

# Photography Basics for Technical Communicators

## *Part 1: Equipping a Communication Department*

### **Introduction**

Many companies have small—sometimes one-person—communication departments. In such a situation, the communication manager must wear many hats: writer, editor, layout designer, illustrator, and so on. Some of these duties are contracted out, especially when the demands of a project outstrip the skills of a one- or few-person operation. Among the project tasks that are often contracted out is photography.

Photography is generally considered an exotic element in a technical communication project, yet many projects require photographs of some sort. Sometimes stock photographs, sold for hundreds of dollars in stock photography catalogues such as Sutterstock are used to compensate for a lack of photographic wherewithall: equipment and skill. But when a particular photograph is required, a professional photographer is called upon, and professional photographers can be expensive.

Black-and-white or color, on-site or off, photographers charge as much as two hundred dollars per hour and as much as ten dollars for each processed photograph. The quality of such photographs may be excellent, but such a quality is not beyond the capacity a small communication department. Here's how you can prepare your communication department to handle photographic tasks in-house, and save your company money in the process.

### **Setting It Up**

To handle photographic tasks in-house, you need some basic equipment and the skills to use the equipment. Most colleges and universities offer classes in basic photography. For a few hundred dollars and a few hours a week, you can learn enough in one semester to skillfully use photographic equipment and develop the repertoire of special skills needed to take photographs in a technical environment, such as a laboratory. Many companies will pay for tuition and books. The real cost of setting up a photography element of a communication department is the investment in equipment. Selecting the right equipment without busting your budget is perhaps more challenging than acquiring the requisite photographic skills.

### **Selecting the Right Camera**

The first step in equipping a small communication department for photographic and prepress services is selecting the right camera. There are four main types of cameras to choose from: view camera, rangefinder/viewfinder, single-lens reflex (SLR), and twin-lens reflex (TLR). By far, the most popular type of camera is the rangefinder/viewfinder, often called the point-and-shoot camera. Often sold in department and camera stores, this type is really not suitable for producing professional-quality photographs. View cameras are ideal for studio work, but are difficult to master and are not easily moved or poised for motion shots. The TLR is more expensive, more cumbersome, and more difficult to use at eye level than the SLR, but it has a quiet shutter release, which is ideal for wildlife or other situations where noise abatement is essential to getting the right shot.

For professional photographers, the mobility, versatility, and affordability of the SLR makes it an ideal choice. Plus, there is a greater variety of lenses and accessories available for the SLR than for any other type of camera. The market for these cameras is keen, so you can get more camera for less than the cost of a view or TLR camera.

The format of the camera is your next decision. For most situations, a 35mm camera format is sufficient. A sharp image on a 35mm negative can easily be enlarged to a full page. If you need images larger than a full page, then you may want to consider a larger format, such as a medium-format SLR, which can use a negative up to 6 x 7 cm.

However, once you commit yourself to a larger format, you lose all the advantages of a 35mm negative that come from its popularity. For instance, many of the affordable slide scanners in the market can scan only 35mm negatives or slides. Film and processing is also less expensive for smaller negatives.

The numerous bells and whistles a camera sports can confuse the novice photographer, but there are a few features required for professional quality and versatility. First, make sure that the camera can be set on manual so that you can control exposure. Automatic exposure is a good feature, but a camera's meter cannot always be trusted. Also make sure that the camera has either a spot or center-weighted meter in addition to a matrix meter (used for automatic exposure). Finally, the camera you select should have a hot shoe to connect external devices such as an off-camera flash. Other desirable but not essential features include auto-focus, built-in flash, depth-of-field preview, and auto film advance. For a comparison of SLRs, refer to the *Photo Handbook of Information*, published annually by *Popular Photography Magazine*.

## **Selecting the Right Lenses**

Essentially, a camera is just a fancy way of controlling a shutter. Once a shutter opens, the only thing between your subject and the film is the lens connected to the front of the camera. Needless to say, the quality of the lenses you connect to your camera is

critical to the quality of photographs. Resolution, focus, and depth of field are all image qualities controlled by the lens and its settings.

For most situations, two lenses will be sufficient: a 24-to-70mm zoom and a 70-to-210mm zoom. With these two lenses, you have a range of 24mm, for very wide angles, to 210mm, for far-away shots. Getting a lens with a “macro” feature will allow you to get very close to your subject, but the feature increases the price of the lens. Also, get the fastest lens your budget will allow. The “speed” of a lens refers to its widest aperture setting. The wider the aperture, the less light you need to take photographs and therefore the faster you can set your shutter. Lens speeds for zooms are listed in a range, such as 3.5–5.6 (slow) and 2.8–3.5 (fast). But the faster the lens, the more it costs.

