LET THERE BE A SINGLE-SOURCE LIGHT

In high-definition platemaking, a single light performs the work traditionally done by many bulbs … and with interesting results.

By James R. Kadlec

I have seen and heard of numerous advances during the course of my career in the flexographic industry, everything from better photopolymer plate materials to presses with tighter registration. Among the best advancements I've seen is the process of high-definition exposure, which utilizes a single-source, high-intensity lamp to produce a straight, consistent light for the imaging of photopolymer plates. How does this differ from conventional platemaking procedures? Let's take a look …

Platemaking History

Photopolymer plates have been around since the early 1970s. Back then, platemaking required a long, intense exposure time, regardless of the type of light source used. The clamshell exposure unit with UV fluorescent bulbs was the most popular exposure choice for flexo platemaking in those days, and is still widely used today. The clamshell unit has about 20 to 30 lamps aligned next to one another, with a vacuum table underneath, creating something resembling a tanning bed. This style of exposure delivers intense UV light for exposing photopolymer plate material, as well as most other UV-sensitive materials.

The high-definition exposure unit differs because it has only one lamp and a glass vacuum frame, along with an integrator (a light-measuring tool), similar to the tried-and-proven offset-platemaking exposure units. What's the difference? The multiple bulbs and ballasts featured in the conventional units can produce inconsistent lamp intensities. And because the lamps are so close together, the UV

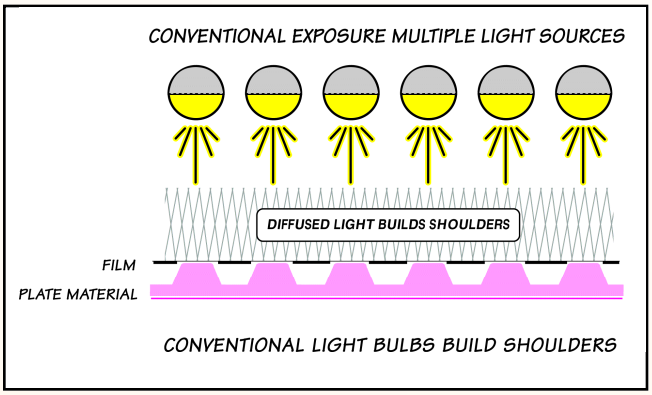

Figure 1: Conventional platemaking techniques feature multiple light sources, which create a "scatter effect" that builds dot shoulders into the familiar pyramid shape.

