Newsletter

December 2006

Electro-magnetic strip stabilization eMASS: test phase experience, industrial version available, crossbow reduction and first orders

The last Newsletter already dealt with the possibilities of optimising the zinc consumption by the use of the electro-magnetic strip stabilization eMASS. In the meantime the system has been tested for two different application fields in different lines and has been released for industrial use.

Installation above the “air knife”
A classical field of application is the installation of the strip stabilization above the air knives to adjust the zinc coating. While doing so the system dramatically absorbs the oscillations without touching the strip – this is different from touch rolls that may have a negative effect on the zinc coating.
The field tests have resulted in minimum potential savings of 2 – 5 g/m^2 for zinc coating thicknesses between 60 and 180 g/m^2 on these lines. This specific EMG solution uses innovative control systems (patent pending) and requires air cooling only.

Use in the cooling tower to prevent strip damage
A second place of installation is above the zinc bath or the galvannealing furnace for minimizing the oscillations in the air cooling section. eMASS – installed in this position – permits the operation at maximum cooling power and strip speed without running risk for the strip of touching the construction of the blowers or the walls by oscillating and twisting. eMASS has already impressively demonstrated this on an application lasting for several weeks.

Fig. 1: Installation of an eMASS system above the air knives in a hot dip galvanizing line

Crossbow reduction

Not only the zinc coating thickness but above all the homogeneity of the zinc coating is an essential quality criterion for the production of hot-dip galvanized flat steel. Decisive for the zinc coating thickness is a distance as equal and controllable as possible to the air knives. An inclination as well as a crossbow of the steel strip in the air knife zone must be avoided. This is exactly made possible by the use of eMASS:

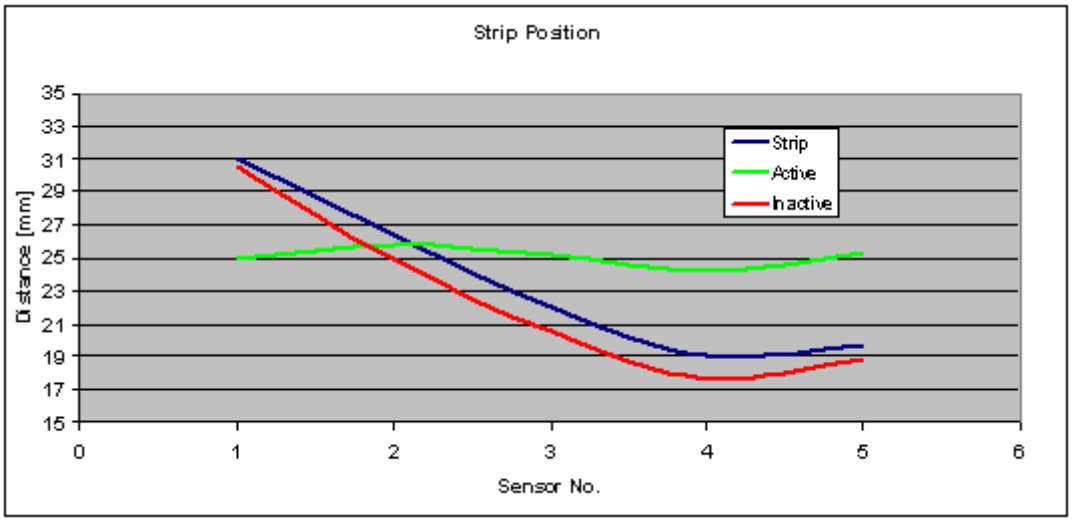


Fig. 2

Figure 2 shows – with reference to the strip width – a typical snapshot for the strip position without stabilization. The distance of the sensors is 250 mm, and the strip thickness is 1.2 mm. Red marks the maximum amplitude, the current strip position is marked in blue and the green colour shows the average strip position after the stabilization (not optimised to flatness, average above 240 sec.).

