

Dialog Box

In Photoshop, it seems so *easy* to make a color separation. But, as you are about to see, it is a real minefield. The dot gain adjustments discussed in the preceding column are only one part of the overall equation. Photoshop's defaults are pretty miserable, but still, you might think, how deeply can one plumb these questions of shadow value, black generation, dot gain, and GCR?

Well, prepare to find out, at great length. Some of these separation problems are similar, but each correspondent has a special case, when you get right down to it.

Dry stuff, perhaps, but desperately important to those whose livelihoods depend on getting good color on press—not just on a proof. It was no exaggeration when I stated in the column that this is the topic I've gotten the most requests to cover, and rightly so.

Most of these missives deal with the pivotal role of black ink, and the equally important question of how to get as dark a shadow as possible, without losing detail. This is tough sledding. I do not propose to pretend that this section is anything other than the most technically difficult of the entire book.

With that disclaimer, let's see how the world is coping with the necessity of making the separation meet the press conditions.

Default Photoshop sep setup as a recipe for “the most ghastly scans”

We in South Africa mostly use 5C3M3Y as standard highlight, and 94C89M90Y75K as a standard shadow setting. I have no knowledge of anyone

here using undercolour removal to any great degree, and therefore have no experience with it. My question is why is Photoshop's default Separation Setup is so far from both this and the setup you recommend? As we scan to CMYK “on the fly,” it doesn't affect us much, but hordes of people scanning on low-end scanners, who do not know of adjusting the Separation setup, produce the most ghastly scans after using Photoshop to convert RGB to CMYK. 100% Black does nothing for Cromalin proofs, let alone a press run where black is usually run heavier for the type. I have found that a 75% Black Ink Limit and a Total Ink Limit of 348%, set on GCR with medium black generation, produces excellent proofs as well as press runs. What part of Adobe's thinking am I not understanding?

Your suggested highlight is fair enough, if conservative, but the shadow value would not be typical of U.S. work.

I would surmise that this is because here, there are so many possible destinations for the work that we cannot be sure who is going to be printing it under what conditions, or on what kind of press. Therefore we must almost assume worst-case conditions and go with a lighter shadow than we would like. If we are certain that the press can handle a shadow as dark as the 95C90M90Y75K you suggest without loss of detail (or if there is no important detail in the shadow that we are worried about losing), then of course we do it.

Absent other instructions, U.S. suppliers produce work to standards suggested by a group known as SWOP, Inc. (stands for: Specifications for Web Offset Publications). SWOP dictates that film is unacceptable if the maximum shadow value exceeds a combined total of 300. Many American magazines go further and insist, for ease of handling on press, that maximum ink value be 280, or even lower. Magazine printers employ film inspectors whose sole joy in life is to reject client advertising that fails to meet these guidelines.

Under these circumstances undercolor removal is mandatory as a practical matter, as to get a realistically dark shadow the black will have to be as heavy, if not more so, than any of the three colored inks.

Conceding this, Adobe's default is quite poor. Allowing 100% black leads to thin-looking shadows, difficulties in color correction, and closure of shadows in many cases. I therefore recommend 85% in the Separation setup dialog box, although your value is certainly reasonable.

Another reason for the muddy-looking seps from Photoshop is not so much that a rather heavy GCR is used as that, in its calculation, Photoshop erroneously assumes that the black behaves like any other ink. As you point out, dot gain will almost certainly be heavier in black—even if the pressman is not doing it intentionally, to compensate for type or something else.

Therefore, Photoshop's black plate tends to be entirely too heavy for practical use. The two ways to avoid this are 1) to use Light GCR and/or 2) change color balance within Printing Inks setup, using a value of .92 or so for black. ●

GCR, UCR, skeleton blacks, shadows without detail, and 3-color seps

I've always suspected that GCR was causing me grief—your column seems to confirm that. I get jobs back from the sep house

sometimes with too much black where the original has little—and this seems to get darker still at my printer—so I usually under-expose the black final when I suspect a problem.

Yecch! That's no way to do things.

I have a question: If I tell my sep house no GCR, does that mean a 3-color separation? (or almost a 3-color separation)

No. It means a “skeleton” black, where the black only appears in depth-of-detail areas and not in areas that have a perceptible color, such as a face. Using moderate GCR, a face may have some small amount of black in it, and if the printer is running heavy black (like, for example, if he is trying to compensate for light type on the same page) this may make your image look muddy. With a “skeleton” black, on the other hand, if the printer overinks, you may start to lose detail in the deep shadows, but that's it.