### **Selecting the Right Accessories**

The cost of accessories can be greater than the cost of the camera itself, so an impulse to buy gadgets that promise better photographs or scintillating special effects can blow apart a tight budget. But some accessories are essential to routinely taking good photographs. A tripod is a must. The sturdier the tripod, the sharper the photograph. Especially when you are shooting with a slow shutter speed, such as in low light, the camera must be held by something other than your hands. To further increase the chances of taking a sharp photograph, use a cable release with a camera mounted on a tripod. Releasing the shutter with a cable instead of pressing on the camera insures that a fat finger doesn't jar the camera.

Even if your camera has a built-in flash, you will need a powerful flash and flash cable so that you can illuminate subjects at various angles and distances (see February 1995 issue of *Popular Photography*). A cheap light stand and umbrella (to soften the light) further increases your lighting repertoire. A few lens filters, which screw onto the

end of the lens, are essential to good photography, but most create too fanciful effects for sober technical photography. Every lens should have a skylight or UV filter to protect the lens. These filters have relatively little effect on exposure. Another essential filter is a filter for fluorescent light.

Other essential accessories include a lens and camera cleaning kit, a reputable reference book, grey card (discussed below), lens caps, extra batteries, an indelible pen, and a spacious bag to put it all in.

## **Getting Photos into Your Computer**

### ***Hardware***

A slide scanner, many of which will also scan negatives, can save hundreds or even thousands of dollars per year in prepress costs. Additionally, you don't have to be so frugal with your imaging options. Getting an image into a publication can take as little as five minutes—no footwork, no vendors.

The performance of a slide scanner is determined by its resolution, bits per color (red, blue, and green), and scanning speed. For images that will be printed at 150 lines per inch, which is the most common [screen resolution] for offset presses, your digital image should be 300 dots per inch (dpi). Scanning a 35mm slide or negative at 300 dpi will yield an acceptably resolved image only about one by one and a half inches in area. That's pretty small. To yield a 300-dpi image about the size of a full page, you need a scanner with a resolution of at least 2400 dpi.

To yield a digital image with accurate color information, get a scanner with at least eight bits of information per color, for a total of 24 bits. Some slide scanners have 30 bits or more. The more the bits, the greater the color fidelity. Finally, select a scanner with an

estimated volume of scans in mind. If you anticipate a large volume of scans, then select a scanner with a fast scan time (less than two minutes). For a low volume, the scan time is not a very important criterion.

### **Software**

Once you have scanned a slide or negative, you will need to touch it up. Among the things you can do to a scanned-in image with an image processor such as Adobe Photoshop are adjust the color balance (such as getting rid of a green cast), adjust brightness and contrast, touch up specs and scratches, change the color model (greyscale, RGB, CMYK, and so on), and export the image as a file type you can place in a page layout program.

### **Case Study**

In early 1995, I was informed by my management that we were going to produce a fancy four-color brochure with many photographs. After I got estimates from the photographer we had been using, I decided that I could save my company a lot of money if I learned how to use a camera and photography accessories. At that time, I had never held an SLR camera in my hands and had no knowledge of photographic principles. Starting from scratch, as perhaps you will, here is what I did to successfully equip my company with the right stuff and me with the right skills.

First, I enrolled in a basic photography course that required three hours per week of my time. The company paid for tuition and books, but I attended classes on my own time. I convinced my managers to purchase a suite of basic photography equipment, after having poured through dozens of photography magazines and picked the brains of dozens of photography vendors. Within three months, we had purchased enough equipment to do

all of the photographic tasks and most of the prepress tasks needed for our four-color brochure.

You will probably be pleased to know that I spent only a moderate amount of beta waves mastering the basics of photography and learning to efficiently use the equipment. For investment of around \$3,900, my company saved in one year nearly as much in photography and prepress services. As shown in the sidebar, each photography shoot cost a minimum of \$140 for one roll of film if the job is contracted, as opposed to only \$7 if the shoot is done in-house. My labor (\$0 for in-house) cancels out because I spend as much time monitoring and directing a contract photographer as I spend doing the job myself. The cost to scan a 35mm negative is about \$30 for a three-by-five inch image. During 1995, I conducted 22 photography shoots and used in publications 30 of the four dozen or so negatives I scanned in. Total savings in photography and prepress services in 1995 was about \$3,700, almost enough to pay for the equipment purchased at the beginning of the year. And that doesn't include the money we saved by doing in-house portraits of our staff.

