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TECHNIQUE OF FREIGHT HANDLING AT RAILROAD STATIONS  
ACCOMPLISHMENTS IN 1947 AND PROSPECTS FOR 1948

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Freight handling is one of the most laborious processes in railroad transport. Over 300,000 men are employed for this work and expenses amount to 3 billion rubles annually.

To carry out the Five-Year Plan, in 1947 the handling of freight by enterprises on their privately operated tracks had to be 52-55 percent mechanized, and handling by freight yards had to be 20-23 percent mechanized.

Specialization of Stations and Unloading Points

The variety of freight handled by stations makes difficult a wide use of machinery. Every kind of freight requires special types and combinations of machinery. Therefore, for efficient mechanization of freight handling, freight stations must specialize in handling certain kinds of freight.

Specialization of stations in large junctions, and of different points or centers within the limits of a given station, makes it possible to concentrate in the same spot the loading and unloading of one kind of large-tonnage freight. Technical and organizational bases for this work were laid in 1947 in the decree of the Soviet of Ministers USSR, "On the Mechanization of Loading and Unloading Work and the Reduction of Demurrage of Freight Cars for Loading and Unloading in the Moscow Junction." In this decree the specialization of stations was clearly defined. A survey of the freight turnover in the Moscow Junction has shown that bulk goods, such as coal, lumber, fruits and vegetables, potatoes, and firewood, were unloaded in about ten stations.

Moreover, in a station, freight was unloaded on several platforms located in different parts of the freight yard. Such dispersed unloading restricts

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the use of freight-handling devices. For this reason, conforming to the above decree, the specialization of stations was started in 1947 in the Moscow Junction for unloading any bulk freight shipped to enterprises which do not have their own railroad tracks.

As an example, unloading of all heavy merchandise is concentrated in three stations of the Moscow Junction, unloading of coal and firewood is concentrated in four specialized stations, shipments of timber in three stations, shipments of cement in one station. Since 1947, vegetables have been unloaded at stations equipped with bunker gantries exclusively. Despite the larger scope of work, compared to 1946, demurrage was reduced considerably as a result of specialization which made possible mechanized unloading of rolling stock.

In 1947, various projects were undertaken for development of track networks, construction of platforms and buildings, and for mechanization. Starting with 1948, a series of specialized stations are to be put into operation.

A coal base plan, recently worked out, provides for the following series of operations. After a train has been weighed, coal is unloaded onto a gantry and then into trucks, or into piles, by grab cranes which move on tracks located on both sides of the gantry. Truck loading is speeded up by using bunkers with 20-30 cubic meters capacity, located on both sides of the gantry. Bunkers are loaded by cranes.

At stations specializing in unloading heavy crates, special platforms will be constructed with tracks for unloading on both sides. Unloading, freight handling, and truck loading is to be done by locomotive cranes with a 6-10 ton capacity. Each platform will be subdivided into sectors specializing in handling heavy freight in crates. Cement is already being unloaded in special elevators. Mechanic shovels with scrapers on belts are used, and the cement is carried by a conveyor system to the elevator bunkers, from where it flows freely through pipes into trucks. Thus, specialization of stations makes it possible to accomplish a complex mechanization from the phase of unloading cars to the phase of loading trucks.

The experiment in specialized stations, carried out at the Moscow Junction, must be widely adopted in other junctions, especially in Leningrad, Kiev, Khar'kov, and Chelyabinsk.

#### Application of New Techniques and Improvement of Technological Processes

In 1947, preparations were made for the use in railroad stations of new types of highly efficient loading and unloading devices.

A dismantlable gantry crane with a 10-ton lifting capacity is being constructed in compliance with the instruction of the Ministry of Transportation; the first test models should be ready during the first half of 1948. The crane will be used at large stations for handling crates and heavy loads. The principle measurements of this new device are as follows: span, 17 meters; two cantilevers, each 7 meters long, make it possible, when the length of crane tracks is small, to operate on a large surface of the loading platform; hoisting speed 12 meters per minute; traveling speed of trolley, 30 meters per minute; traveling speed of crane, 60 meters per minute.