Strictly speaking, if you are giving the printer this instruction, you should include a maximum total ink value as well, such as: No GCR, 280 total ink. An equivalent phrase would be: UCR only, 280 total ink.

If your sep house uses “Light GCR” (Photoshop definition), there is a slight technical difference between this and UCR only, but not enough to worry about; this will give you the same kind of skeleton black that you seem to want. ●

Why do the experts recommend Light GCR and 85% maximum black?

I've noticed that you and other authors recommend a Photoshop Separation setup default of (roughly) GCR Light, 85% maximum

black, 300 maximum total ink, 0% UCA. One author has mentioned that he believes that PS is optimized for GCR seps and states that he has noticed some unwanted grain produced in Photoshop UCRs.

I and most of the clients I work with are getting most of our scans from service bureaus with high-end drum scanners.

While the service bureau rarely discusses this matter with you, they typically make UCR seps. Many corporate clients (even the ones with desktop drum scanners) don't know the difference between UCR and GCR. The clients are gathering/producing seps from a number of different sources and then combining them in the same brochure, ad, etc. I'm sure you know where this is going—the client can easily develop a library of images that drive the pressman a little nuts.

Is GCR Light close enough to typical UCR seps to keep the pressman happy?

To all intents and purposes they are identical. As long as we get a “skeleton” black plate, meaning no black at all in relatively clean color areas, the image will handle the same on press. GCR Light, as a term, is a Photoshop invention. “Typical UCR seps” vary wildly from scanner to scanner, anyway.

With this type of situation in mind, how do you recommend clients make their “in house” seps?

Generally, in the manner you have described. If scanning into CMYK, choose UCR or whatever the equivalent is on the scanner. If scanning into RGB, use Light 85/300/0 in Separation setup during the conversion to CMYK. There are exceptions, mind you, and some of them are mentioned in the column. However, in the absence of what seems to you a good reason to depart from the general rule, leave the black relatively light. ●

If Photoshop's programmers were pressmen, there'd be no problem

Besides not knowing what is happening, what's wrong with setting the endpoints with the levels eyedroppers like Adobe says?

1. It will zero out your highlight unless you change Photoshop's defaults.
2. It does not control black generation.
3. It does not allow you to shape the curves so as to maximize contrast in the interest areas of the image.
4. Lots of images don't have easily measurable white points or midpoints.

Also, why is their shadow value so different from your 80C70M70Y70K? Theirs is something like 55C55M55Y100K.

If Photoshop's programmers were pressmen the difference would vanish rapidly. This is largely a function of Preferences>Separation setup. If you change yours from 100% to 85% maximum black, the problem will go away and you will get a shadow similar to mine. Allowing 100% black is very inferior. ●

Lowering the total ink limit to keep shadows from plugging on press

I recently came under serious criticism by my predecessor because of your book. I would greatly appreciate your opinion.

My predecessor left the drum scanner set for 340% total ink limit. Your book states that 280 is standard for web, and "for sheetfed printing 320 is acceptable. Should you be using very high quality paper, or printing on a waterless press, an even higher limit may be attainable."

Based on this, I decided to start scanning at 280 for work that was to be printed on our sheetfed press. My predecessor, insisting that I had a reading problem and was without a clue to the difference between a web and sheetfed, cited your book as proof of my ignorance. (I'm paraphrasing his words quite generously.)

My reasons for attempting to use SWOP settings on our sheetfed:

- 1. My pressman has had trouble keeping the shadows from plugging. He had asked for lower ink limits for some time. He felt he had no room for adjustment, particularly at 150 lpi and above.*
- 2. This is a small, price-conscious town, and we are the only 4-color press here. So many jobs are run on second grade paper, or even recycled stocks. Premium coated paper is not the norm.*
- 3. Our press is one finicky beast. The pressman here works miracles. He's the only one here that can balance the water to get decent prints.*

Obviously, 280% can and should change from job to job, even image to image. A client wants 200 lpi work next week, and I think it's going to be a big headache.

The problem here is, as in your articles, that your book cannot be simply read and quoted verbatim (please don't take my use of the word

“problem” literally). I felt that I was reaching into what you wrote and came away with a better understanding of the purpose of the Total Ink Limit.

My SWOP scans haven’t come off the press yet, so I have no concrete results. But, I felt I had to question 340, and will always question my own work. One can get overconfident and complacent if they don’t keep asking questions.

