FLASH PHOTOGRAPHY BY MICHAEL SMYTH

This tutorial introduces the use of flash as part of the photographic process. Incorrect or inappropriate use of flash often leads to disappointing results, so many photographers are put off using this valuable tool. Here we explain the basic principles and uses of flash.

ACCESSING FLASH CONTROLS

If you are using your camera on "A" or "P" mode, you have no input into when and if the flash will fire. These decisions are left up to the camera's software to decide, usually only when the light level is too low to be able to shoot at a minimum shutter speed (usually 1/30 sec or 1/60). If you have a DSLR the minimum shutter speed used without flash can sometimes be programmed, but the problem remains that often we want to use "***fill***" flash when there is quite a bit of ambient light, or alternatively, we don't want to use flash and want to record the natural lighting levels. We need to tell the camera when to use flash.

To take control of the flash it is simply a matter of changing from the automatic settings ("A" or "P") and moving to either ***Aperture Priority*** or ***Shutter Priority*** mode. On a compact camera you may have to select flash options (flash manual ON, Flash OFF or Auto). As will be seen later, we recommend using ***Aperture Priority*** mode to gain the best control over flash illumination.

GENERAL PRINCIPLES OF FLASH PHOTOGRAPHY

The flash is fired when the camera shutter is pressed and the first (front) shutter curtain is fully open. This means the flash exposure occurs at the beginning of the "***ambient***" or background exposure. Some cameras have the option of second or rear curtain sync, where the flash is fired just before the exposure ends. This is only relevant at shutter speeds of 1/30 or less as the effect is not visible at higher speeds. See advanced techniques below for more details.

Typically most cameras have a maximum flash sync speed of **1/250 or less**. This means that any shutter speed up to the maximum can be safely used, depending on ambient conditions. At shutter speeds over the maximum synchronisation speed the flash will not fire at the correct instant and generally the camera will not allow you to shoot at these higher speeds.

The light produced by the flash gun is always produced at maximum power. The amount of light produced is varied by the amount of time the flash is left on. The longest duration of a flash is about **1/1000** sec, the shortest is about **1/11,000** sec.

The intensity of the light from the flash falls off dramatically with distance. Double the distance to your subject and the light intensity is reduced to ¼ (This is known as the inverse square law). What this means in practice is that the light from even the most powerful flash unit is only effective over a relatively short distance. The inbuilt flash on your camera will probably only be effective up to 3-4 metres from the camera.

Tip: Provided the shutter speed you select is slower than the max. sync speed for your camera, the shutter speed has absolutely no bearing on the **flash** exposure on your subject**.**

The Flash exposure on your subject is only determined by the aperture of the lens used. A smaller aperture lets in less light than a large one, therefore limiting the distance from the camera that the flash will cover. Most accessory flash units (not part of the camera) have a scale indicating the distance that the flash can cover, based on the aperture selected. Modern flashes that communicate with the camera will show the changes in flash range as you change the aperture settings.

Modern built in flash units and accessory flashes communicate with the camera and determine the exposure separately from the background or ambient exposure. Most DSLRs also allow you to separately adjust the flash exposure, allowing the background and flash exposure to be controlled separately.

CONTROLS AND OPERATION

On Cameras without **TTL** (**T**hrough **T**he **L**ens) flash control, the flash exposure (duration) is controlled by a sensor on the front of the flash gun. This is simple but effective, most of the time.

Cameras with **TTL** flash control measure the amount of light from the flash that passes through the lens. This is almost foolproof with "Normal" subjects, provided the subject is within the min – max distance indicated on the flash. We recommend taking a few test shots to gauge how effective your camera system is at balancing the flash exposure. In our experience, a setting of minus 1/3 stop for the flash exposure usually results in a relatively natural looking image. Experiment and adjust to suit your particular taste.

Once your camera is set to Aperture or Shutter priority, the flash operation can be accessed at any time by simply pressing the button on the camera body to raise the flash (on a DSLR). If you are using a compact camera that does not raise the flash, you will usually have a button or menu selection to turn the flash to manual operation. For our purposes, we want the flash to fire whenever we choose, so select manual flash "on".

WHEN SHOULD FLASH BE USED ?

It is often thought that flash is only used when there is not enough light to comfortably hand hold your camera, however there are other important times when you may want to use flash and manage how it operates:

To give correct exposure to backlit subjects, i.e. to give both the subject and background a ***balanced*** exposure (a more or less equal brightness between the subject and the background). Without ***"fill"*** flash your subject is going to be under exposed and possibly the background may be overexposed.

