SENCON
CONTROL DOWN THE LINE
NEWS&VIEWS
VOLUME
MARCH 19

Internal & External Coatings - measuring automatically

A new quality gauge is now available, providing measurement of both internal and external coatings thickness for DWI cans. Its automated operation allows test frequencies to be significantly increased whilst saving hours of unproductive operator time.

The New QA4400 Automatic Coatings Tester

Rather than spending their time measuring cans, operators can focus on making cans, keeping the line running at its maximum rate.

As with all the Sencon QA gauges, this system operates on the powerful *Windows® 95 platform providing simple configuration to varied customer requirements as well as networked data communications.

The main benefits the system brings to the can manufacturer include reduced coatings consumption by lowering target film weights, increased quality as each can is tested in a precise and repeatable way and reduced spoilage by quickly identifying problems with the spray and coatings processes.

For more information please circle 'Coatings Tester' on the reply sheet

*Windows is a registered trademark of the Microsoft Corporation

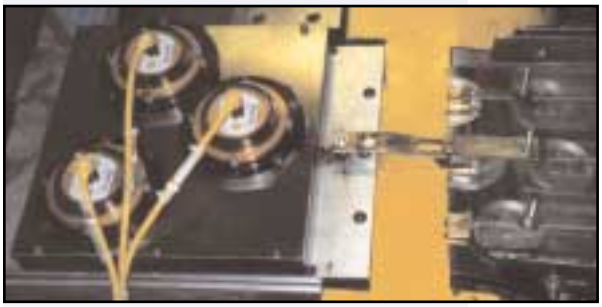
In this issue

The End Leak Tester Success Story

With over 200 units now in use, the Sencon End Leak Tester Package (ELTP) is a proven and reliable method for detecting pinhole sized defects in beverage and food ends. In field trials the following types of defects have been successfully identified:

- Rivet leakers
- Countersink Leakers
- Panel Leakers
- Chuck Wall Leakers
- Score Leakers
- Excessive Compound Leakers

In other cases, clipouts and damaged curls have been detected if they are large enough to impact the light seal around the end.



The ELTP Light Detectors are Mounted at the Discharge of the End Conversion Press

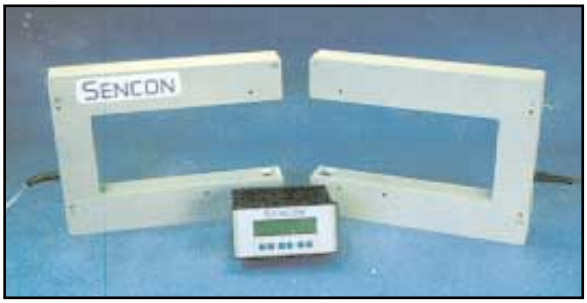
The system has now been installed on Stolle *System 7 & 8 and the DRT *Triple T presses. System users include the Ball Corporation, Crown Cork & Seal, Metal Containers, Nacanco Ltd. and Reynolds Metals Co.

*System 7 and System 8 are Trademarks of the Stolle Corporartion. Triple T is a Trademark of the Dayton Reliable Tool Co.

For more information please circle 'End Leak Tester Package' on the reply sheet

Reducing Spoilage & Downtime on the Three-Piece Line

Two major costs in any manufacturing process are caused by line downtime and product spoilage. This is especially true in three-piece can manufacturing where badly coated sheets can cost up to US$1.65 (UK£1).



The New SC400 Skew Measurement System

Not only do skewed sheets have to be scrapped, but with the weld margin in the wrong position on the sheet, weld wire breakage occurs. As well as creating significant downtime, this can also result in damage to the weld rollers, creating poor welds with subsequent customer complaints.

But the problem has now been solved by a new and innovative product known as the Skew Measurement System. Designated the SC400, this product consists of two *'U'* shaped sensors mounted on each side of the coatings roller which detect the angle at which the sheet exits the machine.

One sensor detects the arrival of the leading edge of the sheet and triggers an IR flash in the other sensor. This flash allows a linear array CCD camera to take a picture of the position of the leading edge of the metal sheet.

Deviations in position between each side of the leading edge of the sheet are indicated by a bar graph and a numerical LCD which may be calibrated in millimetres or inches. The deviation signals are used to trigger alarms and/or reject signals. The limits of reject and alarm can be set by the user and are password protected.

Each measured value is also available over an RS232 port for SPC purposes. The high intensity IR flash permits the SC400 to operate at line speeds of up to 500ft/min (150m/min). Accuracy is better than 0.008" (0.2mm), and is largely independent of the vertical positioning of sheets as they pass through the sensors.