With active stabilization the following typical figure is produced:

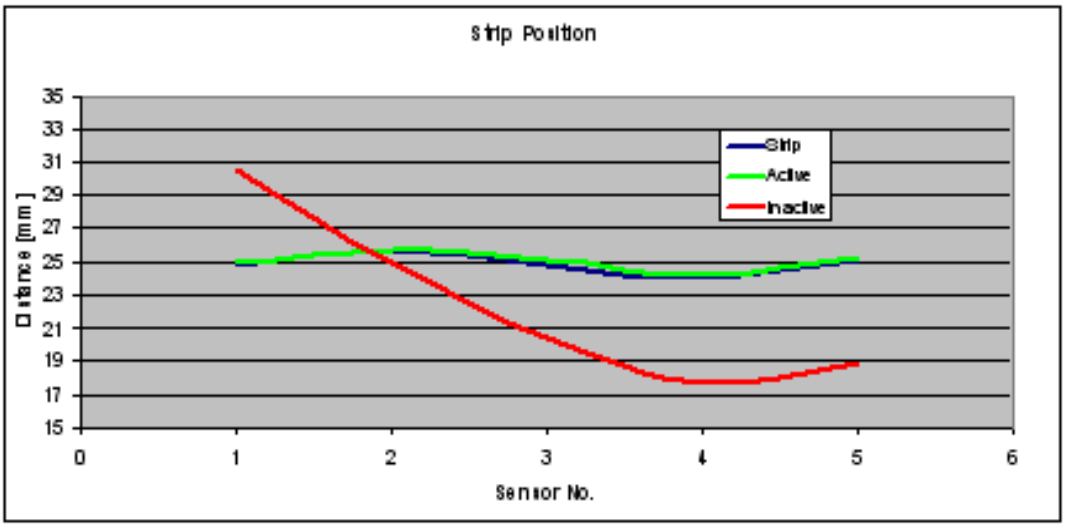


Fig. 3: Blue: actual strip position close to the average value for the stabilized strip (green)

As a result of these measurements it can be summarized:

- In the range of actuators a “crossbow” or “twisted” strip position is reduced by up to 90%.
- In principle a strip position deviating from the neutral axis of the strip can be adjusted.
- eMASS precludes strip touches - as with touch rolls - and avoids so problems relating to surface damages.
- Contrary to air pads / air cushions a fine adjustment of the strip position, e.g. for use in the cooling section is possible. Additional oscillations or resonances are eliminated.

In the meantime EMG has received first orders for the eMASS system in Europe and Asia and is looking forward to further applications. At present the delivery time of the system is 5 months from date of technical clarification.

For further information, please mail to: **sales@emg-automation.com**

Use of online roughness measurement in electrolytic galvanizing lines – Salzgitter orders SORM 3plus

In August 2006 a single-sided roughness measurement system (SORM 3plus) was ordered from Salzgitter Flachstahl GmbH. For the first time worldwide this system shall be used on an electrolytic galvanizing line for strip widths ranging from 900 up to 1850 mm. With the system recently ordered, Salzgitter Flachstahl has equipped its third processing line with a SORM 3plus system since 2003 and firmly follows its philosophy of a “Total Quality Management”. EMG has proved to be a capable and efficient partner in answering quality assurance questions and persistently continues its partnership with leading suppliers of quality products in the steel industry. The investment means for Salzgitter a further contribution to process stability on the electrolytic galvanizing line.

SORM 3plus is an online method of measurement for the optical roughness measurement of moving steel strips. In contrast to the traditional stylus method for testing the steel surface quality, the system from EMG detects the surface roughness of cold-rolled steel strips already during the production process. The production line needs not be stopped specially for the surface quality check. The SORM 3plus system provides reliable roughness measuring data for electrolytically galvanized surfaces as well and is therefore particularly suitable for manufacturers working with different galvanizing methods (hot-dip galvanizing and electrolytic coating).

For further information, please mail to: **sales@emg-automation.com**

Further development of IMH2 inductive sensors for the high-temperature range

EMG installed its first inductive sensor for a strip guiding control system in the furnace on a galvanizing line at ARCELOR EKO Eisenhüttenstadt, and this was in 1993. Since that time the sensor has been working perfectly, to their full satisfaction, and without any claims.