The first order of business is to find out what in blazes is going on! You need to know how heavy a shadow you can put down on your press and still hold detail. From what you are saying under your particular conditions 340 sounds way too high. A test run of several versions of an image that has significant shadow detail seems like the indicated first step. Try out several different separation parameters, rather than guessing at the scanner.

Ink density and screen ruling are interrelated. A lot of times if the screen ruling is too fine, shadow detail can be lost. You say that you have a questionable press and are printing on a lot of questionable stocks. If so, 150 line work is *really* questionable. The higher the screen ruling, the more difficult to handle on press. Try a test with 133 or 120 and see if it looks better—it probably will. Or better yet, run 120, 133, 150, and 200 side by side on the same sheet. You may not be able to see a drastic difference from afar but if you take a loupe to them you’ll see where the dots are plugging.

SWOP calls for 300 total density, not 280. Most magazines take it down to 280 because of concerns about handling problems on press (ink contamination from unit to unit; drying/smearing problems if sheet is too tacky, etc.) It is not unheard of for 340 to work but from what you are describing it sounds high.

The real issue is, how heavy a dot can your press hold and still portray detail? If 340 is your maximum total ink, shadow should nominally be 90C80M80Y90K. That is indeed quite heavy, and under the conditions you describe I question that it is possible.

It makes sense to me to scan to a maximum shadow of 80C70M70Y70K all the time since that will work for almost any application short of newsprint. Nothing stops you from tweaking it up in Photoshop if you know that the particular press conditions support higher values, or if your shadow is a glass pot of coffee or something else that has no detail to begin with. ●

Reseparation and other sneaky methods to reduce total ink density

After optimizing color and gradation, many times we have pushed total ink beyond the original specs. We always do a final check immediately

prior to running the film. If total ink is too high, I convert to LAB mode and change sep setup to UCR and total ink to what we need, before reconvert to CMYK. I've found that method, or selective color correction of the black, to be the most reliable way to do it without screwing up my curves too much.

There are a number of approaches one can take. If you are just off by a little, selective color correction of the black, as you say, is undetectable. On the other hand, converting into LAB gives us the opportunity to do some useful correcting there as well. Don't see why UCR is necessary on the resep, since the total ink will be OK regardless of what black generation you use.

Another interesting use of selective color is that one can perform manual GCR on blacks only. Select blacks, and then subtract the CMY components and then add compensating black ink. We have found that on some pickup jobs where we have to adjust total ink way down, say from 320 to 260, after our usual CMYK to LAB to CMYK scheme, we can close up the black dot giving more visual weight to the shadows without exceeding the total ink spec. It works quite well and it is really amazing the difference closing up the rosette can make. We still don't exceed 95% in the black dot of course.

In a situation like this we are in bad shape no matter what. I don't trust selective color correction of the black to accommodate a 60-point drop gracefully. Whether you use that approach or CMYK>LAB>CMYK, you face a choice of a shadow that is too light or a black that is too heavy, hurting detail. If the printer is asking for only 260 total ink, his paper must be pretty poor, worse than pub grade. And if that's the case there is no way he can hold detail in 95% of any color, let alone black. He would be lucky to hold detail in 80%.

I try to use a combined approach in such cases: I reseparate to get down to 290–300, but then when doing the selective color correction, I really hammer the yellow and only reduce the cyan

and magenta a small amount. Yellow doesn't pull its weight in the shadow, so if something has to go that is the first choice. By having an unbalanced shadow that is chiefly CMK we can get both darkness and detail. ●

What's wrong with using UCA to guarantee a properly dark shadow?

I've been told that some UCA is usually best to ensure a proper dark shadow. This goes back to my drum scanner training. Why aren't you

using it in your suggested separation setup? You say several times that your shadow value of 80C70M70Y70K is conservative (too light?) so why not darken it with UCA? That is a lighter shadow than I've ever dealt with.

It may be lighter, but it isn't thinner than Photoshop's default. People who say they get better results with UCA are generally using it as a form of damage control to compensate for failure to set Black Ink Limit to something sensible.

All UCA does is pour CMY ink willy-nilly into shadow areas.

Figure 3.6. Under-color addition (UCA), at least in Photoshop's rendition, forces more cyan, magenta and yellow into the shadows, but as the ends of the curves in the bottom version show, all it adds is depth, not detail. There are better ways to strengthen a shadow.

