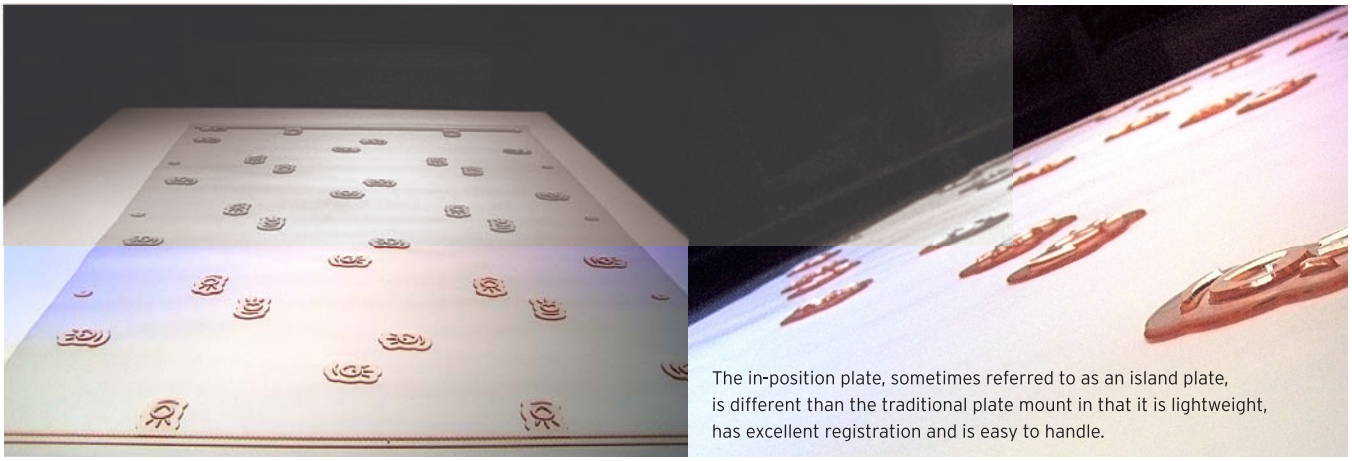

The in-position plate, sometimes referred to as an island plate, is different than the traditional plate mount in that it is lightweight, has excellent registration and is easy to handle.

The In-position Plate

Never an Imposition

By Alvin Randall

Corrugated photopolymer printing plates have always played an integral role in the flexographic printing industry. The majority of corrugated board printing is done with either liquid or sheet corrugated plates. Key properties of these plates are low durometer, resilience and durability. Corrugated plates are usually heavy since they are both large in size and thick. Some common large format presses routinely use mounts of 60in. widths and 48in. repeat lengths. Plate and carrier combinations also tend to be thick to accommodate large historical press undercuts (.285in.).

With the advent of the new, higher speed corrugated presses, the weight of the traditional photopolymer plate mount has become a major problem. At higher speeds, heavy plates cause dynamic imbalance that then creates vibration and printing defects. The only option is to slow the press down or, ideally, reduce the weight of the entire plate mount. This is where the in-position plate shines. The in-position plate, sometimes referred to as an island plate, is different than the traditional plate mount in that it is lightweight, has excellent registration and is easy to handle.

The weight reduction is a result of the elimination of unneeded plate material in the plate floor and the option to eliminate the traditional 30pt. carrier sheet used as a mounting surface for individual plate pieces. Improvement in registration results from the use of a single piece of image film for each color. There is no mounting error from mounting individual pieces of copy to the carrier. The entire process of optical or pin mounting can be eliminated and replaced with a means to affix the lead and trail edges directly to the plate-backing sheet. Plates made in this fashion can be rolled up and carried in one hand. Additionally, storage, shipping and handling are significantly simplified.

MANUFACTURING OVERVIEW

Realistically, these plates can only be made using liquid plate technology. There is simply too much material waste to attempt this with solid plate material. The liquid process allows for recovery and reuse of the large amount of plate material that is not cured during imaging. The basic concept is to image one entire color in register verses making individual copy pieces and mounting them. During the plate exposure step, a background mask is used to prevent the curing of the floor in all areas except directly under the copy (Figure 1). The liquid polymer in the uncured floor areas is then recovered and recycled after the exposure step. The resulting plate has islands of copy adhered to a relatively thin and light polyester back sheet.