Here's our model, "Rocky" The first image is as metered without flash. The camera's metering system has measured the light from the subject and background and as the background is so bright, it has caused our subject to be badly underexposed. The middle image is taken by spot metering on Rocky's chest. See how the exposure is now right for him, but the background is way over exposed. The third image is taken with the original exposure, but with the camera's built in flash illuminating our subject.

To correct colour balance with a subject under artificial light: This used to be a major problem with film, as particularly under fluorescent or incandescent lighting, the subject would have a terrible colour cast. Using fill flash to illuminate the main subject overcame this problem. Today with RAW capture (See our tutorial "***The Digital Workflow***") and accurate white balance, this is less of an issue. If using JPEG capture, an auto white balance will go close to the correct colour temperature, with fine tuning possible later in Photoshop.

Bear in mind that if you are using fill flash under mixed lighting conditions, you will be able to correct the white balance for either your flash lit subject, or the background (ambient) but probably not both.

To soften shadow detail on a subject in bright sunlight. Harsh shadows under direct lighting outdoors can be softened using fill flash or a reflector. If no reflector is handy, you can use your flash, however this is only partly effective as the bright midday sun is very intense and the power of the flash cannot completely eliminate shadows. The closer you can get to your subject the better, plus use the largest aperture (lowest f number) that will still synch with the shutter speed.

Here we have two deep sea divers preparing for a dip in the ocean.

The time was early afternoon with the sun above and behind the subjects. Using fill flash at relatively close range has reduced the harsh shadows and added some light where it's needed.

Under the harsh Australian summer sun, your flash will probably not be powerful enough, however in the softer light of early mornings and late afternoons, the light is less intense and this method is more effective.

To freeze motion in long exposures on moving subjects and for other special effects.

Here a slow shutter speed of 1/15 sec was used together with fill flash. The flash has frozen some of the motion and allowed the ambient exposure to blur the movement. This method relies on the background or ambient lighting to be bright enough to expose the image at the slow shutter speed. To access this method you will need to set your camera on to the "slow Synch" setting to allow slower shutter speeds to be used.

Without flash, the whole of the image would be blurred. This method can be used with or without a tripod, depending on the effect required.

This image was shot with front curtain sync, so the movement has occurred after the flash fired. Can you work out which direction the turntable is spinning ?

To provide the main illumination when the ambient lighting levels are too low for normal exposures.

This is the "normal" use of flash, however it often produces unsatisfactory results.

On camera flash produces flat images with no modelling, as the light source is in line with the lens. For this reason, wedding and portrait photographers will use an off camera flash as well as multiple light sources to try to create some shadow detail.

The image on the left of our budding makeup artist was taken with on camera flash in a portrait format. The flash is to the right of the image and has given her some slight modelling, but the overall effect is still harsh and unflattering.

If you have to use flash as the main light source, try using one or more reflectors either side of the subject to soften the effect, or try a diffuser over the flash head (a thin fabric or tissue draped over the front of the flash will soften the light, as well as cutting back the power.

Another option is to use "***Bounce***" flash, see item 5 below in the advanced techniques.

ADVANCED TECHNIQUES:

1. FILL FLASH

Fill flash is used in normal lighting to fill in shadow areas, e.g. a backlit tourist in front of the Opera house will be a silhouette without fill flash. For the most pleasing natural looking results reduce the flash output by approx 1/3 - 2/3 stop, or to taste.

Back to our model, Rocky. Here, by changing to manual exposure, and choosing a shutter speed 2 stops faster than metered (but still below the maximum synch speed) the background has been correctly exposed. (this is effectively underexposing the ambient exposure by 2 stops.

Because we haven't changed the aperture, the flash exposure is still correct and Rocky is looking good !

To make the overall effect more pleasing, I have adjusted the flash settings on the camera to minus 1/3 stop.

This keeps the flash exposure more natural looking. Note that in this instance the background is in full sun (Approx 5,200 degrees Kelvin) and Rocky is illuminated by flash (5,400 degrees K.). Because there is not much difference between the two light sources, the image looks natural. In other cases where the background and flash light sources are at vastly different colour temperatures (e.g. indoors under incandescent lighting) the effect will be noticeable. We will cover more on White Balance in an upcoming tutorial.

Experiment with combinations of apertures and shutter speeds to create the effect you want.

2. REAR CURTAIN Vs FRONT CURTAIN SYNCHRONISATION

Most advanced DSLRs will have an option to use rear curtain or second curtain sync. You will need to select the camera controls for flash that allow slow shutter speeds. On Nikon Cameras this is called "Slow Synch" and "Slow Rear" synch.

This technique is effective when using flash on a moving subject. With the flash synched to the front curtain, The subject image will appear at the start of the movement. With rear curtain sync, the subject image will appear at the end of the movement. See the images below, from the Nikon flash manual:

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This effect is only really visible at quite slow shutter speeds, or where there is a lot of subject movement. If you look back to the image of the boy on the turntable, you will see that the sharp image is at the right hand side and the blur to the left (look at his feet).

