incinerator bundles and No. 2 Bundles are considerably lower than corresponding recoveries from revert or heavy melting scrap. The metallic recovery data for detinned bundles and No. 1 Bundles seem to indicate that these two types of scrap are desirable.

The tendency toward higher sulphur, copper, and tin residuals in heats melted with incinerator scrap was again demonstrated. Residuals in these heats were somewhat higher than corresponding residuals in heats made from No. 2 Bundles and appreciably higher than the residuals in the heat made with heavy scrap. The detinned and No. 1 Bundle heats had relatively low residuals which further enhances their desirability.

Of the 13 lots of bundled scrap only two incinerator bundle lots and one No. 2 Bundle lot showed moisture contents approaching the 9 pct value reported in the previous investigation. All of the other lots contained less than 5 pct moisture with the two selected No. 2 Bundle lots showing practically no moisture content.

Results from all three investigations are summarized in Table III. These figures giving the relative metallic recoveries to be expected from incinerator bundles and No. 2 Bundles illustrate the probable effect upon all phases of open hearth operation. Heat time, delay time, yield, and the ability to make orders as scheduled are shown to be adversely affected by the use of incinerator or No. 2 Bundles, the degree being determined by the percentage charged.

Ingot Yield Rises as Market Permits Greater Care in Scrap Selection

by A. K. Moore

SCRAP quality and its effect on the production and grade of open hearth steel was evaluated by The Steel Co. of Canada Ltd. in a controlled investigation based on 1953 scrap purchases. Although scrap was in relatively short supply at the time the test heats were run, the results provide a comparison with the recent improved scrap situation.

The direct result observed from increased scrap rejection in recent months has been a 2 pct increase in the average ingot yield. Other results have been a drop of 5 points or 14 pct in melting and final sulphurs, decrease in the slag volume and the lime charge required, a 2.5 point or 34 pct drop in residual copper, and a 7 point or 39 pct decline in tin.

Table I gives the ingot yield and the scrap makeup of the 60 pct hot metal heats. Three main characteristics of scrap that affect production were determined from the tests. They were: A—Density or the ability to charge the furnace fast enough to use the maximum melting power, B—free surface exposed to melting, and C—contamination, which may give poor slag and residual conditions, thus affecting heat time.

It can be deduced from the ingot yields given in Table I that during the steelmaking process 6 pct of a mixture of heavy melt scrap and 12 pct of the weight of No. 2 Bundles will be lost. These losses are as compared to crop scrap.

Table I. Scrap Makeup and Ingot Yield of 60 pct Hot Metal Test Heats

Group	Charge	Lb Per Cu Ft, Avg	Ingot Yield, Pct, Avg
1	Bloom mill crops	260	87.7
2	20 pct 260 lb per cu ft scrap / 80 pct heavy melting scrap	52	85.6
3	No. 2 Bundles (clean old scrap allowing 5 pct galvanizing)	121	82.9

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Heat Time

Best average heat time was obtained from Group 2 of the test categories. Although the scrap was lighter and the average charging time longer than in Group 1, the faster melting rate of the free melting scrap produced 7.5 pct better heat time.

Table II. Average Analyses For Test Heats At Various Stages

Group	Melt Sulphur	Finish Sulphur	Copper	Tin	Nickel
1	0.046	0.030	0.037	0.008	0.051
2	0.049	0.031	0.064	0.016	0.039
3	0.061	0.056	0.126	0.046	0.053

On the other hand, Group 3, melting in about the same time as Group 1, required a considerably longer time to reduce the two point higher sulphur residual. Heat time was 4 pct longer than for Group 1, and 11.5 pct longer than Group 2.

It appears that the degree of contamination of scrap is a major factor in ingot production.

Scrap and Steel Quality

There can be little debating that heats requiring a minimum amount of furnace time to arrive at proper temperature and slag balance are less subject to oxide and other inclusions. It follows then that if scrap quality affects the producing rate it must have a direct bearing on steel quality. In addition to this effect, scrap contamination produces higher average sulphur and tramp alloy residuals as shown in Table II. But again, the ability to tighten up on scrap inspection has resulted in greater cleanliness, better drawing quality, and reduced conditioning requirements for semifinished steel.