## **Conclusion**

For an investment of less than \$4,000, a small communications department can set up a photography and partial prepress service that can save a company thousands of dollars per year. With a little initiative, you can learn enough to master the equipment you purchase in a few months. The skills you will learn are portable and increase your value as a technical communicator. In the Part II of this article, I will talk about taking technical photographs and offer some tips for negotiating complicating factors.

SIDE BAR

<i>Make and Model</i>	<i>Description</i>	<i>Cost</i>
Tiffen 52mm FL-Day	Magenta Filter	\$20
Tiffen 52mm UV	UV Filter	\$13
Tiffen 52mm UV	UV Filter	\$13
N/A	20-inch Cable Release	\$18
Tiffen 58mm UV	UV Filter	\$16
Bogen 3221	Tripod	\$130
Bogen 3025	Tripod Head	\$20
Nikon 6006 Kit	SLR Camera with 35–80mm Lens	\$539
Sigma 24mm 2.8	24mm Macro Lens	\$65
Sunpak 433D	Automatic Flash	\$65
Lowepro Orion AW	Fanny-pack Camera Bag with Backpack	\$76
Raynox 35mm Micro E	Close-up Lens Adapters	\$138
Nikon SC 17	Off-camera Flash Cord	\$50
Wein WP-HS	Flash Slave	\$36
Polaroid SprintScan 35	35mm Slide/Negative Scanner	\$1,810
Adobe Photoshop 3.0.4	Image Processing Software	\$570
N/A	Photography Course	\$240
N/A	Reference Book	\$50

Total Investment in Equipment: \$3,869

Photographic Costs per Shoot				Scanning Cost per Photo	
Labor	Processing	Film	Total Photo		
Contract	\$120	\$20	\$0	\$140	\$30
In-House	\$0	\$2	\$5	\$7	\$4
Savings:				\$133	\$26

Savings for 1995

22 Shoots x \$133 = \$2,926

30 Photos x \$26 = \$780

Total 1995 Savings = \$3,706

## **Photography Basics for Technical Communicators**

### ***Part 2: Taking Technical Photographs***

#### **Introduction**

In Part I of this article, I discussed the opportunity for a small technical communications department to appropriate photography equipment and skills to save a company the cost of contracting photographic and prepress services. Now, we're going to talk about putting all that equipment to use.

Any time you apply a general skill to a specific discipline, you're bound to encounter complications not covered in a general reference book. Photographing technical subjects is no exception. Here, I include the most important considerations for getting the most out of your camera, starting with selecting the right film.

## **Selecting the Right Film**

Options for film include black-and-white or color, slide or print, and speed. I suggest that you always use color film because color can always be removed to leave only information about light intensity (grey-scale information), but color can be added to a black-and-white photograph with only the greatest contrivances. Scanning a color print, slide, or negative in grey-scale mode renders a black-and-white image whose brightness and contrast can be adjusted to taste.

Whether to use slide or print film depends upon what you are going to do with the film. One advantage of using slide film is that the final product depends upon you, not the ability of the photo lab to make a good print from your negative. With slide film, the slide is the film (called reversal or positive film). However, slide film has a much more narrow latitude than print film. That is, to get a good exposure, you must be within about one stop (combination of shutter speed and lens aperture) with slide film, whereas print film has a latitude of as wide as three stops. Additionally, slide film must be matched to the type of light exposed on the film. For daylight and flash light, use a daylight slide film. When your subject is illuminated with incandescent bulbs, a tungsten-balanced slide film is required. Fluorescent light poses a unique problem insurmountable by film selection. As discussed in Part 1, the problem with fluorescent light, which casts a greenish light, can be partially solved by installing a magenta filter and fully solved only by supplying your own light source.

While prints cost more than slides, processing print film costs far less than processing slide film. If you have a negative scanner, you can process the film without making prints, inspect the negatives with a 4x or 8x loupe, and then scan in the images for digital processing. Another advantage of print film is that it is not as sensitive to the green cast of fluorescent light (discussed below).

