Linotype-Hell

Technical Information

Large Format Output Devices

The first high resolution imagesetters for the PostScript** page description language were the Linotronic* 100P and the Linotronic 300. The 12 inch film width of these devices allowed them to do a standard 8.5 inch x 11 inch page with crop marks, trim marks, and bleeds if necessary. Larger pages were also possible, depending on the exact dimensions.

Since the introduction of these devices in 1985, many more PostScript imagesetters have been introduced. Recently, a wide range of large format PostScript devices have been released that allow not only the output of single pages, but have image areas that are large enough to accommodate a fully imposed layout of multiple pages. These imposed layouts eliminate the need to strip individual pages into a flat for platemaking. The film that comes off of the imagesetter may be used to make plates.

Accuracy and repeatability

An imposed layout requires a combination of output device capabilities, effective software programs, and operator expertise. Two important factors in the ability of an output device to handle imposed layouts are repeatability and format size. Format size is important for obvious reasons, repeatability is somewhat more subtle. The terms ‘accuracy’ and ‘repeatability’ are somewhat similar in meaning, but there are some important differences.

Accuracy is the ability of an output device to expose a mark of a given size in a specified location on film. An accuracy specification might be particularly important to someone who was creating bar codes or printed circuit board diagrams where the film must meet extremely demanding tolerances. **Repeatability**, however, is the specification which is more important for color reproduction. Repeatability is the ability of an output device to expose a mark in the same spot on four consecutive pieces of film. A repeatability specification of 1 mil means that if you were to attempt to place a mark in a specific location on four consecutive pieces of film, all four marks would fall within a circle of a radius of 1 mil.

Device	Format size	Device type	Repeatability[1]
Linotronic 260	12” in width	Capstan	1.6 mil (+/- 40 microns)
Linotronic 330	12” in width	Capstan	.6 mil (+/- 15 microns)
Linotronic 530	18” in width	Capstan	1 mil (+/- 25 microns)
Linotronic 630	17.9” x 19”	Internal drum	.2 mils (+/- 5 microns)
Linotronic 830	25.6” x 21.25”	External drum	.2 mils (+/- 5 microns)
Linotronic 930	29.5” x 43.3”	External drum	.2 mils (+/- 5 microns)
Chromagraph R 3020 PS	25.6” x 21.25”	External drum	.2 mils (+/- 5 microns)
Chromagraph R 3030 PS	29.5” x 43.3”	External drum	.2 mils (+/- 5 microns)

[1]These repeatability measurements are calculated over four consecutive pages, on machines operating within specified temperature and humidity ranges. These values are based on specified page sizes which differ from machine to machine. These repeatability measurements are the so-called typical values. For more information, please refer to the published specification sheets for each device.

Capstan versus drum

There are two primary categories of imagesetter: capstan and drum. Generally speaking, a capstan imagesetter is one where the film is moved as the laser beam passes over it. (See Figure 1.) These imagesetters may also be referred to as flatbed devices. In a drum imagesetter (see Figure 2), the film material is attached to a drum during exposure. The laser optical system moves. Minimizing the movement of the film is one way to improve repeatability. Drum imagesetters may be divided into two categories: internal and external. With internal drum devices, the film is attached to the inside of the drum. The laser optical system moves along a spindle which runs parallel to the axis of the drum. In external drum devices the film is attached to the exterior of the drum. With external drum devices, the drum spins during exposure.

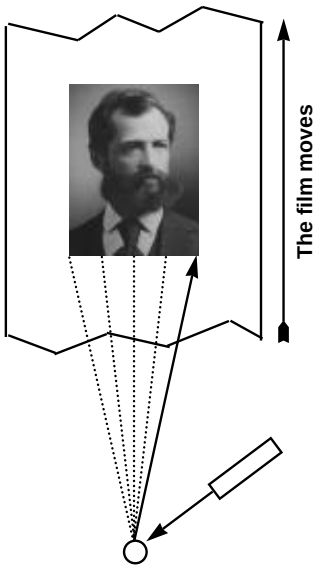

Figure 1 - With a capstan device, the optical system remains stationary, and passes a laser beam across a moving piece of film.

As you can see from the chart on the previous page, the repeatability specifications of drum imagesetters are tighter than those of capstan devices like the Linotronic 230, 330, and 530. In part this is because the large format size of the top of the line drum imagesetters requires an elevated level of repeatability. (Large layouts or pages demand that an imagesetter be repeatable over greater distances.)

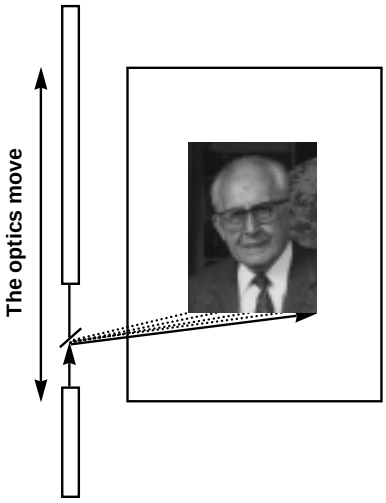

Figure 2 - With a drum device the optical system moves, often on a spindle as shown here. The film is attached either to the inside or outside of the drum.

