IAS envoy

the achievers

AUGUST, 2005

Message from the Managing Directors

Looking back on the recently ended financial year has provided us with a brief moment of satisfaction. IAS has just had a record turnover and has completed many significant projects. In total, 11 automation systems have been successfully commissioned and accepted while nine "Millcheck" audits have been performed and another twelve consulting projects completed.

We would like to think that we have lived up to our reputation as Achievers. Not that there is ever time for extended reflection, so we are now looking forward to new opportunities and new technical innovations to provide momentum for the year ahead.

INSIDE:

IAS RECEIVES ENGINEERING EXCELLENCE AWARD

IAS is proud to annouce that it has won the "2004 National Project Excellence Award in Automation, Control and Instrumentation" from the Institute of Engineers Australia. The award was conferred for the Advanced Hot Finishing Mill achieva SETUP SYSTEM Project at BlueScope Steel's Westernport Works.

The Advanced Hot Finishing Mill achieva SETUP SYSTEM provides significantly improved mill performance capability via the application of a robust setup strategy for calculating processing speeds, interstand tensions and stand thickness reductions and sophisticated physically based adaptive models for all major process parameters.

The on-line mathematical models needed to perform this function involves the solution of hundreds of non-linear algebraic and differential equations and are among the most demanding automation tasks in a steel plant.

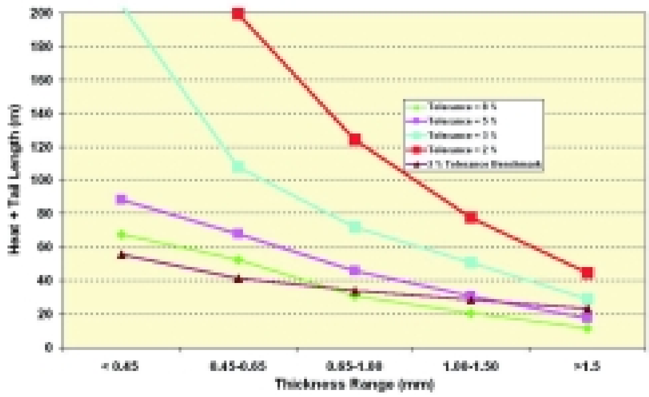
The setup models were developed as a joint effort between IAS and BlueScope Steel Limited staff with the latter providing the yield stress, temperature and friction models. The system also includes an adaptive threading function.

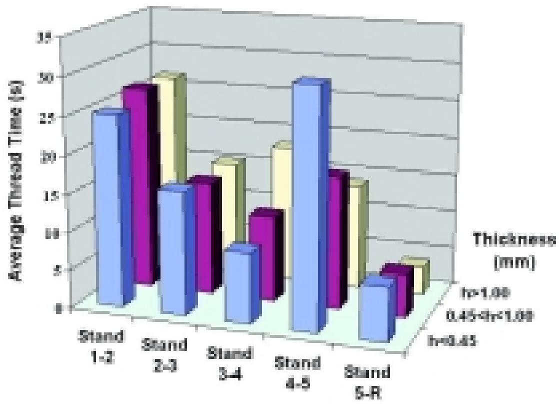
From L to R: John Edwards (IAS), Ron Gloss (BlueScope), David Boothby, Ray Davies, Graham Conway and Peter Thomas (IAS)

GETTING THE BEST "BANG FOR YOUR COLD MILL BUCK"

Everyone wants to meet the world's best practice and performance but few can afford the world's best cost. So what it means is that one needs to know the answers to three questions:

- What is my current performance?
- What performance do I need to keep my existing customers and have the opportunity to attract new ones?
- Lastly, how can I efficiently close the gap between where I am and where I need to be with a low and acceptable risk and what will it cost?





IAS have developed their "Millcheck" audit procedures to address these questions. Initially one must decide what areas of performance are of interest. Typically IAS will collect dynamic and steady state logged data to enable key performance indicators to be generated in the areas of head and tail end yield, body thickness performance, setup model effectiveness and strip flatness consistency.

The setup model review looks at the impact of the setup model on threading, strip breaks, maximization of rolling speeds, coping with new products and maintenance costs.

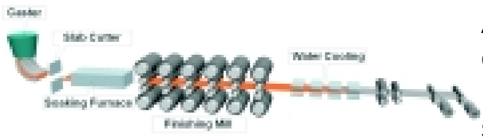
Having investigated many mills, IAS are in a position to compare the measured performance with other equivalent mills before and after various types of upgrade. This enables clients to have confidence concerning the benefits of various upgrade options.

The first graph shows the head plus tail coil end loss for different tolerances. The 3 percent tolerance benchmark figure is also shown which suggests there is substantial scope for improvement. Coil end yield is measured for several different tolerances as it is important to assess any potential improvements in terms that will translate into real dollars at the downstream units where the scrap is removed.

Audits measure the average duration, stand location and frequency of stops during mill threading as well as the run-speed to run-speed "between coil" times.

IAS staff spend considerable time on the mill floor and in the control pulpits getting "inside" the operations. In the figure below a Senior Staff Engineer, Dick Britanik, whose face is familiar to many of our North American clients, is seen measuring roll temperatures.

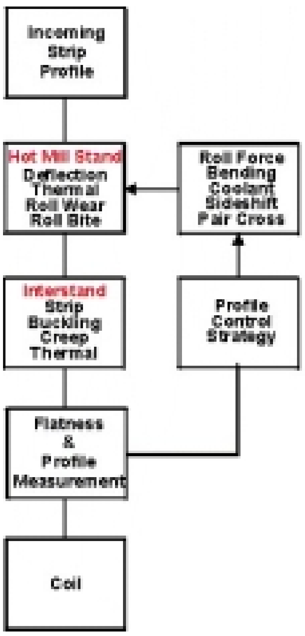
GETTING THE BEST “BANG FOR YOUR HOT MILL BUCK”



When it comes to the most challenging questions asked by our hot mill clients, they inevitably relate to profile and flatness quality and consistency.These issues have major impacts upon the processing at downstream units and are amongst the leading causes for rejects and yield loss.

