The measures which have been described make it possible for the factory to save a considerable amount of nickel each year in the melting of electric steels.

THE RAPID BURNING-IN OF NEW HEARTHS

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In recent years the technique of hearth running repairs has undergone considerable changes, but new hearths are still burned-in with the old method—in thin layers with prolonged baking of each layer.

In our factory new hearths were, as a rule, burned-in in twelve layers, each layer baked for 7-8 hours (the total time taken in burning-in was about 100 hours). This was explained by the deeply inrooted opinion that the whole mass of the magnesite should be carefully baked in.

In working with magnesite-chrome roofs, the furnace heat power has increased considerably: therefore, burning-in new hearths in thin layers with prolonged baking leads to this; the slag melts and, penetrating into the lower layers of the burned-in hearth, enriches them. On the other hand, the upper layers are denuded of slag, and become "dry," "over-roasted," because of which the magnesite grains are imperfectly welded together. This sometimes leads to the breakdown of the burned-in lining in the first melts.

Our factory, having made use of the experience of other undertakings, has developed a technique suitable to the local conditions, of burning-in hearths in thick layers, each layer being treated with furnace scale. In burning-in and repairing hearths, the forming of the layer being burned-in is completed in burning-in subsequent layers, and consequently there is no possibility of finishing off the complete welding of each layer in the process of baking it. It is adequate to ensure that the grains of magnesite powder are held in the layer.

The new technique has considerably shortened the time taken in burning-in: whereas with the old technique, burning-in the hearth of one furnace took 95 hr 05 min , with the new technique in burning-in the hearths of two furnaces 40 hr 30 min and 33 hr 20 min, respectively, were required. The hearths were burned-in in four layers, the thickness of each layer being 50 mm.

Below is described the burning-in of the hearth in two furnaces of medium capacity with chrome-magnesite roofs, working on natural gas with fuel oil carburetion. For starting the slagging-off, the furnaces were well heated (the roof temperature was 1800° C; regenerator temperature, 1250° C)* .

To slag-off the lining, a mixture consisting of 50% ground slag and 50% furnace scale was used. The mixture was thrown in through all the doors onto the hearth, slopes, front and rear walls. When a slag pool 80-100 mm deep had formed on the hearth, it was splashed with special rabbles onto the slopes and onto the front and rear walls. After holding for an hour, the remaining slag was poured off from the furnace into a slag pan. In slagging-off, which lasted about 5 hours, 13 tons of mixture was used.

The hearths were burned-in with pure magnesite powder, which had been riddled through an 8-mm-aperture sieve, the fine fraction not being sieved off. After the magnesite powder had been uniformly scattered, the hearth was baked for 4-6 hours, then the layer was treated with furnace scale, at the rate of about 20-25% of the magnesite powder consumption, with subsequent baking for 1.5-2 hours. The constructional shaping of the angles of inclination of the hearth and slopes was begun in burning-in the first layer.

* The hearth was built up by Chief Foremen I. I. Nabiev and V. M. Katykhin under the direction of P. P. Podgornii; the building-up technique was controlled by O. I. Sarkisova, T. K. Khateeva, M. V. Chubko, and T. M. Torunova.

Before adding each subsequent layer, a sample of the burned-in hearth was taken. The layer was considered to be thoroughly burned-in if the sample did not disintegrate after cooling in air. The samples taken back were black in color with a brown tinge; and in the fractures the different grains of magnesite were hardly visible.

In connection with the use of furnace scale in burning-in hearths, the ferrous oxide content increased considerably and the magnesite content was somewhat reduced: however, as experience has shown, this had no effect on hearth life. After burning-in, the hearth is cooled during 12-15 min and the introduction of the charge is begun. The first melts went well, without breakdown of the burned-in lining, with fluid slags, and subsequently the condition of the hearths has also been good.

In both furnaces the life of hearths burned-in with the new technique has turned out to be longer than in hearths burned-in with the old technique.

In this way, the use of the new technique gives a considerable advantage in time (2-3 days) and ensures high quality in burning-in new hearths.

Each year the team of Communist labor of the blast-furnace workers of the Zakavkazsk Metallurgical Factory, led by Archil Dzamashvili, Hero of Socialist Labor, gives hundreds of tons of pig-iron more than planned. All the members of this team play their part. Archil Dzamashvili himself is a student of Course IV of the V. I. Lenin Gruzniskii Polytechnic Institute. In the photograph: Archil Dzamashvili (in center) with members of his team.

Cherepovetsk Metallurgical Factory. Workers of the blast-furnace shop, who have achieved the high status of Collective of Communist Labor (from the left): Furnaceman M. F. Gusev, Furnace Foreman F. F. Smirnov, Furnace Chief A. Ya. Kiselev, Furnaceman Yu. D. Smirnov, Water-Supply Fitter F. Ya. Tsvetkov, and Furnaceman A. I. Gutorov.

TASS photograph