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# USSR Report

## TRANSPORTATION

No. 83

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28 May 1982

USSR REPORT  
TRANSPORTATION

No. 83

CONTENTS

AIR

Steps in Development of New Aircraft Detailed (R. Sakach; VOZDUSHNYY TRANSPORT, 16 Jan 82) .....	1
Permission To Fly Transsiberian Route Granted to JAL (I. Grigor'yev; VOZDUSHNYY TRANSPORT, 30 Mar 82) .....	3
Yak-42 Landing at Yegor'yevsk School Airstrip (B. Bychkov; VOZDUSHNYY TRANSPORT, 18 Mar 82) .....	5
Aeroprojekt Institute Thinks Competition Evaluation Is Unfair (T. Perestoronina; VOZDUSHNYY TRANSPORT, 30 Mar 82) ..	8
Briefs	
Saransk Airport	10
Spring-Summer Aeroflot Schedules	10
Engine Lubricant Monitoring Improvements	10
Mogilev Efficiency Improvements	11
Aeroflot Accomplishments	11
A New Route	11
Airline Innovations	11
Ukrainian Airline Improvements	12

MOTOR VEHICLE

Introduction of Hydraulic Dredges in Building Roads in Western Siberia (N. G. Vavilov, A. G. Gerasimov; AVTOMOBIL'NYYE DOROGI, Feb 82) .....	13
---	----

RAILROAD

Self-Propelled Power Plant, Model ESU-3  
(V. P. Popov, Yu. P. Savenkov; TORFYANAYA  
PROMYSHLENNOST', Feb 82) ..... 19

OCEAN AND RIVER

Quality of Factory Ship Construction Discussed at Conference  
(A. A. Ishkov; RYBNOYE KHOZYAYSTVO, Mar 82) ..... 23

Use of Auxiliary Sails on Fishing Trawlers  
(D. I. Skvirskiy; RYBNOYE KHOZYAYSTVO, Mar 82) ..... 26

MISCELLANEOUS

Transportation System Examined  
(EKONOMICHESKAYA GAZETA, Apr 82) ..... 29

Statistical Overview  
Gosplan Official's Comments, V. Ye. Biryukov Interview  
Map, Statistics on USSR Transportation

Conflicts Among Commercial Fleets of EEC Countries Reviewed  
(A. Petrov; VODNYI TRANSPORT, 25 Mar 82) ..... 38

Integration of Urban Passenger Service in Belorussian  
Cities Planned  
(A. Bezlyudov; EKONOMICHESKAYA GAZETA, Apr 82) ..... 42

AIR

STEPS IN DEVELOPMENT OF NEW AIRCRAFT DETAILED

Moscow VOZDUSHNYY TRANSPORT in Russian 16 Jan 82 p 3

[Article by R. Sakach, chief of the State Scientific Research Institute of Civil Aviation, professor and doctor of technical sciences: "An Aircraft is Born in the Quiet of the Laboratory"]

[Text] "As airline passengers we are enjoying, so to speak, the fruits of labor of scientists, planners, designers, builders and workers. Well, I would really like to know what the first steps in building an airplane are, the what, where and how of the beginnings of construction of a civil aviation aircraft, just what problems and difficulties are encountered here."--P. Mel'nikov, Irkutsk.

Soviet aviation science is constantly working to perfect the construction of aircraft. Aeroflot science concentrated in the scientific research institutes and institutes of higher learning of the Civil Aviation Ministry plays a specific role in the scheme of problems to be resolved. Exactly how this is done and just how effective is our scientific quest can be clearly seen when we examine the problems associated with constructing a new passenger aircraft.

The State Scientific Research Institute of Civil Aviation is the chief scientific organization in the industry. As the institute of the customer we are obliged first of all to designate to the builder the basis for the entire design process that follows.

Among the "appearance" features of a passenger aircraft are passenger capacity, maximum flight distance while carrying full commercial load, cruising speed and required length of runway.

The institute conducts research aimed at obtaining "appearance" features that require minimal operational expenses for the new airplane. The scientific soundness of this research is attested to by the fact that analogous research conducted by the Central Aero-Hydrodynamic Institute, using its own programs and models, has yielded results which coincide with our findings. This has enabled us to present common data to builders and designers.

Specifications for the new airplane proceed from basic flight technology features. As the customer, we are obliged to designate in this extremely crucial document that level of data which will insure production of a highly sophisticated aircraft with

regard to technology, economics and power energy. Heated argument is flaring up with designers concerning certain features, such as fuel consumption per passenger-kilometer and number of hours spent on maintenance and repair work per hour in the air. Here we not only need to present convincing technological arguments, but to display good fighting qualities as well.

And so, institute specialists have contributed a great deal of effort and persistence towards solving problems associated with reducing expenditure of labor on technical maintenance and towards enhancing the new passenger airplane's adaptability to streamlined production. Special research is being conducted with regard to the Tu-154 and Tu-134 aircraft and analogous programs are being formulated for comprehensive research on the Il-86 and Yak-42.

An airplane's degree of sophistication depends considerably on its adaptability to airports. It is well known that modern airports are a complex entity encompassing a variety of services--as is often said, they have their own infrastructure (internal structure). The more adaptable an airplane is to an airport's infrastructure, the easier is its operation. Compatibility between airplane and airport is reflected primarily through a system of ground-based equipment on the concourse. If there is sufficient ground-based equipment for the new passenger aircraft, then it can be completely incorporated into the airport's infrastructure. Unfortunately, for a number of reasons, every new airplane brings along with it additional ground-based systems. Minimizing the number of such systems is the job of experts at the State Scientific Research Institute for Civil Aviation and "Aeroprojekt."

I would like to cite an example to illustrate the nature of the interrelationship between airplane and airport. Specifications for the airplane which will replace today's Tu-154 are now being considered. We have proposed that the designer examine the possibility of loading the new aircraft with the ABK-1.5 container. Here we have proceeded from the requirement to organize a one-container system at the major airports for baggage, mail and cargo.

Long-range analysis has shown that the ABK-1.5 container variant would be economically advisable. However, this variant would require an increase in the fuselage cross-section. Well, we were able to convince the designer that our proposition was well-founded. The use of only one type of ABK-1.5 container at the major airports will result in great economic savings.

The concept of coupling science with the operation of new aircraft in civil aviation enterprises is an ever-present theme at scientific research institutes of the airline industry. All the many aspects of operations here are accomplished according to the formula--"science in support of production."

Here an important step is the conduct of service trials and governmental tests, results of which enable us to evaluate how the airplane, engines and systems measure up to the specifications, and to determine the final, or, as they say, "record" flight characteristics which precisely determine data for the "Flight Operations Manuals."

Airline industry scientists have accomplished many interesting and complicated tasks. Missions have been fulfilled with regard to commissioning the Il-76T, L-410-UVP, Il-86 and Yak-42. Still more far-reaching feats await us.

AIR

PERMISSION TO FLY TRANSSIBERIAN ROUTE GRANTED TO JAL

Moscow VOZDUSHNYY TRANSPORT in Russian 30 Mar 82 p 3

[Article by I. Grigor'yev: "New Stage in Development of the Transsiberian Route"]

[Text] Talks between representatives of Aeroflot and Japan Air Lines (JAL) on commercial cooperation have been completed in Tokyo.

The basic purpose of these talks, which were held in a business-like, constructive atmosphere, was to reach a mutually acceptable agreement on the terms of commercial cooperation with regard to JAL's using Boeing 747 wide-body aircraft on the trans-Siberian route.

The Soviet delegation to the talks was headed by G. Mirzoyan, deputy chief of the foreign relations administration at the USSR Ministry of Civil Aviation, and the Japanese delegation was headed by JAL foreign routes administration chief T. Ryuzaki.

Aeroflot and JAL have held several rounds of talks in recent years on questions concerning the development of a transsiberian route. Terms mutually acceptable to both parties were worked out and agreed to as a result of these exchanges of opinion and have been included in a program of flights through 31 March 1985.

A protocol was signed between Aeroflot and JAL in Tokyo in March 1981. Its provisions were subsequently the basis for agreements on air communications between the Soviet Union and Japan which were reached at the level of the USSR Ministry of Civil Aviation and the Japanese Ministry of Transport in July of that year. Finally, a new document signed in the course of the most recent talks offers JAL an actual opportunity, beginning 1 April of this year, to begin regular Boeing 747 transsiberian flights from Tokyo to Europe and back.

The importance of the transsiberian route, as the shortest air route from Europe to Japan, is well-known and hardly requires any additional commentary. Let us note simply that opening it to flights by foreign airlines more than 10 years ago played a large role in developing air communications between the Soviet Union and Japan.

According to the documents signed in the early 1970's, Aeroflot and JAL, as well as a number of Western European airlines, received the right to fly the transsiberian route between London, Paris, Copenhagen, Frankfurt-on-Maine, Amsterdam, Rome, Moscow and Tokyo.

The transsiberian route is now even more important, with the operation of wide-body aircraft on it. There is an obvious advantage to using aircraft with a higher seating capacity on this route: flight time is reduced, the flight is over dry land and a well-equipped route, and fuel is saved. In this connection, foreign airlines have been intensely interested in operating wide-body equipment on the transsiberian route. Thus, agreement was reached quite recently on permitting Air France, the first European air freight carrier, to operate its Boeing 747's on this route, beginning 1 July of this year.

Let us recall that Soviet-Japanese civil aviation cooperation began in January 1966 with the signing of an intergovernmental agreement. On 17 April 1967, regular flights began between Moscow and Tokyo, and in 1971 we began operating the Khabarovsk - Niigata route, which is now traveled by both passenger and cargo aircraft.

The development of our ties in the area of air communications has one other aspect.

Speaking recently in Tashkent, at a festive meeting devoted to awarding the Uzbek SSR the Order of Lenin, Comrade L. I. Brezhnev, CPSU Central Committee General Secretary and USSR Supreme Soviet Presidium Chairman, noted in particular the effort by the Soviet Union to have "reliable relations of good-neighborliness, mutually advantageous cooperation and mutual trust..." with Japan.

One component of this policy is relations between our countries in the area of civil aviation. And the document signed several days ago in Tokyo by Aeroflot and JAL representatives only provides new opportunities for increasing the effectiveness of international flights on the transsiberian route and opens up an important page in the development of Soviet-Japanese relations in the area of air communications.

...And so a JAL Boeing 747 will take off on its first run on the Tokyo - Moscow - Paris route on 1 April.

11052

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AIR

YAK-42 LANDING AT YEGOR'YEVSK SCHOOL AIRSTRIP

Moscow VOZDUSHNYY TRANSPORT in Russian 18 Mar 82 p 4

[Article by B. Bychkov: "Landed in a Bare Field"]

[Text] A big 120-seat Yak-42 passenger plane landed right in the middle of a snow-covered field near Yegor'yevsk (Moscow Oblast) several days ago. No, not a forced landing. The new aircraft will be a training aid for Yegor'yevsk Aviation Equipment School, one of the country's oldest.

First Episode. Of course, only a master pilot could have landed this heavy aircraft on snow-covered ground, rather than a concrete airstrip. So the special assignment was entrusted to test pilots of the State Scientific Research Institute of Civil Aviation.

The Yak-42 is designed for a crew of two. But this was an exceptional case. It was the first time an aircraft of this class was faced with landing on ground with blowing snow, rather than at a man-made airfield. And without automatic navigation aids. In a word, this flight assignment went far beyond the framework of even those complex experiments which have been part of the state testing program. Because of this, the crew was doubled. On board were test-pilot first class S. Gorchilin, one of the most experienced pilots at the flight-testing facility, test-navigator A. Lalykin, test-engineer V. Tsedrov and the ship's commander, State Prize winner and test-pilot first class O. Poludo. After receiving the new-series aircraft at the aircraft plant in Saratov and ferrying it to Sheremet'yev, they now had to take it up and then make the landing near Yegor'yevsk....