There are two versions of the in-position plate in regular use today. The first version is the true full in-position plate. This plate has the islands of copy supported by a polyester plate-backing sheet, but goes a step further and eliminates the traditional PVC carrier. Without the carrier, the press locking strips are attached directly to the plate-backing sheet. This version is the lightest and most flexible. The plate supplier will need special equipment to reliably align and mount the press locking strips to the plate substrate.

Due to this equipment requirement and limitations of the true in-position plate for slugging or repairs, some suppliers make a "modified" version of the in-position plate. It is essentially a hybrid of the old and new mount types. The traditional PVC carrier with lead and trail locking strips is retained. Then a single-piece plate with the islands of copy is mounted to the PVC carrier using a standard optical mounter. This version is a little heavier but is still a significant improvement over a standard mount.

MASKING METHODS

In general, the mask is either produced on the film imagesetter or cut from inexpensive paper. The island-shaped holes in the mask are typically ½-in. to ¾-in. larger than the copy. The creation of the mask film image is easily accomplished using the common software applications and a step-by-step approach:

1. The mask film is of equal size to the image film (Figure 1).
2. If a paper mask is chosen, then the image film is placed on

the light table with the paper over it.
3. A marker is used to outline the copy.
4. The image film is removed and the outlines are cut with a razor knife, creating the mask.
5. Paper masks are sometimes tapped to a clear polyester carrier for easy handling. This is common when using the masking box option on large liquid exposure machines.

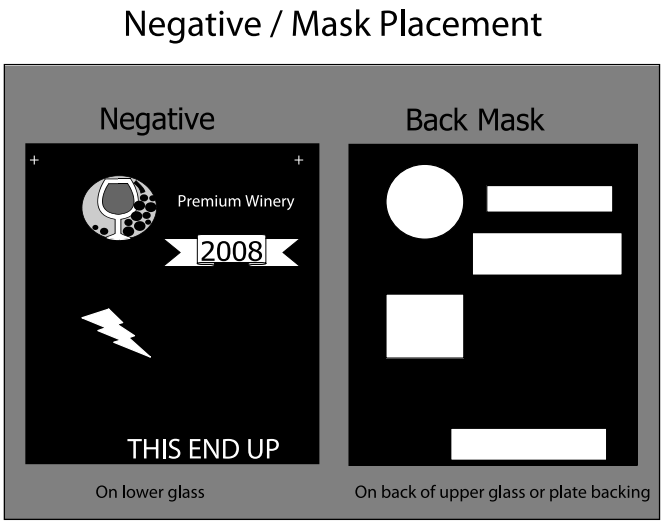

Figure 1

MASKBOX TECHNIQUE

Some large format liquid machines have been supplied or upgraded to include a "masking box." This box has doors that give the operator access to an open area below the upper lights, but above the upper glass. The box is fitted with an alignment scale, which gives the operator a position reference for alignment of the mask with the copy on the lower glass below. The inside vertical walls of the maskbox are fitted with reflectors to maintain the light intensity around the edges of the image area. The platemaking process is summarized below:

1. The film negative is placed on the lower glass with the emulsion side up. It is aligned along a scale using a center mark.
2. The mask is placed in the masking box and aligned to an identical scale using a center mark.
3. The mask is taped in position.
4. A thin cover film is placed over the image negative under vacuum to protect the negative from the polymer.
5. Then a moving carriage travels over the negative and dispenses a metered cast of photopolymer. Simultaneously, a polyester plate backing dispenses from the carriage laminator onto the cast surface (Figure 2).
6. The upper frame lowers onto supporting shims.
7. A vacuum system in the upper glass removes trapped air between the upper glass and the backing sheet.
8. The plate thickness and tolerance is established in a precision mold formed by the upper and lower glass.
9. The exposure cycle starts with the upper lamps transmitting UV light through the transparent parts of the mask film, which is directly aligned to the image negative on the lower glass.
10. The UV light transmits through the transparent areas in the mask and builds a cured polymer floor support for the raised image and sets adhesion between the polymer and polyester backing.
11. Those areas of the mask film that are opaque (black) block the UV light from transmitting through the mask film, which prevents any floor curing on the plate (Figure 2).
12. Next, the lower lamps start and the UV light transmits through the clear part of the negative and forms the raised image.

