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# USSR Report

TRADE AND SERVICES

(FOUO 2/80)



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TRANSPORTATION

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STATUS AND PROSPECTS FOR DEVELOPMENT OF ASU 'VOSTOCHNOYE PAROKHODSTVO'

Moscow PEREDOVOY OPYT I NOVAYA TEKHNIKA in Russian No 10, 1979 pp 3-5

[Article by V. D. Burenok, NIIVT]

[Text] One of the main directions of improving administration of the transport process is extensive use of computer technology, modern mathematical methods, means of automated gathering, transmission, processing and storage of information and development of this basis of the ASU [Automated control system] Rechflot and its lower hierarchical stages--the ASU Parokhodstvo and ASU Port.

Automated control systems in the shipping companies and ports of the eastern basins began to be developed at the beginning of the 1970's.

The annual volume of financing by the ASU theme comprises approximately 200,000 rubles. Eight subsystems have now been developed at the level of the ASU Parokhodstvo and are in the stage of working out the problem:

- calculation of the fleet traffic schedule;
- operational monitoring of fleet distribution;
- operational planning and regulation of fleet operation;
- operational accounting and analysis of fleet operation;
- operational accounting of cargo and passenger traffic;
- control of cargo and commercial operation;
- personnel management;
- management of port operation.

The main technical basis toward which developments according to ASU Parokhodstvo are oriented are the third-generation YeS-1022 computers with which the VTs [Computer Centers] of the shipping lines of the eastern

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basins and the IVTs [Information-computer center] of the Irtysh River Shipping Line are equipped. Measures are being implemented to supply equipment above the basic set to expand the capabilities of the named computer equipment. Thus, two additional disk guides and a storage block with capacity of 256 kbytes have been put into operation in the computers of the VTs of the eastern basin shipping lines.

Developments at the level of ASU Parokhodstvo are being carried out for the Irtysh, Western Siberian and Yenisey Shipping lines.

According to an agreement with customers, step by step presentation of developed programs and working documentation for matching and debugging on the basis of the shipping company computers is being provided to them. This technique of making documentation available permits one to take into account and correct the customer's comments prior to the planning deadline of turning the work over.

Research associates of the departments of NIIVT [Novosibirsk Institute of Water Transportation Engineers] and IVTs of IRP [Irtysh River Shipping Line] are also participating in development of the ASU Parokhodstvo. Technical planning by subsystems has been carried out through the efforts of NIIVT: operational planning and regulation of fleet operation and operational accounting and analysis of fleet operation. Investigations by the subsystem Kadry are being carried out on the basis of all shipping lines of the eastern basins jointly with the GVTs [Main Computer Center] of the department of economics of NIIVT. IVTs of IRP is completing operational planning of problems of calculating depreciation deductions throughout the fleet and processing repair lists.

Developments for Osetrovo and Novosibirsk Ports are being conducted at the level of the ASU Port. The subsystem Accounting for the Presence and Movement of Cargo at Warehouses of Osetrovo Port consisting of the following problems:

- operational accounting for incoming cargo;
- operational accounting of outgoing cargo;
- formation of lists of the presence of cargo;
- accounting for intraport movement of cargo;

a complex of programs for management of NSI [Reference information on standards] of files, was turned over for industrial operation in August 1978.

This work was carried out on the basis of the Minsk-32 computer, with which the IVTs of Osetrovo Port is equipped.

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The problem "Accounting for Fulfillment of Plans for Roadstead-Maneuvering Operations" has been developed for Novosibirsk Port. The program underwent experimental operation on the YeS-1022 computer in the VTs of PVB [Eastern basin ports].

Along with this, the VTs of the PVB is performing production calculations during their navigation season for the Irtysk and Western Siberian Shipping Lines on the problems: operational accounting of the presence of the fleet, reception-transfer of it and calculation of leasing tariffs between the IRP and ZSRP [Western Siberian River Ports] (13 rivers), operational monitoring, accounting and analysis of fulfilling the norms of fleet handling at port docks and of customers (15 rivers).

Considerable work is being carried out to develop information support of the planned tasks and to create a normative-reference base of production subdivisions.

An operational software system for the YeS-1022 is being developed which permits more extensive use of the capabilities of third-generation computers.

A further increase of the effectiveness of introduction and use of ASU and means of computer technology in the river transport of the RSFSR has been provided by a complex program developed according to recommendations of GKNT [State Committee for Science and Technology]. At the same time, problems of improving the organizational structures of management, introduction of modern methods of administrative-economic activity, bringing order to the normative base and teaching and training administrative and management personnel and engineering-technical workers in effective methods of management will be solved. An important place in the plan of ASU development is allocated to design of the subsystems of ASU Parokhodstvo and ASU Port with respect to basic shipping (VORP [Volga United River Steamship line]) and to ports (Gor'ky and Leningrad) with compulsory accounting of the characteristics of other shipping companies and ports for subsequent circulation of developed planning decisions.

Working out typical planning decisions at the basic objects of ASU Parokhodstvo and ASU Port permits a reduction of the cost of developing subsystems and acceleration of their introduction in other shipping companies and ports of Minrechflot [Ministry of the River Fleet].

According to the plan of circulation within the complex program, it is planned to provide further development of automated control systems in eight shipping lines, including the IRP, ZSRP and YeRP [Yenisey River Shipping Line] and 10 ports, including Osetrovo and Novosibirsk.

It is planned to introduce the following subsystems in the named shipping lines:

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operational monitoring of fleet distribution;

operational planning and regulation of fleet operation;

operational accounting and analysis of fleet operation and a number of priority problems from the subsystems "Management of Port Operation" and "Future and Summary Annual Planning of Shipping Line Operation."

It is also planned to circulate the following problems at the level of ASU Port--compilation of fleet distribution within the port, interport exchange of information about the presence and dispatch of cargo, forecasting handling of the fleet and related types of transport within the port, compilation of data on rail car handling and accounting and analysis of production indicators of port operation in Novosibirsk Port and development of operational planning schedule of the transport terminal at Osetrovo Port.

Significant development of computer capacities: introduction of 20 of series YeS and 10 small computers within the ports and planning organizations to implement the complex program.

The planned extensive program of operations to develop ASU requires concentration of attention toward conducting investigations of the general systems plan to work out integration of the ASU Rechflot, which provides interaction of the ASU of all levels.

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TRANSPORTATION

NEW RAILROAD TECHNICAL OPERATION RULES DESCRIBED

Moscow ELEKTRICHESKAYA I TEPLOVOZNAYA TYAGÁ in Russian No 10, No 11, 1979

Two part article: "The New Technical Operation Rules of USSR Railroads"

[No 10, 1979, pp 2-4]

[Text] Thousands of railroad workers took part in preparing the new technical operation rules (PTE). A large number of letters concerning changes and additions to the PTE and Signaling Instructions were published in GUDOK and in the periodical ELEKTRICHESKAYA I TEPLOVOZNAYA TYAGA. Around 1300 proposals were received by the Central Editorial Commission of the Ministry of Railways. All of them were carefully considered. The decision has been made to make changes and additions in 197 points, to include 9 new ones, and to exclude 6. Changes have been made in the Signaling Instructions on 58 points, 3 new ones have been added, and 12 are being excluded. By order No. 30 Ts of 5 July 1979 of the Ministry of Railways they will go into effect on 1 January 1980.