Second Episode. Only someone who is a stranger to aviation would say they were now "playing with fate," that the risk was unpredictable. In fact, the situation involved in the landing had been calculated many times in advance on the ground, in GosNIIGA [State Scientific Research Institute of Civil Aviation] laboratories. In order to exclude the slightest chance of an accident, several people flew out to the landing site several times by helicopter: candidate of technical sciences A. Kazakov, an aerodynamics engineer in an institute department; Aeroflot representative A. Anisimov; flight leader I. Kuporov and GosNIIGA test-flight facility (LIK) chief V. Kozlov. Quite a bit was done by the Mi-8 helicopter crew (commander, test-pilot second class N. Bakulin, co-pilot N. Kryuchkovskiy and flight engineer V. Pisanko) to ensure a successful outcome to the experiment. The large helicopter simulated an aircraft landing under various conditions. All the specialists inspected the half-kilometer landing strip literally meter by meter. The firmness of the ground was measured

with instruments and the snow cover was packed down tightly. "Skill alone is not enough here," Viktor Vasil'yevich Kozlov told me. "Success will depend on the ground as well."

The strip was finally deemed safe. Final preparations for the experiment were underway at LIK headquarters. Both groups, Poludo's crew and the strip ground crew, went through their dry runs and adjusted their glide paths for the dozenth time. Then, suddenly, the capricious March weather "tripped them up."

Third Episode. Yegor'yevsk reported that pot-holes and pools of water had developed at the strip due to warming up of the peatbogs of which the ground here is primarily composed. Every day for a week, both groups of the test team waited nervously for the start. But now everything depended not on them, but on a freeze and on the precise, efficient actions of a third "landing group" comprised of the Yegor'yevsk school collective. It had to prepare a new landing strip as soon as the thermometer dropped below zero.

"This was the time the aircraft had to be landed," says Yegor'yevsk school deputy chief N. Anikin, "because the spot we had chosen for the new strip would be in crops in the summer. There was no more time. The school term was not far off. So when the staff appealed to the school students and teachers there was no lack of volunteers.

For 36 hours after the freeze, the snowy field was the scene of a day-and-night assault. Hundreds of people participated in creating the new landing strip. An LIK headquarters dispatch then reported full readiness.

Landing. Finally, all three groups went out to the target. The thin crust of ice over the snow was tamped down and tightly packed using special rollers. The "science" team of materials-strength engineers and aerodynamics engineers gave its permission. A steady rumbling announced the arrival of the Yak-42 at ancient Yegor'yevsk.

I was sitting in the "flying headquarters," the helicopter. I heard Poludo's voice in the headphones: "How's the wind?" Bakulin told him: "Wind, 100. Everything normal." The aircraft made its first target run. V. Kozlov took over command of the landing: "You're looking good, Oleg. How does it look to you?" Poludo's voice: "Fine. I could have come in." "Make one more run," orders Viktor Vasil'yevich. "Just to be sure!" The aircraft obediently banks. Using radio and ground [visual] signals to orient itself (orange smoke charges have been set off on the strip), the crew had picked out a touchdown point in its two runs.

At a landing speed of 210 km/hr, the big ship lines itself up precisely on the axis of the strip. Seconds later, it touches the surface! A white cloud envelopes the aircraft, but then it "surfaces" from the cloud of snow and shortly (within 800 meters) rolls to a stop on the bare field. Test personnel are taciturn people. Kozlov's words on the radio, "Well done, guys. Beautiful landing," are high praise.

A minute later, our Mi-8 sets down alongside the Yak on the ground. Before the engines of either craft have stopped, the school representatives and I are rushing to greet the pilots. They appear on the ladder in leather suits and cosmonaut-style helmets. Smiling, at ease, somewhat tired, but on the whole, satisfied.

"Was it hard?"

"Of course, it's not every day you get the chance to make such a 'sporty' landing," answers Oleg Semenovitch. "But this proves once again the remarkable capabilities of the Yak-42. Moreover, I was constantly aware of the support of my old comrade, as the co-pilot's seat was occupied by my teacher, and a splendid test pilot, Sergey Ivanovich Gorchilin. With him there, we could have solved an even harder problem. And we need to give proper credit to the 'ground' as well: 90 percent of our success depended on the landing strip and it was prepared very well, in spite of the extremely tight schedule. It's probably easier to set down on a 'field' like this than it would be at a concrete airfield," laughs Poludo.

I can see a line of medical and fire vehicles leaving the strip. They weren't needed. As planned, there was no place in the test experiment for "accidents."

...But the aircraft had to make one more trip a few days later. This time, though, on the ground, not in the air. The multiton aircraft was towed by prime mover several kilometers from the landing site to the school's training base.

11052  
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AIR

AEROPROYEKT INSTITUTE THINKS COMPETITION EVALUATION IS UNFAIR

Moscow VOZDUSHNYY TRANSPORT in Russian 30 Mar 82 p 3

[Article by "Aeroprojekt" Institute group leader T. Perestoronina: "Is the Innovation Evaluation Objective?"]

[Text] Development of the creative activity and initiative of inventors and efficiency specialists is facilitated to a considerable extent not only by good socialist competition organization, but also by objectively drawn up methods of summing it up.

Along with other organizations and enterprises, the "Aeroprojekt" Institute collective participates actively in branch socialist competition each year.

Under the methods for summing up the competition, all civil aviation collectives are divided into several groups whose work is evaluated using a certain type of indicator and coefficient. "Aeroprojekt" is among the organizations of the first group, as the sole subdivision with its own scientific section and its own design section. And the relationship is very substantial here: there are ten times fewer scientists than designers. What has this led to? It is known that, due to the specifics of their production activity, the scientific-research subdivisions are the main "suppliers" of inventions and efficiency-improvement work. It is they who make a tangible contribution to raising the technical level. But designers basically use scientific developments.

"Aeroprojekt" Institute, which participates in the competition jointly with its branches as a single collective, thus turns out to be in an unequal position compared with other, purely scientific, civil aviation organizations. This imperfection in the branch method of summing up competition results has an unfavorable effect on the position occupied by the institute. Under this method, the summary (absolute) indicator of invention, efficiency-improvement and patenting-licensing work is calculated on the basis of the total number of [scientific] workers. And I repeat: scientists here comprise only a tenth, the tenth most active in invention and efficiency-improvement activity. So it turns out that "Aeroprojekt" absolute indicators are adequately high, but in relative terms, the collective cannot equal the purely scientific organizations of the branch.

The specifics of the institute, which includes both a scientific and a design section, and imperfection in the methods of summing up competition results place "Aeroprojekt" in an ambiguous position among other organizations.

I can see two ways out of this situation. We either need to refine the significance factor which takes the specifics of "Aeroprojekt" and "Aeroprojekt" branch activity into account or to examine the results of invention, efficiency-improvement and patenting-licensing work separately for the scientific-research and design subdivisions.

I would think summing up the competition results with consideration of the enumerated proposals would facilitate evaluating more objectively the activity of civil aviation enterprises and institutions.

11052

CSO: 1829/185

AIR

#### BRIEFS

SARANSK AIRPORT--The number of airports in the country capable of handling first-class passenger planes has been increased with the addition of that in the Mordovian capital. The first large commercial aircraft, a Tu-134, has landed here, opening up a new regularly scheduled air route: Minsk - Saransk - Sverdlovsk - Novosibirsk. The airport's potential was increased through renovation. A new runway with radio landing equipment has been put into operation and the terminal has been enlarged. [Text] [Moscow STROITEL'NAYA GAZETA in Russian 6 Jan 82 p 3] 11052

SPRING-SUMMER AEROFLOT SCHEDULES--Spring is when Aeroflot routes become appreciably more active. Spring-summer schedules are being introduced on 1 April. The frequency of runs carrying Muscovites to health-resort cities of the Crimea, Caucasus and Baltic will be increased beginning that month. There are many changes in the spring-summer schedule. They basically involve the new YaK-42, which will be flying for the first time from "Bykovo" Airport in Saratov, from Kishinev and L'vov. Beginning 25 April, the new aircraft will begin flying three times a week to Voronezh, and beginning 1 June -- five times a week. The number of YaK-42 runs to Izhevsk, Kherson, Krasnodar and Nal'chik is being increased. Preparations are underway to begin using the IL-86 air-bus on the Moscow - Simferopol' run. [Text] [Moscow VECHEK'NAYA MOSKVA in Russian 24 Mar 82 p 3] 11052

ENGINE LUBRICANT MONITORING IMPROVEMENTS--The basic specifications of modern flight equipment are being improved year by year. Flight speeds and altitudes are being increased, as are range, cargo capacity and engine power. All this makes greater technical demands on on-board measuring systems, and in particular, on the engine lubricant monitoring system. Many civil aviation specialists, including scientists at the GosNIIGA [State Scientific Research Institute for Civil Aviation], have been engaged in work on this problem. Professor and Doctor of Technical Sciences V. Yampol'skiy, senior scientific associate S. Blokhin and sector chief V. Golyashkin concluded that the engine lubricant monitoring system needed to be improved. Why? Solid particles precipitated from the oil onto the contact plates, contaminating them. Severe contamination can send a false signal. The system must be disassembled to check contamination, which is naturally impractical in flight. Their common effort resulted in an invention called "Engine Lubricant System Monitoring System." They needed to eliminate false signals and work out a way to signal contact plate contamination. A diode, a variable resistor and a capacitor were added to the existing circuit in series between the contact plates and the voltage source. The signaling unit was connected to the capacitor. This circuit solved the problem, eliminating the shortcomings of the existing engine lubricant system monitoring system and improving its reliability. The invention can be used both in aviation and in other branches of industry connected with developing engines. [Text] [Moscow VOZDUSHNYY TRANSPORT in Russian 30 Mar 82 p 3] 11052

MOGILEV EFFICIENCY IMPROVEMENTS--Mogilev Air Facility has summed up innovations in this past year. Five more efficiency-improvement proposals than planned were introduced and 6,000 rubles more in economic impact was realized. Aviation Equipment Center specialists A. Volk, A. Denisenko and S. Vasil'chenko developed and equipped a screening room for checking, regulating and adjusting special Yak-40 devices which previously had to be shipped to another city. More than 10,000 rubles was added to the coffers of the thrifty. These same specialists also manufactured a stand for checking radio equipment. The economic impact was more than 2,000 rubles. Quite a few valuable proposals have also been introduced in other services. The motor vehicle pool, for example, developed a heater to remove ice on the runway using a vertically-adjustable nozzle. The result was a significant fuel savings. Air facility efficiency-improvement specialists have planned higher frontiers for the second year of the five-year plan. [Text] [Moscow VOZDUSHNYY TRANSPORT 30 Mar 82 p 3] 11052

