

Operational simulation model of the raw material handling in an integrated steel making plant



ArcelorMittal

ArcelorMittal

www.arcelormittal.com

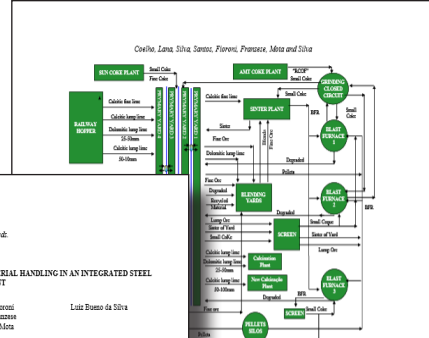
ArcelorMittal S.A. is a multinational steel manufacturing corporation headquartered in Avenue de la Liberté, Luxembourg. It was formed in 2006 from the takeover and merger of Arcelor by Mittal Steel. ArcelorMittal is the world's largest steel producer, with an annual crude steel production of 93.6 million tones as of 2012.

This article is focused on the design and implementation of an operational simulation model (OSM) of the handling of raw material in an integrated steel making plant, considering operations of receiving, unloading, stocking, handling and supplying the different raw materials related to the production process with an operational perspective. The aim of this focus is to help in the decision making of the team controlling the inventory.

Simulation and Forecasting Technology role Operational simulation model, production process

Sector
Metals

[Click here](#) to download the
Case Study



The diagram illustrates the raw material handling process, showing the flow from various sources (SOUTH AMERICA, EUROPE, AFRICA) through different plants (IRON CORE PLANT, HOT CORE PLANT, SINTER PLANT, REDUCED IRON PLANT, SLAG PLANT, BLAST FURNACE) to the final product (CAST STEEL). It includes details of conveyor belts, storage piles, and material flow directions.

Proceedings of the 2009 Winter Simulation Conference
M. D. D'Amico, R. R. Hill, B. Johansson, A. Duchi and R. G. Ingalls, eds.

OPERATIONAL SIMULATION MODEL OF THE RAW MATERIAL HANDLING IN AN INTEGRATED STEEL MAKING PLANT

Roberto Jacinto Coelho Felipe Fernandes Lima Adriano César Silva Tales Pagnotta Santos ArcelorMittal Tubarão	Marcos Mendes Fianetti Luiz Augusto G. Frazzese Daniel de Oliveira Moraes Paragon Tecnologia	Luiz Bruno da Silva Universidade Federal do Paraná Centro de Tecnologia Blanco O - Cidade Universitária Curitiba, Paraná, Brazil
--------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------

550, Brigadesiro Eduardo Getúlio, Av. 1453, Chômetro Amazonas St, 5th floor
Serra, ES, 29145-970, Brazil São Paulo, SP, 04537-012, Brazil João Pessoa, PB - 58051-970, Brazil

ABSTRACT
This article is focused on the design and implementation of an operational simulation model (OSM) of the handling of raw material in an integrated steel making plant, considering operations of receiving, unloading, stocking, handling and supplying the different raw materials related to the production process with an operational perspective. The aim of this focus is to help in the decision making of the team controlling the raw inventory. Based on the methodological structure developed by Coelho (2009), this OSM showed that most of the valid concepts for simulation with a strategic focus do not present relevance from an operational point of view. The advantage of the OSM is the fact that it is not random or stochastic, but deterministic, while exhibiting behaviour considered satisfactory by management and related team alike.

1 INTRODUCTION
In 2007, integrated steel plant ArcelorMittal Tubarão (AIT) experienced an increase in production capacity from 5 million to 7.5 million tons which has influenced all its main production equipment and processes. The direct and indirect reduction of the metallic load into the pig iron (Fe-C alloy with high carbon content - higher than 4%) shows the following alterations in the production area, focus of this article:
• Construction of the blast-furnace with a pig iron production capacity of 3300 t/year;
• Expansion of the raw material receiving system;
• Construction of bays for coke production using the Blast Recovery technology, with a production capacity of 1.55M t/y;
• An increase in the Sinter plant production capacity from 34 to 42 t/h.
Table 1 shows the overview of raw materials by major damper and road-entry bopper for production volumes of 5.0 and 7.5 M.t of steel/year. In this table, it is possible to observe the receiving of additional raw material reaching the volume of 5.0M.t/year.

3058

978-1-4244-5771-7/09/\$26.00 ©2009 IEEE 3055