performed by programmable microprocessor devices (freely programmable controllers) and proportional electromagnets are used as an electromechanical converter, are the most widely spread.

Dynamic characteristics of a hydraulic drive with a proportional program control depends on both, the characteristics of the hydraulic equipment and the capabilities and characteristics of the control system. Therefore, the study of the entire chain - from the formation of a control signal to its reproduction by a controlled hydraulic device, will allow forming the algorithms, correcting control signals, according to the characteristics of both, the hydraulic drive and its control system.

To achieve the goal, an experimental stand, including a freely programmable controller, control signal amplifier E-MI-AC 01/F, a proportional electromagnet and a flow controller, was developed. The studies found the statistical dependence of the hydraulic fluid flow on the control signal, also, the control algorithm was formed, taking into account the nature of the transient process, that allowed to reduce the readjustment value to 3% and to receive a non-periodic transient process.

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REDUCTION OF NONPRODUCTIVE LOSSES IN THE HYDRAULIC DRIVE CONTROL SYSTEM OF A MOBILE MACHINE ON THE BASIS OF THE COUNTERBALANCE VALVE

For domestic mobile machines such as loaders, operating processes are accompanied by the nonproductive losses and the lack of moving speed stabilization. In particular, the nonproductive losses occur because of the attempt to control the speed of lowering of an unloaded actuating device when using throttles with reverse valves. The above-noted issues are solved by way of replacing throttles with reverse valves by counterbalance valves. Designing and studying of the hydraulic drive control system with counterbalance valves is topical.

In the report, the computational scheme and mathematical model for the simulation modeling of transient processes in the hydraulic drive control system on the basis of the counterbalance valve have been considered. The transient processes for various modes of the actuating device lowering have been calculated: a combination of the low and high moving speed modes V of an actuating device with a low and high load T. In particular, the transient processes of the change in the moving speed $V(t)$ of an actuating device, the pressure values in the hydraulic cylinder $p_y(t)$ and in the pressure main $p_n(t)$ at different modes of the actuating device lowering have been presented.

The value of the energy conversion efficiency η during the actuating device lowering has been calculated. The possibility of stabilization of the actuating device lowering has been demonstrated. The power losses for two variants of hydraulic drive control systems: with throttle speed control and with the counterbalance valve - have been compared.

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СИСТЕМА КЕРУВАННЯ ПРИВОДОМ СТАЦІОНАРНОГО КРАН-МАНІПУЛЯТОРА

Ефективним напрямком удосконалення стаціонарних кран-маніпуляторів є розробка системи керування об’ємного гідропривода з асинхронним електродвигуном у якого для регулювання швидкості обертання використовується частотний перетворювач.

На сьогоднішній день частотні перетворювачі є найбільш ефективними пристроями керування асинхронними двигунами. Регулювання швидкості обертання асинхронного електродвигуна в цьому випадку здійснюється шляхом зміни частоти і величини напруги живлення двигуна. Використання частотних перетворювачів дозволяє: зменшити енергоспоживання електродвигуна; керувати швидкістю обертання електродвигуна; уникнути перевантажень електродвигуна і тим самим збільшити його термін служби.