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USSR Report

TRANSPORTATION

No. 85

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AIR

EXPERTS DISCUSS CIVIL AVIATION WORK IN WESTERN SIBERIA

Moscow GRAZHDANSKAYA AVIATSIYA in Russian No 5, May 82 pp 12-15

Report of discussion among Western Siberian officials compiled by A. Troshin and V. Gol'tsov: "Western Siberia: A Union of Land and Sky"; passages enclosed in slantlines printed in boldface

Text In conformity with the directions of the 26th party congress and the November (1981) CPSU Central Committee Plenum, further formation of the world's largest fuel and power complex is being continued in Western Siberia. In the 11th Five-Year Plan, it is planned to reach a daily extraction of a million tons of oil and a billion cubic meters of gas in just Tyumen-skaya Oblast. Oilfields **promysly** and main gas pipelines of considerably greater capacity than in the three preceding five-year plans will be established here. In volume of capital investments assimilated, these are unquestionably the central construction projects of the five-year plan. They surpass such giants as the VAZ **Volga Motor Vehicle Plant**, KamAZ **Kama Motor Vehicle Plant**, and even the BAM **Baykal-Amur Main Railroad**.

In carrying out this far-reaching program successfully, an important role is assigned to civil aviation, especially in performing operations in the desolate northern taiga and the marshes. As Comrade G. P. Bogomyakov, first secretary of the Tyumenskaya Oblast committee of the CPSU, stressed at one of the obkom's recent plenums, civil aviation is invaluable; it is rendering immense assistance to those first in the region **pervoprokhodtsy**, the construction workers, and operations personnel.

The largest volume of operations in the sector in servicing the national economy falls within the Tyumen Administration of Civil Aviation. They constitute nearly one-quarter of such operations carried out in Aeroflot as a whole. Over the five-year plan, airplanes and helicopters will deliver to the oblast's construction sites more than 2 million tons of priority freight, and will carry by special flights more than 10 million specialists of geological exploration expeditions and crews, workers of shift brigades, designers, construction workers, and others eager to

develop the virgin land of gas and oil. In addition, construction and installation operations valued at many millions of rubles will be carried out.

How can the constantly increasing demand for aircraft service of the multisector production complex of Tyumen' be best met? How can we increase the efficiency of aircraft and the effectiveness of their utilization in the various types of operations? A "roundtable" discussion on these and certain other problems was held by the magazine in the Tyumen Administration of Civil Aviation.

Taking part in the discussion were: G. P. Laskin, chief of the administration and Honored Pilot of the USSR; A. A. Lukanin, chairman of the territorial committee of the aviation workers trade union and delegate to the 17th congress of trade unions of the USSR; V. A. Gorinov, first deputy chief of the administration; V. S. Krasnov, Pilot First Class and deputy chief of the administration for organizing flight operations; I Ye. Savchenko, deputy chairman of the administration for political-education work; F. K. Salmanov, chief of "Glavtyumen'geologiya," Hero of Socialist Labor and winner of the Lenin Prize; V. I. Motviiyenko, deputy chief of "Glavtyumen'neftegazstroy"; Yu. I. Topchev, chief engineer of "Tyumen'gazprom"; B. V. Spirin, deputy chief of "Glavsibzhilstroy"; V. D. Vasil'yev, deputy chief of the Main Production Distribution Administration (GlavPRU); V. A. Khozyainov, deputy chief of the "Sibrybprom" association; and A. D. Kolchanov, deputy chief of a department of "Tyumen'lesprom." [expansions of acronyms in quotes unknown]

We are publishing a brief account of this discussion.

/G. P. Laskin:/

"We aviators are pleased that representatives of practically all the key sectors of the national economy of Tyumenskaya Oblast have come together at the magazine's 'roundtable.' We are performing one common task--we are living in the severe North and we are giving the Motherland the oil and gas it needs so much.

"It appears that our customers are satisfied with aviation. Over the past five-year plan, for example, a vast amount of work has been carried out by our crews. With our assistance, billions of rubles in capital investments have been assimilated, the largest oil and gas deposits prospected and built up, and thousands of kilometers of main pipelines for various purposes have been laid. Much has been done for the oblast's lumbering enterprises and fisheries.

"In just the final year of the past five-year plan we carried about 560,000 tons of priority freight and mail and 5.5 million passengers. The scope of these operations will be significantly increased in the 11th Five-Year Plan. It is enough to say that the total ton-kilometers of air shipments will be increased by 1.8

times as much. At the end of the five-year plan we are planning to carry 742,000 tons of freight and mail and 6.8 million passengers annually. Our growth rate is much higher than the average sectorial rate.

"Clearly, it is not easy to cope with such volume. And a great deal depends here not only on the aviators. This is why everyone taking part in this discussion should indicate how to better utilize the aircraft. It is no secret that they are far from being utilized with a full load at present.

"Let us take our most operational helicopter, the Mi-8, for example. The average accrued flying time in it is rather high. But this is not a limitation, for one thing. With skillful work organization the helicopter can be used more intensively. And secondly, the average accrued flying time is being achieved by far from everyone. Often it is lower. Why? Because not all customers take care to reduce the downtimes of our aircraft. Some still reason as follows: the rent, they say, has been paid and the aviators have received their money in full, so what else is necessary?

"We cannot tolerate this. The helicopter is an expensive machine. It should be working, not standing on the ground. Especially since other customers also are impatiently waiting for it. They need it like air, but they have to be refused.

"Another problem is the helicopter loads. It would seem that everyone understands that an aircraft such as the Mi-6, with a carrying capacity of 10 tons, should not be carrying a handful of nails. But in fact, at times just such a situation exists: they load the helicopter with whatever comes to hand, and dispatch it half-empty. Is that really economical?

"The geologists and oilfield workers are going farther and farther away to the north of the oblast. Naturally, we go with them, too. But what is happening? The distances to the sites are getting longer, and in order to reach them, we are forced to fill helicopters with aviation fuel which is termed in a bottleneck pod probku. This, of course, is harmful to the load. We should be taking a tractor or girders, but we are taking kerosene.

"There is one solution--intermediate auxiliary bases for refueling helicopters should be built. This is the vital concern of the customers. But we are worrying more about this than they are.

"In my opinion, it will be correct if everything necessary for the aircraft is incorporated in the construction plan for the same gas pipeline. I have in mind primarily standard landing areas and capacities for aviation fuel. We often have all this delayed until the very end of a project, which results in considerable losses.

"By the way, why do we need namely standard landing areas? Not to mention the guarantee of flight safety, they make it possible to more fully realize the technical capability of the helicopters. In particular, we can make use of the "air cushion" effect during takeoff. Owing to this the same Mi-6 helicopter, with a flight range of 400 kilometers, can carry 6,600 kilograms of freight. But without it, we can carry 3,600. Look at the vast difference!"

/V. A. Gorinov:/

"These are really burning questions. And we are trying to resolve them, of course. The special dispatcher groups of which representatives of aviation enterprises and customers are members have become a reliable shield against mismanagement. They determine the priority of applications for shipments, put together the load, and watch the flight schedule.

"Previously every customer had a helicopter at his disposal when he wished. Now it is being controlled. Specific steps are taken immediately when there is a delay in flight departure or some other kind of work interruption. The dispatchers in these groups can transfer a helicopter to another customer, add freight on the way, and correct the flight route.

"The first dispatcher group was established in Surgut. And this has produced good results. The accrued flight time of helicopters has increased, the commercial load has been improved, and various mixups have been decreased. Subsequently similar groups were organized in Uray, Nadym, Salekhard, Nefteyugansk and Nizhnevartovsk. They all actively influence the production processes. Similar groups soon will be set up in five more aviation enterprises.

"We are cooperating especially efficiently with 'Glavtyumen'geologiya.' This is our basic customer. A third of all aircraft operations are carried out in accordance with its requests. The geologists treat the helicopters carefully--respectfully, I would say--and willingly build landing areas and develop a tank farm for aviation fuel. And there is no doubt that a key role in this is being played by Farman Kurbanovich Salmanov, chief of the main administration and one of the first to discover Tyumen' oil. He knows the cost of aviation very well, and uses it skillfully."

/F. K. Salmanov:/

"Yes, aviation has long been an indispensable assistant for us. In essence, it has become technological transportation. With the opening of all our deposits of oil and gas, we are obligated precisely to it for a great deal. Geophysicists, taking their first steps toward the earth's mineral resources, and drillers, who lay the strata bare--no one can do without airplanes and helicopters.

"We have close ties with the Tyumen Administration of Civil Aviation. The problems raised here are close to us, and we, like the aviators, are interested in more efficient use of the aircraft.

"Our main administration is not sparing resources for construction of aviation projects. We do not have one expedition without an airport. And in the future we will be building concrete takeoff and landing areas with all the necessary equipment. The expenditures for this are substantial--tens of millions of rubles. But in the final analysis everything will pay for itself.

"At the same time, I think that you, comrade aviators, and we have not yet tapped all the reserves. In my view, helicopters can be utilized somewhat better. You know the kind of conditions that develop during the winter in the Far North regions

when the polar night sets in. Flights there are limited, and we reach our new deposits with great difficulty. Something must be done about this. After all, tomorrow they begin building the oilfields, workers settlements, and even cities there. And without regular night flights they will not survive.

"Further. Discussions have been under way for a year already on construction of a helicopter repair plant in our oblast. But there are no improvements. And the helicopters, as before, are being sent for repair many kilometers away. A tremendous amount of time is spent on this, aircraft resources stand idle, and fuel is burned for nothing. If we are seriously engaged in economy and thrift, it is time to move from words to deeds. We are prepared to take part proportionately in financing construction of the plant. I am convinced that other main administrations will take part proportionately.

"And finally, one more suggestion. Tyumen' aviators and geologists have not once been the first to put new aircraft into operation, the Il-76 airplane and the Mi-10K helicopter, for example. Recently the Mi-26 helicopter, with a carrying capacity of up to 20 tons, made its appearance. We are waiting for this aircraft impatiently. At present, in order to carry large-sized equipment, we divide it into five or six parts. This also is troublesome and expensive. But the Mi-26 would simplify the task. I would like to ask the Ministry of Civil Aviation to provide the people of Tyumen' with this giant as soon as possible."

/G. P. Laskin:/

"I agree with you. The new helicopter would be of good use to all of us. For my part, I can assure the Aeroflot management that we have successfully coped with introduction of this aircraft."

/A. A. Lukanin:/

"And I have a question for you, Farman Kurbanovich. It goes without saying that your main administration is doing a great deal to ensure that aviators work with greater efficiency. We are working with you in accordance with the tried and true principle: 'From mutual claims to mutual aid and support.' But it seems to me that our business ties could be even stronger. And there is a reliable means for this--a collaboration contract. Why don't 'Glavtyumen'geologiya' and our administration conclude such a contract?

"There is much sense in this. Collectives of aviation workers already have 20 contracts with oil workers, gas workers, transport workers. This helps to more efficiently utilize aircraft and resolve social problems jointly. There also are such contracts with our subunits. However, it is time to move further, to shift from contracts among enterprises to contracts at the administration and main administration level."

/F. K. Salmanov:/

"Everything that benefits the work should only be welcomed. I have always supported and am supporting progressive beginnings."

/G. P. Laskin:/

"I think we will make arrangements with the geologists. There are many more work difficulties with the gas workers. Especially in building landing areas and re-fueling bases. Laying of the gas pipeline is beginning and equipment must be transported, but there is no place for helicopters to land. Nevertheless, we are adapting in various ways, but all this is from extreme need."

/Yu. I. Topchev:/

"The criticism is justified. We are still turning around slowly. Until recently it was like this: we go out to the deposits, but the helipads have not been built in time. We are taking this bitter experience into account."

"We will have to put the giant Urengoy-Uzhgorod gas pipeline into operation in the 11th Five-Year Plan. Openings already are being cut through the taiga, roads are being made, and places are being selected for settlements. A base also is being laid out for the aviators' work."

"Experience shows that not only helicopters, but airplanes, are needed at such large-scale construction projects. They are more economical in shipping freight over long distances. It follows that airports are required. Long-range planning providing for them is desirable. At the same time, along with our planning organizations, it is necessary to connect specialized ones with this work--'Lenaero-proyekt,' let us assume."

