US Ink A Division of Sun Chemical Corporation

How is a Newspaper

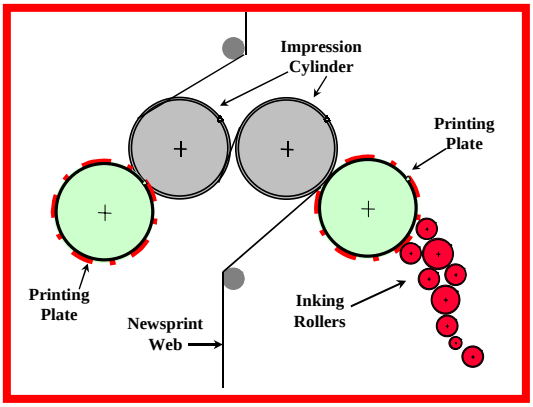
Printed?

January, 1998 Volume XXIV

Newspapers are printed by several different processes. All of these processes have several features in common. They are printed at high speeds, up to 70,000 copies per hour. They are all dried by absorption of ink into the newsprint. All newspapers are printed on rotary printing presses using a moving web of newsprint. To produce` a newspaper there are multiple printing presses using several webs of newsprint. These multiple webs are fed through a complex system of guide rollers into a folding unit, which combines the webs and yields the newspaper we see everyday.

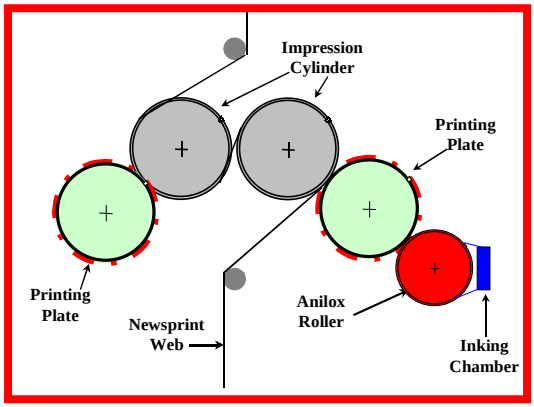
The major printing processes utilized are Lithography, Letterpress, Di-Litho, and Flexography. We will look at each of these processes individually.

Letterpress



The letterpress printing process utilizes a rotary press with a raised image area printing plate. The printing ink is transferred from a series of inking rollers onto the raised areas of the plate. The image is then transferred to the newsprint. This is an older type of printing technology, which is being phased out as the equipment is replaced. The letterpress printing process depends greatly on high impression setting in order to print smooth and uniformly. The impression cylinder is covered with a hard rubber material that can withstand numerous impressions. The printing of the two sides of the web is done at different times.

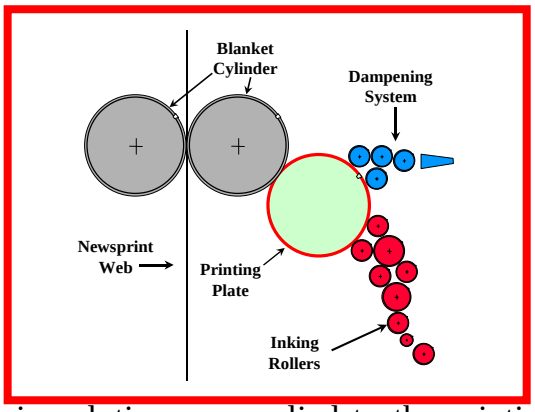
Flexography



The flexographic printing process is similar to the letterpress process in that it utilizes a raised printing surface plate. The flexographic plate is typically softer than the letterpress plate. This process utilizes a water-based ink, which is metered onto the printing plate by an engraved or anilox cylinder. This anilox cylinder has a uniform

engraving pattern, which allows a specific volume of ink to be transferred to the printing plate. The anilox cylinder has a scraper (doctor) blade that removes any excess ink from the anilox cylinder and returns it to the ink fountain. The image is then transferred directly from the printing plate onto the surface of the newsprint. This process requires a "kiss" impression for uniform printing.

