CASE STUDY

# Operational excellence program at an Eastern European steel plant: Increasing yield by 15% with less than 1 million USD of capital expenditure

## SITUATION

An Eastern European steel plant with an output of 350.000 tons p.a. and operating with an EAF had a dissatisfactory operational performance. The budget for large-capex investments was limited.

## APPROACH

Steel Hub experts started common efforts by a technical and economic plant assessment revealing the root causes for the suboptimal plant performance. We then implemented an operational excellence program that involved “soft measures” targeting operator mindsets and capabilities as well as several low-capex technical fixes.

## RESULTS

Three years later, the real EAF power-off time could be reduced by a third, and yield increased by 15%. EAF electricity consumption was reduced by 5%. All improvement measures could be delivered a total capex investment smaller than 1 mn USD.



## STEEL HUB SERVICE PORTFOLIO

### STEEL ADVISORY

- Process Intelligence
- Product Range Expansion
- Operational CAPEX Support

### PERFORMANCE IMPROVEMENT

- Performance Diagnostics
- Production Process Optimisation
- Defects Troubleshooting and Solutions
- Change Management for Operational Transformation

### DUE DILIGENCE

- Operational Due Diligence
- Commercial Due Diligence

## Situation

The steel plant is located in Eastern Europe and manufacture steel reinforcing bars, with an output of 350.000 tons p.a. Due to a dissatisfactory operational performance of the plant, the plant management requested a technical and economic plant assessment to identify improvement potentials. There was only very limited budget for capital expenditure.

Initial review brought the following results:

- Yield was well-below optimal level and potential, and plant productivity well-below European benchmark levels
- Tap-to-tap time was far longer than in any other plant in the client's portfolio
- Plant energy consumption was unusually high
- Scrap management did not meet best-practice standards and caused significant disruptions to
- EAF operations EAF burners were not optimised
- The end-of-heat liquid steel practice was not applied

Following this initial review, the plant management requested an operational excellence program, which we delivered.

## Approach

The operational excellence program started by ensuring that we had both full backing from plant management and plant ownership. In our experience, very often the human factor is the single one variable having the largest impact. Besides working on the mindset and capabilities of operators, we took only low-capex improvement measures into consideration.

We introduced the following improvements:

***"Soft measures" targeting operator mindsets and capabilities"***

Following this initial review, the plant management requested an operational excellence program, which we delivered.

- We aligned with plant management on the priorities of the EAF performance improvement program
- We introduced a daily routine: We started every morning with a ~15 minute meeting involving plant management and leading engineers to review special incidents and behaviour of the previous day
- We showed presence on the shop floor, moving the management office inside the furnace cabin
- We discussed improvement ideas with operators on a 1:1 basis
- We held a performance review together with plant operators every ~2 months to inform and keep them motivated about the technical and financial impacts of their improvement efforts
- We adjusted the salary / bonus structure to set appropriate yield and energy consumption targets for the monetary incentivization of the plant crew (previously, targets had been too low / easy to achieve)

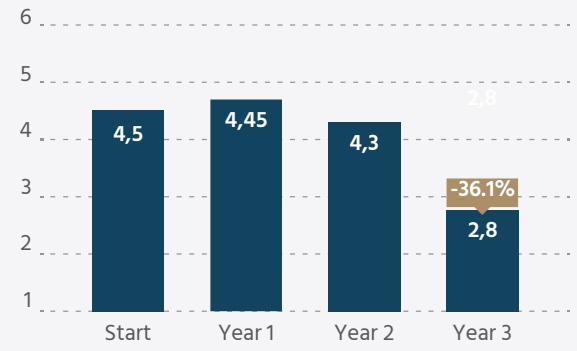
## Low-capex technical fixes

- We switched from manual/human temperature to automatic/robot temperature control to reduce furnace power-off times
- We installed an automatic delay reporting system to replace time-consuming manual reporting processes
- We increased charges per scrap bucket through a mix of creative adjustment measures
- We installed four magnet platforms by the scrap yard to improve the quality of scrap disposed and reused the scrap metal content jumped from 9 to 18%
- We introduced end-of-heat liquid steel practice to reduce electricity required for melting the next load of scrap
- We tweaked the chemical burner mix to reduce electricity consumption

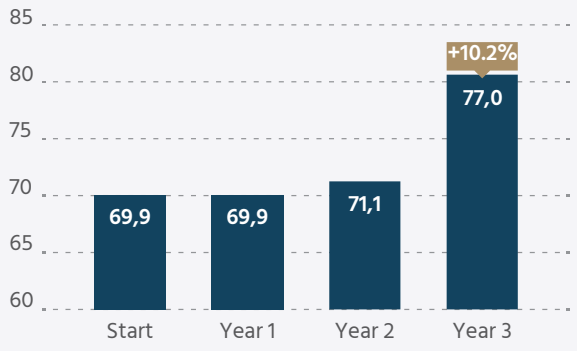
## Results

After the initial phase during which were introduced these improvement measures, we still gave support to the plant management, reviewing progress on improvement initiatives regularly.

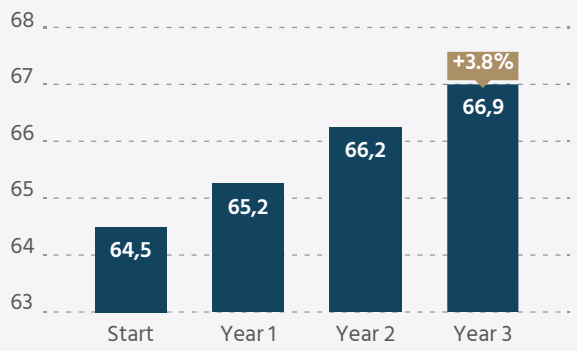
EAF power off: real (minutes)1



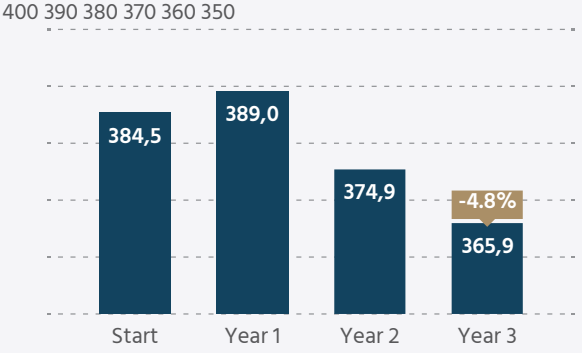

Billets produced per hour (tons/hour)




Scrap per charged bucket (tons)




Electricity consumption of EAF per charged ton (kWh/ton)




Key results from improvements

1: Excluding standard power-off time for bucket charging, tapping and furnace turnaround

Total change Start - Year 3 in %

Three years after the beginning of joint efforts, the real EAF power-off time could be reduced by a third, and yield increased by 15%. We managed to increase scrap per charged bucket by 4%, and the measures of the operational excellence program reduced EAF electricity consumption by 5%.

We would like to restate the fact that large impact does not necessarily need to cost a significant amount of money. Most of the behavioural changes did not require any significant expense, and the technical fixes could be delivered with minor capital expenditure. All results shown in this section could be delivered with a total capex investment smaller than 1 million USD.

After the conclusion of this improvement program driven by very low-capex measures, as a next step, the plant management is now assessing the possibility of improving the performance further through the installation of a chemical package for the EAF.