/V. I. Motvinyenko:/

"It is very good that we have come together and are carrying on this discussion. Each one of us will draw useful conclusions for himself."

"The subunits of our main administration are receiving a vast amount of freight. About 4.5 million tons were shipped last year. The freight is being shipped by all forms of transportation, including by air."

"In order to make shipments more efficient, all intermediate operations should be simplified as much as possible. There is one way to do this--develop containerization. We already have 9,000 containers in circulation for rail and water shipments. Owing to their use, the layovers of railway cars and ships for loading and unloading have been reduced a great deal. As I understand, we, together with the aviators, should be responsible for broad introduction of containers for air shipments as well."

"Such experience has proven itself with the Il-76 airplanes. Containers have made it possible to substantially facilitate and speed up freight handling. But we ship everything in bulk on helicopters, as a rule. Unquestionably, it is worth thinking about aircraft containers suitable for shipping freight both inside a helicopter and on an exterior sling."

"And this matter also deserves attention. True it is somewhat debatable, but in the long term it promises much savings. At the Tyumen' airport every customer is trying to acquire his own freight warehouse. Around the clock, forwarders and loaders are on duty there and motor vehicles are standing. It would be more efficient to bring all this together in a single unit. It is in our interests to build a spacious and mechanized warehouse for common use, based on share ownership. We are prepared to pay our dues."

/B. V. Spirin:/

"I also am for more order in the organization of freight shipments. Although the 'Glavsibzhilstroy' association is relatively new, our need for aircraft is not less, but even greater than others'. We use their services basically in the north: in Khanty-Mansiysk, Belyy Yar, Nadym, Urengoy. And there, as you well know, there is nothing to do without airplanes and helicopters.

"Soon operations on the gas pipeline routes will be developed at top speed. We will need to transport thousands of tons of freight--machinery, equipment, building materials--in short periods of time. And the demand for aircraft will increase continuously. It would be expedient to assign helicopters--even if only a minimum number--to our subunits. A firm guarantee that we will not be left without them is needed. Or else we fill an order today, but not the next day.

"There is also another reason here. Gennadiy Pavlovich Laskin reproached us about landing areas. There you are, there will be guarantees--the customers' motivation to build such areas and refueling bases will be increased."

/Yu. I. Topchev:/

"On the question of landing areas. Previously we built them to measure 10 by 10 meters. Now 20 by 20 meters are required. This is 400 square meters. Aren't we throwing money into the wind?"

/V. S. Krasnov:/

"You must not think that we are indifferent to these expenditures. We also have to count our money. But after all, the aircraft have become much more powerful. And what was acceptable for the Mi-4 helicopter, let us say, is not suitable for the Mi-8 or the Mi-10K. They need more space. This is dictated directly by the technical conditions of operation and flight safety. And we would very much like customers to treat our requirements with understanding, and not give them a hostile reception.

"It will be useful, I think, to devote attention to a question such as preparation of freight for shipment as well. The exact weight is not always indicated, and the crew, to put it bluntly, have a 'pig in a poke.' And this, after all, is fraught with all the problems which ensue from overloading the helicopter. Persons charged with putting the freight together should treat their obligations seriously, with full responsibility."

/I. Ye. Savchenko:/

"High responsibility from the customer is important in other terms as well. We train our personnel in the spirit of strict observance of the requirements of documents which regulate flight operations. Aviators have no right at all to deviate, and must not deviate, from the letter of flight regulations. But unfortunately, this is not always realized locally and they instigate crews to make definite violations. No matter what situation arises with the customer or what kind of 'fire' breaks out, aviators must not be urged to carry out unwarranted risky missions.

"Successful work by crews is closely associated with organization of their pre-flight rest. And this also depends to a considerable extent on the customers and those collectives in which the pilots live and work. Taking this opportunity, I want to make a request of the managers attending here. Show more concern for creating normal conditions for the aviators' rest. Are you interested in where they have been quartered, whether they have been provided with everything necessary? Has their leisure time been correctly organized?

"We should also more actively influence the public, mainly the party aktiv. The unfinished work that we have in common lies in the fact that party and public organizations usually are closed within the limits of their own collectives. Of course, they periodically look for direct contacts--they define joint tasks and ways to resolve them more accurately. But there is little of this. In my view, it is helpful to establish councils of the secretaries of party organizations of the departments concerned, including aviation, at the most important projects in the oblast. Such a council can be established at the construction of the new gas pipelines, for example. By uniting our efforts in these directions, we will be able to achieve more efficient and well-coordinated work, strong discipline and order everywhere."

/V. D. Vasil'yev:/

"Ivan Yefimovich, definite steps already have been taken in this. In construction of the oil pipelines, staffs are set up in which representatives of all departments which have relations with it are included. Such a staff coordinates the work of all organizations. Regardless of to whom the freight belongs, it establishes the priority for its dispatch. The aircraft also operate in accordance with its assignments. Of course, party and public organizations are actively contributing to the successful functioning of these staffs.

"As far as attention to the aviators is concerned, we have not forgotten them. We have even been able to resolve the problem of providing them with incentive on a level with our employees for high work indicators. In particular, we allocate passenger cars for personal use to those who excel the most."

/A. D. Kolchanov:/

"And we have acted as follows. In Sovetskiy Rayon, where logging is being carried out, we have laid concrete for a landing and takeoff area and built housing for the aviators. And now we have a good air base. We are planning to do the same in

Oktyabr'skiy Rayon as well. We have nine timber managements there. All of them, as in Sovetskiy Rayon, are working on shifts, so that their demand for air shipments is high."

/V. A. Khozyainov:/

"As you have noted, the discussion at this meeting is about new sectors of the national economy in Tyumen'. But after all, our oblast still is the country's largest fish department [rybnyy tsekh]. And this department cannot exist without aircraft, either. But here is the trouble: voluntarily or involuntarily, we, as a customer, have found ourselves in the background.

"In the past we were helped by An-2 floatplane versions. They took the fishermen to the deepest spots and carried out the catches from there. Now very few such aircraft are left, and the helicopters are not suitable for us at all. Why is this? After all, fish, like oil and gas, also are needed for the state."

/G. P. Laskin:/

"This problem will be resolved in due course. In place of the An-2 we are expecting a more efficient aircraft, equipped with float gear. But for the present, we must orient ourselves toward helicopters more and develop the appropriate operating base for them.

"As we already have been convinced, there are a great many serious problems in our common effort. Many of them we aviators must resolve. And we, without fail, will concern ourselves with them persistently. But you, our customers, have been called upon to keep in mind constantly the problems associated with the highly efficient, rational utilization of aircraft. It is important that this discussion yield specific results. So that we have not just had a talk, left for our own offices and forgotten everything. And so that the exchange of opinions at the magazine's 'roundtable' becomes a distinctive reference point in improving our collaboration and in further reinforcing the union of land and sky."

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AIR

KIEV INSTITUTE TRAINS FOREIGN STUDENTS

Moscow GRAZHDANSKAYA AVIATSIYA in Russian No 5, May 82 pp 24-25

[Article by special correspondent I. Shabrov: "Kiev Has Befriended Them"]

[Excerpts] One of the country's largest higher educational institutions is the Kiev Order of the Red Banner Institute of Civil Aviation Engineers, which will be 50 years old in 1983. Hundreds of highly skilled aviation specialists leave it every year.

Representatives of more than 50 foreign countries are being trained as part of the institute's friendly student family. There are envoys of the states of Europe and Asia, Africa and Latin America.

There are no obstacles in acquiring their occupation, either. There would be only the desire, the aptitude for a chosen field. Judge for yourselves--there are seven specialized departments in the institute which teach 13 specialties. A foreign student can be seen in each one of them. For example, we came across Cuban Ramon Valdivia Acosta in the electronics department. An envoy of the People's Republic of Angola, Joao Monteiro, is preparing himself for important work as an electrical engineer. In the engineering and economics department I became acquainted with Peter (Grabalek) from the CSSR. Many foreign students are studying in departments dealing with airports, fuels and lubricants, automation and computer technology.

Envoys of the Island of Freedom--Cubans--told how interesting it was to meet students of the 131st secondary school in the city of Kiev, whom they told about the progress of their people in socialist construction.

A great many students--Nguyen (Thi) Minh from Vietnam, Suleiman (Sadibe) from Mali, George Manuel Fernandes from the Cape Verde Islands--recalled enthusiastically their trips in Kiev and other cities of the USSR: Moscow, Leningrad, Baku, Tashkent, Odessa.

The institute supported the idea and assisted in its practical implementation. Thus was formed the international "Podvig" [Exploit] detachment, uniting among its members Vietnamese, Laotians, Congolese, Angolans, Ethiopians, Hungarians and Bulgarians, and students from the GDR, Czechoslovakia, Nigeria, the Cape Verde Islands and other countries.

The institute's collective is justifiably proud that its graduates hold supervisory positions in civil aviation in many foreign countries. They are working as general managers and chief engineers of airlines and as heads of departments and top-level specialists in ministries. And no one loses contact with the VUZ that gave them a start in life. They send holiday greetings, seek advice, and ask that technical literature be sent. And there has not been one case in which those in Kiev have refused. In response, telegrams and letters with words of thanks come in from all corners of the globe.

"We, the former students of your VUZ," reads a letter from a group of graduates in the GDR now working for the Interflug airline, "are proud that we had the opportunity to acquire thorough knowledge of civil aviation at the KIIGA /Kiev Institute of Civil Aviation Engineers/. It helps us a great deal in carrying out our important work for Interflug, for example, in re-equipment of the radar and navigation base for UVD /air traffic control/ or in setting up an AS UVD /automated air traffic control system/ for the GDR."

"As a graduate of KIIGA," writes Kirill Ikonomov from the People's Republic of Bulgaria, "I am proud to say 'our institute' because during the years of study in it I became an equal member of its collective, and in leaving for my homeland, together with a diploma and fond memories, I also took away a small part of its traditions, the precious title of a KIIGA graduate."

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AIR

AIRCRAFT USED BY TYUMEN' CIVIL AVIATION ADMINISTRATION NOTED

Moscow GRAZHDANSKAYA AVIATSIYA in Russian No 5, May 82 p 16

Text A significant new increase in the volume of air shipments and special types of operations to service the national economy is characteristic of the Tyumen' Administration of Civil Aviation in the 11th Five-Year Plan. Passenger turnover will increase by 1.7 times and freight turnover will increase by 1.5 times as much.

Replenishment of the fleet of airplanes with the Tu-154 for passengers and the Il-76 and An-26 for freight, as well as the fleet of Mi-8 helicopters, has been stipulated. Together with this, the arrival of new aircraft--the An-28 airplane and the Mi-26 helicopter, is expected.

Construction of new airports and renovation of those in service has been planned. Air terminals and passenger areas pavil'ony, maintenance docks for helicopters, warehouse facilities and container areas will be built and the aviation fuel tank farm will be expanded.

It is being planned to put group basing of helicopters in places of high-volume operations, operations by their crews in two shifts, and introduction of a number of other advanced measures into wider practice.

Owing to the introduction of new aircraft, improvement in technological processes and dissemination of advanced work methods, it has been resolved to increase labor productivity by 20 percent. This will make it possible to ensure not less than a 55-percent increase in operations volume. Savings of 17,000 tons of aviation fuel also has been stipulated.

The administration's collective has made increased socialist pledges--to complete ahead of schedule the planned tasks for 1982 and the 11th Five-Year Plan as a whole. The pledges are being put into effect successfully.

A significant proportion of the shipments in the Tyumen' administration are handled by Il-76 aircraft. After successfully passing tests under conditions in the Far North, these powerful aircraft have become dependable assistants to those who are prospecting for and extracting oil and gas.

