

MECHANIZATION AND AUTOMATION OF PRODUCTION

MODERNIZING THE SM-143 PRESS

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At the Bogdanovich Refractories Plant, ladle and cupola bricks and other high-density chamotte products are formed on PK-630 and SM-143 toggle presses. The latter are more suited for refractories production than the PK-630 type because their holding time at maximum pressure is 1.8 times longer than on the PK-630.

When molding high-chamotte high-density brick on the SM-143 press, however, the specific pressure is significantly greater (1500-2000 kg/cm²) than for ordinary chamotte brick so that the main components and elements were not strong enough.

The requirement that the quality of the brick must be improved by increasing its density made it necessary to modify the SM-143 presses to give a molding pressure of 560 tons in place of 425 tons.

Making use of the experience of other refractories plants, the ejector mechanism was modified so that the top ram was lifted from the molded product just before the latter was ejected. The molding mechanism and drive shaft assembly were strengthened with account taken of the impending mechanization of control.

In April 1973 operations were started on the first modernized press on which, moreover, the cast iron base had been replaced with a steel base made in three sections to facilitate its manufacture in the machine shop of the plant and its assembly on site.

The guides and slide blocks of the molding mechanism were modelled after those in the PK-630 press and provided with reliable seating and clearance adjustment. The guides were lined with case-hardened sheet steel. The bronze lateral guides of the molding mechanism were replaced with Caprolite ones.

The design of the crankshaft assembly was also modified. All components were made to match those of the modified assembly of the PK-630 press so that all main components of the crankshaft assembly (bearings, bearing body covers, labyrinth wheels, nuts and the shaft itself) of the SM-143 and PK-630 presses became interchangeable.

The crankshaft of the SM-143 press was reinforced and the journal of the connecting rod was lengthened to 330 mm. The bronze lining of the connecting rod bearing was replaced with a Caprolite one which gives a better seal.

The bronze lining of the journal bearings of the crankshaft was replaced with double-row tapered-roller bearings in solid housings with labyrinth seals. The bearing housings were made of steel grade 55L and provided with extra securing wedges.

The shaft assembly of the carriage mechanism was placed on antifriction bearings. The dimensions of the mold body were modified and it was secured more firmly. The seating of the bearing housings of the intermediate shaft was reinforced.

The filling height of the mold is now controlled by mechanical means with a button on the control panel of the press. Two terminal switches ensure that the drive motor of the press can be started only when the lower ram is in the top position.

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Material spinning over from the mold is collected in a trough fitted with a tubular jiggling conveyer. Tending has been facilitated by enlarging and deepening the service pits.

A special housing is in the design stage and when installed will reduce the dust production.

The capacity of the mold-filler box has been increased and the sleeve suspension modified to reduce attrition of the molding compound during the filling of the mold.

All presses have been provided with central lubrication. Four of these modified presses are now operational.

The modernization of the SM-143 has made it possible to improve product quality, increase the performance efficiency of the press, introduce unit repair, reduce air-borne dust, and improve the working conditions.