The technical operation rules presently in effect were approved on 5 November 1970. During the period which has passed since then carrying and traffic capacities have been substantially increased on the railroads. Second tracks are being built and automatic blocking, dispatcher centralization, and automatic locomotive signaling are being introduced at more rapid rates. Tracks are being laid with the super-strong R65 and R75 rails which make it possible to achieve increased speeds by passenger and freight trains. Rolling stock is being reinforced with powerful new locomotives of the VL 10, VL 11, VL 80, and 2TE 116 series and with improved types of cars, including eight-axle ones.

The rapid development of the country's economy is, of course, increasing the intensity of the work of our railroads. From 1970 through 1978 freight turnover increased by almost 38 percent and the average density of freight shipments on the system increased from 18.5 to 24.5 million ton-kilometers per kilometer. Under these conditions it is especially

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necessary to improve the use of transportation equipment and to increase its reliability and to bring about an extensive introduction into the work of railroads of scientific and technical achievements, advanced technology, and improved labor organization.

All of this has made it necessary to review the present technical operation rules and the related signaling instructions, instructions on train traffic and maneuvering work, and other instructions of the Ministry of Railways which are aimed at improving the use of the carrying and traffic capacity of the railroads and increasing the efficiency of operations work.

A new numeration of points in keeping with the present All-Union State Standard has been introduced in the new technical operation rules and signaling instructions. Changes have been made in terminology: "Automatic vehicle transport" has been replaced by the term "transportation equipment" and "technical inspection" has been replaced by "technical servicing" and others.

The present technical operation rules were constructed on the basis of maximum permissible speeds for passenger trains of 120 kilometers per hour and of 80 kilometers per hour for freight trains. At sections where greater speeds are permitted the maintenance norms are established by special instructions from the Ministry of Railways. The new technical operation rules have been developed for maximum permissible speeds of 140 kilometers per hour for passenger trains and 90 kilometers per hour for freight trains. In connection with this, all of the installations and equipment of the railroads have to correspond to the requirements which provide for the passage of trains with the greatest established speeds (Point 2.2). At sections where speeds of more than 140 kilometers per hour are permitted for passenger trains and more than 90 kilometers per hour for freight trains the maintenance norms and the operations procedure are established by special instructions from the Ministry of Railways.

In view of the fact that the above speeds cannot be realized everywhere in the railroad system, the maintenance norm for installations, equipment, and rolling stock with a speed of 120 kilometers per hour (passenger) and 80 kilometers per hour (freight) are retained in the new technical operation rules. Moreover, the principle of the construction of the technical operation rules consists in the fact that first the norms for the maximum speeds are given, and then those for existing speeds.

The new technical operation rules have been brought into complete correspondence with construction norms and rules for designing 15 twenty millimeter-gauge railroads (Construction Norms and Rules 11-39-76) which were

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approved by the USSR State Committee for Construction on 14 July 1976. Point 4 of the introduction establishes that along with the road administration, a road department issues instructions which determine the work of subordinate subdivisions.

In the section "General Duties of the Workers of Railroad Transport" it is emphasized that along with the fulfillment of the passenger and freight hauling plan in absolute traffic safety, the basic duties of railroad transport workers are also the effective use of equipment, the search for reserves, a steady rise in labor productivity, and a decrease in the cost of shipments.

In Point 1.8, in accordance with the approved nomenclature, the job designations of workers younger than 18 years old who are not admitted to work connected with train traffic are made clear: speed regulators, centralization post operators, pointsmen, car inspector-repairmen, and car technical service point operators.

The chapter "Installations and Equipment of the Road Enterprise" has been supplemented with a new point which establishes that "...the location and equipping of road districts, road machine stations, and other enterprises of the road enterprise have to ensure the performance of the necessary work to maintain and repair the road, installations, and equipment for the fulfillment of the assigned amounts of traffic at the established speeds."

In connection with the increased maximum speed of passenger trains to 140 kilometers per hour, the demands have been increased upon the siting of stations, sidings, and passing stations in the plan. Under difficult conditions their location is permitted on curves with a radius of no less than 1500 meters. The width of the permanent way has to correspond to the upper structure of the road and have a road-side with a width (this is established for the first time) of no less than .4 meters on each side of the track.

Bridges and tunnels in the list which have been approved by the road chief are protected by clearance control equipment and equipped with warning signals and stop lights.

Point 2.3 (paragraph 17) has been supplemented by the instruction that freight which cannot be placed on open rolling stock within the limits of loading clearance are shipped according to the procedure established by the Ministry of Railways. In order to verify the correctness of the placing of freight within the limits of the above clearance, clearance gates are installed at mass loading sites.

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Point 3.1 (paragraph 18) has been formulated in a new way. Previously it was written that the strength, stability, and condition of all of the elements of the railroad had to ensure the safe and smooth movement of trains at the greatest designed speeds which had been established for locomotives traveling a given section. With the appearance of new locomotives with large designed speeds this point of the Rules cannot be fulfilled. Due to this, it is written in the new PTE that the elements "have to ensure safe and smooth movement at the greatest speeds established for a given section."

Point 3.10 (paragraph 25) permits the maintenance of the rail thread at five millimeters higher than the other (the existing norm is four millimeters) along the entire length of each straight section, while the amount of the permissible deviations from the established norms in the level of the placement of the rail threads on straight and curved sections is set by the Ministry of Railways (in the existing PTE four millimeters were allowed).

Two new points have been introduced regarding the demands upon rails. In Point 3.13 it is stated that rails on main and station tracks have to correspond in their capacity and condition to the conditions of use (freight intensity, loads, and speeds). Point 3.14 describes the concrete maximum norms for the wear on rail heads depending upon their type and the permissible traffic speed.

In order to improve the maintenance of crossover switches, the checking of their condition at main and station reception and dispatching tracks is performed by defectoscope carts. Point 3.10 (paragraph 25) establishes that baffle guardrails have to be laid in front of the tongues of all facing crossover points on main tracks.

Point 3.17 (paragraph 30) has been supplemented with demands upon the maintenance of the mobile frog core. Point 3.19 (paragraph 32) provides for the mandatory equipping of the mobile frog core with attachments to make it possible to lock them with mounted locks. The equipping with control locks of non-centralized switches which lead to tracks set aside for holding defectoscope carts, track measuring cars, and track machines is also noted here.

Point 3.24 (paragraph 37) clarifies the characterization of level crossings. Previously they were divided into guarded (the presence of a duty officer was had in mind) and unguarded ones. This kind of characterization is erroneous. All level crossings on the railroad are guarded. The existing signaling systems of various types represent the protection of level crossings.

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The new rules establish that grade crossings, depending upon the intensity and speed of the train and transportation equipment traffic, their being equipped with grade crossing signalization, and also visibility conditions, may have gates or be without gates. In accordance with this ammendments have been made to the subsequent points on grade crossings.

Chapter 4 "Installations and Equipment of the Locomotives and Car Enterprise, Water Supply and Sewerage, and Restoration Equipment" establishes not the best but an effective use of locomotives (Point 4.1).

Point 4.2 (paragraph 49) is supplemented by the sentence "sewerage installations have to ensure the removal and treatment of the sewerage waters of railroad enterprises and residential settlements," and in Point 4.4. (paragraph 51) it is added: "It is prohibited for rolling stock to occupy the tracks on which restoration and fire trains and restoration rail cars are standing."

In chapter 5 "Installations and Equipment of the Station Enterprise" all of the changes are directed toward creating better working conditions for transportation workers and raising the level of services for passengers while ensuring absolute safety. Large passenger stations have to have automatic train departure signs, information booths, ticket-printing machines, and also automatic baggage storage rooms.