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MOTOR VEHICLE

BRIEFS

AUTOMOBILE EXPORTS--Last year the Soviet Union exported 378,825 personal automobiles. The largest customers were Bulgaria (59,554), Hungary (50,319), England (22,423), France (18,161) and Belgium (15,952). [Text] [Bonn DIE WIRTSCHAFT DES OSTBLOCKS in German 13 May 82 p 8]

HUGE TUBELESS TIRE--A gigantic tubeless tire has been produced at the experimental works of the Outsize Tire Research Institute of the Dneproshina Industrial Association. Its diameter exceeds 2 meters, its width is nearly 1 meter and its weight is more than 2 tons. A wheel with such a tire is capable of bearing the weight of 32 tons. The unique tires will be used to equip 120-ton dump trucks. The installation of equipment is being completed to launch the production of tires for 180-ton "Belaz" trucks. [Summary] [Moscow Domestic Service in Russian 1430 GMT 4 Jun 82 LD]

CSO: 1829/243

RAILROAD

TRACK MAINTENANCE, USE OF REINFORCED CONCRETE TIES DISCUSSED

Introduction to Discussion

Moscow GUDOK in Russian 7 May 82 p 2

[Text] Each year, the volume increases for major repairs of continuous welded track on reinforced concrete ties. At the same time, industrial enterprises do not always manage to deliver new rails, ties and fastenings on time. In these conditions, repeated use of track structure materials takes on great significance.

Definite experience in this matter has been accumulated on the Southwestern Railroad. On that railroad, it was decided to conduct lessons of a rail network school, in which representatives of all the railroads participated: production innovators, chiefs of track maintenance sub-divisions, research assistants from transportation institutes, designers, employees of the Main Administration for Tracks.

Today our discussion is about the school.

Track Repair Discussed

Moscow GUDOK in Russian 7 May 82 p 2

[Article by non-staff GUDOK correspondent F. Fedorenko: "The Track Grid Is Repaired at the Base"]

[Text] Recently, the operating time between repair for continuous welded track on reinforced concrete ties has been decreasing. This is caused by different service for rails, ties and fastenings, as well as by shortcomings in track maintenance. After passage of 450 to 500 million tons of freight, the fastenings go out of commission in such large quantities that there is not enough time to replace them.

The failure of the fastenings causes serious disruptions of the track. And unfortunately, it is precisely the fastenings which are now determining the repair schedule. But replacing individual components right on an open stretch of track is a very labor-intensive and inefficient matter.

Experience demonstrates that the machine operators of OPMS-121 [Independent Track Machine Station-121] worked most efficiently. They were the first on the rail network to set up repair of the track grid in stationary conditions at their own component assembly base. There they were not constrained by the time allotted for a "window". Also, gantry cranes and small-scale mechanization could be used to make the work easier. The room where these operations took place was designated a re-assembly shop for reinforced-concrete track grids.

Here is how the repair is done. The track sections are spread out in a single layer on a calibration track and the nuts of the terminal bolts are unscrewed, thus freeing the rails. Then the mounting attachment for insertion bolts is disassembled. As a rule, when all the components of the track grid are inspected, 7 to 10 percent of the ties are defective, a slightly larger percentage of insertion bolts and tie plates are defective, but almost all of the shock absorbers and washers have to be discarded. After the complete disassembly of the track grid, the fastenings which were removed are sorted, the gaskets, tie plates and defective ties are changed, and the rails are sent for repair to a rail-welding train.

The cost of re-assembling one kilometer of old grid is almost one and one-half times greater than the cost of assembling a kilometer of new grid. But then, restored track which is re-laid on arrival and departure lines and other lines at stations functions excellently. The amount of work needed to maintain and care for the tracks (compared with grid on wooden ties) decreases by 80 to 90 percent.

During a 10-year period, 1330 kilometers of old grid with reinforced concrete ties was removed on the railroad. Of this total, 916 kilometers were laid again. And more than 500 kilometers of this old grid continues even now to "work" on main tracks.

The participants in the school became familiar with the process used by the Kiev rail-welding train (RSP-5) to repair old rails. The difficulty is that the rail ends must be carefully cut. After all, on open stretches of track, rail lengths are cut with the aid of an oxygen torch, and naturally, the edges of the rail section turn out "ragged". Before sending them to be welded, the ends must be trimmed again.

To make this labor-intensive operation easier to carry out, efficiency experts from the RSP [Rail-Welding Train], together with research assistants from the All-Union Scientific Research and Design Institute for Petroleum and Chemistry [VNIPINKh], introduced the so-called emulsified lubricating and cooling fluid AKVOL-2. Thanks to this fluid, the service life of the cutting tool was extended and the output during a shift was increased by 25 percent.

V. Yarovskiy, chief of the RSP, also told the assembled railroad experts about other innovations. In particular, plasma cutting of rails has been developed and used. This also had a large economic effect.

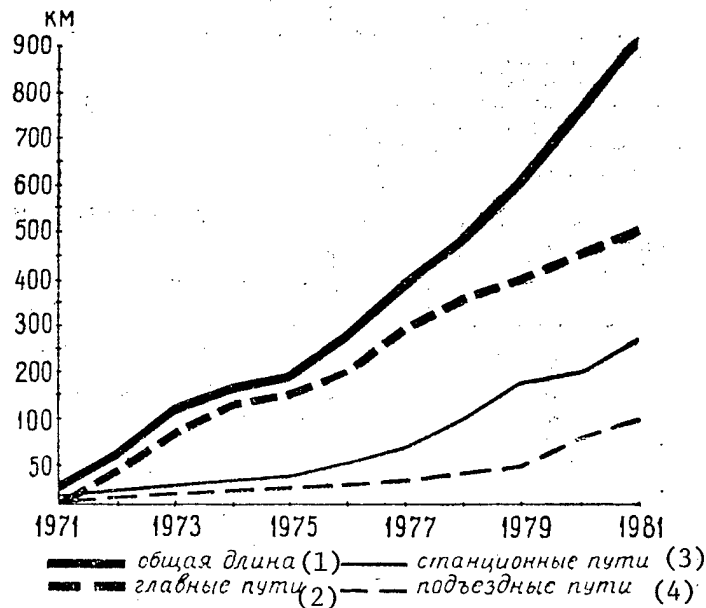
Of course, everyone was interested in this question: how well do tracks of old material function? What kinds of problems arise in operating these tracks? A. Kiagitin, chief of the Zhitomir Track Division talked to the school's participants about these questions.

Previously, track maintenance workers had been very worried about the single-track Fastov-Zhitomir section. On that section, worn-out, light-weight R-43 rails were used. There were between 600 and 700 rotted ties on each kilometer of track, and the evaluation of defects exceeded the 100-unit level. It was decided to renovate the track section with intermediate repairs, after laying the old grid with R-65 rails on reinforced-concrete ties. Then the rail sections were replaced with continuous welded rails. In this manner, 112 kilometers have been repaired during the past 5 years. Having done this, the track maintenance men now have no worries--the safety of train traffic has been assured.

To assure competent operation of the continuous welded tracks, technical training was set up at all line sections. The basic attention was focused on the process for carrying out track-straightening operations, on lessening temperature stresses and maintaining fastenings, especially bolts. Now the tracks are maintained on this section in good and excellent condition. The last passage of the track tester recorded only a defect evaluation in the 15-30 level.

The basic indices have improved and the operational workers have begun receiving prizes more often. The salaries of assemblers and foremen have increased. And this helps in personnel retention.

Table. Increase in Laying Old Track Grid with Reinforced Concrete Ties on the Southwestern Railroad



Key:

- | | |
|-------------------------|-----------------------|
| 1. Overall Track Length | 3. Tracks at Stations |
| 2. Main Tracks | 4. Spur Tracks |

Re-Use of Ties Urged

Moscow GUDOK in Russian 7 May 82 p 2

[Comments by A. Yariz, deputy chief of the Main Administration for Tracks:
"Utilize Reserves More Fully"]

[Text] Last year the plan for major repairs of tracks was carried out only at the 93 percent level. One of the main reasons for this shortfall was a shortage of track structure materials. A new repair season has arrived, even more intense. But the situation with track structure materials has not improved at all--as before, there are not enough of them. In these conditions, efficient use of old rails, ties and fastenings takes on a decisive importance. The experience of track workers on the Southwestern Railroad and, in particular, of the workers in OPMS-121 [Independent Track Machine Station-121] serves as a good and instructive example.

To understand all the importance of repeated use of old grid, it is sufficient to cite some figures. Last year, industrial enterprises had a delivery shortfall to us of more than 1.5 million ties. At the same time, up to 24 million ties go out of commission each year and this number is having a tendency to increase. That is why it is so important for track workers to seriously begin repairing and making repeated use of old reinforced-concrete and wooden ties.

The Ministry of Railways developed special instructions about fundamentally improving the use of new and old ties. The instructions defined tasks for repairing and trimming ties which have been removed from tracks. In particular, wooden ties should be repaired at tie-preserving plants. This will help extend their service life considerably.

Last year we were unable to assure that serious attention be paid everywhere to the work of tie-repair departments and shops. For the rail network overall, the plan for using old ties was carried out only at the 70 percent level. In that respect, the track workers of the Southwestern, West Siberian, Tselina and Moldavian railroads worked better than the others. Available resources were not fully utilized on the Volga, Southeastern and Southern railroads.

The situation was also bad as regards repair of reinforced concrete ties. The assigned task was carried out only at the two-thirds level. Gratifying results were attained when serious attention was paid to organizing repair in a mechanized manner. Such was the case, for example, on the Southwestern, Belorussian, Baltic, Donetsk, Sverdlovsk and West Siberian railroads.

Starting this year, transfer of old track grid to non-transport organizations is forbidden. The grid must be used fully for the needs of the track facilities.

Undoubtedly, what the participants at the school learned from their colleagues on the Southwestern Railroad will be of use to them. True, the OPMS-121 does

not yet have special highly productive machinery and work benches. The usual mass-produced cranes and small-scale mechanization is used in OPMS-121 to work on old grids. But, due to good organization and a creative approach to this important state matter, the machine operators achieved impressive results. Their experience is very valuable; it teaches how one can accomplish a great deal, using accessible and simple resources, to replenish materials which are in short supply.

Unfortunately, there are not yet enough special work benches and track-section disassembly lines on the railroads for old grids. But, we know that scientists and designers from the PKB [Design and Construction Office] of the KhabIIZhT [Khabarovsk Institute of Rail Transport Engineers] drew up the appropriate documentation and the situation will soon be corrected, although these devices must be fabricated in railroad track repair shops.

And there is one other important question. We have talked a great deal about old track grid with reinforced concrete ties, but unfortunately, there are still no specifications for using the grid. In this matter, science is still lagging behind practical activity. True, scientists from the LIIZhT [Leningrad Institute of Rail Transport Engineers], headed by Professor G. Andreyev, have drawn up tentative specifications for the Oktyabr'sk Railroad, based on their research. Analogous work is also being completed at the VNIIZhT [All-Union Scientific Research Institute for Rail Transport], about which Doctor of Technical Sciences V. Al'brekht gave a report to the participants in the school. As they say, the ice has been broken.

The collegium of the Ministry of Railways, where shortcomings were disclosed in organizing last year's repair operations, paid special attention to improving technology, to a more efficient use of "window" time and to increasing the speed of trains, established after repair. There is also concern about increasing the level of mechanization for track operations and making more efficient use of old materials.

Now, when the competition for a worthy reception of the 60th anniversary of the formation of the USSR and for success in carrying out tasks and obligations has developed extensively throughout the entire country, the track workers must also participate actively in this patriotic movement. This will be a fine labor gift in honor of our motherland's jubilee. And the experience which was borrowed in Kiev will help us successfully deal with the assigned tasks for increasing the capacity of the steel gage.

Mechanizing Grid Repair

Moscow GUDOK in Russian 7 May 82 p 2

[Article by S. Savin, chief of OPMS-1 [Independent Track Machine Station-1]:
"On the Way to Mechanizing Disassembly"]

[Text] For a long time we have been worried about the question of how to make the most efficient use of old track grid, which was gradually accumulating at our industrial base. The best rail sections went into use during

intermediate repair of tracks at stations, but part of the grid was disassembled. The rails were sent off to the RSP [Rail Welding Train], but the ties accumulated into mountains at the base. And this happened at a time when new ties were arriving very sporadically.

Like it or not, one had to repair individual components of old grid, to make repeated use of them. But, as distinct from our colleagues in Kiev, we followed the path of mechanizing the basic production processes. We already had some experience with mechanized disassembly and assembly. It only remained for us to organize rail machining (cutting and boring bolt holes) directly at our industrial base.

We decided to use the abrasive cutting method. A disassembled trimmer at a metallurgical plant became the basis of the production line for manufacturing stock rails. The trimmer's abrasive wheel has a diameter of 1500 millimeters, a thickness of 15 millimeters and cuts through an R-65 type rail in 20 seconds.

