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THE SOVIET ESh-1 WALKING DRAG-LINE EXCAVATOR

N. A. Malevich

The ESh-1 walking dragline excavator was developed to facilitate open-pit mining by the nontransport /excavation and removal of overburden by excavator/ system of mining. With open-pit mines reaching depths of over 100 meters, the removal of overburden has become an especially important and labor-consuming process, requiring the most efficient equipment and methods of removal. Labor productivity by the nontransport system of mining is 3-6 times higher than by the transport system /overburden conveyed from the pit by railroad/ and it costs 2-2½ times less to remove a cubic meter of overburden.

The first ESh-1 excavator was developed by the Karpinskiy Machine-Building Plant and the State Institute for Planning Coal Machinery. At present, it is in series production. No single plant of the Main Administration of Coal Machine Building was equipped to handle such a machine, so it was manufactured through the cooperation of the administration's various plants. The excavator is of welded construction, making it light and simple to produce.

The machine is controlled by a combination pneumatic-electrical system. Acceleration and brake action are automatically regulated. The traction, lifting drums, and propelling mechanism are engaged by compressed air by means of a special electromagnetic valve. The excavator can operate on 6,000 volts with a 6,000/400 transformer, or 380 volts without this transformer.

The excavator's lightness and walking mechanism permit operation on swampy ground, loose ground, and open pits. Moreover, it may be used for other excavation work, such as digging canals and irrigation systems.

Unlike US excavators which use a similar but expensive direct-current electric drive, the ESh-1 uses an original alternating current drive proposed by construction engineers of the "Elektroprivod" Trust of the Ministry of Electrical Industry. This electric drive cuts the cost of electrical equipment in half, simplifies operation, reduces electrical consumption, and makes operations safer.

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The electrodynamic brake action on the ESh-1 works very satisfactorily and uses 40 times less electricity than braking by counterflow.

Data of a year's operation of the ESh-1 shows that it uses 12 percent less electricity than US excavators of the same type.

Technical data of the ESh-1 excavator follows:

Dragline

Full swing; shovel capacity 3.4 cu m

Length of boom 38.0 meters

Operating range when boom is at 35-degree angle

Maximum radius, unloading 34.0 meters

" " excavating 42.0 "

" depth, excavating 20.0 "

" height, unloading 17.0 "

Velocity 0.3 km/hr

Length of step (theoretical) 1.83 meters

Maximum angle of grade in moving 15 degrees

Pressure on ground

Base 0.37 kg/sq cm

Shoe 0.8 " " "

Dimensions of machine in working condition

Length 47.0 meters

Height 24.0 "

Width 10.0 "

Total weight 163.0 tons

Power Alternating current

Motor capacity 31.3 kw

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