AEROFLOT ACCOMPLISHMENTS--A press conference was conducted yesterday at the USSR Ministry of Civil Aviation where the topic of discussion was successful accomplishments of Aeroflot employees during the first year of the five-year plan and the tasks facing our airmen in the near future. In the first year of the five-year plan, 109 million passengers were transported, 19 agencies and 100 ticket offices were opened for selling airline tickets. In 1981, airstrips in Ordzhonikidze, Buguruslan, Blagoveshchensk, Minsk and other cities were built or converted. Great tasks remain for Aeroflot to accomplish in 1982. We are planning to transport 109 million passengers and introduce 22 new routes. Construction of major airports will be completed in Minsk, Khabarovsk, Karaganda, Syktyvkar, Krasnoyarsk and Magadan. B. Panyukov noted that accomplishment of the tasks we face will not be a simple matter. Aeroflot's supplies in this regard are directly affected by the slipshod operations of those sectors of the national economy that obtain and process fuel, and which build new aviation equipment. Also, Aeroflot has its own, so-called inherent deficiencies, which affect the quality of passenger service. For example, 50 percent of all the complaints presented by passengers make note of irregularity in flights. At times, even when seats are available, it is difficult to purchase tickets--this too is a result of slipshod organization in the way certain Aeroflot services operate. Civil aviation employees are currently doing a great deal to eliminate these deficiencies. For example, in 1982 11 new ticket sales agencies will come into operation; 13 will be relocated and an additional 110 ticket offices will be set up. New, more comfortable airplanes will be flying the airways. [By Yu. Dzhafarov] [Excerpt] [Moscow TRUD in Russian 10 Feb 82 p 4] 9768

A NEW ROUTE--Regular Il-62 passenger service has been initiated from Moscow to the new airport at Krasnoyarsk. The new service significantly enhances regularity of flights and passenger service efficiency. Whereas up until now, the flight from our capital to Krasnoyarsk took about six hours in the Il-18, current time of flight has been reduced to four-and-a-half hours. Flight crews of the Domoyedovo airline are now operating the Moscow-Krasnoyarsk route. It is this collective that was awarded the non-stop Il-62M routing from Moscow to Petropavlovsk-Kamchatskiy, and from Moscow to Magadan. [By V. Shevchenko, deputy flight commander, Domoyedovo] [Text] [Moscow VOZDUSHNYY TRANSPORT in Russian 26 Jan 82 p 4] 9768

AIRLINE INNOVATIONS--The Vnukovo Technical Aviation Bureau has introduced socialist competition on a broad scale towards enhancing the effectiveness and quality of aviation equipment repair, and towards insuring successful accomplishment of last year's annual plan and the five-year plan as a whole. Creative-minded people have played a

great role in this effort. During the first year of the current five-year plan they committed themselves to presenting 185 streamlining proposals, implementation of which will result in a savings of at least 100,000 rubles. And the facts do not stray from the words. Over an eleven-month period, 195 proposals were introduced in the Bureau for Promoting Streamlining and Resourcefulness. The majority of these have been implemented, enabling 152,000 rubles to be deposited into the airline's coffers. Creative-minded cooperation brings good results. Aviation technicians V. Bogatov and A. Kvachev work together to facilitate their mutual effort. They recently built a filter-indicator switch whose application helped cut down the amount of labor required for one of the operations. In 1981 they introduced and implemented five new concepts in all. In order to blast clean one of the aircraft system units, it used to be necessary to start up a counter-recorder. Aviation technician I. Galli and engineer Ye. Belitskiy developed a device which makes it possible to do without this. They developed a resource to satisfy technological servicing requirements. The new procedure has resulted in a savings of 41,000 rubles. Plant foreman V. Khokhlov and shift supervisor V. Lytnev recently proposed a change in methods of test-sampling the Tu-154 which resulted in fuel savings. In addition, engine safe life is preserved and pollution of the environment reduced. [By V. Loshakov, Vnukovo correspondent] [Text] [Moscow VOZDUSHNYY TRANSPORT in Russian 24 Dec 81 p 1] 9768

UKRAINIAN AIRLINE IMPROVEMENTS--Our RABOCHAYA GAZETA correspondent asked Honored USSR Pilot A. M. Goryashko, chief of the Ukrainian Order of the Red Banner of Labor Directorate of Civil Aviation to comment on how the collective of Ukrainian airline workers will prepare to commemorate the 60th anniversary of the formation of the USSR. In short, whereas in 1961 58,000 tons of freight were hauled, 234,000 thousand tons were transported in 1981. Each year the Ukrainian airline industry increases its production of technical equipment. During the years of the 10th Five-Year Plan, seven airstrips were constructed with artificial surfacing for handling the high-speed Tu-154 and Tu-134 aircraft, three airline terminals were built and five airfields equipped with automated landing systems which meet international standards. The Tu-154 inventory was replenished over the current five-year plan, and the number of airports capable of handling these jumbo aircraft is being increased. The Donetsk airline collective recently began operations using the 180-passenger Yak-42. Borispol', Poltava and Kherson airports are now handling these comfortable aircraft. In May 1982 a new first-class airstrip at Simferopol' airport will begin providing regular passenger service from Moscow on board the 350-seat Il-86 airbus. [By M. Lyakhobetskiy] [Excerpts] [Kiev RABOCHAYA GAZETA in Russian 30 Dec 81 p 2] 9768

## MOTOR VEHICLE

### INTRODUCTION OF HYDRAULIC DREDGES IN BUILDING ROADS IN WESTERN SIBERIA

Moscow AVTOMOBIL'NYYE DOROGI in Russian No 2, Feb 82 pp 4-6

[Article by N. G. Vavilov and A. G. Gerasimov, engineers of the association Transgidromekhanizatsiya [Specialized Association for Hydraulic Dredging of the Main Administration for Construction of Maritime and River Facilities of the USSR Ministry of Transport Construction]]

[Text] Because of the accelerated development of petroleum and gas deposits in Tyumenskaya and Tomskaya Oblasts in recent years, there has been a sharp increase there in the amount of roadbuilding. Since the areas of construction are very boggy and waterlogged, and since there is a lack of earth suitable for building the earth roadbed, it is especially problematical to build the earth roadbed in bogs, across lakes and in river floodlands which are under water.

In the summertime the impassability of the roads, and in the floodlands the lengthy period of flooding, cause problems in using dump trucks to build high fills in the bogs. Given this situation, the method of moving earth with hydraulic dredges has become widespread; it has a number of advantages over the conventional dry method of moving earth.

All the hydraulic dredging in building transportation facilities in Western Siberia is done by the association Transgidromekhanizatsiya of the Ministry of Transport Construction. The components of the association include 2 specialized trusts, 11 specialized administrations, and 2 plants, 1 of which manufactures hydraulic dredges and the other spare parts for them. There are also an administration for aggregate supply of production equipment and a specialized project planning and drafting bureau.

The association Transgidromekhanizatsiya, with a work force of 9,000, moves 125 million cubic meters of earth per year, operations valued at 175 million rubles. By way of comparison, the average trust for mechanized earthmoving of the Ministry of Transportation Construction (Mintransstroy), which has 400 dump trucks, 120 excavators and a work force of 3,000, moves 15 million cubic meters a year, which is 27 million rubles in value terms.

The association possesses 265 hydraulic dredges, 75 of which are concentrated in Tyumenskaya and Tomskaya Oblasts, with a full array of auxiliary machines

and equipment. There are 3,000 hydraulic dredge operators employed on projects of Western Siberia.

Since development of petroleum and gas deposits began, hydraulic dredging has been used in their development to move more than 250 million cubic meters of earth. Annual output is increased from 1.5 million cubic meters in 1966 to 50 million cubic meters in 1981 and is headed toward further growth.

The existence of a good production capability makes it possible for the association to increase its volume of operations (including those in Western Siberia) mainly by raising labor productivity. Since it has 13 subordinate construction subdivisions, plants and a design bureau, the association has concentrated within its hands the design, manufacture and modernization of hydraulic dredges, the planning and organization of hydraulic dredging and their performance, which has been conducive to achievement of high production figures. On the basis of the results for the 10th Five-Year Plan the association was awarded the Commemorative Badge and Challenge Red Banner of the CPSU Central Committee, USSR Council of Ministers, AUCCTU and Komsomol Central Committee and was entered on the All-Union Honor Roll in the USSR Exhibition of Achievements of the National Economy.

The volume of hydraulic dredging in building roads in Western Siberia has tended to increase very rapidly because the construction area is very boggy and waterlogged and hydraulic dredging has technical and economic advantages. The density of the fill created with hydraulic aggradation, without additional compaction, is close to the maximum for the given category of soil. The period of stabilization of the foundation of the fill is negligible because of the hydrodynamic effects on the base of the fill during aggradation. For all practical purposes stabilization is completed during aggradation, and only in bogs of the first type may there be subsidences during the next month or two.

In Western Siberia waterlogged deposits of fine-grained and silty sands in the floodlands of rivers, by and large covered over with a layer of loam 1.5-3.0 meters thick are unsuitable for working with excavators. Hydraulic dredges successfully work such soils, and an improvement occurs incidentally during aggradation: The silty and clayey particles are carried away with the discharge water, and soils not suitable for placement in the fill in their natural form meet the quality requirements of the earth roadbed following this improvement.

Labor productivity in aggradation of an earth roadbed is 3-4-fold higher than in dry dumping, which, given the limited labor resources in Siberia, is a decisive factor. To this we need to add that the production process is continuous and that the quality of workmanship is high in hydraulic dredging. Even certain of the difficulties as to engineering geology in the areas of development of the north of Tyumenskaya Oblast proved to be beneficial for this method. For instance, the abundance of waterlogged areas made it easier for floating hydraulic dredges to move about, and the fine-grained and silty sands typical of Western Siberia are worked with suction dredges considerably more easily than the gravelly-pebbly and clayey soils in other regions which have a more favorable climate.

Two basic modes of operation in hydraulic dredging are used in roadbuilding. The profile of the earth roadbed is directly aggraded when the distance from the cut to the site for placement of the earth does not exceed 5-6 km. In other cases, when there are no cuts for dry removal, the improved sand is aggraded with hydraulic dredge into a pile and subsequently transported by dump trucks and deposited on the fill.

The second mode has been used to build up the earth roadbed of most roads at the important Samotlor Petroleum Deposit, where the silted earth in the floodlands of the Vakh River is practically the only source of material. The earth roadbed of roads built across Samotlor, Kymyl-Emtor and Beloye Lake was done by direct hydraulic aggradation. Gentle beach slopes were designed to protect the earth roadbed from being washed away to replace the reinforced concrete traditionally used for strengthening. This reduced the construction cost, eliminated the need for delivering the slabs, which is quite important for the conditions of northern Tyumenskaya Oblast, and eliminated the operations involved in strengthening the structure. The beach slope faces of the fill, which replaced the expensive concrete, considerably facilitated subsequent construction and operation of the communications of the oil fields (power transmission lines, pipelines, etc.). This design of the earth roadbed has been adopted for most flooded river bottomlands in both road and railroad construction.

The association Transgidromekhanizatsiya, jointly with the head project planning institute and in contact with the Central Scientific Research Institute of Mintransstroy, is continuing its work aimed at more efficient use of hydraulic dredging in road construction. The association has outlined the following main lines of technical development:

Standardization and Further Modernization of Hydraulic Dredges. We have given up having a large number of models of suction dredges and selected three base models. First of all there is the large-capacity hydraulic dredge (Figure 1) with electric drive and a total installed capacity of 2,000 kw. Its output in the sandy cuts typical of Western Siberia is 200,000-300,000 cubic meters per month. Next there is the medium-sized electric hydraulic dredge with a total installed capacity of 1,200 kw, whose output is 80,000-150,000 cubic meters per month under similar conditions. And finally a hydraulic dredge with a self-contained diesel power plant and an output of 70,000-100,000 cubic meters per month.

These hydraulic dredges are to be modernized in the immediate future in the direction of mechanizing laborious repair operations, improving working and recreation conditions on the dredge, automating certain functions, improving safety equipment, and increasing the reliability of certain units. But on the whole there are no plans to change the basic models.