Answering these questions often involves the most intensive use of our simulation technology combined with careful observations and significant data gathering at the facility.

To determine the current profile performance limiting factors on a mill typically requires activities to examine each of the following aspects: the variation in entry profile, the mill operating conditions, the range of the actuators and the available measurements.

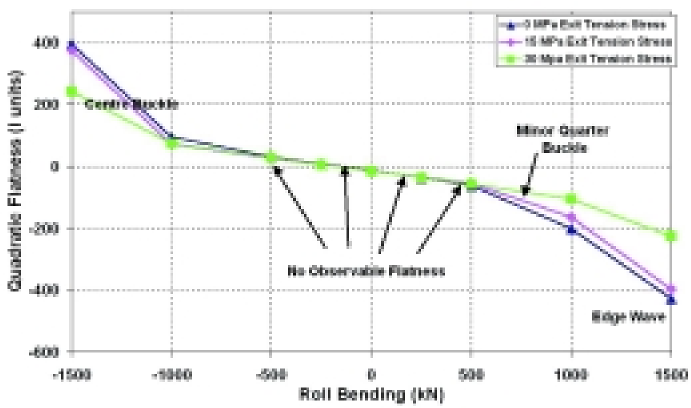


The variation in the incoming profile and changes in mill forces, thermal loads and wear, represent the major disturbances to hot mill profile and flatness. Significant changes to the thermal camber occur within a coil and between coils. Coolant operating practices play an important part here, as the thermal camber has a significant impact on the bending range required to maintain profile and flatness. Backup roll wear is another parameter which can vary over a large range and will have a significant impact upon profile and flatness.

The ability to control profile is limited by the available actuators and instrumentation, as well as the requirement to maintain acceptable flatness as profile and flatness remain closely coupled. Profile control may use a wide and varied range of actuators and is a multi-stand or multi-pass phenomenon with significant interaction between stands or passes. In addition, the strip behaviour is complex, thicker strip means that spread is a significant factor, higher temperatures mean that material can creep between stands or passes, and lower tension stresses more easily result in the buckling at later stands or passes. Whilst accurate and complete measurement of profile is now common, the measurement of flatness with optical devices results in partial information on the process and must be used carefully as only manifest flatness is measured.

Finally, significant flatness changes due to creep may occur after rolling and during coiling. All of these factors not only highlight the importance of simulation in examining and improving the flatness and profile performance of the hot mill, but also the level of complexity which is required in profile modelling.

The graph illustrates how the flatness of strip is affected by the change in roll bending from a typical four high stand under different exit tension conditions. The figure highlights the complex behaviour which can exist in a single stand. At low bending values (less than 500 kN or 50 tons) no observable flatness changes occur; however at larger bending values the sensitivity of flatness to bending increases significantly and the flatness becomes manifest as either centre buckle, quarter buckle or edge wave. The flatness sensitivity is related to buckling of the strip which may occur at either the exit, entry or both of the mill and is dependent upon the mill tension strategy.



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TOTAL UPGRADE SOLUTIONS

When a facility has a clear understanding of its current performance limitations it is often facing deficiencies in mechanical equipment, instrumentation and automation which all need to be addressed to achieve market performance goals. In this situation IAS has been using its depth of process knowledge and project management skills to provide total upgrade solutions centred around our achieva SETUP SYSTEM.

By leading such projects with our achieva philosophy we are able to provide mechanical equipment and instrumentation that is a cost effective solution to the clients' process goals. The recent major upgrade projects which IAS has been supplying to Norandal are good examples of this approach.

These three projects, the Norandal 811 and 921 mills at Huntingdon Tennessee and the No.5 Foil Mill located in Salisbury, NC involved IAS supplying total upgrade solutions. Collectively the project equipment supply includes in addition to the automation, Dry Strip Package, New Entry Bridle, and Exit Coil Car modifications, Segmented Coolant Spray Bars, Hot Edge Spray Technology, and Air Bearing Shape Rolls.

To fulfill the requirements of these projects, IAS carefully examines the performance requirements of the client (with a clear eye on what the laws of physics will allow) and selects the combination of instrumentation and mechanical equipment which will robustly achieve these requirements in the most cost effective fashion.

Recent integrated solutions from IAS have incorporated equipment from Parkegate Engineering, Shape Technologies, United States Controls, and Heat Exchange and Transfer. Ultimately IAS brings all of this together to ensure that the clients' goals are met and our guarantees are achieved.

IRTC

Why do we say "IRTC Is The World's Leading Course For The Flat Rolling Process"? Over the past 15 years it has continued to improve:

- More parallel lectures,
- More tutorial time to cover the practical side of the course material,
- Hot Mill Control lecture added,
- New and additional lecture material on hot and non-ferrous rolling,
- On-line access to the simulation software for 3 months after the course.

IRTC 26 Vancouver, Canada
18 to 24 September 2005
www.indauto.com.au/irtc

STAFF:

Morgan Holt has joined IAS Australia as a Systems Engineer. Morgan has relocated to Newcastle from his home town of Coffs Harbour, NSW. Morgan completed his Bachelor of Engineering in 2003 at the University of Queensland and was awarded a Commendation for high achievement. Welcome aboard Morgan!

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