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Gray Bar Basics

Volume XXVII

Good color reproduction in the newspaper industry requires consistency in the pressroom. This is the area that has the largest effect on tonal reproduction (dot gain) because of all the components necessary to transfer the image from the plate to the substrate (newsprint). Variables such as newsprint, press settings, blanket height and maintenance, ink formulation, and ink film thickness have a major impact on dot gain.

This paper focuses on ink film thickness and how to control it using a gray bar. In the newspaper industry all colored pictures are formed with screens of the three process colors and black. Once the screens have been set for the picture, the amounts of ink used must be controlled to get the proper reproduction off the press. If the ink film thickness is not controlled the colorcast, color saturation, and detail in the picture can be lost. The ink film thickness is monitored with a reflection densitometer. In order to use the densitometer effectively a control device must be present in all columns where color is printed and this can be done by color bars.

Color bars containing solid ink density patches that are typically used in commercial printing cannot be used in newspapers due to the trim area. Commercial presses place the color control bars in the trim area. Thus, after printing, these color bars can be cut off and not seen by the consumer. In newspaper printing there is no trim area. Color bars would, therefore, be left on the printed copy and detract from the print quality.

Typical Color Bar

In order to control color reproduction, newspapers must utilize other methods to control the print density. The development and use of a gray bar for density control for newspaper will be discussed below.

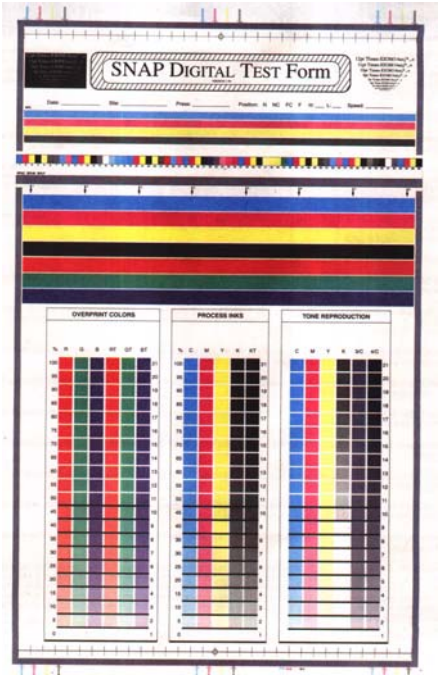
WHAT IS A GRAY BAR?

When the three process colors are printed in the proper ratio a shade of gray is produced. (see What is Gray Balance Volume VI for more detail). A gray bar is the proper screening of the three process colors to obtain the desired level of grayness. Cyan is always the highest screen in a gray bar because of the inherent impurities in the pigments that are used in the process inks. Some examples of typical gray screening combinations are indicated in the table below.

SHADE OF GRAY	PERCENT SCREEN AREA		
	CYAN	MAGENTA	YELLOW
Midtone	40	30	30
Quartertone	25	18	18

WHAT SCREEN AREAS SHOULD MY NEWSPAPER USE?

The use of a gray bar in the newspaper must be transparent to the reader and advertiser. It should not detract from the reproduction on the page where it is used. A test form (such as SNAP, GATF, or NAA) should be run on the press that includes two gray bars so that the editorial department will have samples to look at and can make a decision on which gray bar screening is acceptable to them. Many newspapers have gone to the quartertone gray bars. It is felt that the quartertone gray bar is more sensitive to variation by the eye, yet still yields high enough density readings to be considered accurate (by the densitometer.) During this test run the solid ink densities are set to industry specifications such as SNAP, GATF, NAA.



Dot gain is determined from this run so that proper compensation can be made in the prepress area. The dot gain is very critical to the proper use of the gray bar. If dot gain increases, color saturation decreases at the same density specifications. What this means if the dot gain increases, a higher density would be apparent in the gray bar if the solid ink density was set correctly. If the density of the gray bar was reduced to standard levels, in actuality the solid ink density levels would be reduced.

Once the gray bar is selected from the test form, the reflection densitometer density specifications for the selected gray bar can be determined by reading the gray bar in the same column where the solid ink densities are in specification. Some examples of density specifications for various gray bar screenings are listed in the table below:

Gray Bar Screens				***Density Specifications***
C	M	Y	K	
25%	18%	18%	0%	0.52 +/- 0.03
40%	30%	30%	0%	0.65 +/- 0.03

It should be noted that values above should be used only as a guide because they are dependent on the dot gains for each color on the press. Modifications based on the press conditions may be necessary.

Gray bars and color bar targets should be large enough to permit measurement. A target height/width or diameter of 3/8" is recommended so that proper measurements can be made. Gray bar targets do not need to be continuous and can be creatively designed across the width of the page.

