crucible is dried by using coke for 8 to 10 hours and followed by the full 250 kwt. Most corrosion occurs at the bottom and wall joints (see Fig. 2) and is due to poor ramming and cracking. Inadequate fastening may cause a shift of the inductor and deformation of the crucible because the bottom is compressed between stationary plates and the walls surrounded by the inductor.

Experiments with optimal specimens showed that 15% MgO must be added to slag mixtures. Unless the recommended MgO amount is added, the lacking amount of MgO will pass into the slag from the lining, destroying its slag zone.

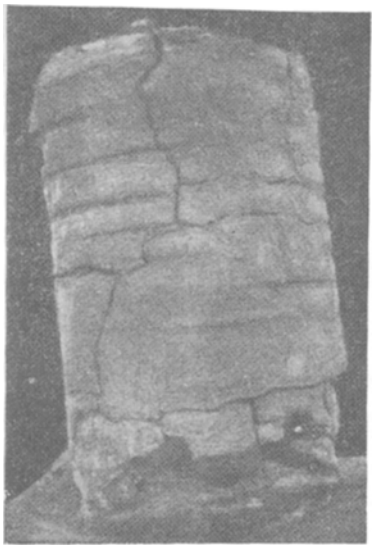

Fig. 2. Lining of crucible after nine heats. Corrosion occurred at the slope.

MECHANIZATION AND AUTOMATION OF PRODUCTION PROCESSES

WORK OF THE DESIGNING OFFICE AT ZAPOROZH'YE REFRACTORY PLANT

A. A. BARANOVA
(Zaporozh'ye Refractory Plant)

A designing office was set up at Zaporozh'ye Refractory Plant by the Central Laboratory of Automation and Mechanization of Production Processes to prepare the plans for mechanizing and automating work.

The office has already completed the blueprints for the stripping of regular and ladle brick from "SM-143" type presses and the removal of ordinary and cupola brick from automatically controlled hydraulic presses made at the Ural Plant of Heavy Machinery. An experimental automatic stripper has given good service. In order to allow a fuller use of the stripper, a blueprint for the automatic grouping and reloading of refractories into drying cars was prepared. The mechanization and automation of the stripper will release two persons per shift and per hydraulic press amounting to a total of over forty persons who service the presses of the chrome-magnesite refractory shop. The designing office completed blueprints for the automation of drying drums, the proportioning of powder in centrifugal mixers (model "115") and the transport of powdered material. It also works on the plans for an automatic push-conveyer for the transport of semi-finished products to the charging sites and a charging machine for the loading of the semi-finished goods into cars. The designing office at the Division of the Chief Mechanic is responsible for the continuous supply of spare parts and pressure cast molds, the improvement of available technological lines and the elaboration of new suggestions and inventions.

In 1960, the Magnesit plant started the production of forged iron frames for drying cars. The designs of dies for the manufacturing of intricate frames for a 400 ton friction press is completed. The use of iron frames instead of cast aluminum frames led to a yearly saving of about 70 ton aluminum and 12,000 rubles. The designing office completed the following plants: a tube mill for the combined grinding of chromite and magnesite, the lubrication system for that mill. The operation of the tube mill allowed a substantial increase as the manufacturing of periclase-spinel refractories.

Based on the practice of Krasnyy Oktyabr' Plant at Konstantinovka, a blueprint was prepared for the manufacturing and installation of mechanical presses for steel-casting stoppers. Furthermore, drawings for the installation of two presses designed by I. F. Yurchenko have been prepared.

The use of the presses will enable to launch the mass production of sleeve bricks by semi-dry method. The rated yearly savings as a result of the use of these presses will be 54,000 rubles. A mechanical shovel for the unloading of magnesite powder from railway cars was proposed by G. T. Tayganikov and drawings were elaborated by the designing office. Another project pertains to the delivery of the mixture to 200-ton hydraulic presses for the production of refractories by semi-dry method. Upon the proposal of N. Z. Pashchenko a filling valve for that press was elaborated. All these measures enhanced the productivity of the press. A technological line for the production of metal boxes including a punch yields a yearly economy of 19,000 rubles to the plant.

Upon the initiative of the local population a Public Designing Office was set up in 1961. The members of that office completed a plant for centralized lubrication of the "SM-143" type press and a project for a crusher to grind defective raw material in the chamotte shop. Work is under way to mechanize a subsidiary kolkhoz. The work of the designing offices allowed the implementation of a number of effective measures concerned with the mechanization and automation of production processes within a short period of time. The staff of the designing offices will marshal every effort to turn the Zaporozh'ye Refractory Plant into a highly mechanized and automated enterprise.

RAW MATERIAL

FIRECLAY MINING IN KIMOVSK COALFIELDS

S. M. KIRYUKHIN AND A. M. GUSENKOV
(Greater Moscow Coal Institute)

The considerable deposits of fireclay in the Tutal oblast coalfields are worked by open method. Underclay, beds between coal seams and top clays are mined at different sections of the Kimovsk coalfields simultaneously with coal. The color of the fireclays is gray and dark gray. It contains small pyrite nodules and carbonaceous matter. The estimated deposits of fireclay in that area amount to about 100 million tons.

The properties of the fireclay were studied at the Greater Moscow Coal Institute that prepared 380 specimens from the underclays, beds between coal seams and top clays jointly with the Tula Geological Survey Expedition. The occurrence of the clays and coal seams is shown in Fig. 1.

Underclays underlie the basic coal seam and expand throughout the coalfield. Their color is gray and dark grey. They are platic and change into gray somewhat sandy clays in the north western part. The thickness of the bed is three to four m. Chemical composition and physical properties of underclays are shown in Table 1.

The underclays may be classified into two groups: (a) clays with at least 30% $Al_2O_3 + TiO_2$ and maximum 3% Fe_2O_3 after firing, loss on ignition not over 15%, refractoriness minimum 1670 °C; (b) clays with a minimum 18% $Al_2O_3 + TiO_2$ and a maximum 4% $Fe\%O_3$ after firing, loss on ignition not over 12%, minimum refractoriness 1670 °C; the deposits amount to 1,200,000 ton.

The central clay separates the main coal seam into two 1.0 to 4.0 m thick beds. The expansion and thickness of the clay layer is rather uniform. In the first section, the color is dark gray and occasionally black, the clay is plastic and oily.

The deposits of central clays in coalfield Nr 1 amounting to 1 million ton are suitable for the production of grog in manufacturing grade B refractories. At coalfield Nr 2 the central clays extend throughout the entire area. The thickness of the seam ranges from 0.6 to 7 m with an average of two to three meters. The color is gray and dark gray, the

PROPERTIES OF UNDERCLAYS TABLE 1

Performance figures	Minimum	Maximum	Predominant
Content in sintered material, %:			
$Al_2O_3 + SiO_2$.	17,50	42,63	30,0—35,0
Fe_2O_3	0,80	6,55	1,8—2,0
Loss on ignition, % .	6,63	23,28	10,0—15,0
Refractoriness, °C .	1600	1750	1670—1700
Water content, % . .	17,0	29,0	20,0—25,0
Air shrinkage, % . .	3,8	8,8	5,0—6,0
Firing shrinkage at 1300 °C, % . .	7,8	18,9	13,0—15,0
Absorption at 1300 °C, % . . .	1,13	19,35	5,0—10,0