Benefits of the system include reduced spoilage by identifying problems at the front end of the line; reduced machine downtime by ensuring the squareness of margins across the sheet; and better can quality with all welds being in the right position relative to the lacquer.

A UK customer who had one wire breakage a week has had none at all since they installed the system six months ago. For a comparatively small investment this unit provides fast payback on the three-piece line.

For more information please circle 'Skew Measurement' on the reply sheet

Discrimination - twenty years of progress

The kind of discrimination supported by Sencon is the ability to discriminate between a can and the punch that forms it. Unlike those other *'political'* forms of discrimination, a lot of effort has gone into perfecting positive discrimination such that we can be sure the entire can has emerged from the wall ironing toolpack.

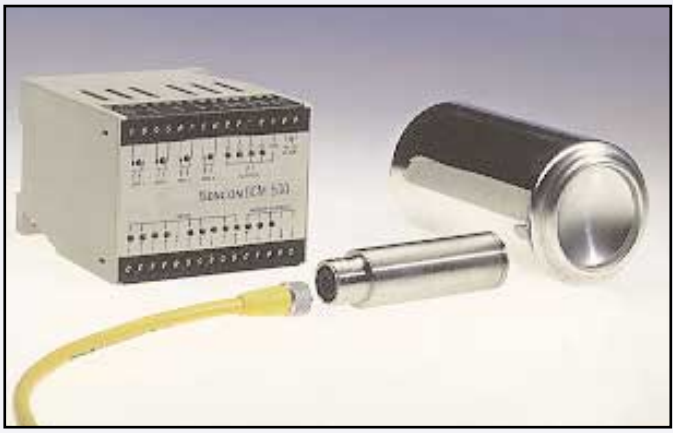
In the early days it was relatively easy, signals could be derived and processed to detect an aluminum can but remain *'blind'* to the steel punch. The main challenge was to design a housing and protection system to give the sensor long life even in the arduous conditions at the Bodymaker stripper.

Then came steel cans and carbide punches, pretty soon we had an array of three *'short can'* sensors specifically tuned for a particular combination of can and punch material. Can makers soon realized the benefits of long life and tooling protection such that Sencon short can sensors became standard fitting on almost all DWI bodymakers.

NICKEL CARBIDES

All was well until the late 1980s when tool makers began to use different alloys of carbide that used nickel in place of cobalt as the principle binder material. These new carbides gave superior resistance to attack from coolant but created huge problems for Sencon due to their rather variable nature.

The use of nickel changed the electromagnetic properties of the punch and it became very difficult to determine the difference between the signal from the punch and the signal from the can. To make matters worse, each batch of punch material seemed to create a different signal and the effect of punch noses and bolts was greater than the effect of the can. At first we introduced three new types of sensor, but soon it became apparent that a far more sophisticated solution was required.



The BCM 387 'Smart Sensor' System

SMART SENSOR

The *'Smart Sensor'* had the ability to be calibrated to the specific punch in use. It looks at the punch and notes its signature or dynamic profile. This can then be stored in its memory and used to determine if a can is present or not. Early versions still struggled to cope with all of the permutations of carbide over all temperature ranges so the *'WR'* or wide range models were introduced. These are now accepted and in use in all parts of the world, working with a variety of carbide formulations, providing positive discrimination over the whole range of materials.

For more information please circle 'Smart Sensor' on the reply sheet.

Closing the Loop -

Automated Process Control on the Coating Line

Sheet coating lines have always presented a relatively unique challenge in process control. However, recent technical advances provide opportunities to improve both process and quality control as well as opening up the possibility of an intelligent, self adjusting sheet coater.

All processes need control and that control is generally based on feedback from the process output. It is an inescapable fact that the quality of the feedback loop determines the quality of the process. The feedback, (normally in the form of measurement data), determines what process adjustments are required, if it is not representative, timely and accurate then a stable in-control situation becomes difficult to establish.

Humans form part of many feedback loops, and in their favor they are an *'expert system'* based upon the worlds most powerful and sophisticated neural network. Unfortunately they also have limitations, and in control feedback terms they are particularly bad at dealing with;

1. **Higher order processes** - where a non-linear relationship between input variables and output exists or is created by combined input effects.
2. **Processes with time constants** - where input and output variation are separated in time or exhibit a cyclic tendency.
3. **Subjective measurements** - and this includes those measurements where measuring technique can influence results, the *'appraiser variation'* component of gauge R&R.