However, capstan devices have been used very successfully with four color separation. To understand the importance of these numbers, it must be kept in mind that factors other than the imagesetter may play a role in repeatability. For example, the dimensional stability of the film material is important. If changes in humidity or temperature cause the film material to stretch or shrink, then the repeatability of the imagesetter is undermined. Machines themselves are also affected by environmental conditions. In addition, certain applications may require tighter repeatability specifications than others. For example, high quality color work printed at high screen rulings on presses with very little variation in registration require excellent repeatability on the part of the imagesetter.

There may be other sources of variation that are greater than anything inherent in the imagesetter. For some printing presses, the variation in press registration is likely to be a more significant factor than the repeatability specification of the imagesetter. In addition, manual stripping will bring some

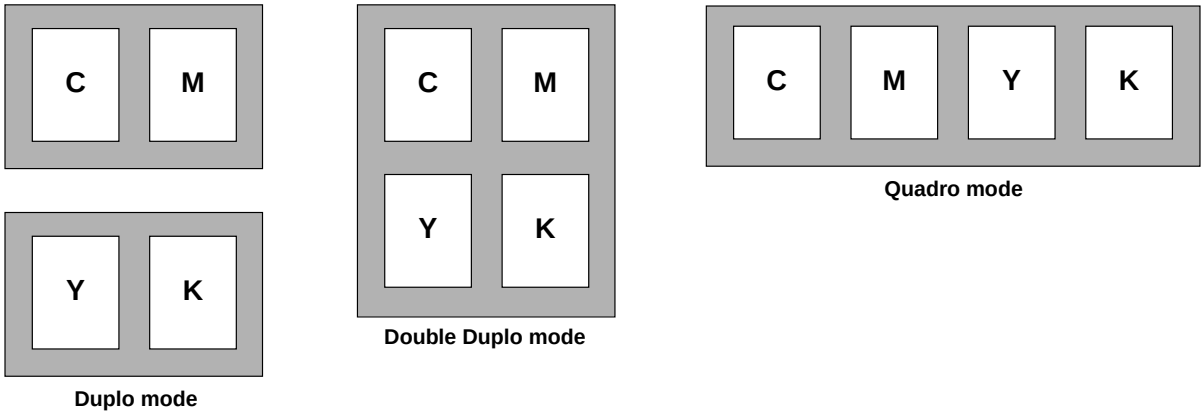

Figure 3 - Duplo mode, Double Duplo mode, and Quadro mode are all ways of maximizing film use with Automatic Page Positioning with Linotype-Hell Production Tools..

potential variation into the process. So while drum imagesetters are generally more repeatable than capstan imagesetters, that level of repeatability may not be required for all jobs. It comes down to this: Is the difference between a 1 mil and a .2 mil repeatability specification of critical importance in your production environment? (Keep in mind that a mil is only 1/1000th of an inch.)

Film misregistration

With variation so small, even on capstan devices, why do we ever see misregistration on film? Generally, this is because specifications are measured on well-maintained machines in ideal conditions. Changes in temperature or humidity can affect the dimensional stability of a film material. Machines operating under fluctuating levels of temperature and humidity can also be affected. Improper film loading techniques may result in misregistration problems. In addition, assuming that the equipment is properly maintained, errors may be due to software problems such as ineffective rounding or measurement conversion techniques.

Format size

At present, the top format size in the Linotype-Hell product line is 29.5” x 43.3”. This size is sufficient to use with a wide range of press manufacturers presses, and standard paper sizes. For example, a 29.5” x 43.3” format size will easily handle a web press with a 23.5” cutoff[1] and a 35” width. This size is commonly used for 16 page layouts (8 pages printing both sides) where each individual page is 8.5” x 11”. A 29.5” x 43.3” format size will also easily handle a sheetfed sheetsize of 25” x 35” which is commonly used for booklets made up of 6” x 9” or 9” x 12” pages. Of course, imposed layouts vary in size depending on page size as well as the amount of space given over for areas that will be trimmed off when the printed sheet is folded, bound, and finished.

[1]In web printing, the cutoff is the length of the printable area based on the circumference of the printing cylinder.

Maximizing film use

Maximizing the use of film is a key issue with a large format device whether you are creating imposed layouts or not. You would hardly want to use a large format device to set a line of type, or even a single scan. To make it easier to maximize film use, these devices can be programmed to effectively use film material. There are a number of ways to do this (see Figure 3):

- Duplo mode entails two side-by-side pages. For example with a four color separation, the cyan and magenta plates could be output side-by-side. The second page output would be the yellow and black, again side-by-side.

- In Double Duplo mode all four separations can be made to fit on the same piece of film.
- In Quadro mode all four separations are made consecutively on the same piece of film, rather than stacked as in Double duplo.

These functions are all performed by the Linotype-Hell Production Tools 1.0 which work in conjunction with the Linotype-Hell Utility 6.0. These functions are referred to as Automatic Page Positioning.

Conclusion

Effective use of a large format output device is dependent on many different factors: a page description language that allows you to compose full pages (in this case, PostScript), large format output devices, imposition programs, and of course, experienced operators. It is only fairly recently that imposition programs have become generally available. For more information on imposition, please refer to the Linotype-Hell Concepts and Solutions brochure entitled Imposition in Computer Publishing.

Comments

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