Improvement of the Technology for Depositing the Earth on the Surface (karta) of the Aggradation. In aggradation of narrow-section structures and mounds bulldozers constantly maintain the banks along the perimeter of the structure. The operating conditions are conducive to intensive wear of the machines, and they ultimately cause idle time of the hydraulic dredge while it waits for the

banking up to be done. At present this idle time is the largest component in total hydraulic dredge operating time losses. Work is to be done to create special stacking machines to work on the surface of the aggradation both to maintain the banks and also to lay the spoil line pipe in the aggradation process.



Рис. 1. Землесосный снаряд 300-40М

Figure 1. The 300-40M hydraulic dredge.

Work is continuing to shape beach slopes not as the earth naturally spreads out, but to conform to a given curve that conforms to operating conditions.

Lengthening the Operating Season, Combating the Nemesis of Hydraulic Fill Methods--Below-Freezing Temperatures. In 15 years of operation in Western Siberia the average length of the season has increased 2 months, and in 1981 one of the hydraulic dredges at the Var'yeganskoye Deposit for the first time did not suspend operations for the winter and operated throughout all the months of the winter period.

Improvement of the Management Structure and of the Organization of Work, including further dissemination of the work team contract, which now accounts for more than 80 percent of the jobs, an organization of the tour-of-duty method of operation. All the principal machines in the association operate around the clock, with four shifts of operators. At projects remote from the base cities and settlements a crew consisting of two shifts does a 7-15-day tour of duty working 12 hours a day, and then the crew is transported out for a rest. This schedule has a number of peculiarities and actual practice calls for scientific recommendations concerning the production, medical-biological and social aspects of the tour-of-duty method of operation.

There is also a need to improve the system of remuneration of workers in connection with this method. The issue of remuneration for traveling time has to be resolved, and supplements reflecting the peculiarities of work in the tour-of-duty method have to be introduced over and above the wage fund.

Improvement of Our Own Production Capability. This direction includes expansion of facilities of our own subordinate trusts and specialized administrations and reconstruction of the Tsimlyansk plant for manufacturing hydraulic dredges and the Kashira plant for manufacturing spare parts for them.

The use of hydraulic fill methods at places where large amounts of earth are to be moved in a straight line always yields a benefit both in saving on physical and labor resources and also in improving the quality of work. But when projects are being designed, consideration should be given to certain peculiarities and shortcomings of hydraulic fill methods so as to eliminate their influence on the effectiveness of this method's use.

Hydraulic dredging is a cumbersome (unresponsive) method of conducting operations. The weight of the equipment runs to hundreds of tons, the delivery of hydraulic dredges to the project is practicable once a year by water during the flood season or over winter roads, which involves disassembly and assembly. For that reason excavations should be explored more thoroughly, a sound plan should be compiled for organizing operations, since if an error is made, the hydraulic dredge is doomed to remain idle until the next period when it can be relocated.

The high energy intensiveness of the method (electric power consumption per cubic meter of earth moved ranges between 2 and 10 kw for Western Siberia). The operation makes it indispensable to have a project plan of power supply and to build a large amount of power transmission lines and substations. In undeveloped areas the scheme is working well of power supply from self-contained mobile diesel power plants. But even in this case time is needed to deliver them, set them up, and to organize the storage of fuel and lubricants. These peculiarities make it a necessity that the project plan for hydraulic dredging operations be delivered at the project at least 2 years before construction begins, i.e., a year earlier than for the operation of excavators.

Metal intensiveness is high: the earth is moved in pipelines with a diameter of 400-700 mm, which wear out after 7,000-10,000 hours of use. That is why on the average 300-400 meters of pipe are completely worn out in the aggradation of 1 km of road fill. In addition, main spoil lines are laid from the excavation to the route of the road, and when operations are terminated, it is difficult to reuse them if they have been laid in a boggy locality.

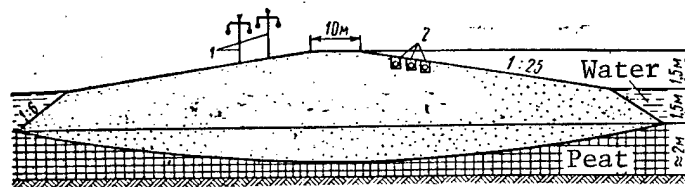


Figure 2. Cross section of the earth roadbed: 1--power transmission line; 2--pipeline.

The losses of earth are sizable in aggrading earth-fill embankment with a base 20-30 meters wide. In our view this shortcoming should be turned into an advantage in flooded areas and bogs by building fills with beach-slope banks and a base width of 60-150 meters, thereby furnishing a foundation for the communications corridor (power transmission lines and pipelines), which are then built and operated more conveniently. The earth-fill embankment aggraded across Samotlor Lake have come to serve a good illustration of this (Figure 2).

The distance that earth can be moved hydraulically is limited (1.5-2 km) without additional pumping. As a rule it is inadvisable to transport earth by hydraulic dredges from the excavation to the place where it is deposited over distances of more than 5-6 km, since when there are several stages of pumping the earth, the cost of operations and power intensiveness rises sharply, and the reliability of the system drops and idle time increases (after all, the hydraulic dredge and the pumping stations are interdependent). This peculiarity of hydraulic fill methods makes it a necessity that when the cross section of the embankment is aggraded excavations be explored along the route at distances of not more than 6-7 km from one another.

**Environmental Impact.** When the water is discharged from the surface of the aggradation the particles suspended in the silt and ooze components get into water sources and silt them up. Settling basins should be set up to prevent this.

Often the entities giving clearance to project plans oppose the use of hydraulic fill methods because when earth is excavated under water some of the earth is not sucked up by the hydraulic dredge, and it then flows downstream, increasing the content of sediment suspended in the water. The allowed standards for increasing turbidity are very rigid and in our opinion unfounded.

These shortcomings or peculiarities may be taken into account only in project plans drawn up by a specialized organization. As a rule the project plans drawn up by head institutes leave something to be desired with respect to hydraulic dredging operations. Rarely is a power supply plan worked out, sites are poorly chosen for setting up pumping stations, and the problems of environmental protection are solved poorly. We feel that a specialized project planning and design bureau should be involved in every stage of project planning.

Assuming the project planning and other issues related to the use of hydraulic dredging in road construction are favorably resolved, all the necessary operations can be performed at a high level of quality and on schedule in the oil and gas field regions in Western Siberia.

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## RAILROAD

### SELF-PROPELLED POWER PLANT, MODEL ESU-3

Moscow TORFYANAYA PROMYSHLENNOST' in Russian No 2, Feb 82 pp 22-25

[Article by V. P. Popov and Yu. P. Savenkov, engineers from the All-Union Scientific Research Institute of the Peat Industry: "The ESU-3 Self-Propelled Power Plant"]

[Excerpts] The ESU-1 and ESU-2A self-propelled power plants, used to move and supply power to track machinery, were extensively used on the narrow-gauge railroads of the peat industry.

In addition, self-propelled power plants are used as locomotives for carrying out switching work at loading points and also for providing freight and passenger transport at a number of peat enterprises.

The ESU-1 (2A) type of self-propelled power plant is a locomotive with a mechanical transmission and is additionally equipped with a commercial-frequency three-phase alternating current synchronous generator.

The D-108 diesel engine is the prime mover on self-propelled power plants. The synchronous generator's drive is produced from the front part of the D-108's crankshaft.

The mechanical transmission consists of a clutch, gear box, reversing gear box and a two-mode transfer box which assures transport and operational travel speeds. The ESU-2A self-propelled power plant is equipped with an asynchronous electric motor for work with a track layer. The asynchronous motor permits remote control of the track-laying train's movement from the main crane.

At present, a number of the complete units included in the manufactured self-propelled power plants are taken from production. On the other hand, the self-propelled power plants with a mechanical transmission cannot simultaneously supply electric power and smoothly provide continuous control of travel speed for track maintenance machinery. At the moment of acceleration and gear changing, the operation of the synchronous generator of the diesel's crankshaft is disrupted. This causes a drop in the voltage and frequency needed for normal operation of three-phase alternating current electrical equipment. In addition, switching from one speed to another is accompanied

by a break in tractive force from clutch slippage. This leads to a reduction in the operating reliability of the transmission.

In 1975, the Gubin Peat Enterprise built an experimental model of the ESU-3 self-propelled power plant (figure 1), according to a design from the All-Union Scientific Research Institute of the Peat Industry. As distinct from self-propelled plants with a mechanical transmission, the synchronous generator of the ESU-3 self-propelled plant provides continuous control of speed and makes it possible to automate the control and regulation processes.



Рис. 1. Самоходная электростанция ЭСУ-3

Fig. 1. The ESU-3 Self-Propelled Power Plant

Based on the results of tests conducted on railroad tracks at the Shatura Transport Administration, the ESU-3 self-propelled power plant was accepted by the departmental commission of the RSFSR Ministry of the Fuel Industry and recommended for series production.

The ESU-3 self-propelled power plant is a hooded locomotive with an alternating and direct current transmission. The machine's frame, on which the equipment is mounted, rests on two dual-axle cradle bogies.

Technical Data for the ESU-3 Self-Propelled Power Plant

<u>Equipment/Capability</u>	<u>Specification</u>
Track Gage .....	750 mm
Mass .....	17 tons
Wheel Arrangement .....	2-2
Load from Wheel Pair on the Rails .....	41.7 kH
Wheel Diameter for Rolling Circle .....	600 mm
Minimum Radius of Passable Curves .....	35 m
Transmission .....	Electro-mechanical transmission with alternating and direct current.

[Continued on following page]

Design Speed .....	35 km/hour
Speed During Long Range Operation .....	6.5 km/hour
Tractive Force for Coupling ( $\Psi=0.3$ ) .....	50 kH
Tractive Force for Long-Range Operation ....	42.7 kH
Diesel-Generator Model .....	AD-100-T/400
Power of the 1D66A Diesel .....	110.4 Kilowatts
Rotational Speed of the Crankshaft During Nominal Power .....	1500 RPM
Power of the GSF-100M Three-Phase Current Generator .....	100 kilowatts
Line Voltage .....	400 volts
Frequency of Current .....	50 hertz
DK-309A Traction Engines .....	2
Power of the Traction Engine's Hourly Mode .	43 kilowatts
Brake Systems .....	Electro-pneumatic
Productivity of the Compressor VV=0.7/8 m <sup>3</sup> /minute .....	0.7
Overall Dimensions:	
Length Between Buffers .....	9090 mm
Width .....	2390 mm
Height from Rail Head .....	3160 mm

The diesel engine is an electrical unit installed on the front cowling and is a self-contained power plant mounted on its own frame and complete with the requisite systems and auxiliary equipment. A condensor shaft, which directs the air flow from the propelling fan at an angle upwards, cools the water and oil for the diesel engine. This design enables air resistance and wind effect to be reduced, depending on the direction of movement. The fuel tank is installed on the front cowling and is located above a dry-type three-phase transformer intended to coordinate the parameters of the synchronous generator and the traction motors. Next to the transformer, a piston compressor is mounted whose drive is produced with the aid of the V-belt transmission from an asynchronous motor. Beneath the engineer's compartment, direct current traction motors are installed which are connected to the transfer box, with the aid of tooth-type couplings. The transfer box is a two-stage two-mode reduction gear box which provides for transport and operational speeds. A dual tooth-type coupling, mounted on the transfer box's output shaft, controls switching of modes. For remote control, the drive of the tooth-type coupling is produced from a double-action pneumatic cylinder whose charging comes from electropneumatic valves. Torque from the transfer box's output shaft to the wheel pairs is transmitted with the aid of automotive Cardan shafts and two-stage axle reduction gear boxes.