In 1948, stations must utilize on a wide scale, the all-purpose truck crane with a forked grapple for handling piece freight, timber and crates, or with a bucket for bulk freight such as coal, ballast, etc. The first model of this truck crane has already been made in one of the factories of the Ministry of Transportation, according to the plans of the construction office of the TsNII (Central Scientific Research Institute). Its technical characteristics are as follows: lifting capacity, 3 tons; lifting height with forked grapple, 4 meters, with bucket, 3 meters; maximum speed 30 kilometers per hour;

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minimum radius for turning around, 3 meters; weight, 4.2 tons; clearance, 200 millimeters /sic/; power of GAZ-A engine (activating all mechanisms of truck crane) - 40 horsepower.

If the lifting height of this crane were later increased, it could also be used for loading round timber, which usually is loaded over supports as high as 10 meters.

At stations unloading large amounts of freight such as coal, rubble, gravel, sand, etc., single-bucket caterpillar cranes must be used extensively for truck loading.

In 1948, one factory of the Ministry of Transportation must start to manufacture cranes with a 10-15 ton lifting capacity, designed to be used on railroad tracks. This type of crane is much more efficient than the crane with a 6-ton lifting capacity, now being made. The crane is designed for hoisting 10-ton weights without the help of outriggers and for hoisting 15 tons, when outriggers are used. Because the crane is assembled on a four-axle platform, the load per axle is lower than in the case of the 6-ton crane. As a result, the new crane may be used on a majority of railroad tracks. Because of its large boom, the area the crane can service is increased by 20 percent. A 30 percent increase in lifting speed raises the productivity of the crane, especially when unloading bulk freight with a grab bucket. In order to utilize the new types of machinery efficiently and to improve the use of types already in operation, the technology and the organization of freight handling must be carefully studied. In 1947, the Scientific Research Institute and the Main Administration of Loading and Commercial Work of the Ministry of Transportation established standard schemes of mechanization for handling the various kinds of freight. All the freight yards in a station are classified with regard to the amount and kind of freight they handle, and technical indexes of mechanization are established for each kind of freight yard. The application of this technological basis to freight yards is an extremely important problem to be solved in 1948.

#### Shipment in Crates

An important feature of the work carried out in 1947 was the increased use of crates for shipping. In one year the number of crates used more than doubled, and considerably surpassed the prewar figures. Along routes where goods are shipped in crates, there are more than 50 handling points located on the main lines, including the following: Moscow-Leningrad, Moscow-Kharkov-Kiev-Odessa, Moscow-Sverdlovsk-Novosibirsk, Sverdlovsk-Chelyabinsk, Moscow-Gor'kiy, Moscow-Kybyshchev, Moscow-Tbilisi, etc. The number of types of goods shipped in crates also increased considerably in 1947. In this category are included perfumery, tobacco products, textiles, confectionery, hardware, etc. When shipped in crates, these products are loaded as packed in the factories. Thus transportation costs are reduced, and the goods are well preserved.

Two cubic meters of timber are needed for one all-purpose crate. In a 2-year period, this saves at least 3 cubic meters of timber which would be necessary to ship the merchandise in a roofed car. Moreover, the use of crates makes it possible to mechanize the whole procedure of freight shipping from the sender's warehouse to the warehouse of the addressee.

During 1947, the Ministry of Transportation studied and made models of new types of all-metal crates with a 2.5-ton capacity, combination crates of metal frame with plywood walls with the same capacity, and crates on legs for use with hand carts.

In 1948, shipping in crates must be extended. The Ministry of Timber Industry must help by increasing production of all-purpose crates above the 1947 output.

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Besides, in 1948 a number of ministries must undertake construction of cranes adapted for shipment of their own goods and for mechanized handling. In particular, the Ministry of Electric Power Plants still refuses to use cranes for peat shipments. The Ministry of Petroleum Industry and the Glavnefteasab could make good use of cranes for mazut shipments. The Ministry of Meat and Dairy Industry must study the shipping of milk in small tanks.

The use of cranes will greatly increase mechanization of freight handling, will accelerate shipments, and will reduce costs.

#### 1947 Station Accomplishments

The volume of mechanized freight operations in 1947 was 113 percent that of 1940. The level of mechanization in this period rose 2-10 percent, i.e., twice the rate of the prewar increase.

