CONTROL PROCEDURES

Maintaining color register during the pressrun involves the control of two types of register. The first is press register of the sheet and the second is the internal register or fit of the images on the press sheet.

Press sheet register involves control of the gripper edge and the side-guide corner of the sheet for each color impression. During press makeready, the gripper edge and side-guide margins are adjusted with respect to image location on the press sheet. The side-guide is then adjusted for each color until the vertical line of the side-guide marks (3) are positioned on the sheet edge with half the thickness of the mark bleeding off.

Press sheet register can be checked by pulling a set of five or more consecutive inspection sheets and fanning them out, sheet to sheet. The vertical side-guide marks indicate whether the side-guide mechanism is functioning properly, and the horizontal marks show the gripper-edge register.

On modern sheetfed presses in good operating condition, the sheet-to-sheet press register variation generally has a standard error of less than 0.001 in. (0.025 mm) (1). Standard error is a statistical measure. It takes into account many factors, each of relatively small importance, that contribute random variations based on the laws of chance. It means that the press register variations will be less than ±1 standard error in about 68% of the sheets, less than ±2 standard errors in 95% of the sheets, and less than ±3 standard errors in 99.7% (or virtually
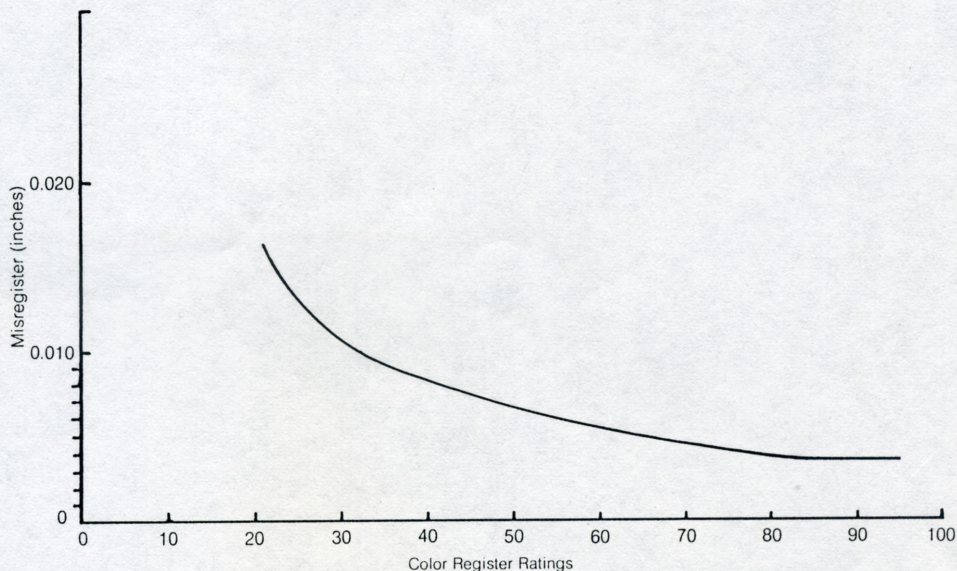

Figure 3. Smoothed curve derived from data points of color register rating plotted against misregister of four-color process prints.

all) of the sheets.

In view of this statistical press sheet register error, one expects the fan-out of sheets to show some slight movement of the side-guide and gripper marks due to chance effects. This need not be a cause for concern unless several successive pulls of inspection sheets show variations in the mark positions of more than 0.002 in. (0.05 mm).

Large, erratic variation in the side-guide and gripper marks may be due to the paper. Paper conditions such as tight or wavy edges, improper moisture balance, or poor trim of edges can cause various types of misregister.

Next, the internal register, the "fit" of individual ink images within the sheet,

should be examined for register. This type of misregister is also called "misfit." All image areas should be checked, as it is not unusual for some images to be in perfect register while others show considerable misregister. Where the gripper edge and side-guide corner are in register and there is misregister toward the trailing edges, the causes are usually attributable to the paper. Among the causes are tight or wavy edges and sheet distortion, or stretch, which is worse with larger sheets and excessive impression cylinder squeeze.

Another source of internal misregister is plate images that do not "fit" due to errors in stripping and platemaking. This is a problem that should be corrected during the prepress operations, and is usually detected in prepress proofing or during makeready.

Internal register will, like press sheet register, show some small statistical variations or errors due to chance effects. This error combines with press register error to increase the total standard error of register. The standard error for internal register has to be experimentally determined for each job since it changes with variations in paper, inks, plate layouts, etc. At present, the conventional procedures of statistical quality control for determining the standard error are too time-consuming and expensive to use except in very special cases. For the above reasons one has to start with simple guidelines in selecting the limits of misregister that will be acceptable in any given job.

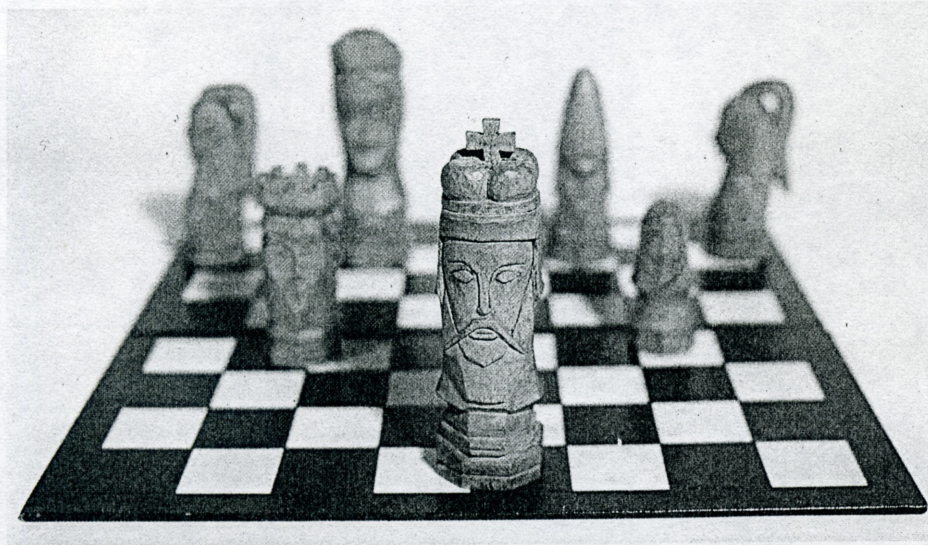The customer's OK sheet is a natural starting point for selecting the limits for

Figure 2. Illustration of image with sharp- and soft-edged detail. Misregister will be more apparent in the sharp-edged foreground detail.