IAS The Achievers

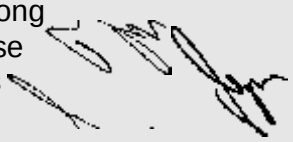
ENVOY

APRIL, 2004

Message from the Managing Directors

Recently IAS have experienced a strong demand for consulting services in the related areas of coil winding and mill equipment alignment. Poor alignment can impact severely on coil presentation, tandem mill threading and flatness control performance. The tight tolerances needed are not always recognised and this issue of Envoy draws attention to the relevant technical issues involved in maintaining good mill alignment.

A short article is also included on the economic benefits of improved coating mass control in hot dip metal coating lines. Strong interest in this area has been created by the increase in zinc prices. We trust you will find these articles stimulating.



INSIDE:

COATING MASS CONTROL:

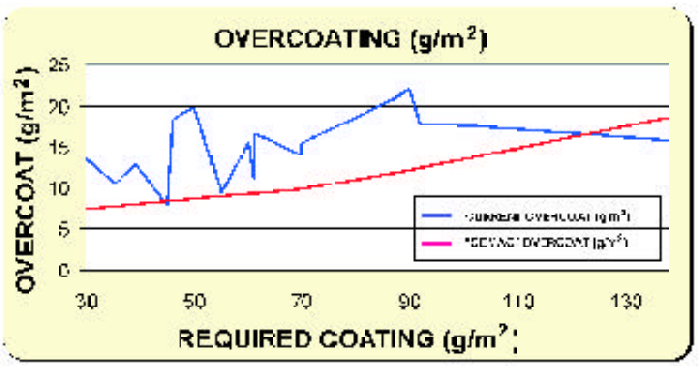
In recent months, the rising price of zinc has precipitated a number of enquiries for COMAC, the IAS coating mass control system for Hot Dip Galvanizing (HDG) lines.

As most of the questions about benefits have been the same (ie. how much zinc will I save?) IAS has produced a spreadsheet to calculate the zinc saving and express this as a payback period.

The spreadsheet analyses current performance data from the line (aim, customer guarantee and variance) and calculates zinc consumption for each product produced on the line.

Keeping the quality (ie. undercoating) the same, the spreadsheet then repeats this analysis using the improved accuracy (and hence reduced variance) that COMAC delivers. The difference is the zinc saving that COMAC would produce on the same product mix.

Would you like us to analyse the zinc saving on your HDG line? If so, please contact Peter Steigler at psteigler@indauto.com. The payback periods calculated for the last three lines analysed have all been in the range 4 to 9 months. **Can you afford not to consider installing COMAC?**



METAL QUALITY FEATURE:

MILL ALIGNMENT & GOOD STRIP SHAPE

Rolling mill alignment is of critical importance to the production of prime quality flat metals. Because of this basic fact IAS performs a significant amount of work associated with establishing and implementing equipment alignment tolerances, which are suitable for the flatness performance requirements of our customer's mills.

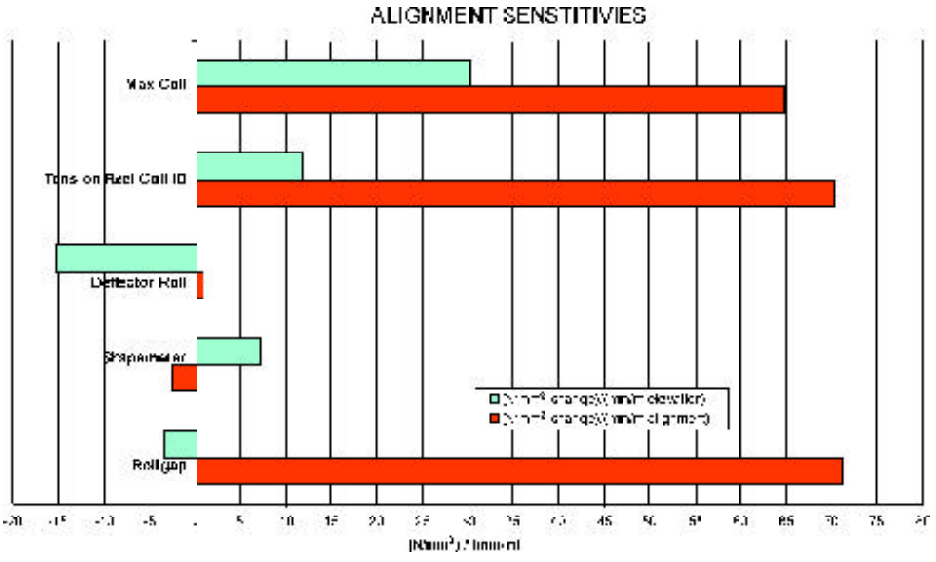
The development of these tailored tolerances, associated mill surveys and subsequent supervisory remedial work has become an important service performed by IAS. Mill alignment studies, in conjunction with our extensive work in shape control and Millcheck audits, enables IAS to provide a focused analysis of the major factors affecting strip flatness performace.