The section for boring bolt holes was equipped with special units which allowed one to make all the holes simultaneously. One of the units was installed in a fixed position, while the other can be moved lengthwise (to machine rails of various lengths). On each unit there are 2 RSM-1 rail-drilling presses mounted, plus a stop system and clamping devices. Roller conveyors are used for moving the rails.

We set up repair of old grid in a closed-in area. A unit for detaching ties was designed by the PKB [Planning and Design Office] of the KhabIIZhT [Khabarovsk Institute of Rail Transport Engineers] and is used to disassemble and assemble rail sections. This made the men's work easier and created an orderly production process.

We have begun to cut, during major repair, track sections not of 12.5 meters, but 13 meters. In the shop, the track sections are put through the unit for detaching ties, where the nuts of the insertion and terminal bolts are unscrewed, thus freeing the tie plates. The materials proceed in three directions: the rails are sent to the repair line, with the aid of a special car; the ties are transferred on the conveyor, where they are prepared for assembly; the fastenings are sent to the sorter.

The suitability of the fastenings for a second use on the main tracks is determined by tentative technical instructions developed by the track laboratory of the Oktyabr'sk Railroad and by the LIIZhT [Leningrad Institute of Rail Transport Engineers].

Since the Ministry of Railways is now planning a definite volume of repair for old track grids, the question has arisen about organizing special shops and sections at PMS [Track Machine Station] bases.

For example, in our track section assembly shop, we can't do more than 200 meters of track per shift, due to engineering reasons. And besides that, year-round work in restoring old track grid requires a permanent contingent of workers. So far, we manage to get along somehow during the winter, but

we don't have enough men during the summer. Once this work is planned, we will also need to establish a labor plan for it and include it in the general output for all track machine stations.

Moscow Railroad Uses Old Grids

Moscow GUDOK in Russian 7 May 82 p 2

[Article by V. Gurov, deputy chief of track service on the Moscow Railroad: "We Must Interest People"]

[Text] On the Moscow Railroad we have also been machining and laying old track grid for a long time now. For example, last year we renovated about 200 kilometers of track with the aid of old grid. But I would like to point out right now that this work is very labor-intensive. Thus, a large portion of the grid was not disassembled, but was immediately laid on freight handling and other little-used tracks.

Realizing all the responsibility of the tasks facing the track-repair workers, we have planned to use up to 300 kilometers of old track sections this year. We are taking specific measures to accomplish this. At the industrial base of PMS-101 [Track Machine Station-101] in Kaluga, mechanized machining of grid (up to 300 meters per shift) has been set up, with the rails being welded into lengthy sections. At the OPMS-103 [Independent Track Machine Station-103] base in Faustovo, a disassembly stand of the KhabIIZht [Khabarovsk Institute of Rail Transport Engineers] system is being tested now. On the territory of the former rail-welding train at Aleksin, technology for welding track sections out of old grids is being developed. And the overhaul of grid with the aid of wrenches to remove wood screws and nuts will be set up at many other track machine stations.

But if you soberly evaluate the situation, you have to admit that we are far behind today's needs. Tracks on reinforced concrete ties have been in use for about 20 years already, but there are essentially no automatic transfer machines for disassembling and sorting old grids. Similarly, there are no tools for machining old volume-tempered rails which also began to be produced about 10-20 years ago.

Moreover, thus far science has not made any recommendations about the best way to use rails after torch cutting or abrasive cutting. Frequently, microfissures appear in the rails while they are being welded. But it is not known if such rail sections can be laid or what speed can be authorized on them.

Nor has the financial side of this question been completely thought out. Now there really is a paradoxical situation: the more a PMS uses old materials in track repair, the higher its labor expenditures, but the cost of the repair itself decreases. In other words, the enterprise bears the losses. Let's say that major repair of 1 kilometer of track with new materials costs R70,000, but by using old materials the cost decreases to R50,000-55,000. A good deed is done, but the financial plan is not being

fulfilled. Consequently, the men who expended more labor and lowered the financial outlays, do not get a bonus.

I think that we must definitely interest PMS workers in extensive application of all suitable materials for repeated use. Perhaps we should evaluate PMS work (fulfilling the plan) not in terms of rubles, but in terms of completed kilometers. Then the machine operators will strive to do a bit more repair work and lay old grid.

At the same time, the central board [Glavk] should concern itself with scientific and technical support of this important matter. Scientists must make recommendations about the best way to use old rails, and must speed up development of continuous production lines for dismantling grid which has been removed from the tracks. But until these production lines appear, we must at least satisfy the PMS need for gantry cranes, specially designed to disassemble old grid.

Grid Problem Being Researched

Moscow GUDOK in Russian 7 May 82 p 2

[Article by A. Darenskiy, engineer from the KhIIT [Kharkov Institute of Rail Transport Engineers]: "The Problem Awaits Its Solution"]

[Text] Just 2-3 years ago, one had to prove the importance of repeated use of individual track structure elements to machine operators--and not just to them. All the participants in the school are now convinced that the attitude towards this problem has changed and a great deal has already been accomplished. In particular, methods for repeated use of ties and fastenings have been developed and some machinery has appeared.

However, not nearly all the problems have been resolved. For example, we don't know the quantity of track structure elements suitable for repeated use which can be obtained by disassembling grid removed from the tracks. And without that knowledge, we can't plan and really organize the work on all the railroads, nor can we determine the economic effectiveness of disassembling grid.

In recent years, research assistants of the "Track and Track Facilities" department at the KhIIT have been studying the performance of reinforced concrete ties and KB [Design Bureau] fastenings. Based on these observations and an analysis of available data, it has been determined that the density of freight traffic and time in operation have the greatest impact on the condition of the ties and fastenings. And often, "invisible" defects (hidden by the ballast layer) develop in the ties. The defects are discovered only after the track grid has been removed.

Based on this research, the department's assistants, under the guidance of Professor V. Angeleyko, developed recommendations about repeated use of reinforced concrete ties. For example, S-56-2 type ties can be re-used, up to 7 times, with freight traffic of 40 million ton-kilometers. The impact

of wearing and corrosion of metal fastening elements on their serviceability is being studied now. Preliminary data allow one to draw the conclusion that up to 40 percent of these elements can be re-used on track sections with the same density of freight traffic.

If one wants to talk about old track grid as a whole, there are several variants on its repeated use: it can be used, without being overhauled, on little-used tracks; it can be used on little-used tracks, with partial replacement of unsuitable ties and fastenings; it can be used on track sections with the same density of freight traffic as before--with a complete overhaul, using only the really suitable elements.

The question of choosing a variant must be resolved by taking into account economic, as well as operational factors. Preliminary calculations show that the last variant is the most effective. Unfortunately, so far only OPMS-1 [Independent Track Machine Station-1] on the Oktyabr'sk Railroad has a mechanized line, while the other railroads don't have such lines.

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RAILROAD

NOTES ON MATERIALS, RAILS USED IN FAR NORTH RAILROAD CONSTRUCTION

Moscow PUT'I PUTEVOYE ZHOZYAYSTVO in Russian No 9, Sep 81 pp 13-15

[Article by A. A. Simon, chief of a track inspection station: "The Functioning of Tracks in the Far North"]

[Text] Yaroslavl'--The day is not far off when the entire Baykal-Amur Main Line [BAM] will go into operation. Most of its track sections are located in areas with a severe continental climate. The functioning of the components of the track structure in such areas has a number of peculiarities. The BAM railroad men should know about these peculiarities so they can correctly organize routine maintenance of the track and not allow the rails, ties or fastenings to prematurely go out of commission. In this regard, the experience of the track divisions on the Kotlas-Vorkuta line is of great practical interest.

The railroad passes through a wooded, very marshy area there, into the circumpolar region and beyond the Arctic Circle. The winter is cold and snowy, with snowstorms and blizzards. The summer is rainy and brief. The ballast is in a frozen condition for 6 to 9 months of the year, during which time the tracks are very rigid. Heavings emerge over a great distance. Basically, type R65 rails and wooden ties have been laid on the rail line. Freight car axle loads are 20 tons per axle, the speed of freight trains is 80 kilometers per hour, while the speed of empty trains on some stretches of track is 90 kilometers per hour.

The farther north you go, the less do the rails, fastenings and switches work. There are many reasons for this, but the extent of influence by each of them has not been fully ascertained. In the opinion of railroad men from four track divisions--circumpolar Pechora and Inta, arctic Sivomaskinskiy and Vorkuta--the brief useful life of metal components of the track structure is explained, in the first place, by the lengthy functioning of the tracks in conditions of increased rigidity.

Rails and Fastenings

On single-track sections, R65 type untempered rails, during a period between servicing, provide passage on straight sections for 450 to 500 million tons gross of freight. During that same period, on curves with a radius greater than 1200 meters, the rails are replaced one additional time, while on sharper curves, the rails are replaced two or three times. In some cases, the rails of the exterior section were first to go out of commission; in other cases, it was the rails of the interior section. Experience has shown that both rail sections must be removed. Replacing only the more worn-out section will result in the service life of the new rails being reduced by 2-3 years, since the new rails function as a "pair" with the old rails.

On some stretches of track, one encounters KMK [Kuznetsk Metallurgical Combine], NTMK [Nizhniy Tagil Metallurgical Combine] and "Azovstal'" [Azov Metallurgical Plant] rails which had been laid at random. For instance, one section will be from one plant, another section from a different plant, a volume-tempered NTMK rail is adjacent to a "crude" KMK, while next to the NTMK is an "Azovstal'" rail, etc.

It is difficult to say, which rails are best. Some railroad men, a majority of them, consider that the volume-tempered NTMK rails are most suitable for the North. Others prefer KMK rails and a third group prefers "Azovstal'" rails.

It is well known that the quality of rails, even from the same plant, is not at all uniform. For example, on the Inta Division the "Azovstal'" rails begin to go out of commission after passage of 30-40 million tons gross. Defects of the 10.1-10.2 and 17.1 type appear in the rails. In time, these defects "start rolling" and develop into defects of the 40 and 41 type. Later, after 20-30 million tons gross, the rails have to be replaced again. The frequency of removing the rails individually during the first year of operation is equivalent to an average of .15 rail units per kilometer. In the second year, the rate is 1.07 units; in the third year, it's .91 unit. The rate is somewhat lower in the fourth year, then it again begins to increase and by the time of major repair, it reaches 6.3 units per kilometer.

On one 55-kilometer length of track, 80 R65 type rails have already been removed. The rails were laid in 1976 and they did not function for the guaranteed period. The rails are damaged more during the spring, with many defects at once, since there are sharp changes in temperatures from "minus" at night to "plus" in the day. During the winter, the rails go out of commission basically due to defect 18.

The railroad men of the Inta Division consider the NTMK rails to be the best, while the Pechora and Sivomaskinskiy divisions prefer "Azovstal'" rails. Incidentally, it is easier to fuse the ends of the "Azovstal'" rails. According to the observations of railroad foremen, KMK rails have a shorter service life (defects 30G.1 and 30V.1), as do "crude" NTMK rails (defect 47.1).

It has also been noted that after major track repairs, defect 10 shows up at first. In 1 to 2 years the defect "starts rolling," but defect 11 arises-- first on sharp curves, later on curves with a radius up to 1000 meters. After that, the rails are damaged by all the fourth-group defects. Defect 11 is not encountered on the more flattened curves and on straight stretches of track.

In the Vorkuta Division, rail ends quickly collapse. The basic cause of this is again the increased track rigidity in winter. In addition, the haphazard laying of tempered and "coarse" rails from different plants has an effect.

Deep saddles (defect 47.1) develop on rails with tempered ends. Collapsing noticeably increased with the appearance of the 2TE10V diesel locomotives. In the Sivomaskinskiy Track Division, the ends are out of place by as much as 3 millimeters on straight sections after passage of 100-150 million tons gross.

To reduce damage to the rail ends, the joints are improved and the rail joint gaps are adjusted. Surfacing, which is especially well organized in the Sivomaskinskiy Division, is widely used. In that division, within 2 to 3 years after new rails are laid, their ends are completely surfaced. This is done during the summer, in dry weather. In June, July and the first half of August, every fine day is used to do this. What there is not time to do in the summer, is completed at the beginning of winter, when the temperature is no lower than -5°C.

