Heraeus | Electro-Nite

SUSTAINABILITY CASE STUDY

Controlling of EAF Process via Chameleon, Optic Fibre Temperature Measurement

SEMI-SMART TEMPERATURE MEASUREMENT IN SIDDIK KARDEŞLER EAF PROCESS - TÜRKIYE

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With the increased demand for green steel, the EAF production route has become more significant for steelmakers. Non-controlled tapping processes, overheated production cycles, and tap hole clogging are more readily prevented issues with (Chameleon) a smart optic fiber temperature measurement system.

INTRODUCTION

The EAF uses mainly electric energy, with a small amount of chemical energy, to generate the heat required for the melting of recyclable scrap. During this study here are some of key questions that were raised:

How do you control your EAF tapping temperature? *Target hit ratio of tapping temperature fluctuates higher in conventional practise due to less frequent observations. Excessive energy and time are consumed when tapping temperatures exceed the target temperature.*

What is the temperature reduction between EAF and LF process? *While Chameleon measurements are taken in the EBT region, which is cooler and more homogeneous, a more precise correlation between EAF tapping and LF start temperature may be achieved.*

What is the frequency of tap hole cleaning? *Due to inefficient temperature monitoring in the furnace, steelmakers typically use tap hole cleaning in the EAF process. This process typically takes 30 seconds and causes steelmakers to lose time and productivity.*

SUMMARY

The measurement system (Chameleon) was installed and tested at Sıddık Kardeşler Steelplant as part of the energy cost reduction and productivity boost project. Fiber optic measuring wire was fed into the furnace from the EBT area via a dedicated feeder system and was controlled by a PLC system

RESULTS

1,1 MWH/HEAT

The use of Fiber Optic temperature measurements in EAF reduced the average energy usage per heat.

1,9 MINS/HEAT

The use of optic Fiber temperature measurements in EAF reduced the tap-to-tap time on average of all heats.

2882 TON-CO2/ANNUAL

Reduced the annual CO2 emissions with real energy savings.

CONCLUSION

By modelling the temperature increase with the dynamic tapping temperature prediction model, the Chameleon system delivers efficient energy and time control. Significant energy savings per heat were realised, and productivity was boosted by lowering tap to tap times, resulting in CO2 reduction and a significant contribution towards sustainability.