On the rear cowling, a rectifying power plant is installed, equipped with forced-air cooling produced with the help of a centrifugal fan. Next to the rectifying power plant is a switchboard, on which an electrical apparatus is mounted, providing switching and protection of alternating and direct current power circuits and control circuits.

Storage batteries, intended for charging the control circuits and the lights, are located in specially-built containers which are installed on the sides of the back beam in the middle part of the machine.

The engineer's compartment is above the forward and rear cowlings and provides a 360 degree view, which is especially important in industrial transport conditions. The walls and roof have thermal insulation and sound insulation. To reduce vibration, rubber gaskets have been installed between the compartment and the frame. Beneath the engineer's compartment, inside the back beam are resistance containers intended to reduce the magnetic field. Seating for a track crew is provided inside the engineer's compartment. There are electric furnaces for heating the compartment. On the front wall of the engineer's compartment, a control console is mounted, on whose panel are located the instruments for controlling and monitoring the self-propelled power plant's operation.

The electric self-propelled power plant is equipped with an automatic and manual braking system, and also with the requisite sound signaling and light signaling devices.

Traction tests for the ESU-3 self-propelled power plant took place on the railroad tracks of the Shatura Transport Administration.

Test trips were conducted under operational conditions, with trains of various weights, which changed the load on the self-propelled power plant. Tractive characteristics of the self-propelled power plant were obtained with the aid of a dynamometric car which was additionally equipped with recording and electrical measuring instruments. These instruments record the operation modes of the synchronous generator and the traction motors.

During the traction tests, tractive force on the self-propelled power plant's coupling was measured with the aid of a hydraulic dynamometer. While tapes from the dynamometric board were being analyzed, excerpts were selected which corresponded to the prescribed mode of operation on straight sections of track with constant speed and constant grade. Therefore, while defining the relative tractive force, corrections were made only in the basic specific resistance to the power plant's movement. This resistance is determined by the roll-down method, which provides for measuring the amount of deceleration.

During the train tests, the ESU-3's tractive characteristics were plotted in relation to operational modes.

To evaluate the operation of the electric transmission, measurements of power, voltage and current of the synchronous generator, as well as current and voltage of the traction motors, were performed with the aid of automatic recorders. As a result of the measurements, the dependence of efficiency on speed, as well as the dependence of tractive force on the current of the synchronous generator, was determined.

According to preliminary calculations, introducing the ESU-3 self-propelled power plant will save R 15,400 per year for each power plant.

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QUALITY OF FACTORY SHIP CONSTRUCTION DISCUSSED AT CONFERENCE

Moscow RYBNOYE KHOZYAYSTVO in Russian No 3, Mar 82 pp 48-49

[Article by A. A. Ishkov, candidate of technical sciences USSR Ministry of Fish Industry: "Give Special Attention to the Quality of Construction of Fishing Ships"]

[Text] The 26th Congress of the CPSU made very high demands for the quality level of output being produced. Matching the best world and domestic models — this is the demand which should be made of fishing ships also.

The fleet is the foundation of the material-technical base of the fishing industry and meeting the challenges that face the sector depends on its qualitative level and use efficiency.

An all-Union technical conference under the title "Raising the Quality of Design and Construction of Ships for the Fishing Fleet at USSR Shipyards" was held on 27-29 October 1981 in Leningrad. The conference was organized by the USSR Ministry of Fish Industry and the Ministry of Shipbuilding Industry.

Participants in the work of the conference included representatives of party agencies, USSR Gosplan, the USSR Ministry of Fish Industry, the Ministry of Shipbuilding Industry, planning-design and scientific research organizations, shipbuilding and repair yards, ship owners (all-Union fish industry associations) and observation groups for ship construction at shipyards in the country.

Considering the leading role of the fleet in work of the sector, specialists devoted particular attention to questions of further improving fishing ships (raising productivity and operating quality, and improving working and recreational conditions for the fishermen); no-waste processing of fish caught, maximum use of the fish to produce high-quality food products in a broad assortment; insuring conditions to preserve high-quality output and reduce the time and cost of delivering fish in transport ships from the fishing regions to marketing ports; integrated solutions to the problems of automating and mechanizing ship production processes in order to reduce the number of service personnel and conserve all types of material resources.

Nineteen reports were given at the conference.

The conference observed that the Soviet fishing fleet is receiving new ships which have proven themselves in operation; a number of series-produced ships and certain types of component ship equipment have been awarded the state Mark of Quality.

On the new classes of ships food and industrial output is produced by mechanized lines in ready-to-sell form. It is high-quality output.

Navigation safety and living conditions have been improved significantly. Contemporary materials are used to finish the work quarters and cabins, and the requirements of safety precautions and industrial sanitation, the International Convention on Avoiding Pollution of the Sea from Ships and other requirements of classification and surveillance agencies are being met.

Designing and series construction of modern highly-productive ships is evidence of the planned implementation of our policy of continuing to improve the working efficiency of the sector.

At the same time the conference noted a number of shortcomings of certain fishing ships built in recent years. They are mainly the result of certain types of component equipment, in particular certain classes of main engines and auxiliary mechanisms, that do not meet requirements. Some times lack of essential component equipment makes it impossible to use optimal concepts in designing new classes of ships, and this lowers their technical-operating indicators. Some ministries and departments fail to meet established schedules for designing and producing new equipment and materials, which delays construction of new classes of ships.

The prerequisites contained in plans for raising the labor productivity of ship crews through comprehensive automation are not fully realized because the automation equipment does not meet contemporary requirements for technical level and quality. The various automation instruments and elements do not always match in parametric and design terms.

The assortment of industrial equipment used on the ship comprises a very large number of classes and modifications.

In certain instances the questions of equipment repairability and very crowded quarters are not adequately worked out in the stage of developing the contract design.

To eliminate these shortcomings and improve the quality of ship design and construction for the fleet of the fishing industry at USSR shipyards the conference recommended that proposals be worked out to introduce new fishing mechanisms and devices built in the sector for fishing ships, and to test the reliability of operating equipment and on this basis work out recommendations for the use of standard assemblies, parts, gears, and materials that insure reliable work by the equipment; adopt measures to build standard industrial equipment that is simple in design and adjustment and can be universalized by replacement of replaceable parts (modules); and take steps to develop various devices and mechanisms to lighten manual labor.

The resolution of the conference was reviewed at a meeting of the board of directors of the USSR Ministry of Fishing Industry. It adopted a decree on carrying out the appropriate steps to realize the recommendations of the conference, which aim at improving the quality of design and construction of fishing ships.

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CSO: 1829/188

USE OF AUXILIARY SAILS ON FISHING TRAWLERS

Moscow RYBNOYE KHOZYAYSTVO in Russian No 3, Mar 82 pp 52-53

[Article by D. I. Skvirskiy: "Auxiliary Sailing Gear of a Fishing Trawler"]

[Text] The idea of equipping trawlers with two forms of traction, sails and engines, is not new, but it is becoming a reality as ships are equipped with light and strong synthetic sail fabrics. The effect from them can be particularly noticeable during crossings to fishing regions when, in addition to saving fuel and lubricants as well as engine life, the trawler gets additional time for actual fishing work.

According to world statistics, only 15 percent of the calendar time at sea is calm; for the rest of the time there is wind. For sailing ships a working wind is considered to be a wind with a force of up to 10 points, or 25 meters per second.

Let us consider the use of a wind with a velocity of 10-15 meters per second to move a BMRT class ship with a displacement under full load of 3,600 tons.

It is known that the best sailing ships have an energy availability on the order of one square meter per ton of displacement. The ship Sedov, for example, has a displacement of 7,320 tons and the area of all 32 of its sails is 4,192 square meters, which is 0.57 square meters per ton. Based on this figure, the BMRT should have 2,050 square meters of sail. Of course, it is not possible to arrange so many sails on the BMRT, nor is it necessary. We are only talking about auxiliary sails.

These sails should meet the following requirements: not hinder navigation, fishing, and cargo-handling operations; use the cargo-handling and fishing devices and mechanisms available on the ship; be set and taken down quickly and easily.

The area of the sails should meet the requirements of ship stability.

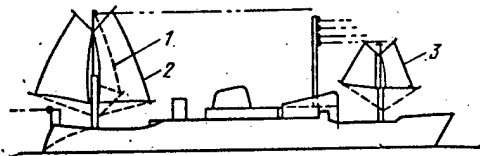
Based on these requirements, it is contemplated that sails will be used for winds from a following wind to wind abeam inclusively. The location of the sails should be determined by the number and height of the cargo columns and portal, the length of cargo-handling beams used as yards, and the line of sight from the wheel houses and from the captain's bridge.

Considering the inadequate height of the cargo columns, it is possible to mount fixed or removable topmast attachments on them.

In the case where the cantilever portal and cargo columns are not strong enough, they are wrapped in supplementary shrouds from the deck.

The illustration shows the paired position of the sails depending on the course and tack relative to the wind. This arrangement of sails is used on catamarans and is not new.

The impression may be created that auxiliary sailing gear is awkward and complicated, and that it is difficult to control. But the maximum load on a sail does not exceed 1-2 tons, and so the sail rigging is much lighter than the rigging of the cargo booms. Therefore, the rigging is made of thin steel and synthetic lines and the sails are made of light, strong lavsan.



Arrangement of Auxiliary Sails on Ship

- Key: (1) Topsail;  
 (2) Main sail;  
 (3) Foresail.

The topmasts are raised before leaving port and may be kept in working condition at the fishing area. As for handling the sails, a trained team can set them and take them down in a matter of minutes.

The author made calculations for a ship of the BMRT class traveling 10,000 miles under sail (see table below).

Indicators	Courses					
	Wind Astern		Free Wind		Half Wind	
Wind Velocity, m/sec						
True	10	15	10	15	10	15
Pennant	3.56	8.56	7.00	11.40	11.8	16.30
Sail Area, m <sup>2</sup>	638	638	527	540	458	458
Brace Angle of Sail, °	90	90	47	53	20	35
Thrust of Sails, norm	8,100	46,500	18,900	46,100	21,900	67,000
Increase in Running Speed						
Meters per Second	0.13	0.75	0.31	0.90	0.33	1.1
Knots	0.25	1.46	0.60	1.75	0.64	2.14

[Table continued, next page]

[Table continued]

Indicators	Wind Astern		Courses		Gulf Wind	
			Free	Wind		
Power Economy, horse- power	115	660	270	800	312	960
Time Savings per 10,000 Miles						
Hours	15	82	26	98	40	116
Days	0.63	3.42	1.50	4.08	1.67	4.84
Fuel Savings, tons	17.4	100.0	44.0	121.0	47.2	145.0
List Angle, °	-	-	-	-	3	6.4

It appears advisable to test the efficiency of the work of auxiliary sails on one or two test ships.