Later, the rails are selectively surfaced, as needed, but no less than two or four times during their service life. Humps are ground during the first fusing. Humps more frequently appear on the tempered ends of "coarse" rails. At the same time, collapsing occurs on the butt itself, then a protuberance appears, 50 to 80 millimeters long, and after that, a saddle is formed. The protuberance is eliminated with a grinding machine. In front of the protuberance and behind it partially, the rail is surfaced and then ground.

In the Pechora Track Division, it was noted that if the surfacing is done when the collapse has a magnitude of 2 millimeters, then surfacing is needed a second time within 5 years. But if the collapse is more than 3 millimeters, a second surfacing is needed after just 2 years. Repair of the ends of volume-tempered rails was begun in the third to fourth year after the rails had been laid. The surfaced area in this case is not large--up to 50-60 millimeters in length--and includes only half the width of the head. The applied layer of metal adheres better on "Azovstal" rails.

When there were steam engines and 2TE10L diesels operating on the line and the gage was 1524 millimeters, the rails did not wear out on the sides. When the 2TE1pL diesels were replaced by the 2TE10V and the track gage was changed to 1520 millimeters, side wearing immediately appeared. On some track sections, the wearing amounted to 3 millimeters after passage of 150 million tons.

After defect 11, a wave-like wearing develops which also increased with the introduction of 2TE10V diesels. Short, medium and long waves are encountered. The degree of wearing is about .5 millimeter for 100 million tons gross and is somewhat greater on curves (there are mostly short waves on the curves). This damage is eliminated by grinding during the winter. The work is begun when the waves are not in excess of .75 millimeter and 15 to 20 passes with a grinding car are sufficient to eliminate the waves.

Other measures are taken to extend the service-life of the rails.

Rails which are not worn much are removed from stations and laid on curves, while rails from curves are laid at block posts. It pays to cut off defective rail ends which have become worn after repeated surfacings. Rails which have been shortened to 20-24 meters serve well on main tracks for 3-4 years. During the winter, the rail joint gaps are installed 3-4 millimeters less than normal. If this is not done, when they "tear," rail creep increases and the rail ends get damaged more quickly. During the summer, the gaps are supported by "zeroes," and the tracks operate for about a month as though they were slightly temperature-stressed. During the spring and autumn, the gaps are dispersed on the braking and approach sections. At the same time, levelling rails are laid on front of stations and insulating joints.

In the opinion of the majority of our railroad workers, the R65 type volume-tempered rails, which are curved to fit on small radius curves, are most suitable for the North. We have not tested R75 type rails, but many people believe that with spikes fastening the rails, they will increase the already-high level of track rigidity. Even slight variations in operational conditions--in the gradient, in the radius of a curve, etc.--have an impact on the service life of rails in the North. On some kilometers of track, not a single rail has been replaced in 7-8 years, but on other sections, more than half the rails have been removed during that period.

Heavings have almost no impact on the service life of rails. But railroad workers link the premature failure of tie plates, spikes and rail anchors not only with low temperatures and a high degree of track rigidity in winter, but also with heavings. After passage of 300-500 million tons gross, up to 20 percent of the spikes are damaged (worn and broken), up to 10 percent of the tie plates are damaged (broken and holes have developed), up to 40 percent of the rail anchors are weakened. The tie plates break due to the cutting of the flange against the interior part of the track. Just in the Sivomaskinskiy Division, more than 3000 tie plates had to be replaced in 1979. Lengthened butt tie plates break sooner than the regular butt tie plates, and only in winter. They can be detected only after the snow has melted. Breaking takes place most quickly when a wooden tie under a "dangerous tie-plate section" is not full-strength and is knotty. On curves, the openings for spikes increase by as much as 6-8 millimeters.

Cover plates rarely fail, but wear up to 2 millimeters and more on the supporting planes. Spikes often break during track adjustments and straightening. Spikes are the most suitable fastenings for the North, but it would

be more beneficial to develop special types of fastenings, taking into account the long winter, heavy frosts, axle loads, etc.

Table. Rail Frogs

Frogs	Millions of Tons Gross	
	Failure Tonnage	Removal from Operation
Nickel Alloys	23	57
Reinforced by Blast Wave	41	73
Aluminum and Magnesium Alloys	40	87
Molybdenum Alloys	38	77
Treated with Synthetic Slags	32	73
Treated with Nitrogen Powder	26	40
Steel, Blasted with Nitrogen	31	66
Recrystallized Casts	51	140
Recrystallized and Reinforced by Blast Wave	65	135

Switches

Previously, type R65, model 1/11 frogs on the Pechora-Vorkuta section allowed passage of 60 million tons gross (86 percent of the guaranteed life). In recent years, the guaranteed life increased, on the average, up to 80 million tons gross. But this was not achieved due to a higher quality of frogs or an easing in operational conditions, but was only due to improved maintenance, plus increased quantity and improved quality of surfacings.

At a tonnage of 30-40 million tons gross, the wearing of guard rails or cores on main tracks reaches 6 millimeters, or a defect arises requiring replacement of a frog or in the best case, speed restrictions over the frog. This tonnage is 1.5-1.7 times lower than the average railroad tonnage.

Almost all rail frogs, even the less maintainable ones, are fused repeatedly. For example, in recent years in the Pechora Division, 96 frogs were fused once, 52 were fused twice, 19 were fused 3 times and the rest were 4 times. Several frogs which have been fused 7-8 times are operating now on the main tracks. This work is frequently done during the winter, in the polar twilight with electric lamps, flashlights and flares.

The table shows the stability of experimental type R65 frogs which were tested operationally on the Pechora-Vorkuta section.

The weakest spot of the experimental and mass-production frogs is the rolling zone. That is where the most wearing and the most dangerous defects always appear. The causes of failure of surfaced frogs on the main tracks in the Arctic (in 95 percent of the cases) are prying out and breaking the surface of the rolling zone. However, the service life of the frog, both before and after repair, depends on the quality of switch maintenance. It is important to remove the rolling scabs on guard rails and cores in a timely manner, while being sure to restore the design contours. Preventive surfacing is advantageous, but it is being introduced slowly since there are not enough wleders and besides, it is difficult to deliver them to a work site, due to the lack of roads and the dense train traffic.

The farther north one goes, the more quickly the rail tongues and frame rails break off and the bolted, welded and riveted joints become misaligned. Although the switches on the Buy-Svecha section allow passage of 260 million tons gross, the tonnage is 210 million tons in the Inta and Pechora Divisions and is only 145 million tons gross in the Vorkuta Division. Wave-like wearing appears on rail tongues, while cross chipping appears on frame rails.

Switches which have been removed from main tracks are laid on arrival and departure tracks and other tracks at stations. First, the switch ties and metal units are repaired. Only 10 percent of the R65 type switches end up as metal scrap. At intermediate distinct points, where trains pass at high speeds without stopping, these switches serve for only 4-5 years, but at local stations, they last up to 10 years.

Ballast and Ties

Asbestos ballast was laid along almost the entire line. As a result, there have been fewer heavings. On open structures of track, there is a two-layer ballast filling, consisting of a bed of old sand, 30 to 50 centimeters thick, and a 20 to 30 centimeter layer of asbestos ballast. The filling has three layers under switches: sand, crushed rock and asbestos ballast.

The technical process of flattening tracks is somewhat different from the standard process. For instance, in the Pechora Division after the VPO-3000 [Flattening and Tamping Machine-300] has passed, ballast is packed by wooden rods, under the center of the ties where spaces remain. After the ballast has been compacted and the rail-tie grid has settled, the center of the ties seems to be packed somewhat less than needed. Slight irregularities in the contour are eliminated by adding and packing ballast.

To eliminate heavings, the tracks are raised onto a thick layer of asbestos ballast, drainage ditches are constructed and soil heaving is removed.

With the increase and decrease of heavings, one and the same place will be flattened as many as 3 to 6 times, depending on the height of the bulge.

Therefore, to preserve the ties for the summer, not all tie plate heavings are removed--those which are thinner must be left alone.

Wooden ties last 15 to 18 years on straight sections of track, 4 to 5 years less on curves. When heavings are present, wooden ties last no more than 10 years and usually last only 3 to 5 years. The main reasons for this are mechanical wearing and splitting, especially during the winter when the tracks are being flattened and adjusted. Ties made of larch and spruce split less than ties made of pine. Annually, 100-150 ties split per kilometer, sometimes 500 per kilometer. To extend their service life, metal bolts, wooden screws and clamps are installed, metal strip and wire bindings are added.

Switch ties on the Pechora-Vorkuta section serve for 8 to 12 years on the main tracks and last another 3 to 5 years after being relaid on less active tracks. Ties which are beneath or behind rail frogs go out of commission 3 to 4 years earlier than the other ties. Ties at the base of rail tongues also go out of commission quickly, as do hooded ties and those at joints. In recent years, the workers at the divisions have been more careful about selecting ties according to length, width and thickness, taking into account the place where they will be laid. Also, maintenance of switches has improved. These improvements increase the useful life of rails somewhat.

Despite difficult climatic conditions and a large amount of freight traffic, the condition of the tracks is improving from year to year. In the Vorkuta Division, where track maintenance operations begin no earlier than the second half of June, the average evaluation has been 15 for 20 years already. The tracks are maintained in excellent and good condition in other divisions as well.

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RAILROAD

BRIEFS

NEW TUNNELING EQUIPMENT--Donetsk, April 9, TASS--Soviet tunnelling complexes of a new type will help accelerate the construction of railway tunnels without using explosives. New tunnelling complexes are now manufactured by the engineering works in the town of Yasinovataya (Ukraine). The first such tunneller will be used to drive the underground way under the North-Muisk ridge, in Siberia, the biggest in the Baykal-Amur Mainline route. This is a unique tunneller in the USSR. It can handle up to 90 metres a month--three times as much as by the drilling-and-explosion method. The number of men engaged in tunnelling operations is reduced 33 per cent. [Moscow TASS in English 1050 GMT 9 Apr 82 LD]

METRO EARTHQUAKE TEST--The earthquake at Tashkent Metro's new "Aivek" station was man-made. The Institute of Mechanics and Seismic Resistance of Constructions of the Uzbek Academy of Sciences has set up the country's first metro seismometric service. Sensors embedded in the platforms and tunnels registered the Force 10 quake which was caused by a powerful vibrating device. The information was transmitted to the central control board together with the instruments' conclusion that "no structural weakening was caused." A seismometric control post has also been arranged at one of the operating stations--"Ploshchad Lenina" (Lenin Square). Besides helping to determine the strength of the structures under construction, the instruments are constantly monitoring the effect of underground shocks on quicksands, salt-marshes and other tectonically weak soils through which the Metro route runs. [Text] [Moscow MOSCOW NEWS in English No 23, 13-20 Jun 82 p 10]

CSO: 1812/113

MORE ON NUCLEAR-POWERED LIGHTER CARRIER

Leningrad LENINGRADSKAYA PRAVDA in Russian 1 Apr 82 p 2

[Article by Yu. Stvolinskiy: "The Fifth Nuclear-Powered Ship"]

[Text] Pouring through the enormous window, the sun illuminates the smallest details of the new ship. Everything that will be white is a blindingly light color on the model. The portholes glow and the steps of the ramps and the web of antennas stand out clearly. It is easy to see what is unusual about this ship, which will be launched in a few years, by looking at the model. It has an icebreaker-class bow and a high tower-house shifted forward on the deck (all the living quarters are concentrated there, far from the engines and above the sides, which the ice will grind against). But what is the reason for the enormous gantry crane, traveling on rails that are a quarter of a kilometer long? In the photograph [not reproduced] you see it roughly at midship. Like a white horseshoe it hangs over some kind of neat "little boxes" arranged in two tiers on the top deck. They are lighters, and the purpose of the crane is to raise and lower them. That is why the stern is completely unique. It has heavy cantilever arms with crane tracks as a kind of extension. The crane moves along them carrying lighters "into open water" to lower them and comes up them to raise them. It is like a little dock whose purpose is to create conditions for loading operations. The estimated time for each lowering-raising run by the 500-ton crane (which is being built at the Zhdanovtyazhmash [Zhdanov Heavy Machinery] Association on the Sea of Azov) is 20 minutes.