EMG Automation GmbH is - seen on a global scale - the only supplier of inductive sensors for control systems on fast moving strips. The high customer satisfaction with EMG's solution, particularly in the very critical high-temperature range, is reflected in more than 300 control systems worldwide installed within thermal processing lines. The close cooperation with our end users is our incentive to
permanently improve and optimise the systems.

With the new IMM2, IMH2, and IMU2 sensors EMG has made a good quality step towards maintenance-free sensors. The new solutions which EMG has supplied since January 2006 are more insensitive to metal vapour or influences arising from the furnace environment. This is connected with a high stability of the output signals which on the other hand enables a fast and uncomplicated
start-up.

Another advantage of the new technology is that the sensors can also be designed up to an ambient temperature of 1100 °C.

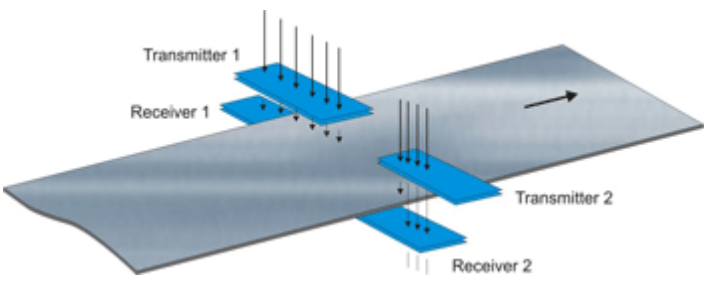
Following temperature range can be realised:

IMM2 up to 650 °C
IMH2 up to 950 °C
IMU2 up to 1100 °C

The strategy EMG is consequently following with these new sensors is to provide its customers with maintenance-free systems in order to keep the current operating costs as low as possible. Since the introduction of the new generation of high temperature sensors in January 2006 EMG has received orders for more than 65 control systems worldwide. Since March 2006 the first systems of this series
have worked perfectly and to customer's full satisfaction.

In summary the advantages of the new inductive sensors for the high-temperature range can be detailed as follows:

- high and reliable control accuracy in thermal processing lines
- simple start-up
- simple planning, also for modifications and enhancement
- maintenance-free
- high reliability
- insensitiveness to metal vapour
- high service life
- high efficiency and economy



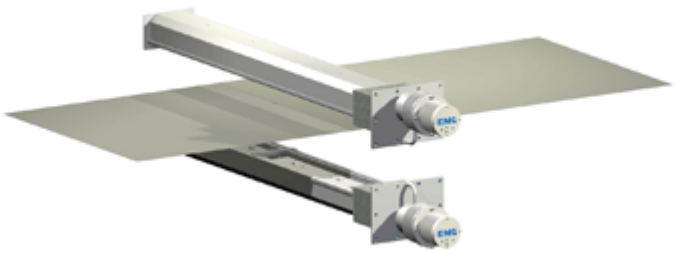


Fig. 4: Schematic view of the measuring principal and application

Our worldwide sales representatives as well as our employees at the headquarters in Wenden will be at your disposal for further questions or consultation at any time.

For further information, please mail to: **sales@emg-automation.com**

VKI – Strip position measurement in the rolling mill

For a continuous rolling process, i.e. in order to achieve a central strip run and the requested strip flatness, the knowledge of the exact strip edge position and the strip width is today of decisive importance. Slit strips especially through their wedge shape will produce a strip offset inside the rolling mill, which without intervention will be increased from pass to pass.
In an extreme case the coil is set down and wound in an adjacent recoiling line before rolling is completed. Moreover, the strip offset will falsify the measured signals of a used, segmented shapemeter roll.

Under rough ambient temperatures with considerable accumulation of dirt and dust and thick oil fog, no satisfying operational reliability will be achieved with the use of optical sensors.
The solution here is the maintenance-free and inductive VKI2 measuring system. A measuring bar that is 120 mm wide is mounted underneath the strip, being even with the carry-over table. The measuring system continuously detects the strip edge positions and determines the current strip width. Considering these measured values the slit strips are safely maintained in the working area by a corresponding adjustment of the mill work rolls. The strip flatness control gets by this measurement current edge position values and can so exactly determine and evaluate the partial covering of the two outer roll segments.

