D. Shevchishen
O.V. Hydaya, research supervisor
I.A. Ivanchenko, language adviser
SHEI “National Mining University”, Dnipropetrovsk

Automatized Electric Sweep Drive of Excavator EMS-5a

The aim of this paper is to study and to analyze the sweep drive control system of excavator EMS-5A (electric mining shovel).

EMS-5A is an electric mining rotary mechanical shovel that ismounted on caterpillar tracks. It is used to dig off and to lift minerals and overburdens from the ground to conveyer. It is employed not only by strip-pits, open-pits and stone-pits, but also by the construction of industrial, hydraulic and other structures and buildings.

EMS-5A consists of abucket, a turntable and a carriage. The basic excavator’s mechanisms and the mechanism of bucket-opening are set in motion with the help of direct-current motor (DC motor) while alternating-current motor puts in motion the auxiliary mechanisms. The sweep drive works with the help of 2 DC motors with indirect excitation.

The swinging mechanism of EMS-5A operates as a generator-motor system. In this paper, the system was changed to thyristor converter-motor system in order to improve accuracy and servicing capacity of the excavator.

Comparative assessment of technical and economic coefficient

	Index	Unit	Project variant	Basic variant
1.	Capital expenditures	hryvnia	81983,14	65273,42
2.	Running costs:	hryvnia	165702,74	197383,20
	- servicing costs	hryvnia	695,36	2693,16
	- energy input costs	hryvnia	148610,75	181635,36

When the new equipping is implemented, the sources of cost-effectiveness will be:

- Decrease of down-time
- Reduction of electricity consumption
- Reduction of servicing costs

According to the technical-and-economic assessment the project is compensated in 2,5 years, therefore it is worthwhile.