LESS WASTE AND TIME:
M.A.N.-ROLAND PLATE AND COORDINATE SCANNER

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In the various sectors of the printing industry developments occur in steps of varied size. For instance in the area of reproduction the introduction of scanners and in the area of composition the abandonment of "hot metal" made tremendous increases in efficiency possible.

In printing itself, however, the changes are less revolutionary. Certainly one of the reasons being the fact, that on a printing press we are dealing with masses in motion - masses which are governed by physical laws. Increases in performance therefore are only possible within this framework of theoretical principles.

Considering this, the introduction of ink controls and automatic ink regulating systems in the Seventies was a fairly big step ahead.

Today, almost all of the important printing press manufacturers offer ink regulation systems of this kind. The aims are:

Better printing quality, less waste, shorter makeready. Most multicolour sheet fed offset printing presses of today are already equipped with modern ink control or ink regulating systems like RCI or CCI. Now it is the designers task to continue along this way and to supplement and optimize it.

The M.A.N.-ROLAND plate scanner, which was introduced a little while ago at the TPG in Paris, is a further step along this way. It was designed to determine for each zone of a printing plate its ink coverage - expressed as percentage - and to compute therefrom the pre-setting of the

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ink slides. The M.A.N.-ROLAND plate scanner EPS operates as follows:

A measuring bar carrying 39 analyzers is guided across the printing plate. The light emitted from a built-in fluorescent lamp is sent back by the printing plate and measured by the analyzers. The difference of reflexion in each zone permits the calculation of the percentages of inking areas on the printing plate.

As the measuring bar travels across the plate, measurements are taken at intervals of 1/10 inch. The length of the printing plate being 40 inches, this totals up to 400 measurements; each zone is measured 12 times.

Calibration of the 39 analyzers among each other is done on a calibration strip which extends across the height of the plate. The calibration for the respective plate contrast is achieved by two calibrating fields with area percentages of 100 and 0. These fields are positioned outside the printing area itself, where the plate is clamped. Up to now, with devices of this kind it was often difficult to distinguish between copper and chromium when measuring bi-metal plates. The reflexion values of both metals are quite similar. By blacking the copper this problem may be by-passed - but at the price of an additional working operation.

M.A.N.-ROLAND instead solved this problem by installing a second light source, the wavelength of which was especially modulated for copper. Accordingly, before the measurements are taken, the appropriate light for alumimium or copper respectively, must be turned on.

Immediately after passage of the measuring bar the measured area percentages appear as advance information on the screen. These data are printed out as graphic representation on the protocol, together with the respective percentage information. Simultaneously these data are stored on a magnetic cartridge tape.

The screen is covered with a sensor foil, thereby turning it into a touch panel. During the input dialogue answers and instructions are transmitted by finger touch. This makes pushbuttons and keys unnecessary.

The input dialogue runs off somewhat like this:

enter cartridge tape number;
plate size;
type of plate / aluminium or copper;
plate number within a set of plates;
colour;
protocol printout / yes or no;
store / yes or no;
start measuring process.

In case of errors during the input procedure - for instance if it was forgotten to load the tape - these errors are displayed on the screen.

In most cases, the plate scanner would be installed in the plate making department. Together with the printing plates the cartridge tape is delivered to the printing press and put into the operating desk of the RCI or CCI unit. Here, the previously measured and stored data are converted into the respective ink slide positions. At the same time, correcting curves allow for the different influences of paper, ink and type of run. After loading the cartridge tape the complete adjusting cycle runs off automatically on all inking units. The operating personnel is free for other tasks; this cuts makeready time considerably.

Moreover, an accurately measured plate reaches proper ink balance faster than a plate, for which the ink requirements were estimated by the printer. Again, reaching the proper ink balance faster, means time saved because of fewer corrections; this also means fewer makeready sheets and reduced material cost.