The full "title" of the new ship is nuclear-powered icebreaking lighter-container carrier. It is planned for 74 lighters or 1,330 containers (either will be put in the holds and on deck). Leningrad designers are finishing up development work on the design of the ship.

Containers and lighters... The container came first, the "sea chest," as it is sometimes called with a note of irony. The solid steel box with rigidly standardized dimensions brought the highways, railroads, and river and sea routes together in a unified transportation system. Specialized transshipping enterprises called terminals appeared. Special container carrier ships came out of the ways. They are vessels that reach considerable size and in some cases can develop speeds comparable to passenger ships.

A good idea is always a simple idea. So containers travel on truck trailers, railroad flatcars, and in the holds and on the decks of ships on the rivers and

turn the shafts connected to the propellers. On the new lighter carrier the steam turbine operates directly on the propeller. It is simpler but, as one of the designers likes to say, you have to pay for everything. The propeller motors of nuclear-powered icebreakers receive and damp all the "ice moments," the blades striking ice, wedging, and the like. Because the lighter carrier propeller is directly connected to the turbine through the propeller shaft, a special coupling is required to eliminate the "ice moments" that damage the machinery. But such a coupling would have to be much too large and heavy. They will get by without it by enclosing the propeller in a circular nozzle. This will prevent the blades from striking large pieces of ice.

But the problems came one after another. Testing in an ice tank revealed that the nozzle drew ice into itself. So they devised special "fins" to mount on the stern, three on each side to deflect the ice away (incidentally, they were proposed by scientists at the Arctic and Antarctic Institute and tested in the ice tank of that scientific center).

The lighter-container carrier will be a highly mechanized and automated, strong and reliable ship with a heavy-duty ice strake with thicker than usual skin. There will be a powerful electricity plant with three turbogenerators, two designed for constant operation. Moreover they envision several reserve automated diesel generators. The operating regimes of the propeller can be changed and the steam-producing installation shut down in emergency situations by remote control from the wheel house.

Navigators will have the aid of a special navigating system which includes a computer. In a matter of seconds it will produce recommendations for passing on opposite courses and permit a determination of the ship's position at sea at any time regardless of weather. The loading complex of this system will manage the loading and unloading of the ship and prevent possible human error. In general, this complex will be invaluable to the command personnel of the ship and will raise the economic indicators of the lighter-container carrier.

The designers are taking great care for the comfort of the crew. All seamen have single cabins. In addition to the wardroom and various messes typical of all Soviet ships, they have planned a large sports complex with an indoor swimming pool, a sauna, and a gymnasium. There will also be a movie hall, a library, and medical offices. They have taken account of the fact that the ship will not sail entirely in the Arctic; it will be there about three months of the year, and will spend the rest of its time in other regions. Therefore, living conditions have been adapted to various latitudes.

The lighter carrier will be built by the Zaliv Shipyard in Kerch'. It has built numerous ships from plans by the Leningrad designers, including tankers of the Velikiy Oktyabr' series, Krym class supertankers, and has begun the Pobeda series of ecologically clean tankers. They plan to lay down the new ship next year.

The maritime fleet is going to receive a very promising ship. Here is an example from foreign experience. One of the Western lighter carriers (not nuclear-powered, of course) made its first trip from New York to 12 Mediterranean ports in 15 days and 10 hours. A conventional freighter would take 28

seas. Often loads are delivered "from door to door," even when they have to cross oceans or shipping points are deep within the continents. So things are fine and we could not ask for more. But what if the container were made to float? Floating containers (lighters) delivered by ships can be put down in the roadstead. A port tug will take them to the dock. The lighters do not have very large load capacities, up to 370 tons, and no special machinery is needed to handle them. The carrier ship can set off again quickly, spending just a short time in the roadstead. After dropping off the lighters it travels on to other ports, then collects them on the return trip.

This system is especially suitable for supplying arctic ports during the still fairly short arctic navigation season.

The majestic program of social and economic development of our country outlined by the 26th CPSU Congress contemplates work to equip transport ships with nuclear power plants. Let us emphasize that we are referring to transport ships. And here is the first step toward realization of the resolutions of the congress -- the nuclear-powered icebreaking lighter-container carrier.

Its chief elements and specifications are: length -- 260 meters; height -- 18.3 meters; displacement -- about 61,000 tons; engine power -- 40,000 horsepower. Its estimated speed in open water is about 20 knots, but designers expect that it will be higher.

There were numerous contradictions in the very idea of such a ship. The stern of an icebreaker should have specifically "spoon-like" lines so that it can move freely through ice in reverse. But lowering lighters requires a perfectly flat "transom-type" stern, not a "spoon." It acts as a support and protects the lighters against the waves, which can push a small lighter under the stern.

Another of the major problems that had to be resolved was controlling icing on the parts of the hoisting mechanism. The crane lowers and raises lighters by means of a special frame which has nesting clamps into which the fittings, the locks of the lighter, fit. But what will happen at low temperatures? The fittings will ice up and the clamps will not work.

A contest was declared in the collective. The young designers responded with special vigor. They proposed several concepts. Their idea for the stern, for example, was to cover the spoon-shaped stern with a flat transom shield which would be lowered by the gantry crane. Both the shield and the support would have centering devices so that the lighter would take exactly the position in which the sockets of the frame and the fittings of the lighter match.

After loading is completed the shield will assume its cruise position so that it does not hinder maneuvering in ice.

The designers know that it is impossible to build a ship that performs equally well in open water and in ice, but they are doing everything they can to minimize the inevitable gap.

They have somewhat modified the power plant system in order to achieve a significant improvement in the economic indicators of the future ship compared to nuclear-powered icebreakers. On icebreakers steam drives the turbogenerators and the resulting electricity is delivered to the propeller engines. They

days for this trip. According to the most conservative calculations, lighter carriers of a system such as our future nuclear-powered ship will permit cutting anchor time by 70 percent!

All that remains to be added is that the lighter carrier will be the fifth Soviet ship to put nuclear power to peaceful use.

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OCEAN AND RIVER

INDUSTRIAL ZONES NEAR PORTS NEEDED

Moscow MORSKOY FLOT in Russian No 4, Apr 82, pp 20-21

[Article by Candidate of Technical Sciences V. Yatsenko, director of the Chernomorsk Scientific Research Design Institute: "One Aim for Industrial Zones and Ports"]

[Text] Volume and distance in the hauling of national economic freight play an important role in the cost of industrial production. On the average, transport delays comprise 4.2-4.5 percent of production costs without figuring in expenditures for the delivery of finished products to the consumer. Depending upon the individual branch of industry, this figure increases to 20-40 and even to 50 percent.

If one takes into consideration the fact that the main volume of raw material resources is located east of the Urals and that their extraction centers are even further away from the heavily-populated European portion of the USSR, then one can expect that the share of transport expenditures in the cost of industrial production will increase.

Curtailing transport expenditures is a realistic and important task. It can be resolved through reducing transportation costs as well as by cutting down on the volume of transport work per unit of industrial production. It must be stated here that transport delays in our country are significantly higher than they are in many other industrially developed nations and although this may be explained by the fact that distances within the USSR are, as a rule, greater than they are in other European nations, insufficient attention is devoted to rationally locating enterprises and to reducing haulage volumes.

I venture to say that hardly anyone doubts the expediency of building the Magnitogorsk Metallurgical Combine in the Magnitnaya Mountains. Thus these unique ore deposits were right out in the plant's backyard, so to speak. They were not only a special national treasure but a warehouse for them as well. Out of the two main components of the metallurgical process, only one--coal or coke--had to be hauled in; the very volume of transport work itself was sharply reduced.

Dozens of examples like this can be cited from various branches of industry, all attesting to the wisdom of locating enterprises in the areas where they

derive their raw material or other raw materials. The main result is a freight haulage volume reduction--the chief indicator of the economic effectiveness of such decisions.

In practice, a seaport is either the initial or final point of haulage for cargo. A port is one of the most effective destinations, allowing for the transfer of freight over great distances and in great volume. Sea transport is able to handle a freight flow of tens of millions of tons and it is more economical for delivering cargo over great distances. For hauling freight between various nations and continents, it is the only possible way in many instances.

For mass cargo, the port of arrival is the spot where freight necessary to enterprises "materializes." There the arriving cargo is, as a rule, transferred to the railroad and delivered to enterprises.

If an industrial plant is located just outside the port boundaries and cargo shipments are tied in closely with the plant's technological processes, then transportation costs are greatly reduced. There is no need to use the railroads so that the loading-unloading of freight cars either at the port or at the enterprise is eliminated, thus reducing the labor of port workers and plant transport workers. One warehouse can be used successfully for both enterprises.

Such an idea is not new; it has been put into practice many times here and abroad. For example, a plant near the port Odessa transmits its product (fertilizer packed in bags) directly by conveyor to loading machines set up on piers at the Port of Yuzhnyy. From other piers at the same port, superphosphate acid is being unloaded and transmitted directly to plant storage facilities. From a specialized complex in Odessa for shipping imported raw sugar, the cargo goes by conveyor belt to the warehouse of a sugar combine which is located adjacent to the port.

In foreign ports, city authorities build piers and rent them, together with adjoining property, to firms, which construct enterprises connected technologically with sea cargo, thus stimulating growth in their cities. Japanese metallurgists, who import both ore and coal by sea, build their new metallurgical enterprises so that ore and coal cargoes are unloaded directly into plant raw material warehouses, while plant production goes from shops to a warehouse located on a pier, from whence it will go to its purchasers by sea.

Unfortunately, examples of rational utilization of port industrial zones are comparatively rare in our nation's practice. To this day there does not exist a system for obligatorily checking the expediency of direct ties between port loading complexes and enterprises.

In our country, new ports and new loading complexes are constructed only for new cargoes or growing volumes. Recipients, as a rule, must resolve the problem of moving their freight independently at existing, new, or reconstructed enterprises, although science could indicate a more economical variant.

In many cases, building a new enterprise in the port industrial zone can be quite effective since expenditures for constructing railroad loading-unloading frontage are eliminated, warehouse costs are decreased and capital investments on railroad rolling stock and other such components are reduced.

In those cases that require operating expenses to be defined and combined with capital investments using a normative coefficient to find the optimal version, calculations of expenditures must be made. All this can and should be done but, unfortunately, is not.

In many active ports whose working history dates back scores or even hundreds of years, it is almost impossible now to create a truly valuable port industrial zone whose enterprises would be closely connected with maritime freight flow. This is due to the fact that the territory of the port is congested with urban structures, railroad lines and stations, and other enterprises unconnected with the port. The idea of creating a port industrial zone often is not pursued even when new ports are built in inlets that are suited to port construction.

It is absolutely necessary to reserve a port industrial zone for the territory surrounding Vrangell' Bay, where the nation's largest port Vostochnyy is operating and being built. Right now, it is surrounded by land which is little suited to agriculture. Right now that land is empty but the possibility is not excluded that, with the bringing in of communication lines, construction will begin on enterprises which will not have any direct connection with the sea and the port.

In addition to this, a grain complex is to be constructed in Vostochnyy, inasmuch as the hauling of grain into regions of the Soviet Far East is a constant and economically justified phenomenon. Designers are providing for piers for grain ships and for a grain elevator, which will be supplemented by a milling combine and combined fodder plant. This will allow us to ship flour and combined fodder in prepared form by sea to the Kamchatka, Magadan and Chukhotsk regions. This cargo will never see a highway or a railroad line. Also, the fact that this cargo will be shipped to the Primor'ye only once, this in a prepared form, directly to the consumers there.

Piers are being designed for the Port of Yuzhnyy on the Black Sea which will have phosphorites (raw material for making fertilizers) delivered to them. Novorossiysk is to have a pier at which ocean tankers bearing vegetable oils will unload. Many such examples can be cited at which the "port enterprise" complex will be a more effective solution.

Before it builds a new port, the Ministry of the Maritime Fleet, usually works out a general plan for a port working at full capacity which utilizes the port's entire shoreline. The Ministry also delineates the shore zone necessary for the port and seeks to set aside this territory in accordance with established procedures.

In constructing a freight-handling complex in separate sequential sections, an over-all general plan is worked out to prevent serious planning errors and

to allow more expeditious use of the water and land allocated for this purpose. Yet sections beyond the boundaries of the port are not specially reserved; these are often utilized in a manner which repeats the fate of old, "traditional" ports.