Lithography (Offset)



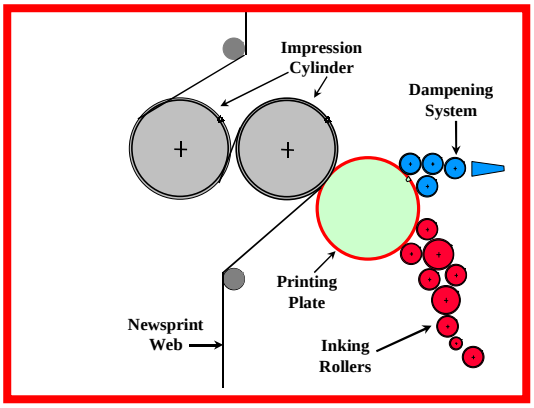
The lithographic printing process is the most commonly used process in producing today's newspaper. The process of lithography uses a planographic (flat) printing plate. This plate has two areas, which are chemically different. The non-printing or non-image area is hydrophilic or water loving. The image area is hydrophobic or not water receptive. In this printing process both an oil based ink and a water based fountain solution are applied to the printing plate. The fountain solution wets the non-image area of the plate while the ink wets the image area.

The ink is applied to the printing plate through a series of rollers. These rollers serve to thin the ink film so the proper amount is applied to the plate. The fountain solution can be applied in several different ways: the solution can be sprayed on, transferred from a high-speed brush or by a molleton or sock roller.

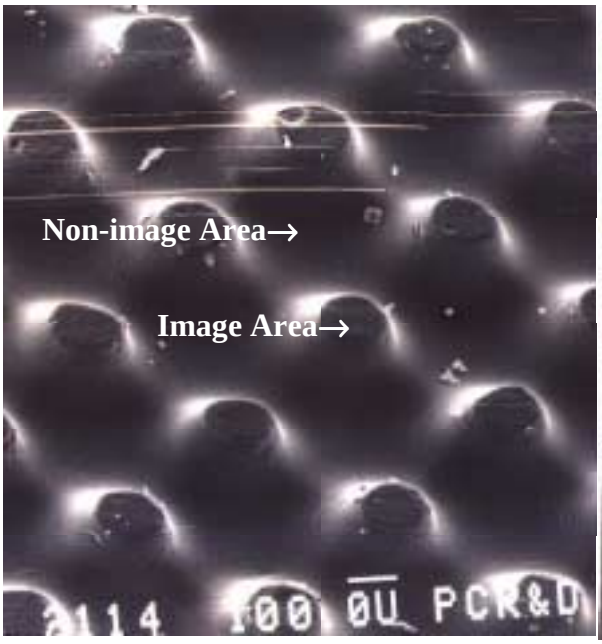
There is an old saying that oil and water do not mix, but as these materials are applied to the plate the chemistry of the plate is insufficient to separate the materials to their respective areas. These materials need to interact with each other so that the proper printing characteristics are achieved. The ink needs to emulsify the fountain solution so that it can properly wet the image area. If the ink does not have this capacity, the ink will not transfer uniformly to the plate. The fountain solution needs to have some detergency capacity so that it can wash out any ink that is deposited in the non-image areas. As the proper transfer of materials is complete, the ink is transferred to a blanket cylinder. The blanket cylinder is usually covered with a compressible blanket material. (See Volume XI for more information on the role of the blanket in offset printing.) This blanket cylinder then transfers the image to the newsprint. This process is usually blanket to blanket printing, with both sides of the web printed simultaneously.

