

0040 Hot Strip Mill Model Validation

Benefits

- ❖ Improved industrial competitiveness through product and operational optimization.
- ❖ Decreased product variability by using an "off-line" predictive tool that can quantitatively link the properties of hot rolled product to the operating parameters of the hot strip mill.
- ❖ Increased production by developing rolling schedules to maximize mill capability.

Applications

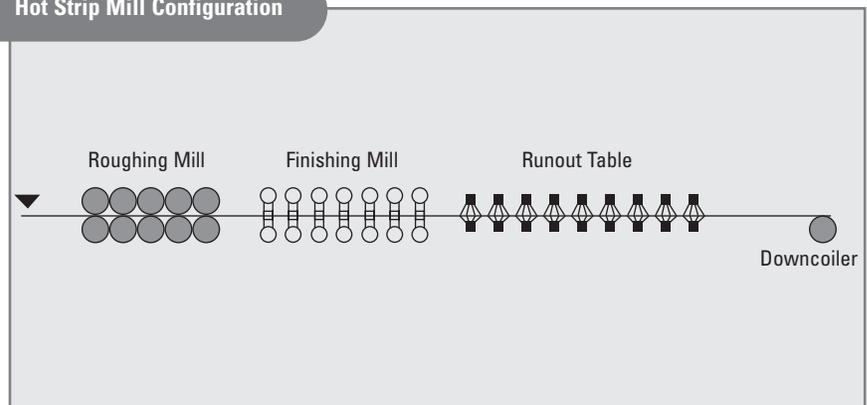
Hot strip mills producing sheet and/or plate products in almost any mechanical configuration.

Accurate Modeling of Microstructure During Hot Rolling Will Optimize Production by Avoiding Costly Rework Trials, Help Define Final Product Properties and Save Energy

Many hot rolled steel product applications demand strict strength and toughness requirements. Precise control of the microstructure is critical to achieving desired final product properties. Maintaining strict quality control specifications requires numerous and costly full production trials before both the range of chemical composition and the range of hot strip mill processing parameters can be comfortably defined. The Hot Strip Mill Model (HSMM) is an invaluable tool to cost effectively determine optimum-processing conditions to achieve desired final product properties. Since the HSMM runs in an "off-line" mode, the model can save many tons of wasted production, greatly improve processing efficiency by identifying the proper mill set-up before the first production run.

This project builds on the HSMM developed under the AISI/DOE Advanced Process Control Program. Full-scale mill trials will test, validate, and refine the core models used for predicting the temperature, roll forces, microstructure evolution and final mechanical properties of steel produced on a hot strip mill.

Hot Strip Mill Configuration



Project Description

Goal: The goal of the project is to validate, with plant operating data, the existing Hot Strip Mill Model (HSMM) developed by the University of British Columbia (UBC) under the AISI/DOE Advanced Process Control Program. The project includes a detailed review of each HSMM sub module and a validation and/or replacement of each sub module as required based on actual plant operating parameters. Practical application functions include an updated user's interface to facilitate the ease of use and complete HSMM documentation will be provided. A five-phase plan was developed.

Progress and Milestones

- ❖ Phase 1 - Improve HSMM usability, was completed during the 3rd Quarter of 2001. An updated HSMMM version was released to the Industry Participants in August, 2001.
- ❖ Phase 2 - Flow-charting, documenting (where feasible) and identifying HSMM inputs and outputs of each module and sub module. Phase 2 was completed during the 1st Quarter of 2002.
- ❖ Phase 3 - Validate each sub module. Using previous tests and published results of the model by the steel companies and UBC, an evaluation of the modules as a whole was completed during the 1st Quarter of 2002. Validation will continue during phases 4 and 5 when additional operating plant data is available.
- ❖ Phases 4 and 5 - Include the integration of a new user interface and updated sub modules followed by the validation and calibration of the upgraded HSMM using full-scale plant data from the Industry Participants. Phases 4 and 5 are scheduled to be complete in 2002.

Total Project Cost/Duration

\$1,911,607/two years

Industry Participants

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US Steel
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Weirton Steel
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