EVENTS

Icing on the Cake

If it seems like déjà vu all over again at Avery Fisher Hall on Wednesday night, that's because Kurt Masur hasn't finished celebrating his birthday yet. Mr. Masur, the music director of the New York Philharmonic, actually turned 70 on July 18, but the parties go on. One of the biggest celebrations will take place when the orchestra opens its season on Wednesday with a gala dedicated to the maestro. The festivities include a preconcert cocktail reception, a Champagne reception at intermission and a postconcert dinner dance with birthday tributes and, of course, the concert: Prokofiev's Symphony No. 1, Mozart's motet "Exsultate, Jubilate," three Richard Strauss songs and Brahms's Symphony No. 1. The soprano Renée Fleming will sing the Mozart and Strauss works. The concert will be broadcast nationally on PBS in the "Live From Lincoln Center" series and on radio in New York City on WQXR (96.3 FM). (Information: 212-875-5709.)

Raga Time

When it comes to sitar pre-eminence, Ravi Shankar may not be ready to pass the torch. But, after a career of some 70 years bridging the classical musical worlds of East and West and amassing acclaim and honors, he is ready and willing to share the spotlight with his 16-year-old daughter, Anoushka. (Last year in these pages, Peter Watrous wrote, "She's special.") Shankar père et fille will perform at 8 P.M. tomorrow at Carnegie Hall in a concert that is also a celebration of the 50th anniversary of India's independence. (Information: 212-247-7800.) The Shankars, with Bikram Ghosh and Vedakrishnan Venkatesan performing on tabla and drums, are also scheduled to appear on Nov. 9 at the Kennedy Center in Washington. (Information: 202-467-4600.)

Archie's Play

SAN FRANCISCO — Fo[illegible]t the Archie Bunker image. The literary [illegible]e of the actor Carroll O'Connor comes to [illegible]tore on Wednesday night at Theater on [illegible] Square, at 450 Post Street, where the cu[illegible]in will rise on the first preview perfor[illegible]nce of his play "A Certain Labor Day" [illegible] the leading role, Mr. O'Connor po[illegible]rrays [illegible]rry Mather, a New York City lab[illegible]g back over his life. The cast a[illegible]ome chips off theatrical block[illegible] Stander, a daughter of the a[illegible]hel Stander; Neill Barry, a son of the playwright P. J. Barry ("The Octette Bridge Club") and Tony Carlin, a son of the actress Frances Sternhagen. "A Certain Labor Day" opens officially on Sept. 24 for a run through Oct. 26. (Information: 415-433-9500.)

Picasso's Last Stand

BOSTON — Encore. For those who missed "Picasso: The Early Years, 1892-1906" when this exhibition of the artist's work between the ages of 11 and 25 ran at the National Gallery in Washington, there is one more chance. The show, illuminating Picasso's early genius, is making its second and final stop at the Museum of Fine Arts in Boston. Comprising 157 works, drawn from the Picasso museums in Barcelona and Paris as well as from public and private collections in Spain, France, Britain, Germany, Scandinavia, Russia, Japan and the United States, "Picasso: The Early Years" will be on view through Jan. 4. The exhibition at the Museum of Fine Arts includes 32 works that were not seen in Washington. Admission is only by ticket for a specific date and time. (Information: 617-931-2632.)

INSIDE

Caruso's Return

David Caruso works a new television beat, prosecuting criminals as the star of CBS's new "Michael Hayes." **Review, page E10.**

Emmy Awards

The prominence of HBO was a focus at last night's Emmy Awards. **Article, page A16.**

IMPORTANT CONSIDERATIONS WHEN USING A GRAY BAR

Listed below are some critical points that must be adhered to when using the gray bar.

- The imagesetter/film processors must be checked regularly to insure that they are outputting the proper film screening for the gray bar. This can be checked with a transmission densitometer.
- The width of the gray bar should be as wide as the target window for both the transmission and reflection densitometers to insure proper readings.
- Densitometers should be checked for proper calibration daily.
- The print density specification range for the gray bar has to be within the density variation capability of your press.
- Always make gray bar density corrections on press from dark color to light. This should be done because the cyan and magenta pigments contain components that affect the yellow component of the gray bars. If the yellow is adjusted first, it would have to be reset after the other colors are brought into adjustment.
- Always take readings on the same position of the gray bar and same plate position (high side or low side) to minimize density variations due to impression on the press.

USE OF THE GRAY BAR IN THE PRESSROOM

When starting up the press the following steps should be taken when using the gray bar:

- **Get page in register**
- **Get gray bar balance across the page by eye**
- **Check the gray bar with the reflection densitometer**
- **Adjust the density if necessary, darkest color first**
- **Recheck density after a few minutes in the same position and adjust as necessary**

The gray bar can be a powerful tool that allows you to have good color reproduction and consistency if it is used properly.