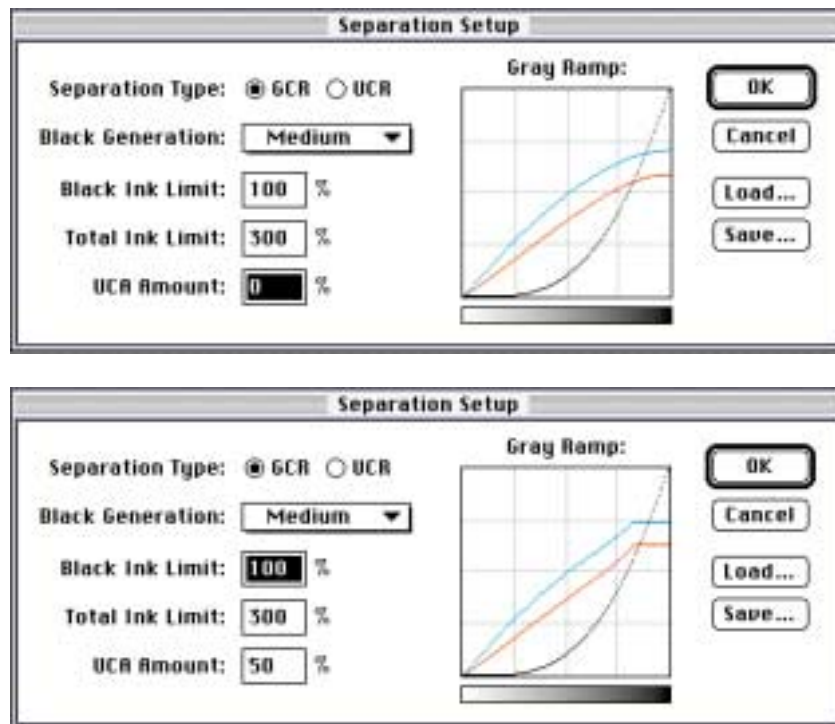


Figure 3.7. Under-color addition loses shadow contrast, and is generally inferior to steepening the black curve. However, in this image, UCA is right. The less detail in the black areas of the cards, the better; at the same time, we would like to guarantee a dark shadow.

It does nothing at all to add detail, which is the nominal reason we want deep shadows.

The reason I advocate a shadow value with black set at only 70 percent is not that I believe a press can't handle higher. Rather, I think it is harder to add detail to a picture than it is to subtract it. This lesson has been brought home to me painfully by many of my students. At 80C70M70Y70K I am sure I will not be losing detail under almost any printing condition. The Photoshop default shadow of roughly 65C55M55Y95K, on the other hand, gets you the worst of both worlds. It is *guaranteed* to lose shadow detail because of clotting in the black, and on a bad day it will actually print *lighter* than the one I recommend.

As you know, a lot of the time shadow detail isn't that big of a deal.

Right, because of the characteristics of the individual image. If we have a picture of a black cat we want to hold detail in the fur. If it's a picture of a black squash ball, we probably don't care whether whatever detail can be found in it stands up or not. Accordingly, we can and should go with a darker shadow.



My method of attaining this would be to lengthen the black curve so that the shadow became, say, 80C70M70Y85K. Because I am using a skeleton black (Light GCR) to begin with, this move is going to be very helpful to the image as a whole. It will add snap and life everywhere, not just in the shadows, because contrast is being added to the black plate.

Compare that to the alternative shadow-darkening method of UCA. As Figure 3.6 illustrates, UCA just pours in flat tints of the CMY inks into shadow areas. It does not add detail in any way, and squanders the opportunity to improve the image.

About the only time I would want to use UCA is in separating an image such as Figure 3.7. There, if I lose detail in the shadows, I like it. The black paint of the cards is the only thing that's even remotely close to a shadow. Any detail that's there is probably a scratch or a reflection or some other thing that we don't want. So, naturally, the heavier the shadow the better, and UCA will help cover up any imperfections that are in the black plate. ●

Bright reds, dark blacks, and lousy transitions: is this a GCR problem?

I had a tough GCR problem the other day. The subject was a red car; the chrome was excellent [Figure 3.8, I trust, is comparable—DM]. The

car's ducts and vents made large, solid shadow areas in the striking red paint. These areas were large enough to cause drying problems when separated at a light/skeletal GCR; the areas would be at the total ink limit.

So, naturally, I separated at a fairly medium GCR. Total ink in the shadows added up to just 210 (about 40C35M35Y100K). Just fine for our press, which has trouble with anything over 300 total ink.