The practical value of this service is in quantitatively relating the alignment of the various pieces of equipment to the strip flatness produced. This linkage allows maintenance foremen to better target their alignment and maintenance efforts on keeping the few critical dimensions within tolerances, which are suitable to their product and production needs.To achieve this it is first necessary to obtain a good understanding of the product flatness requirements for the target mill, as all subsequent efforts are aimed at ensuring that these are satisfied. With regard to alignment the most simple tolerance is typically the maximum amount of camber which can be tolerated.

There are several factors which contribute to the camber in the product with the major ones being passline misalignments, transverse temperature gradients, and shape control system capability (whether manual or automatic).

Allowance needs to be made for these non-alignment factors to enable the calculation of how much error can be generated by misalignment without violating the product flatness requirements. Simple sidewall temperature measurements enable the effect of the temperature gradient to be appropriately sized.

The estimation of control capability is best obtained from online shape classification software, which calculates the standard deviation of the asymmetric error. Where this is not available it is necessary to make an allowance, based on experience, given the mill actuators, instrumentation and control system (or manual operation) on the mill.



Alignment Sensitivities for Exit End Equipment

METAL QUALITY FEATURE: (cont'd)

With such a measure for the effects of temperature and control, we subtract from the flatness specification a suitable multiple of the temperature and control standard deviations to determine the maximum flatness error, which can be associated with alignment errors. This becomes the tolerance allocation for the alignment errors.

The next step is to simulate the passline geometry of the target mill to determine the sensitivity of the flatness error to misalignment conditions for each passline surface. This provides the camber error and / or shapemeter measurement error associated with misalignment of all surfaces, which affect the passline. Examples of surfaces that affect the passline include the rollbite, shapemeter, deflector roll and the tension reel.

Typically the alignment of the rollgap and the tension reel are seen to be the most critical elements. With these sensitivities we have the direct link between strip shape and alignment error. This means we can distribute tolerance allowances across the critical passline surfaces. This provides the largest allowable alignment tolerances, which are compatible with the flatness requirements.

Mandrel Trajectory Under Load

For many mills the tension reel displacement under load is the largest source of misalignment in the mill. So special attention is required to determine the optimum tension reel mandrel starting position. This is necessary to ensure that as the mandrel deflects under the increasing load of the winding coil, it remains within the alignment envelope. This envelope represents the shape tolerance allocated to the misalignment of the reel.

With that engineering preparation the mill can then be surveyed to identify and correct out-of-tolerance geometry elements. Normally at the same time, work roll and backup roll sets are checked for compliance with the rollgap tolerances.

At the end of such an exercise the mill has a report which includes current equipment condition, alignment tolerances, and analysis of sensitivity to alignment errors. These can then be used as the basis for future alignment maintenance as well as providing an understanding of how tighter shape performance requirements will affect the mill alignment tolerances.

Using the services of skilled surveyors, IAS offers the mill owner a means of establishing the basic alignments and elevations necessary to achieve good strip shape. Without the correct basics, a seemingly small alignment error like 0.25 mm (0.01^{inch}) in the tension reel could be the cause of a 4 MPa (2 I-Units) shape defect.

.....BACK CHAT .....BACK CHAT.....BACK CHAT.....

By the time you receive this edition of Envoy, our IRTC team will be in Valencia for the 23rd International Rolling Technology Course.

At the time of writing, we have more than 40 delegates with 22 different companies and 20 countries being represented.

For those of you who have not yet managed to get to an IRTC, here is a short overview.

IRTC covers the major concepts and characteristics of flat rolling needed to stimulate delegates in solving problems.

Each day of the five and a half day course is broken up into lectures, tutorials and discussion groups.

Tutorials and practical application studies, including hands-on exposure to a suite of advanced mill simulation and design programs, will support the theoretical concepts and model derivations discussed in the lectures.

Facilities for private study and informal discussion sessions will be available and delegates are invited to simulate problems of their own choosing outside the formal course timetable. The course has also been extensively used by companies to "kick start" their new recruits into the field of rolling and more experienced engineers can keep ahead of changing technologies.

The lecturers have over 90 years of practical and theoretical experience in the design and implementation of mill instrumentation, control systems and rolling mill models. They have all presented papers at numerous international conferences and work closely with many leading steel and aluminium companies worldwide.

Will YOU be the 1,000th delegate to benefit from the IRTC experience?

Enroll for IRTC 24
19 to 24 September 2004
Vancouver, Canada.

STAFF:

The Newcastle office has a new office assistant in Jasmine Russo.

Jasmine has previously worked in Legal Offices in the local area and joined IAS in December 2003.

She is an active outdoor girl who likes camping, four wheel driving, fishing and bush walks.

In her teenage years she was involved with the Air Force Cadets and Girls Brigade and has achieved a Blue Belt in Rhee Tae Kwon Do.

Welcome to the IAS family, Jasmine.

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