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LOADING AND UNLOADING OPERATIONS AT SOVIET PORTS

COAL AND ORE LOADING AT ZHDANOV -- Moscow, Morskoy Flot, Oct 51

Zhdanov has one of the most modern ports in the USSR. In recent years, 93-97 percent of all freight turnover there was handled by machinery, while the average mechanization level for Soviet sea ports in 1950 was 88 percent.

Manganese ore and coal are the main items transshipped through the port of Zhdanov. Manganese ore is unloaded from ships by portal cranes equipped with grab buckets which have a capacity of 7, 12, 5, and 15 tons. Ships working on regular ore-shipping lines, such as the ships Chernigov, Pervomaysk, Matrosov, Castello, Tuyganos, and Krasnodon, are designed for mechanized unloading of ore. However there are not enough of these ships, and they do not work on the regular lines only. Most of the manganese ore arrives at the port in ships not specially designed for this kind of mechanized work. Their hatches are too small, making it impossible for regular grab buckets with a reach of only 1.5-2 meters to get to all the ore below decks.

To overcome this deficiency, special scraper grab buckets with a 6.3-meter reach are used in the port for the final loading stages. These special buckets can successfully unload ships whose holds do not extend more than 3 meters from the edge of the hatch. However, even these special buckets cannot completely unload the holds of most of the older type ships, and it is not feasible to use buckets with an even wider span because these buckets would stand too high in the closed position to fit in the hold. In addition, the added weight would cut down on the efficiency of the crane.

Because the grab buckets cannot reach all the ore in the older ships, the S-153 coal-loading machine, specially designed for working in holds, was sent to the port of Zhdanov in 1950. Tests proved this machine to be completely unsuited for loading manganese ore. The power chain frequently broke and the motor would burn out. However, modifications, which included replacing the chain conveyer with two individually powered belt conveyers, were made on this machine to make it suitable for unloading operations.

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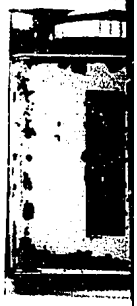

Two more S-153 hold machines were received by the port in 1951. After modifications, these machines will also be used for loading work in the ships' holds.

After experimenting with this modified S-153 machine for nearly a year, it has been determined that it can be used efficiently only in the holds of large-tonnage ships (of the Karaganda and Kursk class, etc.) and especially in the bow holds of ships where much of the ore has to be brought to the hatch openings. The machine is dropped into the hold after the crane has already unloaded the ore around the batch opening; while the S-153 is in operation, the crane unloads other parts of the ship. In this way, the crane is not slowed down by the S-153, which has a slower rate of production.

During the second half of 1950, the combined average productivity of the S-153 loading machine and the traveling crane in unloading ship holds was 54.5 tons per hour, while in the latter months of the 1950 navigation season and the first months of the 1951 navigation season, the average productivity of these machines increased to an average of 74 tons per hour. In some individual cases, the productivity of these machines reached 80, 90, and even 100 tons per hour. The S-153 hold machine is operated by an operator and three other workers.

If two hold machines were used in the hold at one time (until now this has not been practical as not enough machines have been available), it would make it possible for the crane to work at full productivity until the entire ship is unloaded. However, two hold machines cannot work efficiently in some holds of the larger ships and they cannot be used at all in the smaller ships.

Because the hold machine is limited in action to only certain types of vessels, complete mechanization of unloading work at the port can be achieved only if special ore-carrying ships are used. However, until these ships are available, the Zhdanov port will continue to test new methods for mechanizing unloading work and to perfect machines already in operation.

At Zhdanov, coal is loaded at the narrow western pier which has two moorings and is equipped with a 11-ton portal crane. Coal is taken from the coal piles and loaded by caterpillar bucket cranes into special self-opening bucket containers which are mounted on railroad car trucks. In 1950, the port started to use sphere-shaped cutting shovels (sharovyy frezernyy lopaty) for this work.

Trains carrying the loaded bucket containers are hauled to the pier under the portal crane by gas- and steam-propelled switching locomotives. The crane then picks up the containers with the aid of a special traverse, carries them to the hatch opening, and drops them into the hold. The empty containers are then closed and returned to the railroad car truck. The special bucket containers have two advantages over the grab buckets; the freight can be stored far from the ship, and the crane is more efficiently utilized, as the container weighs less than 20 percent of the cranes freight-carrying capacity, while the grab bucket weighs 50 percent of the carrying capacity. Coal loading can be completely mechanized by using either the grab bucket or the special bucket containers if the ship's hold is suitable for this type of work. Ships which permit mechanized unloading of ore are also suitable for mechanized coal loading. In ships not suitable for mechanized coal loading, the coal must be stored manually. Despite many efforts to mechanize this work, little success has been achieved.

Coal is stored in the large rear storage areas of the port. In 1934 large stone unloading platform was built there for car unloading. Since the war, new construction and equipment has not kept up with the increased demands

made on the port. At present, the port must handle ten times more coal than in 1947, and the existing unloading platform can handle only 10 percent of the coal which is shipped to the port. In 1952, the present unloading platform will be enlarged and a new one built.

