for the even movement of the vessels over the system of the line and strictly regulates the entire cargo shipping process in time.

The scheduled operation of cargo vessels is organized with a sufficient cargo flow on the given shipping route, with the corresponding fleet and conditions for the processing and servicing of the vessels within the schedule at the ports of call.

For scheduled operations, cargo vessels are selected the operating and technical specifications of which most fully conform to the nature of the cargo flow and to the natural and navigating conditions on the given line.

The vessels are assigned by name to the lines. The navigation company can substitute individual assigned vessels of the same class under the condition

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of observing the approved schedule. The number of assigned vessels can be reduced or increased depending upon the intensity of the cargo flow during the operating periods of the line.

The ship traffic schedule on each line is coordinated with the ports of call and the other interested parties, and is approved by an order of the chief of the navigation company for the entire period the line is in effect or for another interval of time, but no less than for 3 months.

The time of arrival and departure of the vessels for each port on the line, depending upon the nature of the cargo flow, the length of the line and the particular features of the ports of call, is indicated by date and hour, by the date and by the period of days or only by date. The schedule can be published to inform clients. In this instance the vessels depart and arrive strictly on schedule. But if the schedule is not published, then the navigation company in individual instances, with the agreement of the ports of call, can alter the established time of ship arrival and departure. However, this should not be accompanied by stoppages or incomplete loading of the vessels on the line, and by the start of the following round trip, the vessel should be on schedule.

For vessels operating on a schedule, piers are assigned, as a rule, in the ports. Other vessels can be processed at these piers when this would not disrupt the processing and servicing times for the vessels operating on schedule. The processing and servicing of Soviet vessels operating on a schedule are carried out by the ports within the time established by the schedule, regardless of the presence of other vessels in the port.

If loading has been completed ahead of time set by the schedule, the vessel can leave the port early. However, if in this instance it arrives ahead of schedule in the following port, its lay days are counted from the arrival time indicated in the schedule.

If by the scheduled time of the ship's departure loading or unloading of cargo has not been completed, then the vessel can be kept from departing to terminate the cargo working operations. However this should not delay its scheduled arrival at the next port or cause the delay of another scheduled vessel which has not gotten off schedule.

The running time of the scheduled vessels is set considering a reserve for possible delays enroute for hydrometeorological conditions. The amount of this reserve is set by analyzing the operation of the ships on the route.

The duration of ship anchoring in Soviet ports is figured on the basis of the type of cargo planned for transporting on the given line, the current ship processing rates in the ports and an analysis of ship processing in the previous period.

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If the vessel has fallen behind schedule to such a degree that it is impossible to return it to schedule by the start of the following trip, the navigation company should load a substitute by the scheduled time, and the vessel which is off schedule should be used for other shipments.

The taking of a vessel off a line, the transferal of it from one line to another and an increase in the number of vessels on a line are formalized by an order of the chief of the navigation company and the ports and vessels operating on the given and related lines are immediately informed.

Scheduled vessels are issued trip plans. The operation of the vessels is accounted for and judged according to the fulfillment of the ordinary or round trips.

The traffic schedule for Soviet vessels operating on lines with the participation of foreign vessels (joint lines) is set by agreements between the navigation companies of the MMF and the agencies of other countries. The processing and servicing of scheduled vessels in overseas service at the foreign ports of the line are carried out under contracts concluded by the navigation companies of the MMF and agent firms. The processing and servicing of foreign vessels operating on schedule on joint lines are carried out by Soviet ports within the limits of the schedule under reciprocity conditions.

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