The key difference between the in-position plate and a standard plate is the use and positioning step of the mask.

After exposure, the platemaking process is completed once the plate is removed from the exposure unit and undergoes a resin reclaim process, where most of the uncured photopolymer is recovered and can be reused. Reclaim equipment used for in-position platemaking is normally upgraded to improve the percentage of liquid recovery. The plate then is placed in a soap-and-water washable processor for complete cleaning. After washing and rinsing, the plate is given a post UV curing in a salt bath. A final step of UV light finishing provides a complete surface cure for a tack-free plate.

MASKING SANS BOX

An alternate technique can be used if the exposure unit is not fitted with a maskbox:

The mask is placed directly on the back of the plate backing after the plate has been cast (Figure 3).

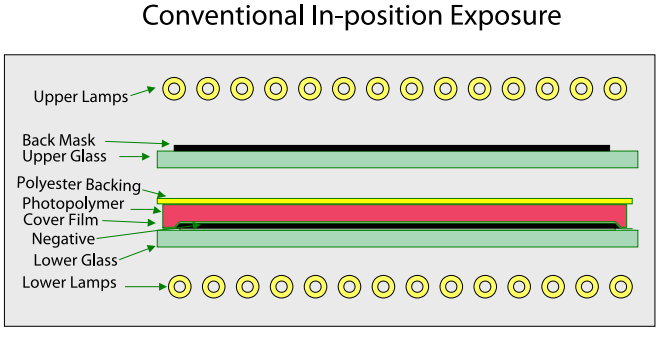

Figure 2

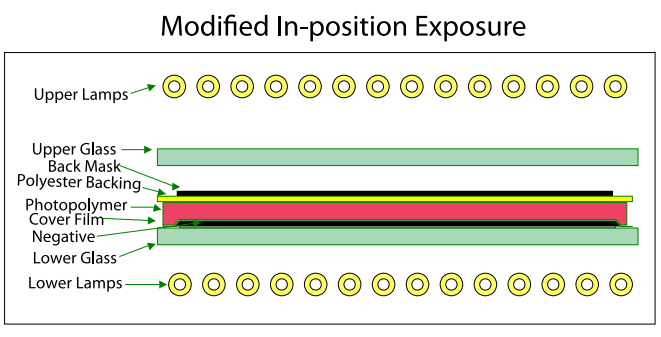

Figure 3

Thin opaque or blueline paper is the preferred masking material since its can be easily cut and has minimum interference with the upper vacuum during plate imaging. The blueline paper image can easily be outlined and cut from the original film image after a short flash exposure. The paper mask will need to be directly traced from the film (Figure 2).

DISTINCTIVE LOOK

There is a distinctive look to an in-position plate. You see a clear piece of polyester with individual islands of copy. There is also a difference in the appearance of an in-position plate depending on the masking method used. If the mask is placed above the glass in the maskbox, the islands of floor taper off slowly to meet the substrate. If the mask is placed on top of the cast below the glass, the island has a very crisp, vertical transition to the clear polyester carrier.

Although both plate types have the island images on a floorless plate, the formation of the floor polymer around the perimeter of the image is different. The variation seen is due to the difference in distance that the masking film is from the plate backing. The maskbox plate backing is much farther from the masking film and the UV light has greater spread from the mask as the light travels through the glass.

SUMMARY

In-position platemaking is truly one of the most common-sense improvements in manufacturing a corrugated plate mount. The resulting mount is lightweight and so performs well on modern, high-speed, high-efficiency corrugated presses. As much as 70 percent of the original cast polymer weight is reclaimed. The reclaim polymer that is recovered from the plate can be reused. This minimizes waste and is more environmentally responsible.

An in-position plate's light weight and its ability to be rolled up are huge advantages when it comes to handling, shipping and storage, as less weight translates directly into shipping cost savings. Plus, a light plate that can be rolled up is much easier to handle, thus decreasing the likelihood of lifting and handling injuries to the converter workforce.

The benefits of single image carrier provide excellent registration. The optical mounting of individual plate pieces onto a carrier has always posed a registration challenge. Excellent registration within each color makes it easier to rapidly achieve registration between colors and so improves converter productivity. ■

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