To use rear curtain sync, first set the flash synchronisation to rear or second curtain (this option will not be available on compact cameras or all DSLRs), then choose the shutter speed and aperture settings to suit the ambient lighting.

You will need a slow enough shutter speed that will show sufficient movement of your subject. In the example on the left, a shutter speed of 1/15 second has allowed the camera to be hand held with minimal background movement, but allowed the movement of the subject to blur.

Next look at the aperture to see if your flash will be effective over that distance. If necessary, change aperture, shutter speed and or ISO to achieve the desired result. Experiment.

3. MOVEMENT EFFECTS WITH FLASH

Try using subject or camera movement, or both. Results can be surprising and unexpected. If you don't have a moving subject, try moving the camera, such as on a merry-go-round or similar. Try to use the slowest shutter speed possible and see how the amount of blurring varies. Moving the camera at the same time as making the exposure can speed up a slow subject.

4. MANUAL CONTROL OF FLASH AND AMBIENT EXPOSURE

For subjects that are not "Normal" you may need to manually compensate (Bride in bright white wedding dress against a black background etc).

With high end accessory flash units you can do this on the flash. With low end units you have to fool the flash by using a different aperture. Most mid range DSLRs allow you to adjust the flash output (this is NOT the same as exposure compensation), refer to your user manual for details.

Where you have a **light subject**, such as a bride in a white dress, the camera will try to "***normalise***" the exposure to a mid grey. Therefore the white dress will be underexposed. Here you will need to **increase** the exposure to compensate. Be careful with mixed subjects, if the bright component is not taking up most of the frame, no compensation may be needed. Try a few test exposures and check the Histogram to check for over or under exposure.

For predominantly **dark subjects**, again the exposure will tend to mid grey, causing your blacks to turn mid grey. Here you will need to **decrease** exposure to turn your blacks back to, well, black.

Remember, adjust only the shutter speed to compensate, otherwise the whole exposure will be altered.

Here this candid image was taken indoors with moderate ambient light. The black background was a velvet curtain. Ambient Exposure was reduced by 1 stop, and the flash exposure set to minus 1/3 stop.

Each situation is different, so experiment with different settings to find what works with your equipment.

5. BOUNCE FLASH

Don't drop your flash as it probably won't bounce ! However you can use another surface to bounce the flash light from onto your subject. The most common surface is a white ceiling, however if your ceiling is not white, your flash will pick up a colour cast from the coloured surface on the way to your subject.

The bounce surface diffuses or spreads out the light for a softer or more natural looking photo. You will need to open up the aperture 1 or 2 stops to compensate for the extra distance travelled and the greater spread of the light. Diffusing attachments, such as a tissue or purpose made units can be effective if no surface is available. Be careful when fitting other materials over the flash head, the surface can get very hot and possibly singe or burn your diffuser.

6. OFF CAMERA FLASH

By removing the flash from on top of the camera you take it away from the direct path into and out of your subject's eyes. This helps reduce Red eye and can help by providing some shadow detail on your subject. You will need a sync cord to be sure that the flash is still synchronised with the camera. Multiple flash units can be use with wireless or cables to give more effects. See the Nikon Brochure titled "SB800 techniques", available from the Nikon website (go to support and downloads and type in SB-800 in the search section).

7. REFLECTORS

You can use reflectors, newspaper, white cardboard or purpose made reflectors to reflect some of the flash light onto your subject to add a further dimension. This is difficult to control if you are shooting on your own, so you may need an assistant or two to hold the reflectors whilst you make test shots. Try coloured reflectors for special effects.

8. VERTICAL SHOTS WITH OFF CAMERA FLASH

Be careful when using on camera accessory flash with vertical shots. Make sure the flash is higher than the camera, otherwise you get "horror movie" lighting from under the subject.

SUMMARY

You can control the background (ambient) lighting and flash illumination independently by using simple techniques:

To increase background exposure	use longer or slower shutter speed (e.g. 1/60 second instead of 1/125 sec).
To decrease background exposure	use shorter or faster shutter speed up to sync speed (e.g. 1/125 sec instead of 1/60 sec)
To increase flash exposure	use flash controls for compensation, or if a non dedicated accessory flash, use a larger (smaller f number) aperture Do not change the shutter speed
To decrease flash exposure	use flash controls for compensation, or a smaller aperture. Do not change the shutter speed.

When experimenting to find the correct exposure, first take a reading with the flash turned off (or closed if built in). Then modify these setting to suit the flash requirements.