The economy of this unit has various stages. At first, a print shop would normally acquire a plate scanner only for a printing press with a modern ink control unit. Nevertheless even in this case the unit may quite advantageously be used for the existing conventional presses: The printer can adjust the ink keys according to the measuring protocol printout.

This method may even be used on presses with differing zone widths, including outside makes. As soon as new presses are acquired, however, the economy of a plate

scanner is multiplied - so it is an investment for the future.

Let me mention another aid for the printer: The M.A.N.-ROLAND coordinate measuring device ECS; this newest one among the developments in the area of ink control devices from our company is designed to reduce material cost; it is particularly useful where very expensive and costly materials are being used.

As you know, all ink control devices need a printed measuring field bar for the densitometric comparison. These measuring field bars are positioned one-dimensionally; consequently - as a rule - an additional strip of material about 1/2 inch wide is needed; this raises the material cost by about 1 percent. The advantage of our new ECS device lies in the fact, that the linear measurement could be abandoned and the second dimension is also used for the automatic measurement. This way it becomes possible, to scan measuring fields at any place on the sheet. The measuring head scans the sheet following a coordinate pattern which has been established using the unprinted areas between the images.

The ECS device is particularly advantageous for applications in paperboard printing, since here practically always room is available between the single folding boxes or on glueing edges for placement of the measuring field bars. The position of the measuring fields of course must be communicated to the computer, so that the measuring head can travel accordingly. It is sufficient to determine only the first field of a measuring field bar.

For the input of these positions, the operator has two options:

1. Determination of positions using a sighting mechanism: The measuring head is moved by remote control to the first field of a measuring field bar. An episcope enlarges the measuring field and this way simplifies an accurate adjustment. Actuating a key stores these position-data. Entering the data for all the measuring field bars takes about 5 minutes.

2. Numerical determination using the XY-coordinates.

Independent of the entering sequence, the measuring head always uses the shortest path to the next measuring field bar. In doing that, it can travel forward as well as backward across the measuring fields. To control the inking and for a quality diagnosis, the data are assigned in the proper sequence, just as in the case of linear measurements. The measuring head is equipped with a filter wheel, which rotates at 180 revolutions per second. Each measuring field is measured 11 times to arrive at an average value. This means a measuring speed of 16 fields per second. Inbetween field bars the travel speed is tripled. This makes it possible to complete the measurements in a short time.

It is a special advantage of the ECS device, that for the first time not only measuring fields can be evaluated densitometrically, but exceptionally critical points within the image area as well. It is well known, that hair colours, complexion, wood tinges in furniture illustrations and the like, are such critical subjects. They are mixtures in the light range consisting of three or four colours with dot percentages between 10 and 40. Minute variations in ink transfer during the printing process can result in poor printing results or spoilage.

Here now the ECS device can - by means of spot measurements - extract the individual density percentages and make them readable in the protocol. This way it becomes possible not only to control the measuring fields but also to directly control the printed image as well, by means of an ink control device.

For the lays on the coordinate table we found novel solutions as well. The otherwise common positioning of the test sheets using stops and marker lines is no longer necessary. It is sufficient to bring the sheet in the approximate measuring position. Discrepancies of the lay edge of up to 0.2 inches and up to 0.8 inches sideways are of no importance for the accuracy of the measurement.

Micro diode arrays recognize the exact position of the front edge of the sheet. The positions of the side edge on the dark background is recognized by the measuring head itself. This three-point measurement defines the exact position of each control sheet. For each subsequent measure-

ment the travel of the measuring head is corrected according to this position. This way, the measuring fields are always accurately approached by the measuring head.

The results of these measurements are in the following converted into the respective slide positions just as in the standard CCI unit.

The economic advantage of this new coordinate measuring device lies in the previously mentioned material savings. In paperboard printing a 1 percent material savings per year represents more than 50.000.- Dollars.

As we can see, pre-setting systems and the electronics contained therein take over more and more tasks to simplify operating, to shorten makeready, to improve quality and to lower material costs.