Researchers at the University of British Columbia and the National Institute of Standards and Technology have developed computer models with input from 14 steel companies. These models quantitatively link mechanical properties to the mill’s process parameters.

The integrated process model allows the simulation of a conventional hot-strip mill of any configuration with, or without, a coil box and a Steckel Mill. Run-out table cooling and the downcoiler are included in the simulation. The model predicts the complete thermal history, deformation in the roll bite, and final microstructure and mechanical properties in the coil. The following eight grades of steel are included in the current version: A36, DQSK, HSLA-50V, HSLA-50Nb, HSLA-50Nb/Ti, HSLA-80Nb/Ti, IF-Nb/Ti-rich, and IF-Nb/Ti-lean. The model can be easily modified to include other grades of steel. The software runs on a PC with the windows operating system and is very user-friendly. Participants can evaluate it quickly and tailor it to the configuration of their hot-strip mill in just a few minutes. Continuous user feedback has been extremely valuable for demonstrating how well the model predicts mechanical properties off-line and in identifying improvements for upgrading future releases.

The Hot Strip Mill Model (HSMM) is a predictive tool that quantitatively links the properties of hot rolled product to the operating parameters of a conventional hot strip mill. The simulation model is complete and is being commercialized by INTEG Process Group, Inc.
Project Description

Goals: Improve energy efficiency and product quality by developing advanced models and control algorithms. Enhance productivity through optimized mill operation methods.

The latest version of the predictive model for eight grades of steel was released to participating steel makers in July 1998. The goal of the project was to create a tool to allow steel mills to predict the mechanical properties of strip for a given set of processing conditions. Currently most mills conduct physical testing to establish that mechanical property specifications have been met. Another objective is to provide a tool for the development of practices to enhance mechanical properties by altering processing conditions. In the long run, this tool can be employed to develop new steel grades.

Progress and Milestones

• Project start date, April 1993.
• The simulation model is complete and is being commercialized by INTEG Process Group, Inc. For more information regarding this model, please contact:

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Commercialization

The American Iron and Steel Institute (AISI) announced the commercialization of the Hot Strip Mill Model technology. AISI, acting on behalf of its member companies has signed an agreement with INTEG Process Group, Inc., Pittsburgh, PA, to be the commercial licensee of the Hot Strip Mill Model technology. INTEG Process Group, Inc., plans to bring this product to market for others to use as quickly as possible.