

PLANT-WIDE COST OPTIMISATION SYSTEM FOR A STEEL INTEGRATE

HOW TO OPTIMISE MATERIAL AND ENERGY
USAGE AT A STEEL INTEGRATE

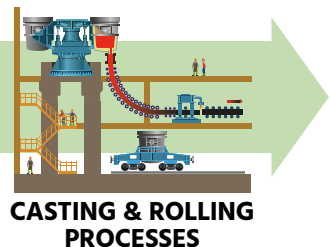
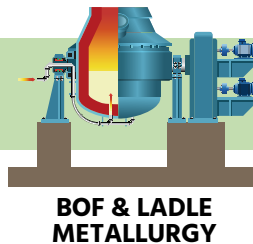
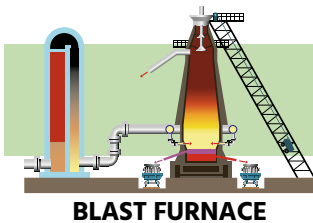
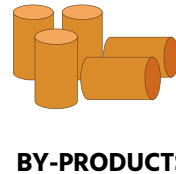
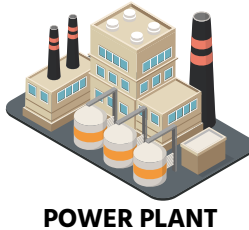
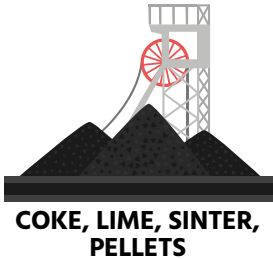
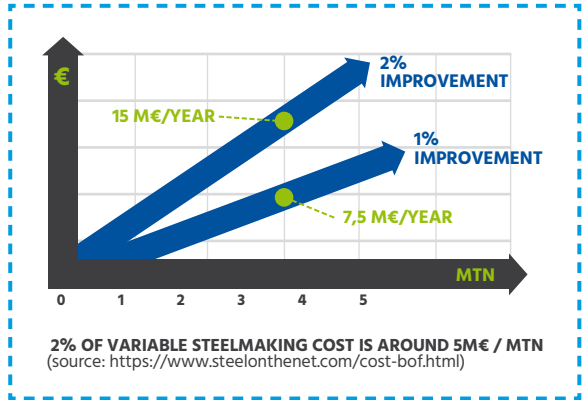
SWD

– WE LOVE EFFICIENCY –

DO YOU WANT YOUR DECISIONS TO BE COST-OPTIMAL FOR YOUR STEEL INTEGRATE?

SWD OFFERS

- Cost-based optimisation model over complete steel integrate
- Easy-to-use scenario comparison



OPTIMISATION

Optimisation seeks cost-optimal result having the variables in permissible range.

USE CASE

RAW MATERIALS

What is the Value-In-Use of a cheaper coal in the mix?

EMISSIONS

Detailed prediction of CO₂ generation and associated costs.

VOLATILE MATERIAL PRICES

Adjusting the hot metal / scrap ratio at BOF steelmaking.

INCREASED RECYCLING

Matching the target impurity levels with minimal changes in use of other raw materials.

Variable N



EXAMPLES OF VARIABLES

Hot metal scrap ratio



Blowing practice: target end point for carbon



Blast furnace burden material selection



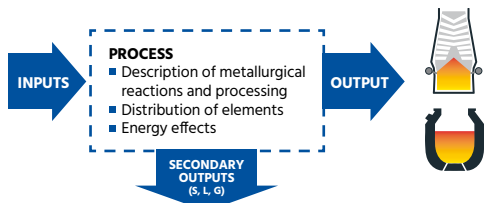
OPTIMISATION RESULTS

- Total cost optimum matching
 - Target impurities in cast
 - Quality standards for secondary products
- Correspondent values of variables
- Detailed profit/cost sheet: materials, energy
- Wide range of detailed process data e.g. concentrations at each process step

HOW THE MODEL IS BUILT?

MASS BALANCE:

Mass distribution coefficients in each block convert input concentrations & mass to output concentrations & mass.



This is chemistry made practical and is called: **'Mass Balance'**

ELEMENT	CONCENTRATION	ELEMENT	CONCENTRATION
C	4.1 %	C	3.2 %
S	2.3 %	S	1.4 %
Fe	89.2 %	Fe	91.2 %
Ni	0.40 %	Ni	0.44 %
Zn	0.32 %	Zn	0.28 %
Mn	1.21 %	Mn	0,89 %

ENERGY BALANCE:

Energy is a significant cost factor. Therefore the model calculates **Energy balance** in addition to Mass Balance.



Read more from our article published in Stahl 2016:
swd.fi/en/energy-efficiency-in-steel-industry/



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