The problem came in the transitions. Around some shadow areas, between the red paint and black shadow, the paper showed through like a halo. I know what happened; the car (about 10C95M90Y0K) and shadow (about 40C35M35Y100K) transition caused rapid removal of magenta and yellow, letting paper show.

Already, you have engineered in three major problems:

1. The overall shadow is too light despite the 100% black; if you can get 300 points total ink why are you settling for 210?

2. There is now a big hole in your magenta and yellow plates in the shadow, as Figure 3.9 indicates (you have rightly pointed to this as a major problem in the job).

3. Your black should not be at 100%, as this will make for a very bad transition; at some point detail will be lost (Figure 3.10).

For shadow areas, GCR setting (light, medium, heavy) makes no difference. The only pertinent numbers are total ink and maximum black. Maximum black should be no higher than 85 percent, always. Total ink should be whatever you feel comfortable with. Photoshop will be feeding black ink as necessary to meet these target numbers regardless of what your GCR settings are.

How can I avoid this blemish in an otherwise beautiful job?

If you had separated at a normal 85%–280, your shadow would have been something like 75C65M65Y75K. This would probably have solved your problem right there, since there is now no significant hole in the magenta.

Better way still: separate at 85%–320. Shadow should now be something like 85C75C75M85K. This is too dark, of course, but

Figure 3.8. Improper GCR settings can cause bad transitions in a difficult image like this. Overleaf, note the defects in the black and magenta plates when the separation is done at the settings the correspondent used.



Figure 3.9. The correspondent's magenta plate, top, has holes in the black areas in the grillwork at top rear of the car, causing poor transitions. Below, a normally separated magenta.

we aren't done. Open Adjust: Selective Color and choose Blacks. Move the yellow slider all the way to the left, decrease cyan slightly and increase magenta. Now, your shadow will become something like 80C85M40Y85K. (If there is anything else of significance in the image other than the car, you should select the car and work on it only, since God knows what impact this move may have on other areas.)



Figure 3.10. Comparing the black plates shows a similar problem. Detail in the tires is lost at top, Furthermore, the shadows in the car are sudden, harsh. Below, a normal black separation.

This gives you a very dark shadow, but only 280 ink coverage. Also, there is now no hole to speak of in your magenta plate. Yellow is so light that it has little impact in shadow areas. You won't notice the hole that remains in the yellow. And if you are having an ink coverage problem in shadow areas, but you still want them nice and dark, you don't get nearly as much bang for your buck with yellow as with magenta or cyan. ●



The perils of preparing separations for web newsprint reproduction

*Dear Mr. Margulis,
I have read your book on
correcting in Photoshop and
found it to be the BEST
resource for production work*

*in Photoshop. I have the utmost respect for your knowledge on correct-
ing and can't begin to tell you how much your book has improved my
work. In fact I'm such a novice I am just now reaching "ape" level.
Having said that, I have also had many, many frustrations trying to
get consistent results on web newsprint "rag" pieces. The following is
a help request that I was going to post to one of the Adobe folders when
I saw your name helping other people that have asked for help. The fol-
lowing was too large for a simple post, so I thought that you might be
so kind as to help me if I e-mailed what I was going to post. Being the
guru that you are, I hope you will excuse the novice, stupid questions
and comments that some of this will undoubtedly be. [Post follows]*

*I have some questions regarding proper steps in preparing
scanned and Photo CD files for film output to be printed on newsprint
on a web press. I don't seem to have much problem getting images to
look good on a good sheetfed using a good stock. But I'm having big
problems trying to get good, consistent color on a web/newsprint com-
bination. One project will be beautiful, the next has red faces and
washed out backgrounds or shadows totally clogged up or something
else is wrong with the color.*

*I've read every book, article, posting or anything else I could get
my hands on regarding getting good consistent desktop color. It seems
that everyone contradicts everyone else, and I come away scratching my
head. One person says that it's all in calibrating the scanner to
monitor to output device. Obviously, you should have these things all
closely matching so you can get some idea that seeing what's on the
monitor is something close to what is going to print. There are lots of
software packages on the market that claim that their software will get
it all working in sync. Then you have someone like Dan Margulis in
his book on color correcting with Photoshop saying to completely
ignore what you see on the screen and go by the numbers that you
sample with the eyedropper tool. Admittedly, using his techniques
have improved my novice color correcting to a semi-comfortable place.*

*At the risk of completely oversimplifying Margulis' book, basi-
cally his approach is that if you get what you know the colors should be*

to be the right numbers, the rest of the colors should fall into place. I have found this to be completely true for the most part. I can get things looking great on the screen, and even great looking proofs. Getting them to go on web newsprint is something else.