In order to improve the working conditions of workers connected with the movement of trains it is permitted to place in the workrooms of station duty officers only control and guidance equipment which is directly related to the work of the duty officer, and also panels for centralized lighting control and for remote control of sectional circuit-breakers.

The demand upon maintaining clearances when tracks and freight and passenger platforms are being repaired have been strengthened. It has been prohibited to change the distance from the track axle to the edge of the platform.

On the territories of stations, in addition to the illumination of the tracks, the switch necks must also be illuminated. In order to economize electric energy, at intermediate stations with a small amount of freight work equipment has to be provided for the section-by-section switching on and off of external illumination for loading and unloading at other station tracks at times when freight and switching is not being performed on these tracks.

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In order to increase the carrying capacity of hump classification yards it is planned to equip on-coming tracks with hump automatic locomotive signaling. Stations with mechanized humps have to have workshops for repairing hump equipment.

The norms and procedure for the technical servicing of signaling and communications installation and equipment are set forth in chapter 6. As the result of the fact that only around 1,000 semaphores are left on the rail system and that they will be replaced in the near future by signal lights, the semaphore as a means of signaling has been excluded from the PTE. Point 6.3 (paragraph 62) establishes: "...Signal lights are used on the road system as permanent signals. At sections where until their replacement by signal lights semaphores are retained, the procedure for their use is established by the Instruction On the Movement of Trains and Switching."

In order to ensure safe and uninterrupted movement by trains, the demands upon the visibility of signals are increased: stop signals -- at a distance of no less than 1,000 meters; go signals -- not less than 200 meters (Point 6.4).

In order to receive trains at a station which have been moving along an incorrect track and also push-locomotives and work trains returning from a stage on incorrect tracks, it is permitted, when there is no clearance for placing entrance signal lights on the right side, to install them on the left side of the direction of the movement (Point 6.6). The necessity for this kind of placement is determined by the road chief. This will make it possible to reduce the train reception interval and to increase the carrying capacity of a section.

At large stations (extra-class and first class) when trains are dispatched from tracks which do not have sufficient length and when the head of the train is located beyond the exit signal light, it is permitted to place a second signal light head on the reverse side of the signal. The procedure for using these signals is determined for each individual station by the road chief (Point 6.11).

It is also provided that not only exit signal lights but also the route signals of stations are to be supplemented by route signs regardless of the amount of traffic. These additions are very important for increasing carrying capacity. Such operations as the writing up and delivery to the locomotive of written permission to dispatch a train are being eliminated. Restrictions have also been removed on the use at entrance signals of signalling the non-stop admission of trains on station side tracks.

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Demands are being increased on automatic and semi-automatic braking equipment which must not permit the spontaneous turning off of a signal light when a switch is made from basic to reserve power, and visa versa. The time of the switch must not exceed 1.3 seconds.

In order to increase carrying capacity, an important supplement has been made to Point 6.19: "...At certain freight intense lines and at stages with two-track inserts, in accordance with the list established by the Ministry of Railways, automatic braking is supplemented by equipment which makes it possible for trains to move on each of the tracks in both directions." This will make it possible to increase maneuverability in the organization of traffic, especially during periods when "windows" are provided for repair and construction work. At stations located on lines with semi-automatic braking it is planned to use equipment to control the freedom of tracks and switches.

At stages adjoining stations equipped with electric centralization it is required, as a rule, to use track braking, or, as is provided for the first time in the new PTE, automatic locomotive signaling which is used as an independent means of signaling and communications (Point 6.29). The use of other means of signaling and communications in such cases can be allowed only with the permission of the road chief.

With train movement only through the indications of locomotive signal lights the latter have to give indications of the engagement or freedom of forward lying section blocks. In addition to main tracks, automatic locomotive signaling equipment has to be supplied consistently and in a planned manner to receiving and departure tracks along which the non-stop passage of trains with a speed of 50 kilometers per hour and more is provided for (Point 6.31).

At sections where automatic locomotive signaling is used as an independent means of signaling and communications warning signal lights are not installed in front of entrance signal lights (Point 6.5).

In view of the increasing role of automatic locomotive signaling and radio communications, it is established in the new PTE that the chief's of signaling and communications districts and of locomotive depots and their deputies check the stability of their operations no less frequently than once a quarter (Point 6.50).

The use of train radio communications is now being spread to all road sections, and not only to sections with electric and diesel traction in keeping with the present PTE. It is also planned to introduce new types of communications -- informational and for transmitting data to a computer center.

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Energy dispatcher communications have to exist not only at electrified sections, but at all sections with intense traffic which are equipped with automatic braking. It is permitted to switch the telephones of the duty engineers of signaling and communications districts into the wires of the train dispatcher communications.

It is clearly established in the new PTE that a normal situation at a switch is indicated by a plus sign in the switch, signal, and route interdependency tables. For stations with non-centralized switches their normal situation, in addition, is specified in the technical routine documents of the station and in the extracts from them. It is made clear in the new PTE that standard decisions for signaling, centralization, and braking equipment are approved by the chief of the Main Administration for Signaling and Communications of the Ministry of Railways.

At the present time wide use is being made on the railroad network of equipment for the automatic disclosure of overheated axle-boxes. In order to increase the safety of the movement of trains Point 6.37 provides that "special equipment is installed for the automatic contact-free disclosure of overheated axle-boxes in passing trains and for the transmission of this information to the locomotive machinist and to the forward-lying station. The procedure for placing this equipment and for its operation and servicing is established by an instruction from the Ministry of Railways."

[No 11, 1979, pp 4-6]

[Text] In the new edition of the Rules the basic requirements upon the installations and equipment of the electric supply system are described (chapter 7).

In order to have uninterrupted operations by the signaling, centralization, and braking and the level crossing signaling equipment, in the event that the alternating current is switched off, a reserve battery power source which is constantly ready for operation is provided for.

In order to ensure the uninterrupted movement of trains the condition of the installations and equipment of the electric power supply system and the measurement of their parameters has to be periodically controlled by laboratory cars equipped with diagnostic equipment.

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The individual voltage level norms at the pantograph of electric rolling stock have been clarified, and the amounts of nominal current voltage in signaling, centralization, and braking equipment have been specified. It has to be 115, 230, or 380 volts. In addition, no more than a 10 percent decrease is permitted as a deviation from these amounts, and no more than a 5 percent increase (Point 7.2).

Point 7.8 (former paragraph 121) has been formulated in a completely new manner:

"The catenary and the automatic braking and longitudinal electric supply lines with a voltage of more than 1,000 watts have to be divided into individual sections with the help of air spans (insulating junctions), neutral inserts, and sectional and inset insulators.

The catenary poles which are set at the ends of the air spans have to have distinguishing coloring.

It is prohibited to stop electric rolling stock with a raised catenary collector between these poles."

The electric supply section chief has been made responsible for assigning the appropriate people to train workers from other services who have been assigned to switching sectional circuit breakers.

The procedure for inspecting installations and equipment and for repairing them is established in chapter 8. In order to perform current maintenance work on the track, artificial installations, the catenary and the signaling, centralization, and braking equipment technological "windows" of one to two hours are provided for in the train movement schedules (Point 8.3).

The procedure for closing stages for moving trains is formulated more concretely and clearly (Point 8.7). The closing of a stage for work on a single-track, double-track, and multi-track section is performed with the permission of the road chief in agreement with the chief of the traffic service, if it does not cause changes in the established amounts of traffic from neighboring roads. Otherwise, the closing of a stage may be permitted by the road chief in agreement with the Main Traffic Administration of the Ministry of Railways.

