

FORCE FEED FORWARD MILL STABILITY SYSTEM

OVERVIEW

The Force Feed Forward Control System for hot strip mills is a unique mill stability, gauge control and width maintenance system that is used in hot strip mills.

The low cost, short implementation, and non-disruptive installation make it an attractive alternative to other controls-upgrade projects, and with project payback in less than 10 months.

The FFF AGC System has been installed and proven in HSMs throughout the world.

- Results in a more stable mill operation, world-class gauge tolerances and reduced width variations in the finishing mill
- The FFF System is designed, installed, commissioned and tuned in less than a year
- No mill downtime is required to implement FFF
- Change from the mill's existing control system to FFF System by the flip of a switch at the operator desk
- No looper upgrades required
- Semi-automatic levelling operation coordinated with operator intervention

FFF BENEFITS

- Mill Stability
 - Higher mill stability by balancing steel mass flow
 - Noticeable reduction in operator speed intervention
 - Reduced torn tail, head-end cobbles and miscoilers
- Finishing Mill Width Performance
 - Reduction in width rejects
 - Reduction of overwidth practice
 - Reduction in head-end necking
- Gauge Performance;
 - Less than 4.5 mm - better than 98% within ¼ ASTM A568M
 - More than 4.5 mm - better than 96% within ¼ ASTM A635M
 - Improved head-end performance by 5 to 7%

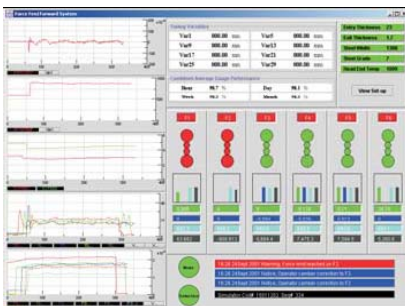
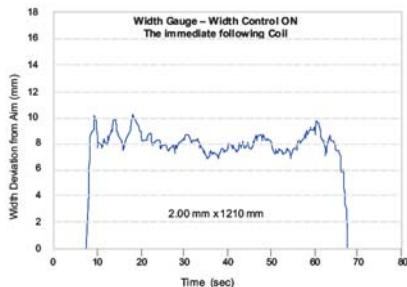
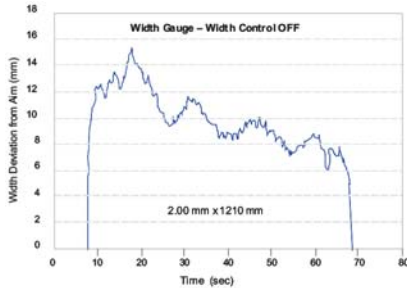
FFF USER QUOTE FROM SIDERAR, ARGENTINA

"...La estabilidad del laminador también se observa también en la baja tasa de cobbles en el tren terminador que actualmente es de 0.05%...El comportamiento de los loopers es mucho mas estable trabajando con AGC FFF que en modo AGC BISRA."

Translation; "The stability of the mill likewise manifests itself in the lower cobble rate in the finishing train which is currently at 0.05% ... The looper behavior is much more stable when working with the FFF mode of AGC rather than the BISRA mode."



TECHNOLOGIES



FORCE FEED FORWARD MILL STABILITY SYSTEM continued

PRINCIPLES

- F1 roll force and differential is taken, splitting and tracking each incoming bar from the roughing mill into increments every 0.05 seconds
- Predictions about the characteristics of each increment in each succeeding mill are made
- At the appropriate time, the tracking system begins the process of positioning the roll gap actuators (electro-mechanical or hydraulic) for each increment and corrections to the main-drive speed are made to prevent mass flow disturbances
- Looper electrical current changes are made to maintain width and correct width
- problems from rougher mill
- The FFF System makes predictions about the steering characteristics of each increment in each succeeding mill-roll bite using proprietary models that analyze the roll force differential
- In stands F4, F5 and F6 (and F7) a specifically controlled steering function ensures the reduction is coordinated to avoid strip steering sideways
- Advisory role to operator on potential torn tail end problems by trending and alarming

FFF USER QUOTE FROM US STEEL IRVIN WORKS, USA

"Beyond the initial installation, shadowing, tuning, and acceptance testing, the Hatch FFF system has been a relatively self-sustained 'black box' and required minimal system maintenance."

ACTUAL PERFORMANCE RESULTS FROM FFF INSTALLATIONS

- Tail tears - Observed reduction by more than 45%
- Gauge re-classification - Typical reduction in gauge re-classification by more than 52%
- A decrease in the number of width rejects by up to 35% has been demonstrated in FFF installations
- On average 2.0 mm can be reduced from the over-width practice
- Operator Intervention - Hands-off operation
- Easier rolling of thin gauge steel
- Maintenance free system with self tuning features
- Return on Investment is less than 10 months

FFF USER QUOTE FROM MITTAL STEEL VANDERBIJLPARK, SOUTH AFRICA

"I feel positive about the system. It is the right way to go for a mill like ours."

CONTACT

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