The rule of thumb for selecting the film speed is get the slowest speed your lighting situation will allow. The higher the ISO rating of the film, the less light required to properly expose the film but the more grainy the image. Slow film, ISO 50 or less, is best for detail and sharpness. A flash can be used if the lighting is not sufficient and the subject is small enough. If the subject is not in motion or the subject is in motion and your project can tolerate blurred motion, then you can use the slow film with a slow shutter speed to let in more light. Otherwise, you can use a medium-speed film (ISO 100 or so) or even a fast film (ISO 400 or so) to compensate for low light. For a list of films and their characteristics, see the April 1995 issue of *Popular Photography* or the April 1995 issue of *Outdoor Photographer*.

## **Getting the Right Exposure**

Exposure is the amount of light that reaches the film inside your camera. Imagine that the amount of exposure is equal to the amount of water in a bucket. You can increase the amount of water by increasing the diameter of the hose supplying the water or by increasing the amount of time the hose is on. Likewise, the larger the aperture of the lens and the longer the shutter is open the more the exposure. Doubling the aperture size or the shutter time increases the exposure by one stop, which is the unit of measure for exposure. For example, increasing the shutter time from 1/60 to 1/30 will double the amount of light exposed on the film.

Aperture settings are a bit more difficult to calculate. Basically, aperture settings are inversely proportional to the diameter of the aperture. The standard aperture settings, or f-stops as they are called, are 1.4, 2.0, 2.8, 4.0, 5.6, 8, 11, 16, 22, and 32. Each decrease in f-stop doubles the amount of light exposed on the film. Most cameras automatically adjust the exposure level to match the speed of the film (doubling the speed reduces the exposure by half). But for manual cameras, correct exposure can only be achieved if you set the ISO dial to the ISO rating of your film.

The camera you purchase will have a built-in exposure meter, so purchasing a handheld exposure meter is not necessary. Your camera's meter measures the amount of light reflected off the subject and passing through an area on your lens. If you use the center-weighted setting on your camera's meter, then the meter will favor the light passing through a moderate portion of the lens center. If you use the spot setting, it registers only the light passing through a small circle at the center of the lens. Many SLRs also have a multi-segment setting, or matrix meter, used to make complex calculations about the light reflected from the subject.

For most shots, the matrix or center-weighted settings will yield a good exposure. However, when you have a high-contrast scene (elements have a four or more difference in measured exposure) or a high- or low-tone subject (white or black), then you should use spot metering and a grey card for proper metering. Available at photo suppliers, grey card is a piece of grey cardboard that reflects 18 percent of the light that falls on it. Your camera was calibrated at 18 percent before it left the factory, so using a grey card will yield a very accurate exposure for any subject. In fact, I use a grey card for every shot, regardless of the scene, subject, or lighting. If you find yourself in a shooting situation

without a grey card, you can take a substitute exposure reading by metering your hand (if your skin has an average tone), concrete, or other mid-tone areas.

One way to hedge your chances for a correct exposure is to bracket your shots. Bracketing is when you take one shot with less exposure suggested by the meter, one shot according to the meter, and one shot with more exposure suggested by the meter. I usually bracket in 1-stop increments (-1, 0, +1). For critical shots, I take many shots, such as -2, -1, 0, +1, and +2. Wasted film costs much less than redoing a photography shoot.

## **Composing with Purpose**

### ***Depth of Field***

The distance of acceptable sharpness in front of and behind the point of focus is called the depth of field. For illustration, imagine taking a photograph of a crowd of people. If you focus on someone in the middle of the crowd, some people in front of and behind that point of focus will also be in focus. The distance between the last person in focus and the first is the depth of field.

You can control depth of field with the aperture. The wider the aperture, the less depth of field. Unless you have a depth-of-field preview feature on your camera, the depth of field you see in your view finder is the depth of field you will yield at the largest aperture of your lens (smallest f-stop setting). Without a depth-of-field preview, you have to imagine the depth of field. The distance between you and your subject also affects depth of field. The closer you get to your subject, the less the depth of field.

When you compose a photograph, consider how depth of field affects the composition. Do you want the viewer to notice foreground and background elements? If

not, then set a narrow depth of field. If in-focus background and foreground elements are important to the composition, then set a wide depth of field. Sometimes your composition will require a moderate depth of field. For example, I once composed a shot of an engineer holding a “super capacitor” in front of him. I wanted the capacitor to be in focus, but the engineer’s face to be somewhat out of focus so that the engineer was anonymous but the human form was obvious. This “fuzzy” technique can be used in many dramatic ways to highlight some elements and mystify others.

