After drying is complete the cars with the containers are delivered by the electric bogey to the store, and the containers are removed with a bridge crane and stored. Before loading into the railway cars, the containers are tightly covered with lids.

The containers are made of heat-resistant steel in order to avoid oxidation and contamination of the powders with scale. The construction of the container was worked out according to a factory project by the Ul'yanovsk scientific-research and planning institute for engineering. The capacity of the container is 1 ton and is based on a single utilization of powder at the automobile factory.

The method of drying powders completely eliminated contamination of the air and segregation of powder. The drying process is completely mechanized.

In arranging mass production it is possible to use the wet method of preparing the compound followed by dewatering on vacuum-filters and drying with the proposed method.

SHAFT FURNACES AT THE SEMILUKSK REFRACTORIES FACTORY

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Department No. 5 of this plant has reconstructed all shaft furnaces from square cross sections to round on the existing foundations, which has increased the volume of each furnace by 8 m³ and the chamotte output by more than 50%.

In connection with this shortening of the heating zone and the rapid entry of the material into the high-temperature zone, the briquet cracked and was destroyed, as a result of which there was an increase in the dust removal and in the aerodynamic resistance in the kiln.

Despite the elongated cooling zone, the chamotte left the kiln with a high temperature – up to 500°C. This adversely affected the working conditions. The use of water to cool the discharged chamotte contributed to steam formation. Furthermore, because of the high temperatures of the chamotte, the belt conveyers were put out of action for several weeks. The use of metal slat conveyers demanded a large expenditure on installation, servicing, and repairs. The use of rotating grates for discharge from the kiln fitted with sharp teeth was also unsatisfactory; firstly, there was skewing of the fired material zones due to the irregular discharge because of the different states of the material, which in turn adversely affected the degree and uniformity of firing; secondly because of the high temperatures at discharge and the presence of fusions the unloading devices were constantly breaking down.

The use of VD-8 fans for cooling the chamotte hindered the regulation of the kiln's aerodynamics and sharply increased the dust content in the building, despite the installation of sluice traps at the chamotte discharge sites (these consisted of three chambers separated by sequentially opening valves).

The chamotte from the kilns had to be unloaded with Antonov system devices made in a reinforced version with two parallel sliding blocks.

The welded metal girders carrying the lining and the rigid girder over the discharge area were rapidly deformed because of the high temperature of the chamotte. Using water for cooling the girders proved to be unsatisfactory since the slightest deformation broke the seal, and circulation of the water ceased.

The installation of a connecting pipe (expanding toward the top) in the heating zone, in order to increase the volume of this zone, and hence the material's dwell time in it, in the same way as a gutter around the periphery of the kiln for taking off waste gases did not give satisfactory results. On the other hand, because of the peripheral suction of gases into the central part of the heating zone, we noted steaming of the raw materials, and adhesion of the briquets which were thus discharged from the kiln quite unfired.

As a result of the large number of burners (18-20) and the inspection windows over them, it was not possible to arrange a monolithic lining in the firing zone; the slit apertures for evacuating the gas-air mixture were destroyed, and they had to be continuously cleaned to remove sticking material. The lining in the firing zone was rapidly worn out. Servicing of the burners was complicated.
For all these reasons the kilns had to be stopped frequently for capital repairs - once every 3 years.

The collective of the department took many steps to increase the effectiveness of the shaft kilns: increasing the interrepair periods, improving the quality of the chamotte, facilitating the working conditions, and improving the production standards.

One of the main problems was to reduce the temperature of the chamotte at discharge. It was possible to do this by reducing the aerodynamic resistance of the material in the shaft.

Experiments were made to increase the strength of the briquets. The molding on roller presses of cellular shaped briquets measuring 70 \times 90 \, \text{mm} instead of 90 \times 120 \, \text{mm} enabled us to increase the compressive strength from 1.0–1.1 to 1.5 \, \text{MPa}. The briquet with the reduced dimensions was less extensively damaged in firing. However, there was a reduction in the press output. It was necessary to establish additional units to increase the force of the roller presses.

To prevent "crumbs" getting into the kiln (pieces of raw material from the edges of the briquet after shaping) it was screened on pouring devices made from metal rods and rotating in a double-shaft mixer. Furthermore, the lower heads of the elevators were fitted with grids, and between the guards ejecting the briquet into the hopper over the kilns and the belt conveyor we left certain gaps which also serve to separate the crumbs with the aim of returning them to production.

The clay before being handled by the roller presses is blended in double-shaft mixers and moistened where necessary to 20–22\% with warm water.

To eliminate suction of air into the kiln, work was done to seal the burners and inspection windows. The slits in the lining for repairing the burners and discharge of gas–air mixture were made with a special shape produced at the factory. The effectiveness of the burner operation and the service life was significantly increased. The number of burners in the kiln was reduced from 18 to 14. The upper band was fitted with 8 injection burners in checkered fashion and with 6 burners in the lower band. This arrangement ensures uniformity of firing near the lining and increases the guarantee of firing in the middle of the kiln. The upper row of burners was lowered 300 \, \text{mm}, which elongated the heating zone and created a more concentrated firing zone with regard to maximum temperatures.

The connecting pipe in the heating zone and the channels around the periphery of the kiln for taking off the flue gases were eliminated.

For various reasons, sometimes the temporarily rising flue gases have a high temperature, as a result of which the cover of the kiln is often deformed, upsetting the sealing, and this causes air intake. Recently the covers have been fitted double: inside the metal housing a cover is made of metal sheet up to 16 \, \text{mm} thick which is covered with a layer of insulating articles and at the top metal sheet up to 20 \, \text{mm} thick is fitted with bolts.

An important role is played by the distributor cone during charging of the briquet. Its purpose is to distribute the briquet charge toward the walls of the furnace around the periphery. As a result of the funnellike level of material in the kiln the more perfect briquet rolls to the center, which thereby guarantees firing of the material in the central part.

The longer service of the metal constructions contributed to the replacement of the welded girders carrying the lining and the ridge girders over the discharge carriage by cast iron castings having straight-through cavities inside. This excluded the use of water for cooling.

Shaft furnaces are affected by: automatic loading of briquets in the hopper over them [1]; automatic loading of briquet in the kiln which is effected according to the prescribed output, the essential temperature of the flue gases, and the presence of briquet in the hoppers; automatic maintenance of a certain level of charge in the kiln, blocked with the operation of the discharge devices, which ensures regular operation of the kiln and almost constant movement of material through the shaft.

The collective is working to improve the systems of unloading the chamotte so that, depending on the heat schedule and the state of the unloaded material, there will be constant movement of material along the shaft. This will exclude the formation of fused areas and also adhesion to the lining and will provide more uniform firing of the clay.

The work sites of the firing operators have been fitted with sound and light signalling panels to control the flue pumps and discharge devices.