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MISCELLANEOUS

TRANSPORTATION SYSTEM EXAMINED

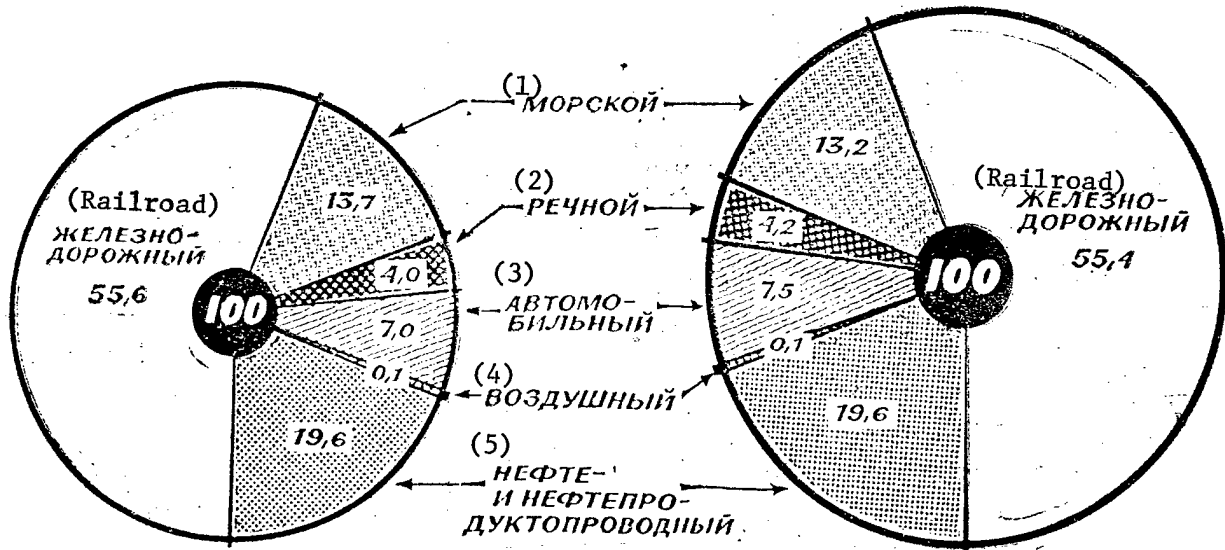
Statistical Overview

Moscow EKONOMICHESKAYA GAZETA in Russian No 16, Apr 82 p 1

[Article: "The Unified Transportation System of the USSR"]

[Text] The Soviet Union has all forms of modern transportation, and they form a unified transportation system. Like the Unified Energy System of the USSR, which was discussed in No 10 of this newspaper, it is a key link in the country's unified national economic complex.

Growth and Structure of Freight Turnover



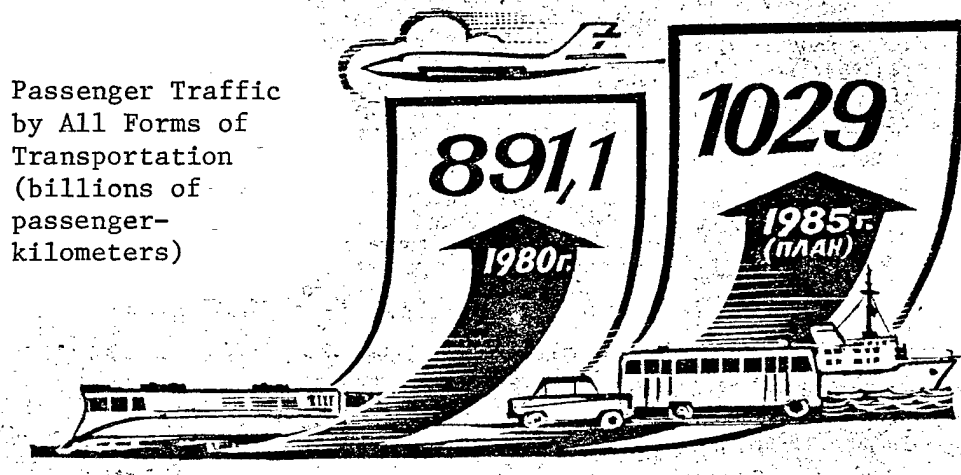
1980 Total — 6,184.2 Billion Ton-Kilometers

1985 Plan — 7,000 Billion Ton-Kilometers

Key: (1) Maritime; (2) River; (3) Motor Vehicle; (4) Air; (5) Petroleum and Petroleum Product Pipeline.

In 1980 the freight turnover of rail, maritime, river, motor vehicle, air and petroleum and petroleum product pipeline transportation was 6,184.2 billion

ton-kilometers; in 1985 it will reach 7,000 billion ton-kilometers. Counting fast-developing gas pipeline transportation, freight turnover will reach 8,130 billion ton-kilometers, an increase of 19.4 percent during the five-year plan.



Passenger conveyance by all types of transportation will increase 15.5 percent during the five years.

As the pie diagram shows, railroads continue to be the leader in transportation. In 1985 they will account for more than one-half of all freight turnover.

Petroleum and gas pipeline transportation are developing rapidly in the 11th Five-Year Plan. As a result, the share of petroleum, petroleum products, and gas pipeline transportation in the total volume of freight turnover by all forms of transportation including gas pipelines, will be 30.8 percent. More than two-thirds of the fuel extracted in the country (converted to standard fuel) is pumped along the pipelines.

#### Gosplan Official's Comments

Moscow EKONOMICHESKAYA GAZETA in Russian No 16, Apr 82 p 2

[Interview with V. Ye. Biryukov, deputy chairman of Gosplan; "Operate the Transportation Conveyor Smoothly"]

[Text] [Question] Tell us please, Viktor Yefimovich, what is the role of transportation in the unified national economic complex?

[Answer] I have to give some figures. General-use transportation accounts for about 17 percent of the fixed production capital of the Soviet Union. It employs

10 percent of all workers and employees. The state spends more than 10 percent of the total volume of capital investment on transportation. The unified national economic complex in our country is developing well. Solving such major national problems as development of the fuel-energy and raw material riches of Siberia, the Far East, the Far North, and the BAM zone, and development of the non-Chernozem zone greatly facilitate the continued growth of all the fraternal republics. And transportation plays an important part in this.

The different forms of transportation interact and complement one another in the shipping process. They make up the country's unified transportation system. This system includes rail, motor vehicle, maritime, river, and air general-use transportation. The trunk pipelines for pumping petroleum, petroleum products, and gas are specialized forms.

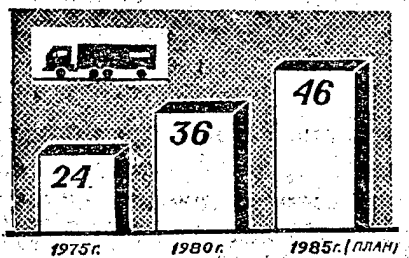
Growth of the Soviet economy and expansion of economic ties demand allout development and comprehensive improvement of the transportation system. This system is expected to meet the needs of the national economy and the population for shipping and conveyance fully and at the proper time. In his report at the 26th party Congress Comrade L. I. Brezhnev pointed out that, considering the seriousness and scope of the transportation problems that have accumulated, a solution to them is possible only on the basis of a long-term, integrated program. Development of this program will be completed late this year. Implementation of the program, which is figured for the year 2000, will begin in the 11th Five-Year Plan.

[Question] How did the unified transportation system of the Soviet Union form and how is it continuing to develop?

[Answer] This system took shape in a consistent, logical manner closely tied to the challenges being undertaken by the country and the demands of socioeconomic progress. Until the Great Patriotic War, and also in the first decade after the war, primary attention was devoted to rail transportation. Technical re-equipping of the roads and the introduction of electrical and diesel traction were stepped up. Internal waterways were also improved.

Accelerated development of other forms of transportation, above all motor vehicle, began in the 1960's. The increase in extraction of petroleum made it essential to expand the petroleum pipeline system. A network of heavy-duty gas pipelines is now being developed rapidly within the unified transportation system. One of the largest construction projects of the 11th Five-Year Plan is the system of trunk gas pipelines from the Urengoy deposit. With the appearance of large jet aircraft the air fleet became the principal form of long-distance passenger transportation.

Growth in Share of Freight Turnover Performed by Motor Vehicles with Diesel Engines (as percentage of all freight turnover by motor vehicle transportation).



Economic development, increasing specialization and cooperation in production, and territorial division of labor in national interests are the solid foundation of transportation and economic links among the fraternal republics. The exchange of products of specialization among them runs to tens and hundreds of millions of tons.

Rail transportation occupies a dominant position in transportation and economic links. The exceptions are natural gas and a large part of the petroleum, which are delivered to consumption points by pipeline.

In terms of amount of freight delivered to other economic regions and republics, the Donets-Dnepr, Northwestern, Central, Ural, Volga, and West Siberian economic regions and Kazakhstan have the largest shares. They account for 70 percent of the total volume of interregional freight, by origin. At the same time the regions that receive the largest amounts of freight from other parts of the country are the Far East, the Urals, Siberia, the Volga region, and the Central Zone.

[Question] What special features for transportation are there in the 11th Five-Year Plan?

[Answer] Pipeline, motor vehicle, and other forms of transportation will develop faster than rail transportation. The five-year plan envisions steps to rationalize freight shipping, improve transportation links, use means of transportation, and reduce specific norms of fuel expenditure. According to the decisions of the 26th party congress appropriations for the development of railroads will be increased, above all to increase the traffic capacity of the most heavily used trunk lines. By the end of the five-year plan through train traffic will be open along the entire BAM route.

The share of the railroads in the total volume of capital investment allocated to general-use transportation in the 11th Five-Year Plan exceeds 38 percent. At the same time the share of motor vehicle transportation is 17.7 percent and appropriations for vehicle roads are 14.4 percent.

The introduction of new equipment and automated control systems is being stepped up in all forms of transportation. The level of full mechanization of loading-unloading and repair work is rising.

The challenges for transportation workers are to improve passenger conveyance significantly, minimize violations of schedules, and improve the quality of service on the road, at terminals, and at airports.

USSR Gosplan plans the development of all forms of transportation in a coordinated manner, as constituent parts of the country's unified transportation system on the basis of uniform raw data about transportation.

Last year the freight turnover of all forms of transportation rose 3.3 percent over 1980. But serious problems continue in the work of transportation, above all rail transportation. National economic needs for shipping a number of key types of freight, and also for passenger conveyance, were not fully met. The

Annual shipping plan was not fulfilled. To carry out the assignments of the five-year plan it will be necessary to use the reserves that are available to transportation workers more skillfully and efficiently.

[Question] What are these reserves with respect to the specific features of particular forms of transportation?

[Answer] Success depends on improving the technology and organization of the shipping process. In rail transportation this means evening out the processes of loading and unloading by periods of the day, and especially by days of the week. The average figure for car loading and unloading on days off and holidays is only 95-97 percent of the figure for work days. As a result, the railroads carry some 50-55 million tons less freight in a year than they could. Freight unloading continues to be done irregularly.

One of the progressive ways to organize freight flows is to set up through shipping routes. About 45 percent of all freight is now shipped in this way, but the quality of the work to establish through shipping routes is low.

I must emphasize the following. Evening out freight-handling work and further development of through shipping demands coordinated efforts by railroad workers, freight shippers and receivers, and supply-marketing organizations. Unfortunately, however, they often still operate at cross purposes.

Motor vehicle transportation has reserves. We must work harder to implement the policy of consolidating vehicle enterprises and establish large sectorial and territorial associations. I refer to the useful experience of Glavmosavtotrans [Main Administration of Motor Vehicle Transportation of the Moscow City Executive Committee], Glavlentavtotrans [Main Administration of Motor Vehicle Transportation of the Leningrad City Executive Committee], Shchelkovoavtotrans [Main Administration of Motor Vehicle Transportation of the Shchelkovo City Executive Committee] and numerous others. Sectorial associations are expected to provide shipping by sectors: construction, agriculture, trade, communications, and the like. But territorial associations working on the basis of economic contracts are expected to do all the work of hauling freight to and picking freight up from railroad stations and river and seaports in a particular region. They also perform direct shipments of small batches of goods and assume responsibility for transportation service to particular enterprises.

The number of small motor vehicle enterprises declined by 20,000 between 1971 and 1980, but this still is not much.

We must make dispatcher service more operational and precise in order to intensify the use of the transportation fleet on the seas and rivers. This will make it possible to bring ships in to their ports of destination more evenly, eliminate unproductive downtime, and reduce "ballast" runs. The "direct" variation of loading, from the railroad car to the ship and from the ship to the track, should be widely used in ports in the 11th Five-Year Plan.