Point 8.9 clarifies the procedure for opening a stage and restoring the operation of an exiting signaling, centralization, braking, communications, and energy supply equipment: "The restoration of signaling, centralization, braking and communications and electric supply equipment is performed upon the receipt of a notification from the senior

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electrical mechanic of signaling, centralization and braking and communications, or the energy dispatcher."

The following additions and changes have been made in the section "Rolling Stock." Point 9.1 establishes that "rolling stock has to be maintained in working order which ensures it uninterrupted operation and safe movement.

The prevention of the appearance of any defects and the ensuring of the established service life of rolling stock has to be the chief element in the work of persons responsible for its maintenance.

In addition to the requirements stipulated by the present Rules, the Ministry of Railways issues instruction on the servicing, repair, and operation of rolling stock which is used in passenger trains with a speed of more than 140 kilometers per hour or freight trains with a speed of more than 90 kilometers per hour."

Switchers have to be equipped with equipment for uncoupling them from cars from the machinist's cabin (Point 9.9), which is very important when a switcher is manned by a single machinist.

The concrete permissible wear and tear norms for wheels have been established in relation to the speed of the trains. It is clearly described that with a slide from 2 to 6 millimeters the train is permitted to proceed to the nearest station with a speed of no more than 15 kilometers per hour. With a slide of more than 6 millimeters the procedure is established by the road chief on the basis of the Instructions of the Ministry of Railways.

Some of the freight cars have to have a crossover platform with an emergency brake and a hand brake. The emergency brake in passenger cars and in motor-car rolling stock is placed in the vestibule, inside the car, and sealed (Point 11.2).

In order to shorten the time involved in making up trains and eliminate delays in dispatching them a concrete difference has been established between the longitudinal axes of the automatic couplers of cars. In a freight train it has to be no more than 100 millimeters; between the locomotive and the first loaded car of a freight train -- 110 millimeters; in a passenger train traveling at a speed of 120 kilometers per hour -- 70 millimeters; with a speed of 121 to 140 kilometers per hour -- 50 millimeters; and between the locomotive and the first car of a passenger train -- 110 millimeters (Point 11.5).

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The responsibility for the technical condition of automatic coupling equipment and for the correct coupling of cars in a train is placed upon the car inspector who performs the technical servicing of a train before it is dispatched. At stations where there is no inspector the yard master is responsible for the coupling of cars to the train and also for coupling when cars are being switched. (Point 11.6).

The new Point 12.5 establishes that locomotives and self-propelled rolling stock has to be examined by a commission twice a year (in the spring and fall) in accordance with a procedure agreed upon with the Ministry of Railways. It is planned to have control points for inspecting locomotive automatic stopping and automatic signaling equipment not only at the basic depots, but also, when necessary, at technical servicing points and locomotive turnaround points (Point 12.6).

The requirements on the performance on the technical servicing of cars have been increased. A check is established of the working order of car bodies which guarantees the safekeeping of freight and of the working order of crossover platforms, special steps, and hand-rails (Point 12.12).

The technical servicing and repair procedure for cars in trains has been clarified (Point 12.13). At stations where they are assembled and disassembled, and on their route, at stations stipulated by the train traffic schedule, every car has to undergo technical servicing and, in necessary cases, be repaired. At these stations the repair of these cars without uncoupling them is organized.

At stations where there are no points for preparing cars for shipments or technical servicing points, every car has to be inspected before it is placed in a train and prepared for travel to the nearest station which has a technical servicing point.

The procedure for presenting cars for technical servicing and for providing notification of their readiness, and also the procedure for inspecting and repairing cars before placing them in a train at stations where there are no shipment preparation or technical servicing points is determined by the road chief.

The workers of the above points are responsible for the safety of the cars and for their movement without uncoupling from the train within the guaranteed section which has been established by the road chief.

In view of the paramount importance and organizing role of the train traffic schedule, it is established in addition that the traffic schedule has to ensure the most effective use of the traffic and

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carrying capacities of sections and of the processing capacities of stations, the highly productive use of rolling stock, and the possibility of performing current maintenance work on tracks, installations, signaling, centralization, and braking equipment, communications, and electric energy supplies (Point 13.2).

In order to increase responsibility for the punctuality and validity of the assignment and removal of passenger, mail-baggage, and freight-passenger trains traveling within two or more roads it has been established that their assignment and removal is performed by the first deputy minister (Point 13.3).

At stations located at sections with dispatcher centralization the train dispatcher is responsible for switching and for controlling signals (Point 15.5). A clear distinction is made that control over technical servicing, cleaning, lubrication, and the fastening and replacement of bolts at centralized switch-changing points is performed by district workers, while at non-centralized points it is performed by the switch post duty officers who tend them (Point 15.12).

The procedure for switching maneuvers, when there are centralized switching routes and also in the absence of switching signal lights, is made clear. In Point 15.15 it is written: "It is prohibited for the locomotive motor man who is performing the maneuvers to put the locomotive in motion without receiving instructions from the yard chief personally through radio communications, two-way yard communications, or a signal given by hand signal instruments.

In addition to instructions or a signal from the yard chief, before moving out onto switches of centralized switching routes, the motor man has to be convinced of the presence of a permission signal from the switching signal light, and for non-centralized switches he has to receive a signal or a communication (personally by radio communications or loud-speaker equipment) from the switch post duty man concerning the readiness of the switches for switching movements. When there are no switching signal lights, before moving out onto non-centralized switches the motor man has to receive a communication concerning the readiness of the switches for switching movements from the station duty officer (personally through radio communications or the two-way park communications equipment) or through the maneuver chief.

At stations with electric switch and signal centralization moving out onto switches is permitted with instructions or a signal from the yard chief when switches are transferred from central to local control.

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The basic regulations on the use of radio communications and loud-speaker equipment during switching are specified in the "Instruction on the Movement of Trains and on Switching."

It is stipulated that the freight train weight and length norms for directions and for each section are established in the traffic schedule and in the train formation plan and have to correspond to the type of the locomotive, the profile of the track, and the useful length of the receiving and departure tracks at the stations of these sections.

In order to achieve clearer control over the safe movement of passenger trains, the procedure for coupling above-normed cars to them and for the movement of long passenger trains is established by the Ministry of Railways (Point 15.25).

In order to ensure the safe movement of trains the list of cars which it is prohibited to place in trains has been expanded. They are empty covered cars with open doors, tank cars, hoppers, grain carriers, cement carriers, and other rolling stock with open upper and lower loading and unloading hatches (Point 15.26).

In order to improve the services of line subdivisions and their workers and reduce the loading up of sections with special trains for the shipment of foods, the possibility has been provided for at individual sections and with the permission of the Ministry of Railways of coupling not more than one passenger or covered freight train to electric trains (Point 15.28).

The question of improving the procedure for using locomotives is extremely important. The additional point is made that "locomotives which are employed in train work have to be operated within the limits of their work sections. In exceptional cases the admission of locomotives to unassigned sections is permitted by the Ministry of Railways (Point 15.46). This entry in the PTE is supposed to promote an improvement of the technical condition of the locomotive pool. Instances when single cab locomotives may move in reverse are made clear, and this movement is now also permitted when a train is removed from a stage by an auxiliary locomotive.