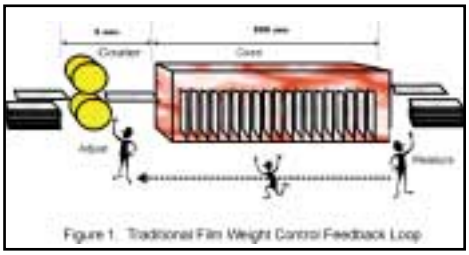


Figure 1 Traditional Film Weight Control Feedback Loop

This goes a long way in illustrating the reasons why coating line process control has traditionally been such a challenge, particularly with film weight control. **Figure 1** above illustrates that a coater and

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oven have many input variables, long time constants, human feedback and significant appraiser variation in film thickness measurements.

The latter two problems can be resolved with the On-line Film Weight Monitoring system. This is a non-contacting spectrographic device which provides continuous real time indication of applied film weight. It is installed right at the front end of the line, on the coater discharge. This provides immediate feedback - and if a constant lacquer solids ratio is maintained - a very accurate representation of dry film weight.

Figure 2 shows the improvement to the feedback loop this creates. Measurements now reflect what is happening at the coater - not what was happening fifteen minutes ago. The effect of input variables such as sheet characteristics, lacquer viscosity and machine adjustment can be monitored in real time. Cycles become evident and trends can be spotted and reacted to earlier.

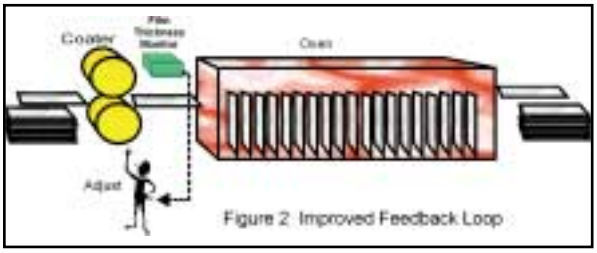

Figure 2 Improved Feedback Loop

The final improvement would be to remove the operator from the feedback loop. *'Closing the loop'* is the challenge now being addressed in a joint project involving Sencon and the German canmaker Huber. More sensors are being developed to monitor additional variables and the data processed into signals to initiate automatic machine adjustment or request operator intervention. Actuators built onto the machine will be able to continuously adapt and optimize settings in a manner that the operator could never be expected to.

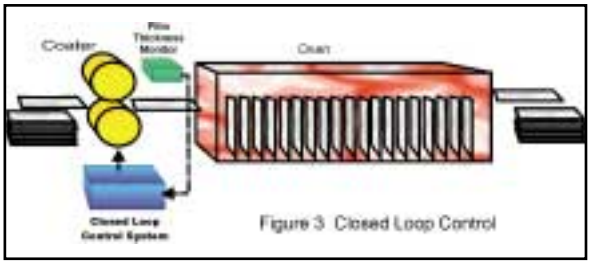

Figure 3 Closed Loop Control

As shown in **Figure 3** the operator is completely removed from the feedback loop though would still be needed to *'manage'* the process. The system would include SPC functions and facilities for storing the characteristics and settings for different coating jobs and lacquers.

The goal is to produce a process that can never make bad product. Not only will quality be improved, but it should be possible to reduce process tolerances to the point that reductions in target film weight can be made. Significant cost savings will result as lacquer consumption is reduced, spoilage is cut and the need for time wasting set up and adjustment eliminated.

For more information please circle 'Film Weight Monitor' on the reply sheet

In Brief

Email Addresses

Two new Email addresses have now been registered for both our U.S. & U.K. offices.

For Email to Sencon Inc. in the U.S. please address as follows:

sencon@ameritech.net

For Email to Sencon (UK) Limited and Sencon (Europe) Limited in the U.K. please address as follows:

sales@sencon.co.uk

Cannex '98 The Biggest Ever?

This years Cannex could posssibly be the largest exhibition ever held for the Canmaking industry. It takes place in the Colorado Convention Centre in Denver from May 13th - 15th.

Sencon will be exhibiting on **booth 713** with a number of new products on show, including the Automatic Coatings Tester featured on page one.

The last time Cannex was held in Denver in 1995, 176 exhibitors from 20 countries attracted 2,500 visitors, with almost a quarter coming from outside the USA.

The New Product Guide

A new guide to the complete Sencon range is now available. It includes over 100 pages of product information all perfect bound to make reviewing and selecting products easier and simpler for our customers.

The new catalog also includes up-to-date information on all our new products as well as all the existing product ranges.

The guide is currently being distributed. If you would like a copy ***please circle 'The Product Guide' on the reply sheet.***

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