[Question] The five-year plan envisions elimination of countershipping, unnecessarily long shipments, and other irrational forms. What practical work is being done in this area?

[Answer] USSR Gosplan has an interdepartmental commission for rationalization of shipping. It adopted an elaborate program for the current five-year plan. Specifically, it set the goal of significantly reducing long interregional shipment of petroleum products. For this purpose plans envision construction of new petroleum refineries and expansion of existing ones in petroleum-short regions of the country, Central Asia, Siberia, the Ukraine, and the Baltic.

A number of trunk pipelines and local pipelines from petroleum refineries to electric power plants and airports will be built to continue relieving the railroads of the job of transporting crude petroleum and, especially, petroleum products. Short shipments of gasoline, kerosene, and other petroleum products have been switched to motor vehicle transportation, which will facilitate the construction of dispensing units at some plants.

Plans envision reducing long-distance coal shipment by 10 million tons a year and cutting countershipments of coal extracted in various regions. In Siberia and the Far East there is to be significant growth in the production of timber, pulp, plywood, lumber, and railroad ties. As a result, it will no longer be necessary to ship up to 8 million tons of unprocessed timber from these regions to the European part of the country, the Urals, Kazakhstan, and Central Asia.

The program to eliminate irrational shipping also covers other sectors of the economy. Some of the measures adopted by the interdepartmental commission have been carried out or are now being carried out. Thus, for many years Donets anthracite coal was shipped to electrode and abrasive materials plants in the Urals and Siberia. It was decided to cut these shipments by 62,000 tons in 1982 and completely stop them in 1983-1984. The countershipments of A-76 gasoline from Angarsk to the Far East and A-72 gasoline from Komsomol'sk-na-Amur to the west are being reduced significantly this year.

There are great opportunities for organizing shipping, including better distribution of shipments among the types of transportation. Steps to rationalize freight shipping are expected to increase shipping volume using river transportation by 25 million tons in the five years and to switch 35 million tons of short-distance shipping from rail to motor vehicle transportation.

Carrying out the vast program to eliminate irrational shipping depends on working people in all sectors of the economy and on every ministry and department.

[Question] Raising the power and efficiency of the country's transportation system depends on many factors. What part do container and stack shipping have in this?

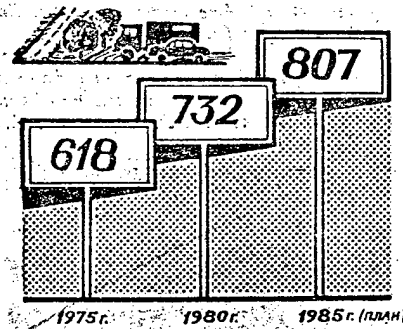
[Answer] At the present time the annual volume of container shipping has reached 80 million tons, while for stacks it is 270 million tons. A statute on annual and quarterly planning of such shipping will be put into effect in the

near future. The enterprises and associations that ship freight, the territorial transportation organizations, the transportation ministries, and USSR Gossnab are involved in this work. The Ministry of Railroads has formed a Main Administration for Container and Stack Shipping and Mechanization of Loading-Unloading Work, while the Ministry of the Maritime Fleet has set up an Administration on Container and Stack Shipping. USSR Gossnab has also organized an appropriate administration for all container shipping.

One would expect all these things to have a positive effect on the organization of the shipping process and the use of containers. Unfortunately, the desired changes have not yet come about.

Analysis shows that stepping up the turnover containers in the rail system by two hours would make it possible to increase shipping volume with the same stock of containers by 4-5 million tons a year and save the national economy 60 million rubles. Success in organizing container shipping by the most efficient, through transportation systems depends decisively on correct interaction among the cooperating forms of transportation.

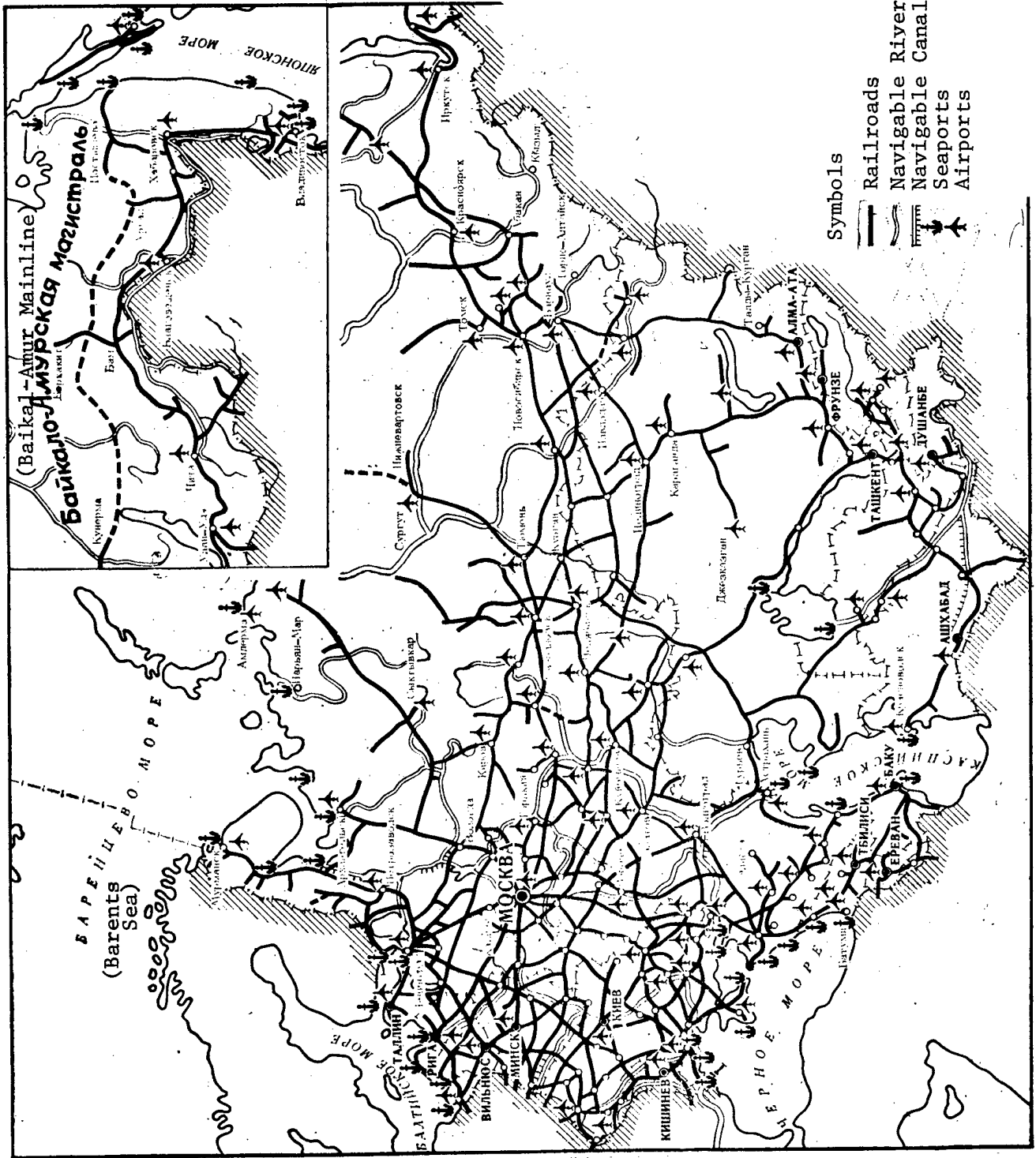
Growth in Total Length of General-Use, Hard-Surface Vehicle Roads (thousands of kilometers at year's end)



[Question] What is new in competition among transportation workers?

[Answer] Like all the working people of our country, transportation workers have become actively involved in national competition to celebrate the 60th anniversary of the formation of the Soviet Union in a worthy manner. The movement to utilize efficiency and quality reserves is generating progressive know-how and valuable patriotic initiatives.

More than 400 rail transportation enterprises have already adopted the practices of the collective of the Moscow Railroad to accelerate freight shipping by increasing the weight and length of trains. Their practices were ratified by the CPSU Central Committee. As a result, in the last two years the average weight of freight trains has risen markedly. The number of consolidated comprehensive brigades in seaports is increasing. They include almost 30 percent of workers employed in loading-unloading operations. Sixteen percent of these brigades have switched to cost accounting. The practices of the Leningrad transportation center are now being used by 83 sea and river ports and more than 300 rail transportation enterprises.



The methods of the collectives of enterprises in L'vovskaya Oblast to use railroad cars efficiently have been spreading lately.

It is the duty of workers in all forms of transportation to carry out the assignments of the five-year plan successfully on the basis of creative, active work.

Map, Statistics on USSR Transportation

Moscow EKONOMICHESKAYA GAZETA in Russian No 16, Apr 82 pp 12-13

[Article: "The Unified Transportation System of the USSR"]

[Excerpts] Freight Turnover by Transportation (in billion tons of ton-kilometers)

Form of Transportation	1922	1981	1985 (Plan)
Rail	18.2	3,503.2	3,880
Sea	4.2	846.1	926
River	5.5	255.4	291
Motor Vehicle	0.1	454	524
Petroleum and Petroleum Product Pipeline	0.2	1,263.2	1,375
Air	-	3.1	4

Introduction of Fixed Production Capacities in Transportation in 1981-1985 (in kilometers)

New railroads . . . . .	3,600
Second tracks on single-track railroads . . . . .	5,000
Electrification of railroad lines . . . . .	6,000
Automatic blocking and centralized dispatching on railroads . . . . .	15,000
Hard-surface vehicle roads . . . . .	73,000
Petroleum pipelines . . . . .	10,100
Gas pipelines . . . . .	38,000

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CSO: 1829/189

MISCELLANEOUS

CONFLICTS AMONG COMMERCIAL FLEETS OF EEC COUNTRIES REVIEWED

Moscow VODNYY TRANSPORT in Russian 25 Mar 82 p 4

[Article by A. Petrov, candidate of economic sciences: "The EEC - Problems and Difficulties"]

[Text] Maritime shipping plays a fairly significant role for the European Economic Community as a whole: 53-55 percent of the foreign trade cargo of "little Europe" is shipped by sea. But the dependence of EEC countries on maritime shipping differs: for England it is almost 99 percent, for Greece 93-95 percent, and for Denmark about 80 percent of all shipping. This figure is lower for other countries: about 58 percent for the Netherlands, 32 percent for Belgium, and 20 percent for West Germany. The different degrees of dependence also manifest themselves in different approaches to formulation of maritime transportation and economic policy, both for individual countries and for the community as a whole.

The EEC is already more than 20 years old. But it still has not worked out a unified maritime transportation-economic policy that defines relations within the community as well as relations toward other countries and it does not have a unified position on issues of international commercial navigation. But the political and economic processes that engulfed international shipping in the 1970's forced the community to take such combined measures in commercial navigation as protection of common interests and negotiations to conclude agreements on commercial navigation between the EEC and other countries; coordination at the community level of steps being taken within the framework of bilateral agreements concluded by EEC members and other countries; and, close coordination of positions within the framework of international organizations involved with issues of maritime transportation.

Some steps toward coordinating activities have already been taken. For example, the national associations of ship owners of "little Europe" have established the Committee of Shipowner Associations of the EEC to improve cooperation in commercial navigation. In June 1978 the community issued a handbook on commercial navigation which includes such matters as safety at sea and competition with the commercial fleets of third countries. On this basis they organized collection of information on the maritime carriers of trade partners and shipowning companies whose merchant ships work in the charter market of the community under flags of convenience. Another important step toward development of a unified

maritime transportation-economic policy was approval of the rules for ratification of the Convention on the Code on Conduct of Line Conferences. But all of these measures are nothing more than isolated acts: the EEG countries do not have a unified approach to development of such a policy. The differences in views result primarily from the different role which the commercial fleet plays in the different national economies and in transportation of foreign trade cargo.

