Scooptrams in overseas mines

Mining

One of the most common types are currently loading mining equipment operating underground mines overseas, are productivity-vysokopro s cargo dostavoch nye-machine (PDM), which are used in room-and-pillar system design, system of horizontal layers with a bookmark, the systems with magazinirovaniem ore substage-tion and the collapse of the floor, as well as the mining works. Application of PDM also provides for the construction of new projects in mining enterprises.

Created and operated at the treatment works and the tunnel are several types of cargo dostavoch-GOVERNMENTAL machines. There are two main groups: machines with storage capacity that load ore bucket in his tank for later delivery, which include "Transloder" and "Ekspaskup" firm "Joey" (USA, France), "Autoloder" firm "Atlas to Cope" (Sweden), and some models are "Eymko" (USA), machines, transporting ore in the ladle, which include the LHD firm "Eymko," "Scoop Three" firms "Wagner" (USA). PDM firm "Schopf" (Germany) and "Skupmobil" firm "IABC" (USA). All these machines are available in pneumatic run mostly diesel driven. Diesel cars are equipped with scrubbers to clean the exhaust gases have a hinge-but-jointed body and equipped with hydraulic controls for the individual working units. Almost all the cars the company "Atlas Copco" and some of the VSD by "Eymko" produced with a pneumatic actuator.

Each type of machine has its own idiosyncrasies. Thus, the machine "Transloder" and "Ekspaskup" have the tank capacity of 20 tonnes, and work especially well for large distances delivery. These machines are often used in room-and-pillar system design, which is required to provide high performance for loading and transportation of ore, and there are conditions for the use of machines of considerable size. Available in several models transloderov (TL-50, TL-55, TL-60, TL-70 and TL-110), which differ in size, capacity, and method of discharge. Machines TL-50, TL-55, TL-60 TL-70, working at many mines in the USA, are available with bottom discharge hopper through the hatch, which requires a special adaptation of the ore passes or a conveyor for unloading rock mass. Machine TL-70 9.5 ton capacity, working on a lead mine, "Mag-MONT" (Missouri) at room-and-pillar system design, loading and transporting 500 tons of ore per 8-hour shift at a distance of 420 meters each way. Sometimes the ore is delivered to the machines to the bunker in the trunk, while the transportation distance of 1000 m or more. Haulage drifts to move the machines are a cross section 3,05 X4, 2 m

Transloder TL-110 comes with a bucket capacity of 1.6 m 3 and hinged hopper capacity of 9.6 m 3 (Fig. 1).

PDM "Ekspaskup", produced in France by "Joy" and used in the French iron mines are pivotally-co-articulation body, its own hydraulic bucket load and unload a telescopic device bunker. The machine "Ekspaskup» ES-2 payload can carry 15 tons of ore over a distance of 450 m at 680 m productivity / man-shift 11].

Widespread in the mines of Canada and the United States received and unloading, delivering cars

"Scoop Three" firms "Wagner", produced with a bucket capacity of 1.5 to 8.5 m 3 , with capacity from 3.5 to 16 tons and engine power from 78 to 225 liters. a. These machines, as well as the LHD car company "Eymko" is easily loaded and abrasive lumpy ore and can be used for loading ore into dump trucks or other vehicles. In 1970 the company "Wagner" has released a new small-sized car HST-1 in air-operated cranes with diesel engine "Deytts" and hydraulic power transmission to the chassis of the car. Foot pedal control allows smooth control of machine speed from 0 to 10 km / h HST-1 machine with a bucket capacity of 0.76 m 3 highly manoeuvrable and is designed to work in the workings of a small cross section (height in transport position 1800 mm. width 1200 mm).

In 1970-1971. in the mines of Canada experienced further growth in the proportion of sublevel caving with pogruzoch-but-haul equipment. At the 8 mines of Inco Sudbury area in 1970 to work on the 146 and unloading, delivering cars, 5 of them - with a bucket capacity of 6 m 3 , 97 - 3.8 m 3 , 2 - 2.3 m 3 , 32-1 5 m 3 , 10 - 1 m 3 . Canadian experts noted that the mines of Canada's most frequently used immersed zochno-delivering machine "Scoop Three» ST-4A carrying capacity of about 6 tons in 1970 the mines employed more than 150 vehicles of this model, which represents almost 50% of all on- unloading, delivering cars in the country [2]. The machine works efficiently for systems development with magazinirovaniem ore drifts sublevel, sublevel caving and storied, with systems development: the bookmark.