In the existing PTE, paragraph 230 permitted an electric train to be accepted on a track occupied by another electric train at blind-end stations. In order to increase traffic safety, Point 16.6 provides for a new procedure. In order to improve the use of receiving and departing tracks at individual stations with a track length sufficient for the placement of two motor-car trains, it is permitted to divide the track with a route signal light into two sections onto which these trains may be admitted.

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When a motor-car train occupies the track section behind the route signal light which separates the receiving track, the second motor-car train may be admitted onto the free section before this signal light through a special signal at the entrance (route) signal light. The indications of this signal light have to be dependent upon the indications of the route signal light which divides the receiving track.

The requirements for entrance and exit signals have been changed in connection with the fact that semaphores have been excluded as a signaling means.

The entrance signal has to be opened personally by the station duty officer, or, upon his instructions, by the centralization post operator. At stations equipped with dispatcher centralization the entrance signal is opened by the train dispatcher.

The entrance signal must be closed automatically after the first set of wheels of an arriving train passes it, and at stations which do not have electric rail circuits -- by the station duty officer and the centralization post operator after the entire arriving train passes the signal (Point 16.7).

The procedure for the simultaneous reception at a station of trains going in opposite directions has been clarified. The demand has been eliminated for an absolute prohibition against the simultaneous reception by stations at double-track sections of trains going in opposite directions, if the route of one of them intersects the reception route of a passenger train. This prohibition has been kept only for instances when trains approach a station with an incline sharper than six degrees. This supplement will improve the use of the traffic capacity of sections and stations without detriment to safety.

In the existing PTE; paragraph 240 designates what constitutes permission to occupy the stage for a train motor man. In the new Rules Point 16.16 clarifies this procedure: "It is prohibited to dispatch a train to a stage without the permission of the station duty officer. Permission to occupy a stage for a motor man dispatching a train is represented by a permission indication from the exit signal, and when it is not in working order or when a train is being dispatched from tracks which do not have exit signals -- written permission in the established form, an order from the station duty officer transmitted through radio communications, or the staff."

A new procedure has been established for hanging and removing signal instruments at the tail of freight trains. It is stipulated that the technical servicing of these instruments and their hanging and removal

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is performed by workers of the car enterprise service (Point 16.22).

For the purpose of making better use of traffic capacity and economizing energy resources the possibility has been provided for of passing a signal light with a prohibition sign when there is a conventional permission signal -- a panel with a reflective sign in the form of the letter "T" -- without stopping all freight trains. When there is a permission light on the locomotive signal light and a passage signal light with an extinguished light it is permitted to proceed without stopping, guiding one's self by the signal of the locomotive signal light (Point 16.27).

The demand prohibiting the dispatching of passenger trains onto a stage when all communication means have broken down has been excluded. The procedure for organizing the movement of trains in this case is established by the Instruction on the Movement of Trains and on Maneuver Work (paragraph 253 of the existing PTE).

In order to improve the use of the traffic capacities of stages, especially during the period when "windows" are provided for repair construction work, it is permitted to increase the forward speed of work train cars when there are radio communications on the locomotive and the track machine in relation to the design of track machines up to 40 kilometers per hour.

The demands upon a motorman after a locomotive has been coupled to a train are made clear (paragraph 261 of the existing PTE). In Point 16.37 it is written: "After a locomotive is coupled to a train a motorman is obliged to:

convince himself of the correctness of the coupling of the locomotive with the first car and of the joining of the air hoses, and also that

the end valves between them are open;

load the brake line with compressed air and assure that the pressure has not fallen lower than the established Ministry of Railway norms, and test the automatic brake;

obtain information about the provision of the train with brakes with the number of the tail cars specified and assure that the brake pressure and the train corresponds to the established norms;

acquaint himself through the waybill with the composition of a freight and freight-passenger train--the presence of cars with roller bearings, cars occupied by people and freight of certain categories which require special caution, and also of open rolling stock.

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When a locomotive is coupled to a passenger train whose cars are electrically heated, the motorman is obliged to lower the pantograph so that the train electrician can switch on the high voltage intercar electric connections.

At sections equipped with automatic locomotive signaling, the motorman driving a locomotive or motor-wagon train is obliged to switch on this equipment on the locomotive before being dispatched from a station and at sections equipped with radio communications to assure that the radio station is switched on."

In addition to the existing rules the motorman is obliged to find out the reasons and the possibility of further passage and when there is a forced stop at a stage, in the event that the stop is not connected with a delay by a signal light with a prohibition signal, and in addition to inform the station duty officer or the train dispatcher through train radio communications of the reason for the stop and the necessary measures to eliminate the obstacles to movement (Point 16.43).

The motorman has to immediately request an auxiliary locomotive when a train whose weight exceeds the forward movement norm is stopped on an incline and it is not permitted to push it back. (Point 16.6).

The terminology of a track post section block and of a train containing people and a passenger train has been refined in the new PTE. The following additional terminology has been included: catenary, "window," long train, train signals, and unit train.

The basic changes in the Instruction on Signaling are connected with changes in the PTE. In working out the new Instruction the following tasks were set:

to simplify the Instruction as much as possible while ensuring full traffic safety and the performance of switching;

to see to it that the established signaling carries maximum information and helps to increase the efficiency of the use of transportation equipment;

to prepare the Instruction for publication in such a way as to make it convenient to study and to use during work time.

In the new Instruction the text and the illustrations for it are placed on a single page. In studying the document it is not necessary to look for an explanatory illustration in other places, on other pages, as in the present Instruction.



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In the new document semaphores, torch lights, station bells, and permanently illuminated speed reduction discs are excluded as a means of signaling. It is established that the transmission of signals by the permanent speed reduction disc is performed during the day and night by an unilluminated yellow disc.

In order to decrease the number of signal instruments which are used during maneuvers and to unify them it has been recognized as advisable and the new Instruction accepts the demand for the use during night maneuvers of a torch only with a transparent white light, excluding here the use of a yellow light.

In order to identify the tail of a freight and a freight-passenger train during the day and night during movement on single-track and double-track sections which are equipped with automatic braking, the present Instruction provides for the use of a red unilluminated disc with a light reflector.

In view of the results of tests on experimental models of discs which have demonstrated their good visibility at a distance of 1,000 meters when they are illuminated by the search light of a following locomotive, the new Instruction (Point 7.3) establishes the use of a red disc with a light reflector for identifying the tail of freight and freight-passenger trains day and night at all sections of the railroad, regardless of their type of signaling and communications.

In order to make better use of traffic capacities at those stations where entrance signal lights are located at a substantial distance from the first switch change the road chief is permitted to establish the speed of passing such signal lights with two yellow lights, of them the upper one a blinking one, and also two yellow lights at more than 50 kilometers per hour in relation to local conditions (Point 2.3).

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LONGER, HEAVIER TRAINS USED ON MOSCOW RAILROAD

Moscow ELEKTRICHESKAYA I TEPLOVOZNAYA TYAGA in Russian No 9, 1979 pp 7-8

[Article by V. K. Bogdanov, Secretary of the Dorprofsozh: "A Competition for Running Heavy and Long Trains"]

[Text] Basing themselves on the rich practice of organizing socialist competition, the trade union organizations of the Moscow road are devoting great attention to disseminating and introducing advanced experience and to turning valuable initiatives into a mass movement.

One of the chief directions of the work of the trade union committees is a struggle to improve the quality of the use of rolling stock. The road is experiencing great difficulties in moving car flows on a number of very important sections and directions due to insufficient traffic capacity. For this reason, until the reconstruction and construction of additional main lines occurs this problem is being solved by searching for other possibilities to increase traffic capacity.