At present, most of the gondolas are unloaded by caterpillar bucket cranes. These same cranes are used to load the bucket containers with coal from the coal piles (for ship loading). Even when these cranes are working at peak efficiency, there are not enough of them to do both of these jobs at once; to avoid excessive ship layover, manual labor has to be employed to unload many of the coal gondolas. This problem should be eliminated in 1953, when all gondolas will be unloaded from the unloading platforms.

Ten to 15 percent of the coal continues to arrive in the port of Zhdanov in closed cars which have to be unloaded manually. This constitutes 4-7 percent of the total freight turnover of the port.

Like many other ports which are even more completely mechanized, the port of Zhdanov is more in need of transport suitable to the task assigned it than it is in need of new and better equipment. When the proper transport is available, the existing machinery can be used more efficiently.

LENINGRAD PORT USES S-153 COAL LOADER -- Moscow, Morskoy Flot, Jun 51

Coal is unloaded from ships in Leningrad by portable derrick cranes equipped with grab buckets. The unloading is started with ordinary grab buckets having a capacity of 8 cubic meters and is completed with special scraper-type grab buckets which have a 6-meter swing.

On decked ships, coal is brought to the hatch openings by the S-153 coal-loading machine after the deck area in the vicinity of the hatch has been cleared of coal by the grab buckets. The coal-loading machine is lowered onto the deck by shore cranes equipped with special welded hooks, which make it easy to transfer the machine from the shore into the ship's hold and, during the operations, from one deck to another and into the holds. Two men, a mechanic and assistant, working 10-15 minutes, are required to set the machine in place.

To operate the S-153 machine safely between decks, at least two beams must be erected, and hatch covers, at least 2 meters wide, must be laid. The machine must not draw nearer than 0.5 meter to the hatchway coaming.

The conveyer's unloading end always faces the hatchway opening, into which coal is thrown from the deck.

The S-153 machine must be run by a highly-skilled operator. Narrow passages handicap the machine and, in addition, the machine frequently skids on the metal deck, requiring the operator to check constantly the hose cable feeding the motor.

After the coal is unloaded between decks, the machine is lowered into the ship's hold, where it continues working until operations are completed. The S-153 machine cannot reach coal more than 7 meters from the hatch opening, so in ships where this is necessary, the coal is unloaded from the hold by means of special scraper-type grab buckets. These two machines service a deck where the coal may be as much as 10 meters from the hatch opening, and together they assure complete mechanization of unloading operations.

While operating in the ship's hold, the S-153 has a capacity of 50 tons of coal an hour. From May to November 1950, 36 ships were unloaded in Leningrad with the S-153 unloading machine. More than 160,000 tons of coal were unloaded and 335 layover hours were saved. Manual labor was eliminated in the unloading operations, except for cleaning up small lots of coal left after the machines were through.

Operational tests show that these coal-loading machines completely answer the question of mechanizing the time-consuming process of bringing the coal to the hatch opening. However, the machine has many shortcomings which lower its effective performance:

1. The caterpillar tractor is not mounted on rubber tracks, which causes the machine to skid over the metal deck frequently when in motion.

2. The friction clutches are not conveniently placed, which makes control difficult and overloads the machine. This causes the shaft to twist and shears the gears.

3. The traction chain of the conveyer is not durable enough and frequently breaks, especially while the conveyer is making the return empty trip.

4. As there is no cutout apparatus for the oil pump, hoses and pump parts wear out prematurely, and oil leaks result. The pump should have an automatic cutout device.

5. The conveyer's emptying overhang beam is not long enough for hold operations. It should be extended $1\frac{1}{2}$-2 meters.

Despite the enumerated deficiencies, the S-153 machine is very useful and should be recommended for ports which unload coal.

CRITICIZE VOLGATANKER FUELING STATIONS -- Moscow, Rechnoy Transport, 9 Oct 51

Fuel barges are unloaded in two stages. First, 75-80 percent of the load is pumped out, with the pumping station working at full capacity. The remaining 20-25 percent is unloaded in what is called a stripping operation. Half the total time required for unloading the barges is used up during the stripping operations, although only a small part of the load is processed in this manner.

Not a single fueling station of modern construction has been built for the Volgatanker Ship Line in recent years. For example, when the designers draw up plans for rebuilding fueling stations, they persistently plan fuel loading and unloading from both sides of the tanker. In practice, fuel is loaded from one side and unloaded from the other. Loading and unloading at two sides not only raises the overhead of the fueling station but complicates communications and makes it more difficult to handle the equipment.

At present, piston pumps are being used exclusively at the Volgatanker fueling stations. It is often thought that to increase the station's performance, it is necessary to increase the number of cylinders and the number of revolutions of the pump, but it is probable that the expenditures necessary to accomplish this will increase much more than the performance of the fueling station.

To increase unloading efficiency, piston-type pumps should be replaced by more modern types. Centrifugal- and gear-type pumps, which are very efficient because of their small clearance gauges, simple construction, and absence of a connecting-rod crank and valves, should be used.

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The capacity of the fueling-station pumps must be expanded to unload the bulk of the fuel, while acceleration of stripping operations depends on modern barge construction. Many suggestions for accelerating stripping processes have been offered, but nothing has been done about them.

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