One of the reasons for the conflict of interests is reserving cargo for commercial fleets under the national flag. The group of countries including France, Belgium, West Germany, and Netherlands prefers to base its policy on reserving a share of national foreign trade circulation within the total volume of Common Market foreign trade. Without additional expenditures to make their fleets more competitive this approach insures that the participation of their fleets in shipment of national foreign trade cargo will increase because of the dominating position of the community in foreign trade. France today ships about 30 percent of foreign trade cargo in its own fleet, while for West Germany the figure is about 16 percent, for Belgium 6.7 percent, and for the Netherlands 3.4 percent.

England, Greece, and Denmark are in the opposite position. They reject the idea of reserving cargo based on a proportion of foreign trade because its adoption could reduce the participation of their fleets in carrying foreign trade cargo. Shipowning companies under the flags of England, Greece, and Denmark not only carry national export-import cargo, but also are expanding into the charter markets of third countries, that is, they carry the cargo of foreign charterers. Carrying the cargo of foreign charters is a significant way for the treasuries of these countries to receive foreign currency. But it is difficult for these countries to insure substantial protection for the interests of their fleets in this case because the total volume of their foreign trade does not exceed 19 percent of the foreign trade turnover of the community.

The differing views of the EEC countries came out during discussion of the Convention on the Code on Conduct of Line Conferences proposed by UNCTAD. The convention contemplates reserving 40 percent of foreign trade cargo in bilateral trade to the fleets of the two direct trading partners, while 20 percent is given to the line carriers of other countries. West Germany, France, and Belgium supported the fixed quotas proposed by UNCTAD in the hope of increasing their participation in shipping. England and Denmark took the opposite position. At the present time shipowners sailing under the flags of England, Greece, and Denmark carry approximately 15 percent of the foreign trade cargo of France, 23 percent for West Germany, 25 percent for the Netherlands, and 41 percent of the export-import cargo of Belgium and Luxembourg. Moreover, in the charter markets of West Germany, Belgium, Luxembourg, and the Netherlands shipowners sailing under the English, Greek, and Danish flags carry substantially more cargo than the commercial fleet under the national flags of these countries.

Thus, England, Greece, and Denmark have monopolized a significant part of the foreign trade shipping of the "little Europe" countries. To protect their profits they are calling for development of a unified EEC maritime transportation-economic policy that aims at defending the principle of freedom of the sea and opposes any restriction on the activities of their national shipping

companies which carry the cargo of foreign charterers. These three countries prefer to base this policy on the size of the fleet of national registration, a figure by which they dominate in the community. This approach provides proper protection for the interests of their shipowners in the charter markets of other countries and not only preserves but also strengthens their current position. In 1980 England and Denmark together had 42.5 percent of the total EEC fleet, or 46 percent by tonnage. The corresponding figures for West Germany were 13.8 and 11.2 percent, for France 10.3 and 16.9 percent, and for the Netherlands 13.2 and 7.8 percent.

It is true that the position of England and Denmark in the commercial navigation of the community has been somewhat shaken in the last decade. The more rapid build-up of commercial tonnage under the flags of other EEC countries led to a decline in the English share of total tonnage from 46.2 percent in 1970 to 38.4 percent in 1980. Nonetheless, England and Denmark continue to hold strong positions in the maritime foreign trade shipping of "little Europe."

The entry of Greece into the EEC (it became a full-fledged member as of 1 January 1981) strengthened the position of England and Denmark, on the one hand, while on the other hand it sharpened the existing conflicts in the community and generated new ones. At the same time it transformed the EEC into the largest shipowner in the world, controlling 28 percent of world tonnage, or 30 percent if we consider the Greek fleet sailing under foreign flags.

The views of Greece, the 10th member of the EEC, with respect to commercial navigation do not coincide fully with the views of any of the older members. Its entry into the group exacerbated existing conflicts among EEC countries. The desire of the old members of the community to increase the proportion of the commercial fleet under national flags in shipping their own foreign trade cargo conflicts with the aspirations of Greek ship owners, who are trying to bolster their influence in their charter markets. As an international shipper, Greece finds the position of France, Belgium, West Germany, and the Netherlands on the issue of reserving cargo on the basis of foreign trade, as well as any other policy that subverts the principle of freedom of the seas, unacceptable. This is because such a policy infringes on the interest of its fleet and actually reduces the inflow of foreign currency. Greece has joined with England and Denmark in opposing the formula proposed by UNCTAD for reserving foreign trade cargo, but Greece is pursuing other goals. The principle of assigning cargo quotas, especially for bulk and liquid cargo, takes work away from the Greek fleet and cuts off an important channel of foreign currency receipts.

The interests of England and Greece with respect to line shipping are opposed. The attempts by Greek shipowners to broaden their participation in EEC line shipping ended in failure because of the closed character of the line conferences. It is obvious that Greece will fight to open them or for its shipowners to be freely received into these conferences.

It is to be expected that the competitive struggle in the EEC charter market between Greece and the other members of the community, especially those who carry the cargo of foreign charters, will become sharper. The operating costs of

Greek shipowners are one-half to one-quarter of the costs of the other EEC countries.

There is no question that American transnational monopolies, which have their own commercial vessels in the EEC area, will influence mutual relations among countries of the community with respect to problems of commercial navigation. These companies own, for example, three ships under the flag of Italy, 6-11 ships under the flags of France and West Germany, the Netherlands, Belgium, and Denmark, and Greece, and 100 ships under the English flag. The conflicts among EEC states prevent them from working out a common approach to solving the problems of commercial navigation. The entry of Greece made it harder, not easier, to solve this problem. And for the EEC the 1980's will be a decade of growing conflicts in commercial navigation. The crisis that has engulfed the economies of the EEC countries will have a significant impact to exacerbate existing conflicts in the commercial navigation of EEC countries and on the appearance of new ones. At the present time it is impossible to work out an agreed-upon maritime transportation-economic policy that considers the interests of all the countries of "little Europe." And if such a policy is worked out in the future, it will reflect the interests of one group of countries at the expense of the interests of other EEC members.

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## MISCELLANEOUS

### INTEGRATION OF URBAN PASSENGER SERVICE IN BELORUSSIAN CITIES PLANNED

Moscow EKONOMICHESKAYA GAZETA in Russian No 15, Apr 82 p 17

[Article by A. Bezlyudov, Belorussian SSSR minister of housing and municipal services, candidate of economic sciences: "Transportation in the City"]

[Text] A great deal is being done in our republic, as also in many other places, to make transportation work more precisely and see that passengers enjoy essential conveniences.

Unfortunately, the work of urban passenger transportation in the republic today still does not meet growing needs. The reason for this is lack of clearcut interaction among those services of the municipal system on whom improving the efficiency of passenger transportation work depends, problems of material-technical supply, violations of traffic schedules, and a level of personal service that is inadequate.

Objective factors can also be added to this. The heavy snowfall of the past winter is still fresh in memory, and not everyone was ready for it. This caused a drop in the regularity of traffic and affected the conditions of passenger conveyance.

When we are talking about the necessity of making transportation work more efficiently, we cannot forget its social importance. There is no longer any doubt today that time saved on travel is an additional production reserve and increases opportunities to restore work capability, pursue cultural development, and improve qualifications. It has been calculated that unsatisfactory travel conditions lower the labor productivity of workers by 2.5-4 percent.

Improving the regularity of traffic and increasing operating speeds can reduce time lost for travel by 8-10 percent.

I believe that the primary indicator of the work of urban transportation enterprises should not be growth in profit or reduction in losses, as is the case today. It should be the quality of transportation services: how full our vehicles are at peak hours, expanding the system of routes, increasing the number of vehicles on the line, improving the regularity of traffic, and so on.

The Minsk streetcar and trolley administration has been working with such a system of evaluation indicators for three years now, on an experimental basis. They have achieved positive results. They introduced an additional plan indicator, number of vehicles and cars sent out in the morning and evening peak hours. In the last two years they have reduced the crowdedness of transportation vehicles by almost three percent through more regular operations. In this they use scientifically substantiated norms for maximum time that a passenger is en route, optimal number of vehicles on the line, and several others.

But further improvements in travel speed and comfort inevitably involve increasing operating costs. The income of transportation enterprises is based on stable rates for passenger travel, however, and does not cover costs that are constantly increasing for reasons that do not depend on the transportation enterprises.

The industrial enterprises and organizations of the cities could provide significant help in covering the costs of transportation services and improving transportation. I am suggesting that they cover, at least partially, the costs of conveying people to their place of work and home again.

At the present time the different forms of urban transportation are under the jurisdiction of different ministries and departments. Their activities, development, and financing are planned separately.

Minsk has a republic council to coordinate the work of different forms of transportation. On its recommendation the Belorussian Design-Technological Institute of Municipal Services of the Belorussian SSR Ministry of Housing and Municipal Services worked out technical-economic substantiation for consolidating all forms of passenger transportation in the cities. This promises a significant economic effect.

But the system of planning the development of urban passenger transportation enterprises needs to be improved. At the present time we do not have unified reporting for all the forms of such transportation. The activities of urban passenger transportation enterprises and their development and financing are planned separately for different divisions of the republic Gosplan. The time has come to assign urban passenger transportation to one department. In our opinion, this department should be the Ministry of Housing and Municipal Services.

Maintenance, repair, and development of roads is managed by city executive committees and, correspondingly, the Ministry of Housing and Municipal Services, Road construction and related development, construction of dispatcher stations, booths, and the like is done with city capital investment. It would be wise for all this work to be managed from one center. This would make it possible to spend capital more expediently and rationally and to concentrate the functions of client and contractor in the same hands. In this case there would be better coordination of the activity of urban passenger transportation with urban non-transportation organizations: the road operations and structures service, the street lighting service, and the traffic patrol.

Within the municipal services system subordinate to the Minsk City executive committee and the Belorussian SSR Ministry of Housing and Municipal Services the

essential conditions and prerequisites have been established to integrate all forms of urban transportation and the corresponding services in order to insure work that is reliable in a technical sense and stable organizationally.

Merging bus, street car, and trolley systems will be the basis of the association. But to limit to just these forms of transportation would fail to carry through the principle of the systems approach to management of urban passenger traffic. In our opinion, the association should also take in suburban bus transportation and route taxis later.

Coordination with other forms of transportation — rail, air, intercity bus, and subway — is a very significant part of the transportation process and can be insured by setting up public coordinating councils at the level of the managers and representatives of all forms of out-of-city transportation. The council must be given the necessary power.

The Belorussian Design-Technological Institute of Municipal Services of the Belorussian SSR Ministry of Housing and Municipal Services has developed a draft organizational structure, economic indicators, and certain other normative documents for establishing the Minsk Production Association of Urban Passenger Transportation. One of the most difficult questions in any version of subordination is finding sources to cover the losses of urban passenger transportation. The Minsk City executive committee has the final word in solving the problem of transportation integration.

In his speech at the 17th Congress of the USSR Trade Unions Comrade L. I. Brezhnev spoke of the necessity of devoting greater attention to the service sphere. Passenger transportation is one of those spheres which is expected to serve people every day.

Improving the system of managing the work and having enterprises and organizations participate in paying the cost of transportation organizations can and must significantly improve service to the urban population. This is one of the factors in raising the efficiency of public production.

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