The overall performance of preparatory measures, the creative working out of a number of organizational and technical measures, and the wide scope of socialist competition at the enterprises of all of the branches of the road enterprise made it possible for the advanced machinists of the Moscow Classification-Ryazan Depot, the Hero of Socialist Labor V. F. Sokolov, V. S. Rumyantsev, P. S. Eusev, and V. Ya. Skoz, to come out with the remarkable initiative of running trains with a conventional length of 125 cars and with a weight of 6,000 tons.

The basic result of this initiative has been a more efficient use of the traffic capacity and an increase in the carrying capacity of the road's sections. The formation, running, and movement of such trains demands especial skill and the harmonious work and responsibility of all workers and above all of traffic, locomotive, track, car, and energy workers.

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The workers of the Moscow Classification-Ryazan Depot appealed to all of the railroad workers of the road to develop a competition for the formation, running, and movement of trains of increased weight and length under the motto of "Excellent Quality Train." This valuable initiative was approved by the Presidium of the Dorprofsozh [Railroad Committee of the Railroad Transportation Workers' Trade Union] and by the road administration and recommended for wide dissemination.

The road workers welcomed with great enthusiasm the decree of the Central Committee of the CPSU "On the Work Experience on the Collectives of the Enterprises of the Moscow Railroad to Speed Up the Shipment of Freight by Means of Increasing the Weight and Length of Trains." The tasks of the trade union organizations which follow from the decree of the CC CPSU were examined at the Presidium of the Dorprofsozh and by the road's trade union aktiv. Concrete measures have been worked out to carry out this decree and they have been given to every enterprise.

A substantial place has been devoted in them to increasing the role of collectives in strengthening labor, production, and technological discipline and traffic safety and the role of trade union groups in carrying out the decree, activating the work of the permanent production conferences and workers' meetings and organizing the mass technical creativity of the workers.

Provision is made for economic executives to join in holding competitions aimed at improving the techniques and technology of production, accelerating the turnover rate of cars, improving the use of rolling stock, finding reserves for increasing labor productivity, decreasing the cost of shipments, improving the quality and reliability of equipment, and improving traffic safety. The measures reflect the questions of labor protection, social insurance, domestic matters, mass cultural and educational work, and many others.

The rayon and local trade union committees along with enterprise leaders have now done a large amount of organizational work to make every worker aware of the decree of the CC CPSU -- a party document of exceptional importance. It has been discussed thoroughly in a business-like manner at the workers' and trade union meetings of labor collectives. The road's experience is being dealt with quite profoundly on the pages of the newspaper MOSKOVSKIY ZHELEZNODOROZHNIK with a display of advanced production workers and innovators.

A commission containing representatives of all of the road services has been created at the Dorprofsozh in order to exercise constant control over the course of the socialist competition to accelerate the shipment of freight through increasing the weight and length of trains, to work

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out proposals on a further improvement of the moral and material stimulation of the competition participants, and to study, generalize, and disseminate advanced experience.

In accordance with the decree of the CC CPSU, the Dorprofsozh and the administration of the road have worked out and approved the terms of the competition by collectives of shifts, teams, and workers in the leading occupations. According to the terms, the socialist competition is participated in by shifts of the operations division of the traffic service, duty offices on the road's divisions, maneuver dispatchers (station duty officers), train dispatchers, locomotive teams, shifts of senior car inspectors, overall makeup teams, and overall teams for locomotive repairs.

The victors in the socialist competition are those collectives of shifts and teams which achieve the highest quantitative and qualitative results in the organization of work to form, process, and move trains of increased weight and length, a high level of the fulfillment of output norms, an economy of materials, fuel, and electric energy, and a high quality level in their work and in the maintenance of their work and the reliability of equipment.

The terms of the competition for locomotive teams provide for the punctual and high quality running of trains (without delays through their fault) along an entire section. The basic indicators for the overall repair teams are ensuring high quality in the technical servicing and current repairs of the locomotives which are used for running the trains of increased weight and length and preventing the disrepair of these locomotives during their runs within established periods and during their run between technical servicing and current repairs.

In addition, ensuring the safety of traffic and of maneuvering work and the state of labor protection are mandatory conditions for all of the categories of competitors. Account is also taken of the state of labor and production discipline, the organization of socialist competition, the movement for a communist attitude toward labor, and the development of creative initiative.

The shift and team collectives which occupy first, second, and third place on the road are awarded, respectively, with challenge banners, diplomas, honorary certificates of the road administration and the Dorprofsozh and monetary prizes.

The outcome of the competition is totaled up at the enterprises on the basis of the work results for a month, at divisions -- quarterly, and

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on the road twice a year: at Railroad Worker's Day and on the basis of annual work results.

The first victors have been determined. They are: the shift of the maneuver dispatcher V. F. Fedorov (Rybnoye Station), the overall team which is lead by G. G. Spirin (Orekhovo-Zuyevo Station), the locomotive teams of the machinists V. F. Sokolov (Moscow Classification-Ryazan Depot) and M. M. Khvorostinin (Bryansk II Depot), and others.

The lists of victors in the socialist competition are published in the newspaper MOSKOVSKIY ZHELEZNODOROZHNIK. The banners, diplomas, honorary certificates, testimonials, and monetary prizes are presented in a ceremonial atmosphere at workers' meetings of the collectives.

At the present time the trade union committees of the enterprises together with the executives have developed an extensive socialist competition for the organization on all of the road's sections of a mass movement of trains of increased weight and length. The course of this competition is constantly controlled and concrete measures are taken to further improve the moral and material stimulation of its participants.

A great deal of attention has been devoted to training cadres which are connected with running heavy trains. Additions have been made to the system of material stimulation which are helping to make better use of rolling stock.

At the present time expertise in running trains of increased weight and length has been mastered by the machinists of the locomotive depots Moscow Classification-Ryazan Orekhovo, Bekasovo, Cherusti, Rybnoye, Ozherel'ye, and others.

A complex of measures has been worked out which is aimed at improving the technical condition of the locomotives in accordance with the increased demands being made upon them. For this purpose a review has been made of the repair schedules, the maps of the technological processes for repairing basic parts and units, and of their maximum allowances, the regulation parameters have been changed, tests and the selection of traction electric engines have been introduced, and the characteristics of diesel generators have been brought to their passport designations.

The amount of improvement work has been increased at current inspections and repairs of locomotives in the depot and changed uniform lists have been introduced for the current inspection of locomotives by series. A system of diagnostic equipment for the condition of locomotives -- spectroanalysis of diesel oils, rheostat-free diagnosis, and others -- is being introduced at the technical inspection points.

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In the repair shops specialized teams have been created to carry out specific work on the mechanisms so that each of them is given attention and ensured an operational guarantee. A system of control over the quality of repairs has been introduced, control over the work of the technical inspection points has been strengthened, and the Lunin method of caring for each locomotive has been introduced.

The train driving regimen has an important influence on the technical condition of the locomotives. For this reason especial attention is devoted to training the machinists in efficient regimens. At all of the depots the regimen maps and the brake test sites have now been reviewed. There are systematic classes for the teams on trainer locomotives in order to work out methods of controlling the train.

The workers of the energy enterprise also underwent serious training to move the trains of increased weight and length. Since the current loads on the contact system increased almost twofold, engineering calculations were made to strengthen it. A number of additional reinforcement wires were installed as were parallel union points for the contact network, and the supports of the contact network which had insufficient mechanical strength were replaced. Technical measures were worked out to prevent the overheating of the contact wires upon contact with the trains and in necessary cases the substations were strengthened with traction transformers. The extensive introduction of advanced methods made it possible to ensure the fulfillment of the work by the existing staff of energy supply participants. Most of the road's traction substations are served by the branch method.