I am in a position that I have control over every facet in the process except making the plates and running the press. This brings up the questions about Photoshop's preferences settings:

Re: Monitor setup

1. Does the monitor setup interfere with the settings I have in the Gamma control panel that I have automatically starting at computer bootup?

They work in tandem.

2. I have a 20" Radius Precision Trinitron monitor. The monitor drop-down menu does not list this monitor. What should I select, default?

Any Trinitron setting should do.

3. Do the settings in this dialog box affect the actual file or just they way the screen looks in Photoshop?

If your file is in LAB or CMYK, only the screen display. If the file is in RGB, there will be a slight variation in the actual data when you convert it to either of the other two colorspaces.

Re: Printing Inks setup

1. Does selecting the various ink/paperstock/dot gain settings here affect the image file itself or does it simulate on my monitor what the printed piece would look like, thus enabling me to visually adjust the image for the intended press/paper/dot gain combination?

If you have a CMYK file already, the file itself will be unaffected by a change in these settings, but if you have an RGB or LAB file, two different Printing Inks setups will result in two different files once you convert to CMYK. Changing the Printing Inks setup also alters the monitor display in CMYK, but not in the other two colorspaces.

2. When I calibrate my imagesetter, I can send (have been sending) with the calibration, a compensation for dot gain. If I use the SWOP (Newsprint) setting at 30% dot gain in the Printing Inks setup in

Photoshop, and adjust my image to look good on the monitor, can I assume that dot gain is accounted for at that point, or do I also account for dot gain when I calibrate my imagesetter?

If your printing conditions vary, compensate in Photoshop, not on your imagesetter. Its calibration should be the same regardless of final destination. You need (at least) two different Photoshop Printing Inks setups, one to load for commercial jobs and one for newsprint. While a good monitor can help, keep in mind its limitations in portraying what will happen in high dot gain situations, discussed in the preceding column.

3. What does the gray balance do?

It compensates for unusually heavy dot gain in one specific ink, or a known printing anomaly. Since Photoshop incorrectly assumes that dot gain is the same in all four colors, I recommend using the values of Figure 3.4 instead. Thereafter, if you find a consistent color imbalance (everything prints too red, for example), you can make further adjustments.

Be very careful of ad hoc changes in monitor settings, though. It is critically important that you not base such an adjustment on one or two samples only, as you could just be spinning your wheels, adjusting to unusually sloppy presswork.

Re: Separation setup. I have been using GCR/Black Generation Light/80% Black ink Limit/ Total Ink 250%. This gives me a dull, flat image in RGB to CMYK conversions. I then go to curves, start at getting the highlight dot somewhere close to 6C2M2Y, then darkest shadows near 70C60M60Y60K. Most of the images I use are people poses, so next I go to work on the skin tones bringing them to an average of around 20C40M40Y0K (for Caucasians). I don't worry too much about black levels until this point, even though the image is still very dull and flat. Next I go to the black curve and start adding black at the midrange to highlights. This of course brings in all the definition and sharpness.

The fleshtone values you are citing are too high in the cyan and magenta, even for commercial printing, and newsprint would be worse. On newsprint, cyan should be no more than a quarter of magenta and yellow should always be higher than magenta.

Your shadow values are correctly balanced, but they are too light. Your 250 maximum ink density is probably correct, but your final values should be around 65C55M55Y75K, which is much darker than the 70C60M60Y60K you cited.

1. *Is my Separation setup correct for going to web/newsprint?*

Yes.

2. *Are these good separation setup settings for different press/stock combinations?*

No, Light/85/300 is more customary.

3. *What about all this software I'm seeing advertised that promises to separate to CMYK from RGB scans or Photo CD, color correct, and sharpen, for whatever press/paperstock combination, all flawless and automatic with one small click of the mouse?*

If you are willing to spend five to ten minutes correcting manually, you will be able to do much better. If you are not willing to do this these programs will be better than nothing.

With the flood of all the articles, books, software manuals, seminars, calls to vendors, reading on-line postings and all of my own trial and error on the subject, it seems like the answers to consistent color on web/newsprint would be attainable. But I seem to be getting more confused. It seems that decent, consistent color on lower quality "rag" style web/newsprint would be the easiest to attain. I find it much harder than on better quality paper/sheetfed combinations.