In Fig. Figure 2 shows the performance of loading and suffi-nal machines "Scoop Three" of the distance of transportation in the mine "Sudbury."

On mine, "Kraygmont" (Canada) in the extraction of 3,000 tonnes of nickel ore per day system of sublevel caving are seven cars ST-4A, each performance

300 tons / shift at a distance of 220 m in the delivery of an end. The mine achieved the productivity of 13.5 tonnes / man-shift, including staff and supervision.

The firm "Eymko" produces pogruzoch-but-haul car models 911LHD, 912LHD, 915LHD, 916LHD 920LHD and diesel driven, with bucket capacity from 0.76 to 7.6 m 3 . The latest model of this company - 920LHD machine with a bucket capacity 7.6 m 3 can work in the mines section 2,7 x3, 7 m at a speed of 16.5 m with a cargo of 22.4 km / h The car has a four gearbox with one reverse gear to transfer. 911LHD VSD is small in size and can work in mines section 1,8 x1, 8 m (Fig. 3). The machine can load the pieces up to 1000 mm and has been used successfully in the mines of the United States, Canada and Australia under a system of horizontal layers with a bookmark, during sublevel and inclined workings of Congresses, replacing the scraper delivery. To ventilate the workings, which operates a diesel engine model requires 911LHD 109 m 3 / min air. The performance of such a machine, working on the Canadian mine "Aunor" which develops gold deposit system of horizontal layers with a bookmark at a distance of shipping ore to the descent of 45 m on average 48 t / h [3].

The firm "Eymko" also produces machine models 802 and 803 with the hopper and pneumatic actuator for use mainly on tunneling works at distances up to 100 m delivery

Company "Atlas Copco" (Sweden) produces Scooptrams type "Autoloder" models T4G, «Cavo" 310 and "Kavoe 510 for air-operated cranes with pneumatic actuator and T7GD car with diesel drive capacity of 200 liters. ie, a bucket capacity of 1.5 m3 and the hopper with a capacity of 5 m 3 , downloadable rollover ago. The machine "Cavo" 310 has a bucket capacity of 0.13 m 3 and a hopper capacity of 1 m 3 , the capacity of the bucket at the "Cavo" 510 0.5 m 3 and a bunker - 2.2 m 3 .Scooptrams of this type have good mobility, can be used when loading hard, abrasive rocks and ores in the sinking of the workings, for systems development with a bookmark and sublevel caving. The compact design allows use in mines the minimum cross section: 2,2 x2, 3 m for the "Cavo" 2,8 X3 310 and m for the "Cavo" 510. The distance delivery for these machines of 100-200 m, but usually at the treatment works is 35-45 m

The machines of this class applies Scooptrams «Taiku» T-ZN company "Nichimen" (Japan) with a bucket capacity of 0.2 m 3and the hopper capacity of 1.2 m 3 . The height of the rock mass unloading at overturning the bunker 510 meters, which allows you to use a car for stowing operations.

Using a small VSD in the workings of a small cross-section allowed to replace the scraper during the delivery of sublevel openings and implement a mechanized system design horizontal layers with a bookmark, which is now widely used in overseas mines for mining non-ferrous metals.

Using a self-propelled drilling and LHD equipment carrying capacity of 1 - 8 tons on Canadian mines that use the system with the development of horizontal layers tab, allows to achieve productivity in the slaughter of 720 - 1350 tonnes / man-shift at high utilization rate of machines in a closely spaced lava. Under these conditions, a preferential distribution of VSD were firm "Atlas Copco" with pneumatic drive, diesel-powered cars "Scoop Three" firms "Wagner" with a bucket capacity of 1,5-3,8 m 3and the car company "Eymko» 911LHD with bucket 0 76 m 3 .

Based on the analysis of the practice of Scooptrams in overseas mines, there are two main schemes of delivery of ore from the working faces.