The situation created is not difficult to change if oblast and kray organizations, in conjunction with territorial institutes and their own corresponding divisions, were to devise a situation which would facilitate more rational utilization of port territory in creating an industrial zone for every port and basin.

In addition to this, it is also necessary, in designing freight-handling complexes, to work out the technical-economic justification for the location of either producer or consumer enterprises with both consignees and shippers.

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OCEAN AND RIVER

NEW VESSELS HAVE SHORTCOMINGS

Moscow MORSKOY FLOT in Russian No 4, Apr 82, pp 49-51

[Article by Chief Engineer A. Philipenko, design bureau Chief V. Sheremet, and Mechanic-Instructor N. Malakhov of the Far East Steamship Company: "A Scientific Approach to Creating a Fleet"]

[Text] The Far East Steamship Line has accumulated a great deal of experience in operating ships, experience which tells the company that many of the new vessels which have been added to the fleet have shortcomings.

There are design shortcomings due to a failure to pay sufficient heed to reliability and maintainability of proposed design decisions on the hull, to the selection of mechanisms, equipment and auxiliary items, as well as to specific operating conditions in the Far East Basin. Secondly, these are technological errors which resulted when shipbuilders deviated from ship construction technical requirements. And, finally, there are errors caused by patently outdated technical decisions, outdated because of the significant gap between the beginning of design work and the completion of construction work on many ships. Ships are placed into operation that don't meet requirement changes made by inspection organizations during that elapsed period and that do not meet the requirements of adopted conventions.

The main shortcoming of ships joining the fleet is the excessive hull vibration caused by the attempt to reduce mass characteristics by decreasing thickness without maintaining sufficient design rigidity and without increasing the capacity of ship power units to facilitate the required handling speed. In the majority of cases, vibration is what causes such equipment as joint connections, automation instruments, electric motor ballbearings, etc., to break down.

Due to vibration, ships of the "Varnemyunde" type exhibit penetrating cracks in tanks. This leads to connections between tanks and could result in cargo spoilage and commercial losses. Local vibration under the automated mooring winches in the after body of the "Leninskaya Gvardiya" type leads to frequent breakdowns of the roller bearings as well as their corrosion.

As a result of vibration of after body extremities, on the diesel motor ship "Khodozhnik Sar'yan" cracks appeared in the hull in the area of the tanks.

As the result of intense vibration, ships of the "Vlas Nichkov" type developed ruptures and holes in the area of the bulkheads where the ship's fuel-ballast tanks are located.

A serious design flaw nature in newly-built ships is, as it was in the past, a limited possibility for creating a rational draft for vessels in shifting ballast. The result of this shortcoming is "slamming," which results in significant damage to hull design: the overlapping of deck end plates, stanchions, etc.

Ships of the "Aleksandr Fadeyev" and "Khudozhnik Sar'yan" type have a poor wave mounting ability particularly under full load. In meeting Force 7-8 wind waves head on, the nose of the ship encounters strong blows. Streams of water, formed when the bow hits a wave, rise vertically over the vessel to a height of 10 meters and then slam down on the foredeck, doing damage to hull structures and mechanisms. As a result of this, what has occurred aboard ships of the "Khudozhnik Sar'yan" type is deformation of the upper deck, beams and beam knees of the upper deck as well as the platform located beneath it, plus the pillars in the area of the 203rd ring frame support. Analogous phenomena were observed aboard ships of the "Rostok" type. Diminishing the force of wave blows by reducing course speed is not always practical inasmuch as these ships handle poorly even at average speed.

Aboard ships of the "Sestroretsk" and "Aleksandr Fadeyev" type, in connection with the fact that in the engine-shaft-propeller system, the zone of twisting oscillation is situated close to the working range of the propeller revolutions, after one year of operation, considerable damage to the surface of the cones of the propeller shaft and the screw propeller could be detected. Elimination of this defect required complex shipyard repairs, with these vessels being taken out of operation. Special shock absorbers had to be purchased abroad for vessels of the "Sestroretsk" type. Installation of fly wheels on the "Aleksandr Fadeyev" at the Nakhodka Ship Repair Yard took 45 days. It might be stated here that the task of working out effective methods for protecting ships from corrosion has yet to be resolved by our scientific research organizations.

One can observe a comparatively rapid deterioration in the main jointing of the hull and hull structures which reduces the ship's service length. This is due to the following reasons: the presence of welding scaling on hull plates and sections; reduced corrosive stability of steel in salt water; violation of painting technology during the ship's construction; the use of ineffective paint and varnish materials and coverings.

Due to these reasons, during the first year of operation of vessels of the "Pyatidesyatiletaye Komsomola," "Aleksandr Fadeyev," "Leninskaya Gvardiya" and "Varnemyunde" types a deterioration of the painted surfaces of the main hull and super-structure was discovered. The premature deterioration of the hull leads to the engine overlooking, fuel overexpenditure and decreased speed. The unsatisfactory painting of the diesel motor ship "Staryy Bol'shevik" led to speed being reduced to 11 knots while the ship's design

calls for 16. After six months of operation, the ship was placed in drydock to have its hull cleaned and painted.

The greatest expenditures during repairs go for repairing hatch doors, rewelding corroded welding seams, for welding cracks in the plating of the second deck, and for overhauling tanks damaged by local vibration. Labor expenditures on hatch door repairs reached 30 percent of the over-all volume of repairs. After 4 years of operation the "Leninskaya Gvardiya" line's entire hatch cover hydraulic system had to be replaced because of corrosive deterioration.

Interior work also leaves much to be desired. Within less than one year of operation, living and service quarter vinyl wall coverings of the "Sestroretsk" type ships showed dark gray spots. Linoleum in quarters was not glued down well. Plastic trim was cracked and warped.

Certain ships of the new construction have freight-handling equipment which does not satisfy modern operation requirements and progressive methods of hauling cargo by sea. The main shortcoming is the low lifting capacity of jibs, which does not allow for introduction of enlarged cargo container haulage and which lowers the productivity of freight operations. Aboard ships of the "Nikolay Novikov" and "Vlas Nichkov" series, design of the freight-handling equipment is unwieldy and the relationship between the length of the jibs and the height of freight columns was poorly coordinated. In working with shore-based cranes, parts of the ship freight-handling equipment are damaged because of the fact that the jibs cannot be removed from hatch openings.

The "Sestroretsk" and "Aleksandr Fadeyev" container ships, which made their appearance in 1972-1973, were built to haul 20-foot containers only, i.e., are on yesterday's level when it comes to operational capability. No provision was made for hauling refrigerated containers. The steamship line made proposals based on operating these vessels. As a result, the ships have been re-equipped to haul 40-foot containers, so that the holding capacity of the "Aleksandr Fadeyev" series has increased from 316 to 400, while that of the "Sestroretsk" series has increased from 218 to 302 (20-foot) containers. As is evident, full use of ship hauling capacity and load capacity reserves is not always provided for during the design stage.

We shall now examine the basic shortcomings of the power units of new vessels. The main shortcomings are the large number of types of equipment as well as unreliable equipment. At the recommendation of the Leningrad Central Planning and Design Bureau, dead-wood ball bearings with metallic inserts were installed aboard 24 ships built during the past few years. Their diameter is 300 mm or more; they are coated with a viscous lubricant and have packing glands of the "Sublime," "Simplex" and "Simplex-Compound" types. Their use was not expedient in all cases because of their insufficient reliability. The bearings, for example, do not last the 3-4 year work period without the shafts having to be removed. The imperfection of their design is confirmed by the firm's operating instructions, in which a flow of oil of up to 10 liters per day is considered normal, something which is not right.

In the installation of new equipment, questions regarding the provision of necessary replacement-spare parts are not being resolved. Thus, only 8 years after the "Simplex" type deadwood ballbearings were installed was any thought given to manufacturing the necessary packing bushings and glands. We were forced to use foreign exchange money for the purchase of replacement and repair parts. During the design stage, no attempt is made to deal with such a basic question as the procurement of equipment parts, something which calls for carrying out repair work during the period of operation.

It is the reliability of the main power unit which determines safety of ship operation and the effectiveness of its utilization.

An analysis of main engine defects and emergency repair incidents demonstrates to us that piston-cylinder group blocks, main ballbearings, the body of the high-pressure fuel pumps, cylinder heads, trunks of the pistons and other important components still have substantive design and technological shortcomings. The complex of measures worked out by the steamship company involving setting the cylinder heads along the outside surface on the cylinder housing together with an increase in the tensile strength characteristics of materials used in the bushings yielded positive results. Since 1980 two cylinder bushings made of modified cast iron have been operating. Cylinders of a new design provided by the Bryansk Machinebuilding Plant and 8 engines with modified cylinder head setting have also been operating. Following two years of operation of the diesel motor ship "Baykonur" with this modified cylinder head setting, the inspectorate of the USSR Ship's Registry gave it a positive assessment.

Many defects may be observed in the ships' electrical and automation equipment. Due to poor installation and high vibration, control, signal and automation controls frequently go out of order and disrupt electrical contact jumpers. The poor quality of the electric cables (power lighting) and their installation is the reason for their going out of order prematurely. Outages and failures of individual elements create a lack of faith in automation equipment on the part of crews and lead to the disconnection of the automatic remote control system (while operating in complex navigational conditions) and to manual shiphandling. There is practically no documentation on automation centers aboard certain vessels.

The EOS-15 biological equipment for purifying fecal waters aboard the motor ship "Kapitan Sergiyevskiy" came up with unsatisfactory results. The device for purifying water in the hold, the SK-2.5, on a series of vessels of the "Kapitan Sakharov" type proved to be unreliable because the coalition filters quickly went bad (after 20 to 40 hours instead of a rated 100 hours).

The above ship shortcomings substantially influence the overall economic labor indicators of the steamship company; they result in an increase of capital investment funds for modernization measures, for repairing and purchasing replacement and spare parts; they result in ships being taken out of operation, and in lowering the effectiveness of their work.

The main role in resolving these problems it seems should be allocated to the Administration for Ordering and Supervising Construction of New Vessels under the Ministry of the USSR Maritime Fleet. In our opinion, it should strengthen its supervision over the quality of design efforts, should facilitate the unification of equipment which has been decided upon and the proposals based on operational evaluation. In the long run, this administration should bear the responsibility for fulfilling plan indicators for the technical operation of newly-added vessels.

The existing system for overseeing fleet construction involving representatives of the "Sudoimport" Association, the USSR Ship's registry and ship-owners does not substantively influence the quality or time blocks involved in ship construction; therefore, this system needs improvement.

Work on increasing ship reliability and the efficiency of technical equipment is done under the Central Scientific Research Institute of the Ministry of the Maritime Fleet and its Design Bureau. The level and quality of this work is characterized by the examples which we have cited above and requires improvement.

Efforts to lower the cost of vessels by supplying unproven mechanisms with low levels of reliability leads to significant expenditures for repairs and spare parts during fleet operation.

We think that the over-all evaluation of the level of reliability and maintainability of newly-built vessels should be taken into consideration during the design stage of working out a calculated and scientifically based period of ship amortization with consideration of the realities of operational conditions.

According to foreign data, the operational life of transport vessels is 16 to 18 years due to wear and aging. According to material furnished by the Far East Affiliate of the Central Scientific Research Institute of the Ministry of the Maritime Fleet, vessels aged 15 to 16 years require increased repairs to restore their technical and operational characteristics.

An analysis of material on the reliability and the maintainability of ships and concrete actions will enable our steamship companies to establish well-founded plan assignments on technical operation indicators which will, in the long run, increase the effectiveness of the fleet's work.

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OCEAN AND RIVER

PIER IMPROVED TO MAKE WAY FOR SUPERTANKER

Moscow VODNYI TRANSPORT in Russian 27 Mar 82, p 4

[Article by Special Correspondent M. Mikhaylov: "A Pier for Supertankers"]

[Text] During the past decade, the Novorossiysk Steamship Company has added large-tonnage vessels of the "Krym," "Boris Butoma," "Marshal Budenny" and "Marshal Grechko" types to its fleet.

However, Tsemesskaya Bukhta did not have a pier of sufficient depth to take on such tankers or ore and oil carriers with a load capacity of up to 145,000 tons.