However, mechanized loading and unloading still represent an insignificant part of the total volume of work. The major part of the freight is handled manually. It should be pointed out that the increase in the volume of freight handled mechanically depended mainly on the better utilization of the equipment available and was also the result of Socialist competition among railroad workers for the fulfillment of the Five-Year Plan ahead of schedule. Many progressive workers considerably exceeded the mean progressive technical norms for utilization of machinery.

Thus, Comrades Kabanskiy and Drugov, hoisting-crane mechanics on the North Donets Railroad system, fulfilled their annual plan in 9 months by combining loading and unloading. Comrades Strekalov and Nalimov, crane operators of the freight office of Moscow Junction, reduced the time lost in maintenance and maneuvering and raised the productivity of the crane to 500 tons per shift, double the mean progressive technical norms. Transport worker Comrade Stoyanets of the Odessa Railroad system increased the productivity of conveyors up to 180 tons per hour, and now loads a car with wheat in 6-8 minutes. At a station under field conditions, Comrade Stoyanets loads a wheat train in 5 hours with a combination of mechanical devices composed of six belt conveyors, a scraper conveyor, and a portable electric power plant.

During 1947, the quantity and quality of the stock of railroad hoisting machinery improved. There were new truck cranes and improved types of locomotive cranes.

In 1947, railroads started to use scraper conveyors more widely for loading wheat and free-flowing freight. During the period of increased wheat shipments, 35 mechanical installations were operated by the railroads. Each installation consisted of 4-6 belt conveyors, one or two scraper conveyors (self-loader) and a 25 to 30-kilowatt mobile electric power plant. These installations materially aided the transportation of the new crop, especially in field stations which do not have permanent, mechanical equipment and electric power generators at their disposal. At the North Caucasus, Ordzhonikidze, Odessa, and Southwestern railroad systems, mechanical installations for loading wheat made it possible to reduce manpower requirements and to increase the speed of train loading three times.

However, the freight handling machinery, such as hoisting cranes, belt and scraper conveyors, mechanized carts, etc., available at the railroads may be used efficiently for certain freight only. Up to now, the problem of mechanical handling of warehouse stocks is still unsolved. These amount to 30 percent of all freight handled in yards. The problem of mechanical unloading of bulk freight, especially from roofed cars, requires a thorough technical study. The results achieved in 1947 do not satisfy workers of the Ministry of Transportation. The urgent problem for 1948 is to increase the mechanization of freight operations as much as possible, especially in the principal junctions and in the freight yards of the main stations.

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Mechanization at Privately Operated Railroad Tracks

The major losses, caused by excessive demurrage of rolling stock during loading and, especially, unloading operations occur on tracks operated privately by industrial enterprises. The 1947 figures show that mechanization of freight handling on privately operated tracks is far behind the Five-Year Plan schedule. As a result, car demurrage on privately operated tracks increased in 1947 by an average of one hour in comparison with 1946. Compared to the prewar indexes, demurrage is 1.5 times greater. A series of enterprises which receive freight regularly do not have any mechanical equipment for speeding unloading operations. Such a situation is intolerable. The fines paid by enterprises to railroads in 1947 for excessive demurrage of cars would have provided enough money to build at least 5,000 cranes or an unloading gantry over 300 kilometers long.

Enterprises can do much toward increasing the mechanization of freight handling, as is confirmed by the experiment of Moscow Junction. In accordance with the decree of the Soviet of Ministers USSR, mentioned above, enterprises of the Moscow area executed important projects for development of freight handling centers: the construction of gantries for unloading, and the building of a considerable number of conveyors, hoists, scraper devices, etc.

The measures stated above, as well as a general improvement in the organization and the application of standard technical procedures at stations and in transport departments, made it possible in 1947 to reduce the demurrage of cars for freight operations from 9 hours in February to 4.5 hours in December. Industrial enterprises of the Urals, Siberia, Donbass, Leningrad, Kiev, Kuybyshev, Gor'kiy, etc., can and must develop their own means of mechanization. Lifting devices, scrapers and slat conveyors, hoists, lifting jacks, mechanized carts, simple types of cranes and other similar devices may be manufactured by a majority of enterprises for their own needs.

At the same time, it is extremely important to accelerate mass production by our industry, of highly efficient freight-handling machinery, mechanical loading devices, and various lifting cranes.

In 1950, cars loading and unloading must be 75 percent mechanized. This task, as set for the Plan, can and must be accomplished earlier.

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