BSE Excellence Story

BADISCHE STAHL-ENGINEERING GMBH

Smart modelling helped in finding out the right measures and preventing expensive mistakes

Fluid Dynamic Model Studies executed for customers using different steel-making equipment

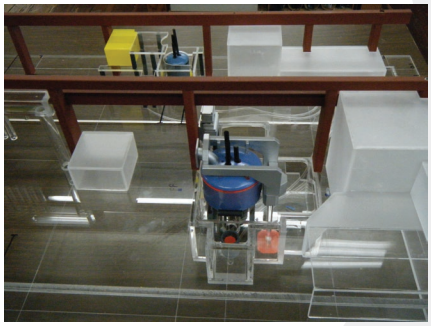
The simulation of the in-shop environment and dust and heat distribution using a Plexiglas replica of the meltshop in the Physical Fluid Dynamic Model helps steel plants to understand and improve the building ventilation and working environment. The FDM study executed by BSE subsidiary Bender Corporation (BCI), provides an efficient, cost effective solution for more than 50 customers worldwide. The following projects executed in 2013 show the capability of the FDM study to be implemented to a big variety of applications:

Uddeholm (EAF)

Uddeholm AB is a producer of high quality tool steel bars operating a 70 tons EAF at its meltshop in Hagfors / Sweden. Beside an already modified bag house system, Uddeholm is planning to extend the existing casting bay as a preliminary step for the installation of a second ladle furnace.
Based on this new situation, Uddeholm wanted to conduct a FDM study in order to see the impact of these changes on the building ventilation and to check if the existing bag house capacity is sufficient to provide a good building ventilation.
In 2008, Uddeholm had conducted a FDM study with BCI. Hence, the existing model could be re-used for the new project with only minor modifications. During several tests at BCI, Uddeholm representatives were able to check the required roof exhaust capacity, determine the ideal location of auxiliary equipment and find out further measures to improve the building ventilation, e. g. modification of hoods, installation of the tapping sheds and partition walls. Like all models, the Uddeholm **FDM is stored in BCI's facility and can be re-used at any time** to check in advance the impact of future equipment rearrangement on the building ventilation, thus providing a cost and time saving solution.

Höganäs (EAF)

Höganäs Sweden AB operates a 50 tons EAF at its meltshop in Halmstad / Sweden. During the years, production capacity has been increasing. Therefore, the existing emission control system capacity became inadequate and needs to be upgraded.
Höganäs asked BSE / BCI to conduct a FDM study of the complete meltshop in order to **determine the required exhaust capacity and building modifications** in order to improve the building ventilation and to define a step-wise implementation of the required modifications.



Model of Höganäs meltshop including EAF, tapping ladles, ladle preheaters and tundish rebuilding area

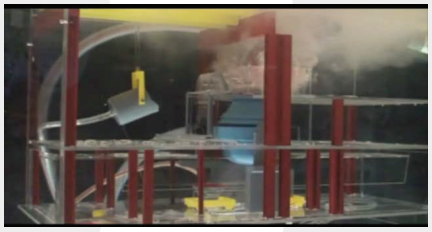
The most important task for every model is to properly simulate the present situation. This challenge was mastered for this project. With Höganäs representatives being convinced of the model validity, many tests were mutually performed and the following modifications determined:

- Increase of canopy exhaust flow rate
- Installation of partition walls
- Eliminate the use of single cooling jets and transformer cooling fans

Contact:
pierre.pfister@bse-kehl.de
Phone ++49-7851-877-131

BOF plant

BSE / BCI recently conducted a comprehensive FDM study for a BOF plant equipped with three BOF's. The intention of the FDM study was to improve performance of the BOF primary and secondary emission control system, to control the emissions from the hot metal mixer, the ladle cleaning or skimming station and the ladle furnace. In order to have a clear and complete picture, the FDM study was conducted for the BOF emission control system and the local evacuation system for all auxiliary emission sources.



Model test for BOF plant

The FDM tests determined the required exhaust capacity for each emission source. The detailed recommendations how to modify the existing equipment and the existing operations were developed as the outcome of the study, such as closed door operation in certain process stages or installation of local suction hoods. Many of the recommended equipment modifications were rather small, but implemented together they proved to be very effective. The big advantage of the FDM study was the possibility to **detect and test all the operating scenarios and modifications on a model rather than doing the more expensive and long way of trial and error at the real shop.**

Contact:
carsten.pfundstein@bse-kehl.de
Phone ++49-7851-877-119

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Badische Stahl-Engineering GmbH
Robert-Koch-Straße 13
D-77694 Kehl/Germany
Phone (+49) 7851/877-0
Fax (+49) 7851/877-133
eMail info@bse-kehl.de
www.bse-kehl.de

BSE America
1811 Sardis Road North, Suite 210
Charlotte, NC 28270
Phone (704) 553-1582
www.bse-america.com

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