The use of the inductive measurement (VKI2) in the rolling mill has proved to be the right decision and ensures so

- the reliable knowledge of the strip edge position and the current strip width
- an on time intervention to avoid a disturbing strip offset
- a continuous rolling mill process without interruption caused by rewinding
- a correct strip flatness control

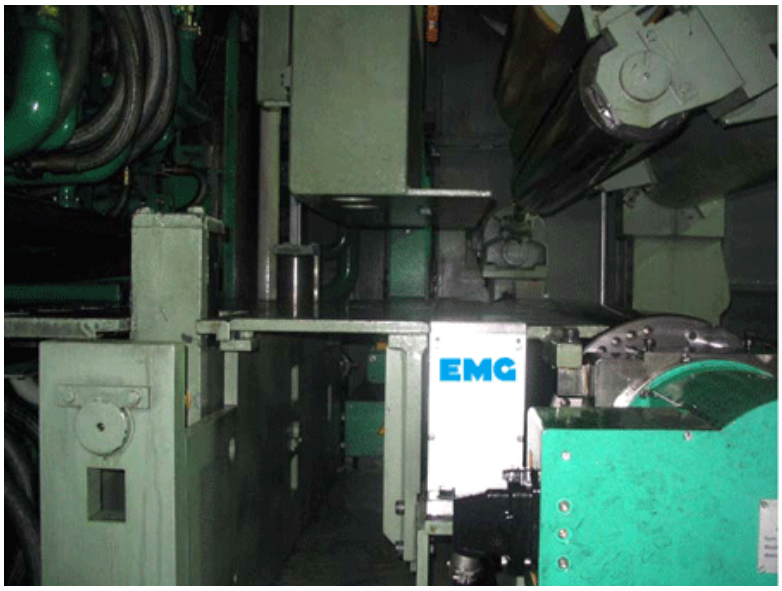


Fig. 5: Installed VKI sensors

For further information, please mail to: **sales@emg-automation.com**

Miscellaneous

- ***Quality Assurance Systems: Strengthening the international advisory skills for EMG customers – International Workshop in September 2006***

On the 25 and 26 September the ST-QS business unit in Wenden held its first product and sales workshop that was exclusively focussed on Quality Assurance Systems. The total of 19 participants was made up of sales partners and representatives of branch offices from 9 nations and regions: China, India, Korea, USA as well as the European locations: France, Great Britain, Italy, Austria, and Germany. In the course of such measures EMG is aiming at improving its international advisory skills for quality assurance solutions.

Fig. 6: Workshop participants at work

Experts for the QA-products SORM, IMPOC and eMASS are also worldwide available for EMG's customers.

- ***Quality Assurance – New orders for SORM and IMPOC from industry***

SORM 3plus	*ARCELOR-BREGAL, GERMANY*	*Galvanizing line, EBT, automotive supply*
SORM 3plus	*Salzgitter Flachstahl GmbH, GERMANY*	*Electrolytic galvanizing line*
SORM 3plus	*confidential, GERMANY*	*Subsequent processing*
SORM 3plus	*Anshan, CHINA*	*Continuous annealing line, automotive supply*
IMPOC	*confidential, GERMANY*	*Subsequent processing*

- ***Events***

EMG was present at:

- Stahltag 2006 (Day of Steel Industry), 9 Nov. 06 in Düsseldorf – Joint presentation of ThyssenKrupp Steel AG, Salzgitter Flachstahl GmbH, IMS Messsysteme GmbH, vatron – voestalpine mechatronics GmbH and of EMG Automation GmbH

"The Steel Industry as driving force for innovation for worldwide operating technology based firms"
(Presentation available on request)

EMG will be present at:

- ***AISTech 2007, Indianapolis, USA from 7 – 10 May 2007***

- ***METEC 2007 from 12 – 16 June in hall 6, booth B03***
In SteelCon *in conjunction with METEC: lecture dealing with: EMG-eMASS – Homogeneous zinc layer and high production speed via an electromagnetic strip stabilization system above the air knives*

For further information and dates, please mail to: sales@emg-automation.com