### ***Close-Ups***

Many camera lenses are able to focus down to a few inches away from the subject. Called macro lenses (short for photomacrography), they allow you to focus images anywhere from 1/10 life size to a few times life size, depending on how close you get. Supplementary lenses, sometimes called diopters, can be added to an ordinary camera lens to magnify the subject. To maintain good resolution and sharpness, use only diopters with multi-elements (lenses). With a regular lens and a diopter, you can focus images as large as twenty times life size.

One warning must be heeded when you get close to your subject for a close-up photograph: Depth of field will decrease to millimeters, even if the aperture is closed to its minimum diameter. Because depth of field decreases as the subject gets closer to the lens, depth of field may be so narrow that if the raised letters on a coin are in focus, the scratches on the coin’s background will not be. Therefore, close-up photography is difficult for three-dimensional subjects. It’s best to experiment with different angles, focal lengths, diopter strength, and aperture (f-stop) setting.

### **Special Circumstances**

CRTs (motion, interlace, flash washout, intensity, bracketing)

### ***Reflective Objects***

Reflections on glass, water, and other non-metallic objects can be reduced or eliminated with a polarizing filter. However, filters are ineffective for metallic surfaces. To eliminate reflections on these surfaces, first block or extinguish any direct sources of light hitting the metal surface. Then, create a tent with a white sheet. Shine your light source through the tent onto the subject and meter off a grey card next to the subject.

### ***Fluorescent Lighting***

Different types of light sources have different color balances. Daylight, for instance, has a color balance of about 5,000° Kelvin (K), a flash about 6,000° K, and a tungsten floodlamp about 3,200° K. Fluorescent light, however, does not have a continuous spectrum of color as do other sources of light. Fluorescent bulbs emit large amounts of blue and green light, but very little red. No color film can compensate for this discontinuous spectrum, but some techniques and accessories can mitigate the greenish cast of fluorescent light on a color negative or slide.

If the scene of the photograph is small enough to be illuminated by flashes, then you can turn off the fluorescent lights and use flash light only. However, flashes do not have enough power to cover large scenes, such as full laboratories or large offices. A magenta filter (designated FL-D for daylight film and FL-B for tungsten film) partially blocks the strong blues and greens from the light spectrum, but the red portion of the spectrum will still be small in comparison. Print film is slightly less sensitive to the unbalanced light than slide film, so use it whenever the main light source is fluorescent. If you have a scene lit by fluorescent light and your subject is close to the camera, you can mitigate the green cast in the scene and eliminate it from the subject by using a magenta filter on the lens

(CC30M) and a light green filter on the flash (CC30G). However, one drawback of using a magenta filter is that it significantly reduces the total amount of light that reaches the film, by as much as 2.5 stops.

And finally, the image color balance can be adjusted with image processing software, such as Adobe Photoshop. To adjust the color balance of a subject exposed in fluorescent light, increase the amount of red and decrease blue and green (if you are in RGB color mode) until the image looks balanced, such as when flesh tones look realistic.

## **Conclusion**

Developing photographic skills increases your marketability as a technical communicator. Additionally, demonstrating a willingness to adapt and innovate money-saving measures will increase your value to your employer. But perhaps the most rewarding aspect of learning photography is that taking good pictures can be fun and exciting, especially once you have mastered the basics. Like many goals, the real reward is the journey itself. If you run into trouble along the way, there are many sources of helpful information. The side bar shows a few, on-line and off.

### **SIDE BAR**

#### **Web Sites (URLs) for Photographic Information**

<i>Name of Site</i>	<i>URL</i>
Agfa Division Bayer Inc.	<a href="http://www.agfahome.com">http://www.agfahome.com</a>
Bengt's Photo Page	<a href="http://math.liu.se:80/~behal/photo/index.html">http://math.liu.se:80/~behal/photo/index.html</a>
Canon USA	<a href="http://www.usa.canon.com">http://www.usa.canon.com</a>

Eastman Kodak	<a href="http://www.kodak.com">http://www.kodak.com</a>
Fujifilm	<a href="http://www.fujifilm.co.jp">http://www.fujifilm.co.jp</a>
Grafica Obscura	<a href="http://www.sgi.com/grafica/">http://www.sgi.com/grafica/</a>
Photography on the Web	<a href="http://www.ksu.edu/~camk/photography.html">http://www.ksu.edu/~camk/photography.html</a>
Polaroid	<a href="http://www.polaroid.com">http://www.polaroid.com</a>

### **Reference Books**

London, Barbara, and John Upton. *Photography*. 5th ed.

New York: HarperCollins, 1994.

Hedgecoe, John. *The Photographer's Handbook*. 3rd ed.

New York: Alfred A. Knopf, 1994.