



Improvement of Taphole Cleaning Equipment at İsdemir Blast Furnaces

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In this study, cleaning equipment used in cleaning around the tap holes in İskenderun Iron and Steel Co. (İSDEMİR) in Blast Furnaces are examined. The aim of this research reducing the cost of cleaning equipments, improving cleaning process of the around of the tap hole and reducing the production losses due to the tap hole.

In İSDEMİR Blast Furnaces, tap holes are drilled by drill and liquid pig iron is discharging from tap holes. In each blast furnace of İSDEMİR there are 10-12 casting operations per day. After each casting operation, employees check for scaling around the casting hole. if scaling occurs around the tap holes, the tap holes cannot be closed by mudgun, this situation leading to production losses and for this reason, around of the tap holes should be thoroughly cleaned. The cleaning equipment used before the improvement project is shown in figure 1. After the improvement project, the new design trimming apparatus is shown in figures 3 and 4. With the newly designed equipment, reduction costs of the equipment and production losses due to cleaning processes have been reduced.

Keywords: İSDEMİR, İskenderun Iron and Steel Co., Blast Furnace, Blast Furnace Tapholes.

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1. Introduction

İSDEMİR is the largest integrated facility of Turkey. There are 4 blast furnaces and 3 of them are on operation. In active furnaces, 4th Blast furnace has 3 tap holes, 3rd Blast Furnace has 2 tap holes and 2nd Blast Furnace has 2 tap holes

2.-Tap Holes at Blast Furnaces

In each blast furnace of İSDEMİR there are 10-12 casting operations per day and total 30-36 castings are performed daily. Tap holes are checked after the end of casting process and employees checked whether there is a risk that may affect production. Figure 1 shows the general scheme of blast furnaces. in this figure, the tap holes in which the liquid pig iron is discharged from the blast furnace are also seen.

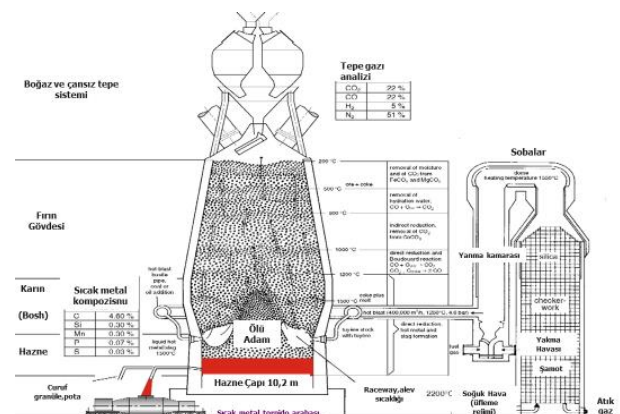


Figure 1. General scheme of blast furnace

3.-Problems of Old Type Cleaning Equipments in Blast Furnaces

Old type cleaning equipment will be damaged in a short time and because of this problem, around of the

tap hole can not cleaned properly by cleaning equipment. As the cleaning process cannot be done properly, production losses due to tap hole occur. Scals may accumulate around the spill hole when cleaning is not performed properly and this situation shown in Figure 2. Scals accumulated around the tap hole leads to production losses.



Figure 2. Scals around the tap hole



Figure 3. Old Type Cleaning Equipment

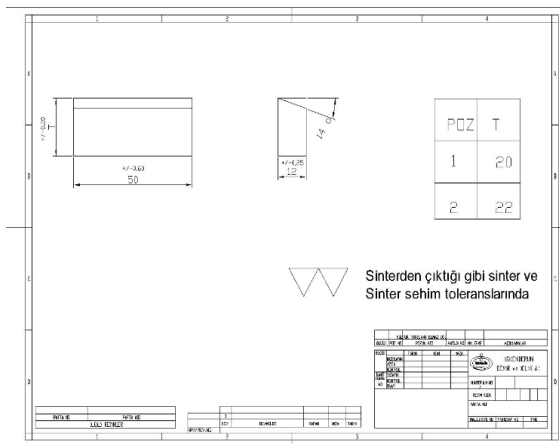


Figure 4 technical drawing of old type cleaning equipment

4. New Designed Cleaning Equipment

Newly designed and modified cleaning bits, cleaning equipments;

Instead of the rod-shaped cleaning bits used in the old type (Figure 3 old-style tip technical drawing), 8 WC drill bits (Figure 4) are used as consumables used in the furnaces in casting opening process. These drill bits are less susceptible to rupture and rapid wear problems with older drill bits. The problem of axial misalignment in the center of the cleaning equipment is also prevented from slipping out of the center by extending the length of the drill bit used in the center and inserting it into the tap hole. (Due to the misalignment in the center, the problem of not being able to close the casting is eliminated.)



Figure 5: New Cleaning Equipment



Figure 6. around of the tap hole cleaned by new cleaning equipment

Conclusion

After the improvement project, the number of daily casting operations in İSDEMİR Blast Furnaces has been reduced. With the new designed of the cleaning

equipment when mud is pressed with mudgun to close the casting hole, the amount of mud spreading around the tap hole is reduced. If the tap hole cannot be filled with mud, the liquid pig iron solidifies in the tap hole and this situation leads to the use of more than a drill bits for drilling the tap hole and leads to a short casting operation. With the improvement project, the problem of accumulation of liquid pig iron in the tap hole was prevented. This situation leads to a reduction in the costs of casting operations .As can be seen in Figure 8, the surface cleaning of the casting holes has been made better with the new design cleaning apparatus and the bits used in the old type apparatus (Figure 3) have been saved and thus savings have been achieved.

References

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