It is. Color correction is a compensation for poor conditions. The worse the range of colors available to us, the more important it is to get all the contrast we can. Newsprint is going to give us a flatter picture than fine paper no matter what we do, and our skill level is very important to compensate. Look at it this way: suppose that because your newsprint work is so unsatisfactory, tomorrow your company cuts your pay by 25 percent, and you can't find another job, so you have to accept this. The question is, now that you have less money available in your paycheck, is it more important or less important that you spend your money wisely? In going from fine paper to newsprint, you take a contrast cut instead of a salary cut, but the principle is exactly the same. ●

Is the RIP a good place to apply a curve to compensate for dot gain?

HELP! I'm doing a large job on an unfamiliar and lower quality press than I'm used to, and I've got some ink questions I can't figure out. We're

bringing the prepress in house to get better control, quicker turn-around, better quality, etc. The specs I've gotten from the printer include: 45-lb coated paper (similar to the advertising inserts you get in the Sunday paper), 270% max ink coverage, 75% GCR, 133-line screen.

I've done a lot of web work, but never on a press/paper combination with quality this low before. The main thing that strikes me about the previous magazine is the loss of highlight detail; particularly in images of marble statuary, the highlights have been almost completely blown out. I received some of the scans from the previous issue, and have looked at the highlight dots, and am thinking that I might be able to improve on the quality by using different GCR and highlight settings.

The printer uses Matchprints to proof files. They then remake the film and apply a curve on the RIP that takes the 50% dots to 35%. I'm thinking that this might be part of the problem...

I'm thinking it might be most of the problem. Such a curve decreases contrast in the lighter half of the image and increases it in the darker half. This would account for the lack of detail in the highlight. Sounds like a big mistake to me.

...and that a carefully constructed curve in Photoshop would give better results.

You bet it would.

A sample highlight number from their drum scanned file is 2C2M3Y3K. Applying their RIP curve in Photoshop, this gets taken down to 2C1M2Y2K.

This is one of the most fouled-up numbers I've ever heard of. There should not be any black in the highlight. The cyan has to be at least two points higher than the yellow. It is unlikely they can hold the 1 percent magenta dot under these printing conditions. I'll bet that they are using some kind of color management system

and have somehow been persuaded by a densitometer salesman that what they are doing is right. This almost has to be calibrationism at work—it's virtually impossible for a human to come up with a setup this bad.

I re-separated this file in Photoshop (Heavy GCR, Black Ink Limit 85%, Total Ink Limit 270%, UCA 0%). This gives me a highlight of 5C4M5Y. Applying their RIP curve, this gets taken down to 3C2M3Y.

This is better than what they had, but will result in a red cast. The cyan ink must be higher, otherwise the highlight will not be neutral, and neither will much of the rest of the image.

The GCR in the printer's file seems to continue all the way into the highlights; in fact, the minimum black dot in the original image is 3K.

You should call the police and send them over to the printer. Somebody there should be facing arrest on charges of impersonating a scanner operator.

My Photoshop separations with Heavy GCR don't put any black dot in the highlights at all. Is this an advantage or a disadvantage? It seems to me that having such heavy black in the highlights drops down the values of the other three inks to the point where they break up, possibly leading to the loss of highlight detail.

The GCR setting shouldn't have much of an impact in the highlight—there shouldn't be any black there no matter what. I would be a little chary about using Heavy GCR in this setting because newspaper black dot gain can be absurdly high and Heavy GCR shifts crucial detail into the black plate. If you are going to do this, you definitely need to use the Printing Inks setup adjustment recommended in Figure 3.4.

My first thought is to shoot for a highlight of 9C3M3Y, which would get taken down by their RIP curve to 5C2M2Y. My second thought is to do the curve myself in Photoshop, and engineer a curve that would spare the highlight values, and possibly increase contrast a bit in the highlights.

#2 sounds like a much better plan.

I'd really like to know what kind of highlight I should shoot for in this situation. 5C2M2Y seems low to me.

5C2M2Y is a conservative highlight, appropriate even for newsprint. The question is whether your press can hold a 2% dot on this paper. Most can. Possibly 6C3M3Y might be more prudent, but I doubt it. You use the term “blown out” to describe your complaint about the highlights. Most people use this term to mean that the highlight is missing altogether and you see paper only, not dots. What you are describing sounds like general lack of detail, not lack of dots. ●

When adding undercolors actually makes the shadow seem lighter

I'm working on short-run, large format displays on a new plotter with a number of interesting controls. In running my color tests, I've found that the

400% 4-color black actually appears duller and less intense than the 100%K.