The struggle for a fuller use of traffic and carrying capacity reserves was thoroughly developed in the enterprise collectives. An increasingly large number of competition participants are being drawn into it. Today we already have a mass of excellent examples of the introduction and creative development of the valuable initiative at various of the road's enterprises.

In the celebrated collective of the station of Lyublino which in the 1950s was the initiator of work with long trains on short routes the best train composers, the Hero of Socialist Labor N. N. Kharitonov, I. M. Zubtxov, and I. N. Vedenkin, with active engineering support, have successfully mastered the technology of working on short routes and are forming a large number of trains of increased length and weight for the Large Moscow District Ring.

The column of machinists of the Moscow Classification-Ryazan Locomotive Depot where the trades union group organizer is V. I. Mashninov has already fully mastered the running of heavy and long trains. At the

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station Moscow Classification-Kiev and Moscow Freight-Smolensk where there are short sorting tracks trains consisting of 125 empty gondolas are being formed.

The patriotic initiative has already been taken up by all of the enterprises of the road. It was largely responsible for the fact that under the conditions of the past severe winter the assigned amount of shipments was fulfilled and the unimpeded passage of all car flows was organized. The initiative is now acquiring an even greater scope. The road collective fulfilled ahead of schedule on 29 June the half-year plan for loading such very important freights as hard coal, ferrous metals, motor vehicles, and grain. In May-June 65,000 empty gondolas were sent to the country's coal basins.

The established assignment for car turnover and locomotive productivity has been fulfilled. Since the beginning of the year the road has carried 39,000 heavy and long trains in which 14 million tons of above-planned economic freight was carried without increasing the locomotive pool. In effecting a regimen of economy, in a half-year the road's enterprises economized 18 million kilowatt hours of electric energy.

At the present time the top-priority task of the road's enterprise trade union committees is a further increase in their role and responsibility in developing the creative activeness of the railroad workers aimed at achieving the highest indicators in work and the successful fulfillment of production plans and socialist commitments for a wider introduction of advanced work methods. Especial attention has been directed to the fulfillment of the plan of basic measures for carrying out the decree of the CC CPSU "On the Work Experience of the Enterprise Collectives of the Moscow Railroad to Speed up the Shipment of Freight Through Increasing the Weight and Length of Trains."

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INCREASING THE RELIABILITY OF LOCOMOTIVES

Moscow ELEKTRICHESKAYA I TEPLOVOZNAYA TYAGA in Russian No 11, 1979 pp 2-3

/Article by L.V. Rudneva, special correspondent of ELEKTRICHESKAYA I TEPLOVOZNAYA TYAGA/

/Text/ As freight turnover grows and the speeds and weight of trains increase, the steady operation of locomotives depends to a significant degree on the reliability of the rolling stock. A system-wide conference, which was held by the Belorussian Railroad, was devoted to the subject of improving the quality of repairs and of applying progressive methods for locomotive maintenance.

Much initiative, creative thought and energy has been shown by the workers of the following roundhouses in their efforts to ensure a high technical level of locomotive maintenance and to reduce the time during which the equipment is under repair: Sol'vychevodsk of the Northern Railroad, Zhmernika of the Southwestern Railroad, Melitopol' of the Dnepr Railroad, Petrozavodsk of the October Railroad, Uzlovaya of the October Railroad, L'vov-West of the L'vov Railroad and Orsha, Baranovich and Gomel' of the Belorussian Railroad. The experience accumulated by these enterprises in the rational organization of labor deserves serious study and dissemination.

It was noted at the conference that the poor mechanical state of locomotive stock at a number of railroads seriously complicates operations. The main indicators of rolling stock operations are growing worse. For example, the roundhouses accounted for 6.9 percent of the locomotives out of service in 1978, compared to the established norm of 5.2 percent. During the first nine months of 1979 this indicator increased 0.4 percent and exceeded the established norm by 2 percent. During this period the number of locomotive failures increased by 284, and the number of locomotives brought in for unscheduled repairs increased 6.4 percent, while the downtime for locomotives increased by 443,000 hours.

Only 11 railroads were within the established norm for the percentage of inoperative locomotives at roundhouses: the Baltic, Belorussian

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Moscow, Northern, Southwestern, L'vov, Dnepr, Northern Caucasus, Trans-Caucasus, South Urals and the East Siberian railroads.

At the same time railroads such as the Alma-Ata, Kuybyshev, West Kazakhstan, Far Eastern, Tselina and the West Siberian lines had figures for the percentage of inoperative locomotives which were more than double the established norms. These lines were also the worst in terms of the number of unscheduled repairs.

The causes of the unscheduled repairs are mostly to be found in poor and incomplete maintenance and routine repair work, as well as in violations of the established conditions for the operation of locomotive equipment.

For example, the Karasuk Yard of the West Siberian Railway permits over-runs of up to 15,000 km between regular servicing. Despite categorical prohibition of such practices, trains are operated with loads exceeding the critical weight and at speeds below those planned, especially on the Trans-Baykal, Northern and Tselina railways. The guilty parties are not being called to account.

Even now the situation with regard to traction engines is difficult. The most glaring irregularities are permitted in their repairs and maintenance. Some roundhouses do not meet the basic requirements for maintenance of the engines: they do not perform air blast cleaning of the armatures; they do not carry out pressure testing at the proper times, nor is the insulation dried out. This kind of attitude toward maintenance is observed at a number of roundhouses, mostly on the Alma-Ata, South Eastern, Tselina and West Kazakhstan railroads. The process for treating armatures during the TR-3 maintenance work is unsatisfactorily organized at a number of enterprises in the Alma-Ata, Azerbaijan, East Siberian and Kuybyshev railroads. Some roundhouses do not attend to the engine-armature bearings during the TR-2 and TR-3 maintenance work.

It should be noted that many roundhouse chiefs limit themselves to the formal publication of an order; they do not draw on the brigades of electrical vehicles specialists when selecting mechanics especially to repair and maintain electrical engines (as is done at the Lyangasovo Roundhouse). As a result, the roundhouses often have no one who is able to perform in a skilful and timely fashion the work necessary to prevent the engines from breaking down.

Diagnostic methods which do not call for dismantling the equipment are still used only infrequently. At many enterprises the locomotive inspectors keep themselves aloof from the work of monitoring the maintenance and repairs made on traction engines.

This situation leads to a reduction in engine reliability and to interruptions in locomotive operations. For example, the number of

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unscheduled engine repairs during the first eight months of 1979 increased throughout the system to 9.22 instances per 1 million km of distance traveled from 8.84 during the same period last year. A particularly bad situation has developed on the Alma-Ata Railroad. Of all the failures occurring throughout the system in 1978, this railroad was responsible for 20 percent of the broken bearings, 20 percent of the gear problems and 15 percent of the armature breakdowns.

One of the questions raised at the conference concerned the cooling of traction engines, which is at present a cause of serious danger. For example, the employees of the Khar'kov Institute of Transportation Engineering conducted a study in the Zhmernika Roundhouse of the Southwestern Railroad, where they discovered large deviations in the cooling conditions (the air pressure was in line with the established norms on only 36 percent of the diesel engines of the TEZ /expansion unknown/ type. The operation of the engines when there is a limited supply of cooling air leads to overheating with the subsequent unsoldering of the commutator riser and the breakdown of the insulation.