Di-Litho

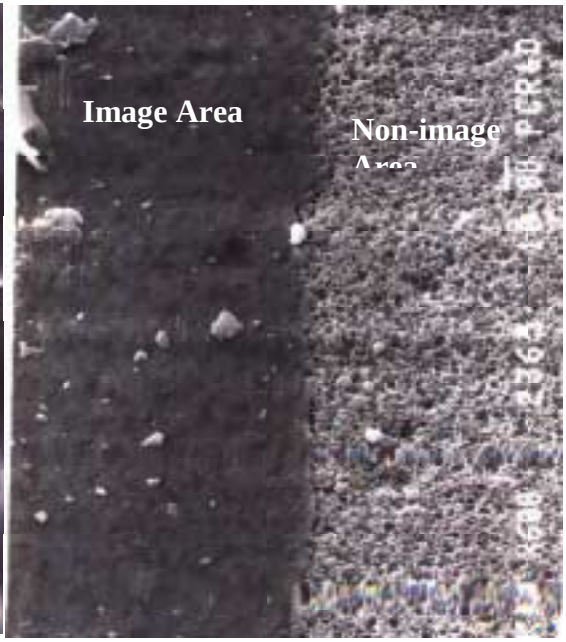
The process of Di-Litho or Direct Lithography uses the lithographic printing process, however the image is transferred directly from the printing plate onto the surface of the paper. This system is typically found in newspapers that have converted a letterpress printing press to utilize a lithographic printing plate.



To better understand the differences in the raised plate type of technologies versus the planographic plates, the following photomicrographs show these plates.

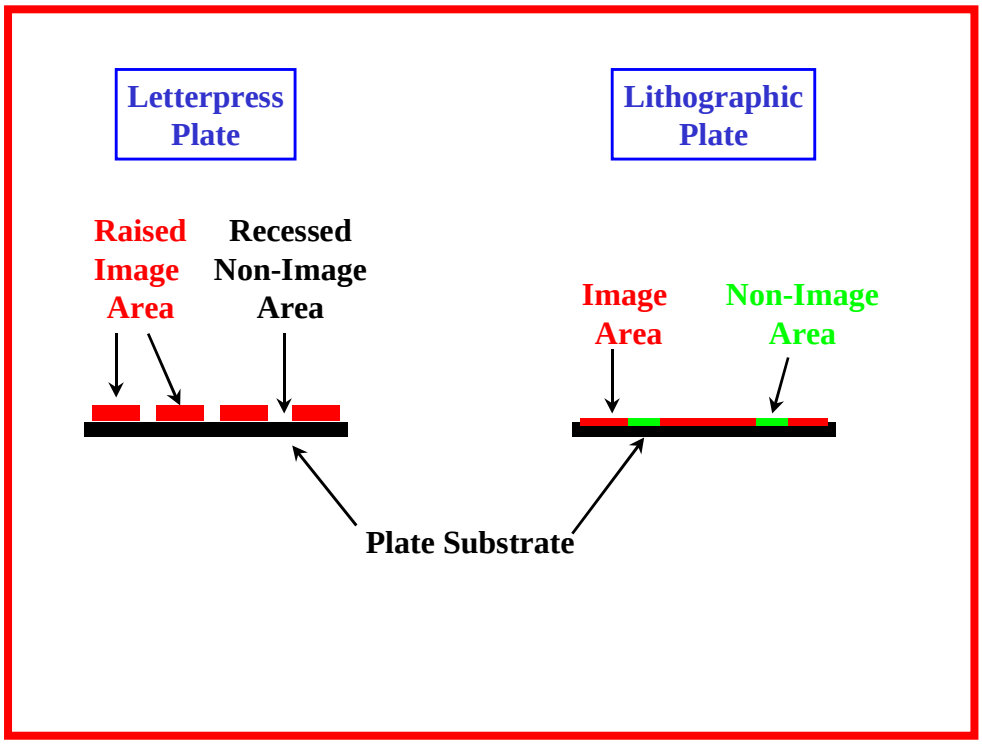


Letterpress Plate



Lithographic Plate

The following schematic drawings show a cross sectional view of the printing plates.



This paper is a generalization of the types of printing processes for newspapers. Various manufacturers of printing presses utilize different designs for their presses. The intention of this paper is to give an overview of the processes so that one can contrast the differences.