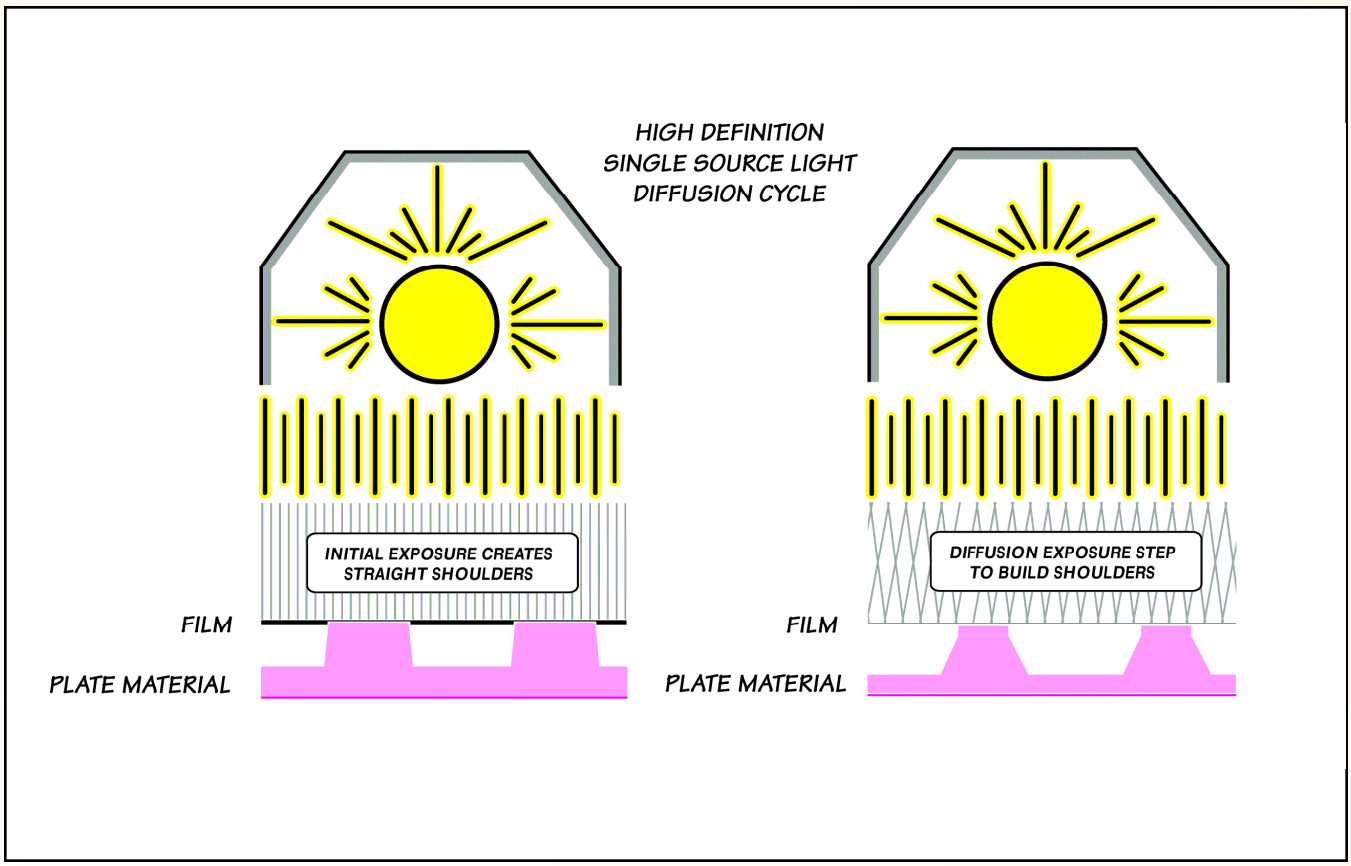

Figure 2: The single-source light used in high-definition platemaking creates dots with shoulders that are so straight they resemble telephone poles. These dots are very sharp, but shoulders of this nature will not provide the necessary stability during the printing process. How do we fix this problem? In the second step, pictured in the image to the right, diffusion exposure (depicted by the crossed lines) employs scattered light to build shoulder support.

light actually crosses light produced by its neighboring bulb, causing light to radiate under the black portion of the negative (See *Figure 1*, on the facing page). Because high-definition platemakers employ a single lamp, positioned 2 to 3 feet above the imaging surface, the light is straight and consistent during exposure, thus producing a faithful image on the plate.

The straightness of the exposure used in high-definition platemaking creates a few unique characteristics, one being the shape of the dot shoulder, which is so straight it resembles a telephone pole, as opposed to the pyramid shape achieved through conventional platemaking techniques. However, since the scatter effect of a conventional platemaking unit is actually helpful in building the shoulder of an image, a subsequent special step called *diffusion exposure* has been built into the high-definition system to allow light to scatter (see *Figure 2*). This broadens the shoulder and increases support for the dot, without sacrificing the sharpness achieved in the initial exposure. This leads to what I feel is a more faithfully reproduced dot, much more so than those achieved through conventional platemaking methods.

Sharper Is Better

Where the added sharpness pays off is in the printed image, especially in screens and reverses. Factors affecting overall sharpness include the type of light used in exposure, shoulder quality and the length of exposure. The long exposure required to fully polymerize a thick photopolymer plate and hold 2-to-3-percent dots, causes dot shoulders to broaden, beginning in about the quarter tone (the 25-percent dot) and continuing through the shadow/solid. This is the beginning of dot gain.

A small amount of overexposure naturally occurs during extended exposures under any type of light source, so dot gain is a natural function. The larger the dot being created, the more it has a tendency to grow during the overexposure required for holding the super-small highlight dots. This occurrence happens throughout all photographic reproduction processes, including offset platemaking and proofing procedures. However, conventional flexographic exposing systems tend to accentuate the occurrence more than high-definition exposure does, meaning high-definition plates have less dot gain built into the plate.

Part of quality flexo platemaking is the ability to produce a proof that represents some of the dot gain, so that a better curve can be built. In this regard, high-definition exposure units produce dots on the plate that are the same size as the dots on the negative and the analog proof. For example, a conventionally exposed plate may require a reduction of the 50-percent mid-tone dot to a 45-percent dot on the film, so that it will grow to become a 50-per-

cent dot on plate when exposed. Then an additional compensation for dot gain would need to be added. For example, a 40-percent dot on film images as 46 percent on plate, printing a 54-percent dot on press. From my experience, I have found that high definition requires a 47-to-48-percent dot on film to image a 50-percent dot on the plate, and because of the added sharpness of high definition, a 46-percent dot on film has printed at 51 to 53 percent on press. The difference is that conventional plate imaging can have a 10-to-15-percent difference between the negative and the printed image, whereas high definition produces a 5-to-8-percent difference. Of course, results may vary, depending on press conditions.

THE STRAIGHTNESS OF THE EXPOSURE USED IN HIGH-DEFINITION PLATEMAKING CREATES A FEW UNIQUE CHARACTERISTICS, ONE BEING THE SHAPE OF THE DOT SHOULDER, WHICH IS SO STRAIGHT IT RESEMBLES A TELEPHONE POLE.

In summary, high-definition platemaking offers a relatively cost-effective method of creating a high-quality image and dot. Granted, digitally imaged or laser-masked plates, in my opinion, still achieve the most accurate linear reproduction of dots over a wider range of dot sizes. But since only a few big trade shops can afford laser technology, the option of a high-definition light source rates as an economical, yet high-quality, alternative.

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