The situation with regard to diesels remains difficult. During the TR-1 and TR-3 maintenance work the turbocompressors are not removed for repairs or for the removal of soot; the exhaust systems are not cleaned properly, and this leads to overheating and the warping of commutators. When repairs and maintenance are done, water leaks are not eliminated, and as a result, the locomotive brigades must add untreated water. All this has a negative effect on locomotive reliability.

The Main Locomotive Administration of the Ministry of Railroads has repeatedly directed attention to the need to adopt the most decisive measures to ensure that all maintenance requirements are met and to develop on a regular basis measures to improve the organization of the repair work and the operation of the locomotive stock.

However, certain managers in the field of locomotives are in no hurry to disseminate and apply these measures. Strict inquiries should be made of those directors who fail to ensure that the mandatory requirements are met.

It is important to make a comprehensive and profound analysis of the most advanced experience accumulated in the operation of locomotives; this analysis should be used as the basis for the organization of maintenance and repair work. The goal should be to guarantee reliable operation of the stock under any conditions and to increase the durability of units and parts of machinery. We now have in the roundhouses skilled engineers and technicians who know and love their work. A number of railroads have established special laboratories and reliability groups, which should be used everywhere. There is no doubt that the people who operate and repair the locomotives know

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better than anyone else the inadequacies of the equipment, and, consequently they can make a significant contribution to the improvement of the rolling stock. The engineering and technical personnel in the roundhouses must make a decisive effort to find and use various means to increase the operational reliability of locomotives, as well as to increase motor capacity and the service life of equipment units and parts.

In this work the widely-known experience accumulated in this area by the Belorussian Railroad can be useful. The railroad spends, for example, an average of 0.5 million rubles on capital investment to modernize its locomotive stock; modernization of the locomotives involves 50 or more items. The main job of the railroad's locomotive section is to maintain the locomotives in good repair. As of today the railroad has virtually no train locomotives or diesel trains which have not undergone scheduled maintenance and repair work.

The timely performance of all types of locomotive repair and maintenance work imposes great responsibility on the instructors of mechanics and on the locomotive brigades to carry out the second part of the process of keeping locomotives in good working order, i.e., quality maintenance work. The directive from the head of the railroad "Concerning Measures to Improve the Quality of Maintenance Work on Locomotives" in fact regulates the procedure for the fulfillment of #157 PTE /Technical Operation Rules/; it is essential to refer to this rule in order to establish the obligations of the mechanics. After this directive was issued, the railroad carried out great organizational and educational work with its locomotive brigades on the need for the mandatory fulfillment of the TO-1 maintenance work.

The mechanics' instructors have each been assigned 50 brigades and 50 locomotives, which are divided into 10 smaller columns, each containing five brigades and five locomotives. A mechanic is assigned to be responsible for each locomotive; he keeps track of the condition and maintenance of the assigned locomotive when it is in use. Every one of the small columns consisting of five brigades carries out TO-1 on five locomotives. When the locomotive makes its first run after TO-3 and TR-1, one of the five assigned brigades can always be called upon to monitor the quality of the repair and maintenance work.

The following procedure has been established among the locomotive brigades. The inspecting brigade checks to see whether the TO-1 work has been carried out by the brigade turning over the locomotive, and the former makes appropriate notes in the log, including an evaluation of the quality of work performed. The mechanics' instructors also monitor the fulfillment of the necessary work. When the locomotive is presented for TO-2, each mechanic must deliver it to the engineer on duty for the TO-2 shift. The latter will stamp on the reverse side of the speed chart the following: "Maintenance and TO-1 performed." Any irregularities which are discovered are recorded in a special book, and all information is sent to the head of the roundhouse.

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The performance of the TO-1 is strictly monitored; every mechanic is issued a list of the jobs involved in the maintenance of the locomotives. Every month the locomotive section of the railroad carries out a detailed analysis of the operation of all the roundhouses. If the TO-1 maintenance is not performed or more than 48 hours elapses between TO-2's, the guilty mechanics are invited to the office for a discussion. As a rule, they are deprived of coupons.

In order to increase the material interest of the locomotive brigades in the performance of quality maintenance work, a bonus amounting to 20-25 percent of wages is paid. At the recommendation of the administration of the locomotive section, this bonus is divided into two parts-- 50 percent is awarded for the fulfillment of the basic indicators of operational work and 50 percent for the maintenance and high quality repair work performed on the locomotives.

The railroad also carries out other measures to improve locomotive maintenance. In order to completely eliminate the practice of allowing excessive mileage between service checks, the planning for each roundhouse's maintenance work is carried out in a centralized manner by the administration of the railroad. Through the planning department the administration office assigns to the locomotive section targets for maintenance work, labor capacity, costs, as well as a labor plan; this is then further broken down for each roundhouse; monetary resources are appropriated in accordance with assigned targets and labor plan. However, practice has shown that this system is not entirely convenient for the roundhouse; the plan is established by the locomotive section office but is financed by a department of the railroad; as a result, the railroad department every year fails to approve the wage fund to support the number of workers necessary to meet the targets. It is true that this year the question of centralized planning and financing by the office of the locomotive section has been solved, but only for the TR-3 repairs. A desire was expressed at the conference to see this kind of system extended to other types of repair and servicing.

The Belorussian Railroad offers specialism in the locomotive section broad scope for work in the area of improved organization and engineering of maintenance. The experience accumulated by the roundhouses of this railroad--experience which has been described many times in this journal--provides convincing evidence of the significant economic benefit which has been realized here. Five major roundhouses have been provided with essential equipment (production line techniques have been applied; oil, water and sand are fed into the work sites; all the heavy work of replacing engine blocks has been mechanized and equipment has been provided for the electrical centralization of switching functions, etc.). This has made it possible to improve the facilities for the maintenance points and not only to virtually eliminate locomotive overruns, but also to set up procedures to carry out more major repairs of locomotives and carry them out in a volume exceeding the TO-2. This has made it possible to eliminate the practice of sending the locomotives

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to the roundhouse of registration, thus reducing the significant losses incurred when locomotives are moved around unloaded. In this way the roundhouse is forbidden to transport locomotives to their own bases even for major work, i.e., unproductive runs are not permitted.

The conference participants adopted recommendations aimed at improving the state of repair and the operational efficiency of locomotives. They called for the broad dissemination of the experience of the Belorussian Railway and the best roundhouses of the system (Sol'vyche-godsk, Osnova, Zhmernika and others), which have achieved high indicators in all spheres of work.

The attention of locomotive section directors and of officials in locomotive divisions of departments and roundhouse chiefs was directed in particular to the need to carry out established preventive maintenance programs for which the following are necessary: the establishment of a procedure to monitor strictly the observance of deadlines for presenting locomotives for repairs and maintenance; the systematic examination of the causes of malfunctions and failures of major units of locomotives, the filling of vacancies for locomotive mechanics at maintenance points in order to keep the amount of work actually completed in line with the established norms, the provision in future plans for the development of repair bases and the training and upgrading of the skills of those employed in this work.

In order to eliminate inadequacies in the materials and equipment it was recommended that railroad bases should be created to produce spare parts which are in very short supply and to manufacture large-scale units to modernize locomotives.

The accumulated experience and the creative initiative of the best collectives should be used for the essential work of improving the operation of locomotives, improving the work of locomotive brigades and of maining locomotives in a good state of repair. The best experience constitutes our wealth. It must be used everywhere and to the maximum advantage.

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