

Charging Practice:

Its Effect on Open Hearth Output

by William Schwinn

TO obtain a more uniform charge and faster charging time at Keystone Steel & Wire Co., the time of the scrap preparation crew and the stockers is scheduled to make the best use of the scrap available.

Previously, the use of the scrap preparation crew in loading No. 2 heavy melting scrap in charging boxes lying on the ground was described. This is believed the most satisfactory way to obtain the highest weight per buggy.

During May and June, 1949, two furnace operation was in effect the greater part of the time and one buggy of coke (3900 lb) was charged with 80,000 lb of iron. The average charging time was 5 hr, 55 min, averaging 57 buggies of scrap and iron per charge. The average production of ingot for this time was 12.42 tons per hr. The No. 2 heavy melting loaded in boxes on the ground averaged 760 lb heavier per buggy than those loaded on the buggy.

During July, 1949, on three-furnace operation, 142 heats were charged, of which 31 pct used one buggy of coke (3800 lb) with 80,000 lb of iron with an average charging time of 6 hr, 14 min, averaging 55 buggies of scrap and iron. No coke was used on 69 pct of the charges but 33 pct iron was charged, with an average charging time of 5 hr, 34 min; averaging 37 buggies of scrap and iron per charge. The No. 2 heavy melting loaded in boxes on the ground was 900 lb heavier than when loaded on the buggies (5253 to 4351 lb, respectively). The average production in July was 12.39 net tons of ingot per hr.

In September, 1949, the scrap loading personnel was changed by decreasing the size of the scrap preparation crew and using the men to add to the stockers. A scrap foreman was assigned to each turn to supervise loading all material used to charge the furnaces spotted by the stock foreman. During that month, no coke was used and 36 pct iron was used, of which 20 pct was mold scrap, 10 pct cast iron carwheels, 3.5 pct pig iron, and 2.5 pct miscellaneous cast. No. 2 heavy-melting loaded on the buggies accounted for 10 pct of the steel charge, averaging 4290 lb per buggy; 14 pct was No. 1 heavy-melting averaging 5880 lb per buggy. The remainder was 7 pct turnings, 2 pct No. 2 bundled sheets and miscellaneous (mill scrap, No. 2 bushelings, etc.). Average charging time was 5 hr, 34 min, averaging 46 buggies of scrap and iron per charge. Ingots produced totalled 12.66 net tons per hr.

The use of oxygen would be impractical unless it is possible to keep the average charging time below 5 hr, 30 min. The average charging time, fast and slow, of five heats was taken to show that by decreasing the charging time through the use of heavier scrap and good iron, ingot production is greatly affected when using oxygen. On five heats charging in less than 4 hr, the average charging time was 3 hr, 42 min, using 36 buggies of scrap and iron, consisting of 41.6 pct iron, 40.7 pct No. 1 scrap, and 17.7 pct miscellaneous (mill scrap and bundled sheets). The average tap to tap time was 10 hr, 11 min, and ingots produced was 15.91 net tons per hr using 13,000 cu ft of oxygen per heat. Five heats averaged 6 hr, 32 min, using 53 buggies of scrap and iron consisting of 30.3 pct iron, 8.2 pct No. 1 scrap and 35.1 pct No. 2 scrap and 26.4 pct miscellaneous. The average tap to tap time was 13 hr, 25 min, and ingot production was 12.25 tons per hr using 16,000 cu ft of oxygen per heat.

October, 1949, was an all-time record month. A total of 192 heats of all grades were charged and tapped using a 31 pct iron charge, consisting of 15 pct mold scrap, 5 pct cast iron carwheels, 2 pct pig iron, and 7 pct miscellaneous cast. The steel charge consisted of 20 pct No. 2 heavy-melting, averaging 4290 lb per buggy, 14 pct No. 1 heavy melting averaging 6080 lb per buggy, 6 pct No. 2 bundled sheets, 6 pct turnings, 14 pct blooming-mill crops, and the rest miscellaneous. The average charging time was 5 hr, 30 min, using 44 buggies of scrap and iron per charge. Ingot production for this month was 14.49 net tons per hr.

Realizing that ample switching facilities are important in obtaining a low average charging time, a 65-ton diesel electric locomotive was purchased to serve the open hearth along with a 70-ton steam locomotive. These two engines were put on a 24-hr schedule to service the open hearth floor and deliver ingots to the soaking pits. They are under the direct supervision of the stock foreman. A further reduction in charging time was realized by the addition of a scrap loading foreman, thus allowing the stock foreman to give more attention to the switching needs. Not enough time has been available to make a thorough check of what has been accomplished but it is felt that charging time and production have been improved. During the last 17 days of March, 1950, 90 heats of all grades were tapped with an average charging time of 5 hr, 5 min. A new higher average of 14.84 net tons per hr of ingots produced was obtained during this period, with an average consumption of oxygen of 17,900 cu ft per heat.

William Schwinn is associated with the Keystone Steel & Wire Co., Peoria, Ill.
