

(5)

NEW TRENDS IN D R I APPLICATIONS

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HYL IRON AND STEEL TECHNOLOGY

1. Purpose

To develop and optimize technologies with the use of D R I in the electric arc furnace and in the blast furnace.

2. Effect

In the electric arc furnace, the utilization of D R I in different percentages of the metallic charge has distinctive advantages in productivity, yield and quality of steel.

In the blast furnace, 65,000 tons of D R I were used in order to determine the effect of D R I additions in different percentages of the burden on the productivity and coke consumption of the furnace. The secondary reduction of D R I in the blast furnace coming from the metallizing effect of carbon in D R I was also studied.

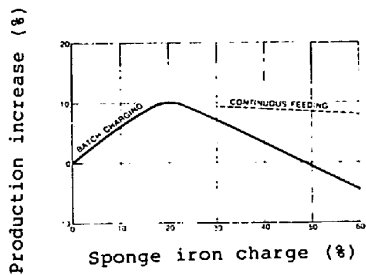


Figure 1 Influence of sponge iron on electric arc furnace production

3. Results

Use of D R I in the electric arc furnace has increased productivity up to 10% (Figure 1) depending on the percentage of D R I used; metallic yield has increased up to 7%, and regarding quality, the content of tramp elements decreased by more than 100%, and the gases content (N_2 and H_2) also decreased by more than 100% (Figure 2).

In the blast furnace, results from D R I percentages in the charge indicated that for each 10% of burden metallization, hot metal production increased by more than 8% and coke rate decreased by more than 7%. The sulphur content in the hot metal decreased (Figure 3). Carbon in D R I has a metallizing effect of 5.4 times its weight (Table 1).

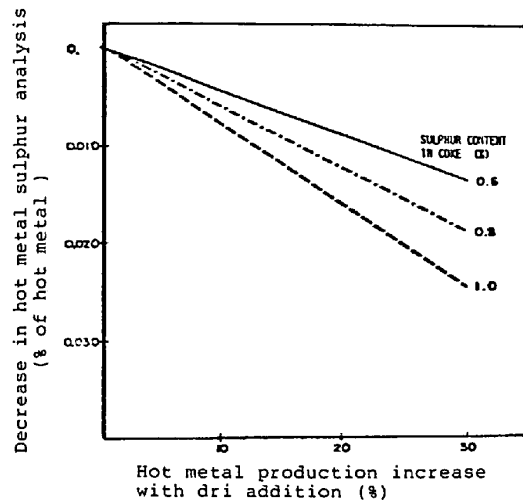


Figure 3 Calculated decrease in hot metal sulphur analysis by increasing hot metal production with dri addition

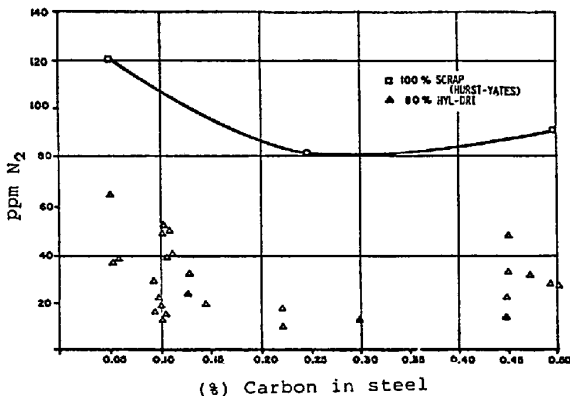


Figure 2 Change in nitrogen content in liquid steel during meltdown and refining

TABLE I
INITIAL AND FINAL ANALYSES OF DRI

Sample	Fe _T	Fe ^o	%M	%C	ΔM	ΔFe ^o	ΔC	ΔM/C
Before	89.33	78.72	88.2	2.06	-	-	-	-
After	93.45	91.12	97.5	0.34	9.3	12.4	(1.72)	5.4

Fe_T = Total iron in sample
 Fe^o = Metallic iron (determined by the HgCl₂ method)
 M = Metallization (Fe^o/Fe_T) x 100
 C = Carbon