"That is why loading an oil cargo was done in two stages, first from the pier and then out in the waterway from smaller vessels of the 'Sofiya' type," said O. I. Yevmenchikov, Deputy Chief for Oil Transport of the Novorossiysk Seaport and Chief of the Oil Region. "Naturally, this is not economical, it took a great deal of time and often depended on weather conditions."

That was the way it was until recently. Now we have at our disposal a deep-water pier whose technical capabilities are unique; it is outfitted with fully automated equipment and can load vessels with a deadweight tonnage of up to 250,000 tons. This complex structure was erected on a pile foundation composed of metal and supplemented by pipe. Have a look for yourself....

From where we are standing, on the balcony of the two-story building which belongs to the regional oil administration, there is a beautiful panoramic view of the Sheskhari Petroleum Harbor.

Together with V. A. Parikov, Deputy Chief of the Region, we are walking along a reinforced concrete pier where regular tankers tie up and then, across a pedestrian footbridge, onto a scaffolding which has all communication lines and technical pipelines laid along it. Everything here is unusual. The ship "Akademik Sechenov" is berthed here, tied to four bollards. It is being loaded and is jammed into a veritable crag of pipes leading onto the pier. On top of this crag are special fender shock absorbers. Such a system does not allow a vessel to empty its cargo directly onto the scaffolding, which is only connected to the bollards by crosswalks. The bollards are

equipped with quick-release hooks, which allow the vessel to be unmoored automatically. The pilot, by pressing a button on a special control board, sends a ultra-short wave signal which releases mooring hawsers one by one or all of them at once. Cargo loading is automated.

For communication between the shore and the supertanker, an electromechanical gangway and elevator has been installed on the scaffolding. Fire prevention security has also been well thought out. A seawater pumping station and foam generator have been set up on shore. Almost 11,000 cubic meters of water can be cast immediately upon a fire. All of the pier's hydrotechnical structure has been encircled by a special protective system which surrounds it with a thick curtain of water when it is necessary. Eleven water jets have been set up on special towers to localize fires aboard ship, jets which can use both water or foam. These systems can be controlled from a central or auxiliary control panel.

Television cameras permit the region's dispatcher on duty to control the situation on pier number 1.

Only four men serve this entire complex. There is also a brigade of seamen which goes into action during mooring operations.

Today, for example, electromechanical specialist V. Shein, a port worker, is at the control board. A. Kurlyuk is the operator of the fire-fighting complex.

We walk out on the pipe to the last bollard on the scaffolding. Sheskharis. Tsemesskaya Bukhta is the nation's largest oil-loading port. It is from here that the supertankers go to sea. "Akademik Sechenov," whose tanks hold 94,500 tons of oil, is just about ready to depart.

"The depth of the water beneath us," V. A. Parikov says, "is 22 to 26 meters. The pier has been built with an eye to its long-range development and expansion."

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OCEAN AND RIVER

VEGETABLE GROWERS ALONG VOLGA TO GET SPECIALIZED CARGO SHIPS

Moscow TRUD in Russian 14 Nov 81, p 1

[Article by N. Chaykovskiy: "The Vegetable Haulers Will be Sailing Along the Volga"]

[Text] Preparations for the construction of specialized vessels-vegetable haulers are now being completed at the Rybinsk Shipbuilding Yard. The need for such ships was stipulated in the goals set by the 26th Party Congress: to increase significantly the freight-carrying capacity of river transport, to reduce losses as much as possible, to improve the safe keeping of cargoes being hauled, particularly perishable vegetables and fruits.

On the Volga River Delta today, on the abundant lands of Astrakhan' Oblast, the harvest of tomatoes and watermelons has reached the point where it is well over 300,000 tons. The transfer of such a tremendous mass of perishable produce to the Central and Northern regions of our nation on existing ships, mainly self-propelled barges which are at best equipped only with ventilation units, means that all this cannot be done without loss, naturally. Those losses are quite significant. They average 10-15 percent per trip.

"The time has come to provide our river fleet with new ships with a reliable system for air conditioning its holds, i.e., vessels capable of delivering intact the fruit being transported," said V. Melekhin, Director of the Rybinsk Shipbuilding Yard. "The vegetable hauling vessels which we have begun to build specifically meet this requirement. Tomatoes and other vegetables in slatted box-pallets are to be placed into containers and lowered into a hold. It will be hermetically sealed and then locked under seal. Depending upon the type of vegetable and the technology for its storage, it is to be kept under automatic optimal temperature. This way, the shipper will not have to send service personnel on a trip together with the produce."

Although the vegetable hauler is a specialized ship, it can be adapted to transport other cargoes. These ships will be hauling fruit in season and, in between seasons, can hold packaged lumber plus various bulk materials including grain, 20-ton containers, etc. As a consequence, the carrying capacity of these vessels can change from 600 tons for hauling vegetables and fruit to 1,500 tons for hauling grain, timber or gravel. This will

permit us to utilize these vegetable haulers for hauling cargo throughout the entire navigation season--from thaw to freeze.

Construction of these vegetable haulers will be based on the most up to date shipbuilding technology. At the Shipyard imeni Volodarskiy and at other enterprises subordinate to the Rybinsk Shipbuilding Association, reconstruction is going on full blast, and modern progressive equipment is being installed. Plans call for launching the lead vessel in this series in 1983.

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MISCELLANEOUS

SHORTAGE OF COVERED RAILROAD CARS AT VENTSPILS PORT

Moscow GUDOK in Russian 14 May 82 p 1

[Article by Yu. Paderov, chairman of the coordinating council of the junction, chief of the port: "The Effect of Packaging"]

[Text] In the Ventspils Junction, the commercial port, the railway station, and the office of Soyuzvneshttrans [All-Union Association for Foreign Transportation] began to work in accordance with a mutually-agreed plan and schedule of processing ships and railroad cars beginning in July 1979. At that time, complex technology was created and introduced, information was adjusted, planning was improved, and co-operation in the work of through-shifts of allied suppliers was strengthened.

Since that time a coordinating council meets on a daily basis to discuss the results of the joint work, to resolve problems that arise, and to determine the tasks for the following week. Close cooperation made it possible for us to cope with the ever-growing volume of work and to reduce in so doing the idle time of railroad cars and ships. Even in the first quarter, which is very difficult in regard to weather conditions, we kept within the norm of idle time. And in many respects the packaging of freights helped in this.

A great deal of work has been done in this direction. In the port itself, as well as with the shippers and clients of the Ministry of the Maritime Fleet and the Ministry of Foreign Trade. In the first quarter, for example, the receipt and processing of freight in packages amounted to 27,000 tons, which is significantly more than during the same period of the past year. We regard packaging as one of the main directions of the further perfection of the method of the Leningrad transportation workers and as an important reserve for the acceleration of the transportation process.

Let us say, earlier synthetic rubber arrived in slabs in bulk. Its transfer required a tremendous lot of time and working hands. Now it comes in packages weighing between 500 and 600 kilograms, as a result minutes are spent unloading a railroad car instead of the former hours. Barrels supplied much cotton. In weight and volume they were very different, every type of barrel required its own rigging, and fastening it during lifting required much time and manual labor. Now freights packaged in barrels comes in packages, their transfer is fully mechanized. Non-ferrous metals, chemicals, asbestos, and even peat comes in packages. . .

All this has completely changed the working conditions of the dockers, facilitated the work of the workers receiving and transferring freight, who were freed from the

necessity of rereading hundreds and thousands of pieces, speeded up and facilitated unloading at points of destination, and improved the preservation of the cargo being shipped.

No doubt, the transportation workers of the junction have difficulties. At present one of the chief ones is the shortage of covered cars for grain. Earlier, when potassium salt came to us in covered cars from the Urals, the problem of the empties was not so acute: After unloading the cars were thoroughly washed and used for grain. Now raw materials arrives in mineral carriers. On the one hand, that is very convenient, but on the other. . . Somehow it is difficult to resign oneself to the fact that on the way back, from the shores of the Baltic Sea to the Urals, they go almost half-way across the country as empties.

We are convinced that there are all possibilities to eliminate their empty run if . . . they are loaded with grain in the direction in which they are going. Let them carry grain to the Gor'kovskaya, Kuybyshevskaya and Sverdlovskaya [Oblasts]. Of course, for this a washing place must be equipped in Ventspils for cleaning mineral carriers, and along the itinerary--the appropriate receiving equipment at elevators.

Can one wash these cars? It is possible and, very likely, necessary: The mechanisms for the opening and closing of the hatches, cleared from the chemically very active salt, will be less subject to corrosion. To clean these cars is even easier than the covered ones: They have smooth walls, there are fewer cracks of all sorts and places that are difficult to get to for cleaning.

There is, to be truthful, one complication: They belong to Soyuzkaliy [All-Union Association for the Production of Potassium]. But this complication, too, is not difficult to overcome--given the desire: One must only determine the procedure for the mutual accounting between the USSR Ministry of Railways and the Ministry of Mineral Fertilizer Production for the use of these cars. It seems to us that every side will gain--above all, the state. The freight will reach the place of destination more quickly, empty runs will diminish, and covered cars in short supply will be released.

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MISCELLANEOUS

SHORTAGE OF WELL-MAINTAINED CARS CAUSES GRAIN LOSSES AT LENINGRAD PORT

Moscow GUDOK in Russian 27 May 82 p 3

[Article by V. Fedorov, senior inspector of the Main Freight Administration of the USSR Ministry of Railroads: "Our Answer: Shock Work! The Railway Workers and Transportation Builders Have Perceived the Decisions of the May Plenum of the CPSU Central Committee as a Battle Program of Action. A Damper to Grain Losses"]

[Text] With great emotion and interest the railway workers of the October Railroad are familiarizing themselves with the report of the general secretary of the CPSU Central Committee, comrade L. I. Brezhnev, at the Plenum of the CPSU Central Committee and with the decree on the draft of the Food Program for the USSR for the period to 1990. These important documents reflect the general line of our party for the increase of the well-being of the Soviet people and the further development of agricultural production.

The realization of the tasks set by the Plenum is a nationwide cause. An outstanding role is assigned to transportation, including railway transportation. We are called upon to supply consumers with agricultural produce quickly and without interruption, excluding at the same time losses during loading and unloading, as well as in the process of transportation.

I, a worker of the Main Freight Administration of the USSR Ministry of Railroads, frequently have to be at stations. I will say openly, by far not everywhere is a reliable damper put to losses. Let us say, at the stations Avtovo and Novyy Port --loading bases for agricultural produce for the Leningrad Sea Port--one can see swarms of pigeons, sea-gulls, and other birds on the tracks at any time of the year. They are attracted here by the grain that is spilled in abundance on the ground. Many tons of valuable produce are irretrievably lost.

The whole thing is that grain is carried in rolling stock that is insufficiently prepared for its transportation. Thus, on one day alone at the Novyy Port station, of 38 cars being loaded with grain, only 16 turned out to be suitable. The analysis of data on the receipt of covered rolling stock shows that of the number of cars received only from 10 to 25 percent are fit for the shipment of grain.

And, you know, they prepare all of them especially for grain at points in Kalinin, and at the stations Medvedevo and Sredne-Rogatskaya. But there, and also at the Novyy Port station, which is supposed to comply with the Rules for the Use of Railroad Cars in International Passenger and Railroad Freight Traffic, no quality repair work and washing of rolling stock is provided. At the Leningrad-Vitebskiy Department

by far not everything is being done to speed up the turnover of special grain-carrier cars. Not one of the four stations of this department, where grain is loaded, fulfills the norms for the idle time of rolling stock.

The Central Committee of the party orients us, railway workers, to the further increase in the efficiency of transports of agricultural freights, to the securing of their preservation. The workers of the October Railroad need to adopt effective measures to liquidate the reasons for the losses of agricultural produce.

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MISCELLANEOUS

BRIEFS

BRIDGE SAFETY ANALYSIS METHOD--A system of acoustic-emission diagnosis of damaged bridges developed by students of the Moscow Institute for Railway Transportation Engineers will be widely applied for the non-destructive control and diagnosis of the damage of the constructions of highway, railway, and pedestrian bridges at the time of their operation or testing. Cracks in the construction are discovered even at a distance of up to ten meters from the pick-up gauge. [Text] [Moscow TRUD in Russian 21 May 82 p 2] 8970

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