I assume this has to do with the “reverse dot-gain” you mentioned in the column, where the extra saturation causes ink to be absorbed into the paper instead of reflecting light while lying on top of the paper.

No, it doesn't, sorry. The counter-dot gain I was talking about there was where adding ink makes the image darker, just not as fast as one would think. Whereas, when we are in a heavy dot gain situation we are accustomed to color getting darker *faster* than we think. In principle, if you add ink, of no matter what color, you *have* to be making the image darker. Your printer, though, doesn't use conventional ink; it probably uses heat-released dyes.

What you are talking about is an entirely different animal: a situation where you add ink (or equivalent) and yet the image gets *lighter*. This happens typically with dye-sublimation printers, apparently because the heat generated to activate the cyan, magenta, and yellow dyes vaporizes some of the black.

I know the phenomenon exists but haven't had enough experience with it to offer any intelligent suggestions on what to do. My guess would be that UCR only, 100 maximum black, 200 total ink, would be a good start. This would yield an almost totally black shadow, without paying the consequences of that decision in the rest of the image. ●

The prepress conspiracy revealed: It's the fault of those Americans!

We're a small design studio in Prague, and since there's no information of any kind about anything, we've had to figure out prepress and lithography

ourselves. We have pictures scanned, and color-correct them ourselves, without calibration (except a CMYK color chart). A bit of a joke, but we get better results than local printers and lithographers!

However, I have one question not answered by your article (and 100 more to ask!). When we have traditional drum scans made, delivered as CMYK, we usually have to convert to RGB and reparate as CMYK using GCR in PhotoShop. We've spotted the following: the scanners use UCR, resulting in flat pictures and flat blacks. We've taken exactly the same picture and prepared it both ways, and confirmed our method. While we understand the losses involved in the conversions, we, too, have wondered about a prepress conspiracy. We also receive the same answers, and one new one! They refer to bright pictures with rich blacks as "American"!

Many older drum scanners have this same problem of giving much too much black in the shadow and not enough elsewhere. Frequently, one cause will be that they have programmed the scanner to give a specific maximum of all four inks in the shadows (usually 300 in the U.S.). If this is the case you can ask them to give you a heavier shadow in the CMY colors; if they do this, you may be able to color-correct the black to something you like better, without converting. If you do have to convert as you are doing now, at least the conversion will be better.

We often do 2- to 4-color spot color photo-realistic images. We can't find what opacity we should set ink colors in Photoshop to preview mixing of spot inks. Am I dreaming, or is it possible?

It is difficult at best and also not particularly accurate, since Photoshop only allows you to set the values for 100% of one ink alone or combinations of 100% of two or more inks. It assumes that a 50–50 blend of two inks, would be based on the 100%–100% values and that is not always true. You can try this if you like but a better way in my opinion is to use specialized software such as that of the Dutch firm, Visu Technologies.

When we print a metallic ink, we're not sure if there's a problem printing on top of it. It should be OK, but we can't get an answer.

This depends on the specific metallic ink. Drying characteristics are different for each one. Ordinarily, you are correct, just as ordinarily, the metallic ink is thought to be darker than black for trapping purposes.

We've experimented with crude stochastics in CMYK and can't get the dot-gain right, especially since we (and the printers) don't have densitometers. They work well in 2-color. We use the Diffusion Dither bitmapping in Photoshop to do it. Any suggestions? After 45%, dot gain becomes dramatic. Black is at 85%.

No one has yet been able to conquer the dot gain problem with stochastic screening, which is why the technique has never caught on, except with newspapers. Its dot gain is much heavier than in normal printing. The smaller the dot, the greater the dot gain, and obviously stochastic dots are *extremely* small. This is the same reason that dot gain increases with a finer screen ruling.

Even if you can predict the dot gain from the imagesetter, if you are having your film contacted or otherwise duplicated by hand this introduces another variable, because normal contacting methods are not sufficiently controlled to guarantee precise reproduction of stochastic dots.

For these reasons I recommend that you not use stochastic except on plates that mostly give color and not detail. There is no problem with having conventional screens on some plates and stochastic screens on others. In fact, if you are doing 5-color printing, a stochastic fifth color is probably better, as it avoids moiré. If you are printing five colors, the fifth color is mostly to add depth. Even if you miscalculate the dot gain, the printer will probably be able to control it on press. ●