A. Location haulage horizon at the same level with the lava, which allows for loading and transporting the ore suffi-nal machines directly to the faces of the bunkers shafts. So, on a lead mine "Viburnum" (USA), using room-and-pillar system design machine "Transloder» TL-55 has successfully transports the ore from the working faces at a distance of 900 meters, and the mine number 29 - a distance of 1200 m, but with a significant decrease in performance.

Two. Stope and haulage horizon is located at different levels with an overload of ore, ore passes through the most, in other vehicles. Thus, at the mine, "Fletcher" (USA) in the development of a large gently dipping ore body strike the main haulage horizon is located at 42 m below the mine. From the working faces PDM deliver ore to the ore passes and then reloading it on the transportation of haulage workings horizon to the trunk of mine dump trucks with carrying capacity 35 and 40 that some mines, such as "Ozark" and "Milk" (Missouri), at a distance of transportation of up to 4.8 km of rail haulage is used as a more cost-effective, and the distance of delivery for cargo vehicles dostavoch-GOVERNMENTAL taken to be 250 - 300 m [4].

The following table shows the technical characteristics of new Scooptrams issued by foreign companies over the past 5 years.

With increasing load length of delivery vehicles for the last two years has increased from 210 - 240 to 760-910 m, which is obviously a limit for the existing types of VSD. The most cost-effective delivery distance of 300 m is considered speed of movement of vehicles in recent years has also increased up to 24-30 km / h at an average speed of 9,6-12,8 km / h The main factors affecting the speed of movement, are the sole workings of the coating and the magnitude of deviations. Most of the cars cross the slopes up to 17 ° [5].

Most good and cheap way of covering is gravel with a size of 16 mm pieces, spread and compacted machines. The cost of coating thickness of 12.7 cm

drifts section 4,27 x2, 74 m averaging 1.64 USD / m Concrete is used to cover the soil in all the loading points at the location of the ore pile. As noted, the destruction of soil loading workings to a depth of 20 cm significantly reduces the performance of loading.

The presence of good roads, regular check-ups and high qualification of operators are a prerequisite for the application of self-propelled equipment.

REFERENCES

A. Dosmont. Evolution of load andcarry Machines in underground Mines. New York. In 1970. [Report on the Meeting of the American Institute of Mining Engineers (AIME)].

Two. Mamen S. Annual round - up of Canadian Mine Technology. «Canadian Mining Journal», January, 1971.

Three. PJG (Pete) du Toit, Leonard P. Colvin. Why underground Mining technology holds great promise for the 1970's.«World Mining», June, 1970, v. 23, № 7.

4. Parker I. The use of small Load - Haul - Dump Eqipment at Bunker Hill in Mining and development Systems. AIME, World Symposium on Mining. New Jork, 1970, v. 1, Section III.

Five. Load - Haul - Dump Machines are changing Mining concepts. «Engineering and Mining Journal», 1970. June.

- Before the Storm
- Ninth height
- Wanted people a lot of people ...
- With the approach of the party
- Double ordenonosnogo
- The country needs a metal
- Search reserves
- Blast furnace plant in the ranks!
- By the half-century anniversary
- Genesis - total care
- Seven years - ahead of schedule
- Rate of STD
- Chronicles the history of the plant
- Penetration of rising with the tunnel complex CPV-1
- Dust on the concentrators
- Picking up the pace
- Head of Construction
- To teach, educate, lead the
- On Lenin's shock watch
- Harder to keep a step
- The effect of reconstruction
- During the height of the height
- New technology development of ore deposits by underground mining (in order of discussion)
- Steppe Krivorozhskaya
- According to the plans of social development
- By law, friendship and cooperation
- Finish tenth Five-Year Plan
- For a complete metallurgical
- Under the banner of the 50th anniversary of the October
- The development of brigade forms of organization and motivation in enterprises RPO "Ukrruda"
- The experience and effectiveness of self-propelled hydraulic butoboev
- To work to win
- On the drawing paper - in production
- The costs of growth
- Golden Jubilee of the Motherland
- Birth of the giants
- A look at tomorrow
- Work and study
- Much to start
- Where difficult
- Honour and Glory - Labour
- On the way to the records
- People with gold stars
- The clouds over the city
- Defeat to work again
- To go further, do more

- Best - awards of the Motherland
- The first breath
- Build and produce
- Restless Heart

Main Menu

- Chronicles the history of the plant
- Krivorozhstal
- Mining