

Since 1966

PITTWATER CAMERA CLUB INC.

CAMERA CRAFT - MEETING I EXERCISE



Thanks to everyone who came along to tonight's Camera Craft Session and for letting us know about the things that you are interested in finding out more about.

Tonight we discussed the relationship between Aperture - Shutter Speed & ISO and used the analogy of filling up a bucket of water by adjusting how long we have the tap on (Shutter Speed), how much we open the tap (Aperture) and how big the bucket is (ISO).

Here is a link to the PhotoPills guide which explains this in detail (this was the source of the handout)

<https://www.photopills.com/articles/exposure-guide>

I suggest you download the ebook and have a quick flick through it to see what it covers and then delve into the areas that spark your interest as time permits.

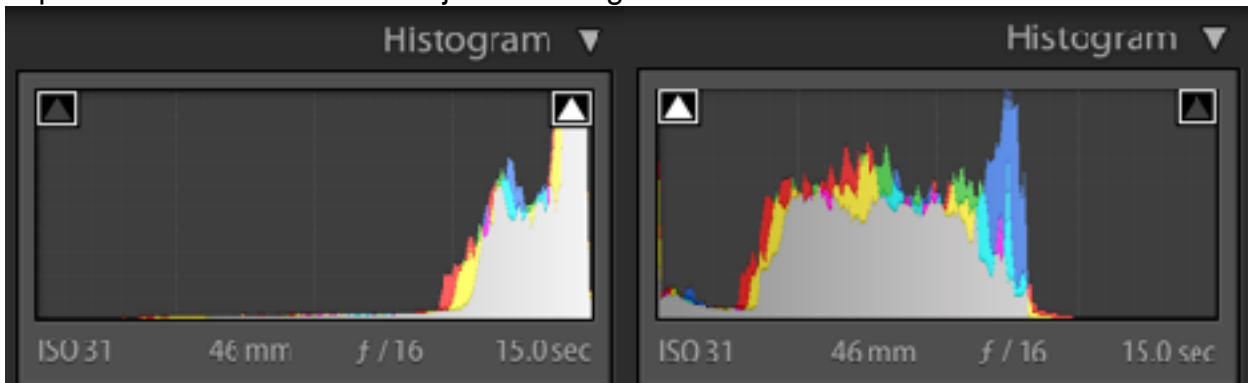
Exercise to be performed prior to the next meeting:

Aim: determine how many stops you are able to over-expose the highlights in your image and still retain detail during processing.

Method:

- i) Set your camera to spot metering mode if available. If not available, choose centre weighted or the setting on your camera with the smallest sampling area for exposure.
- ii) Set your camera to manual. Check that Auto ISO is not turned on.
- iii) Choose a scene with a range of tones, from bright to dark.
- iv) Aim your camera at the brightest highlight in your scene. (If you are shooting directly into the sun, use live view on the back of your camera so you don't risk eye damage by looking directly at the sun)
- v) Choose a shutter speed that you can comfortably take a handheld shot without any blur due to camera movement.. As a guide, use 1/ (lens focal length). For example, If using a 100mm lens, use a shutter speed of 1/100s
- vi) Then choose an aperture that moves the exposure indicator to be centred on the exposure indicator scale. You may need to adjust the ISO to be able to do this. If the image indicates that it will be under exposed, open the aperture by choosing a smaller f/ stop number, Eg If you were on f/8, try f/5.6 then f/4 etc If you are unable to achieve a correct exposure just by opening up the aperture, you may need to increase the ISO. If the image indicates that it will be over exposed, close the aperture by choosing a smaller f/ stop number, Eg If you were on f/8, try f/11 then f/16 etc If you are unable to achieve a correct exposure just by opening closing the aperture, make sure the ISO is reduced and if the exposure is still too high, increase the shutter speed eg go from 1/100s to 1/200s etc.
- vii) When you have a "correct" exposure according to your camera for the highlight, take a photo of the scene including the highlight.
- viii) Then over expose the shot by 1 stop (ie double how much light falls onto the sensor). This can be done by doubling the ISO.
- ix) Then over expose the shot by 2 stops.

- x) Then over expose the shot by 3 stops.
- xi) Import the images into your photo editing software.
- xii) First look at the most over-exposed image (the 3 stops overexposed image). Look at the histogram. If the histogram is cropped on the right, it is overexposed. Drag the exposure slider to the left to adjust the image.



Look at the highlight detail of the darkened image. If there is no detail in the highlight (ie the highlight turns a uniform gray colour when darkened), the image has been overexposed and the highlights have been clipped (lost and unable to be recovered). This image shows that the details have been lost in the sun.



- xiii) Repeat step xii) for the 2 stop over exposed image and then for the 1 stop over exposed image.
- xiv) After reviewing each image in your photo editing software by darkening the image and observing if detail is recovered in the highlight, determine how “overexposed” you are able to take photos with your camera without losing the highlights.

Peter Squires
19 February 2018



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CAMERA CRAFT - MEETING 2 EXERCISE



The exercise for this week is to use our cameras to explore the depth of field that we can achieve with our gear, how to control it and to anticipate the results.

“Depth of field is a key compositional element in many, if not most, photographs. It is one of the most important tools a photographer can use to create striking images.”

And it's true – using depth of field the right way is very powerful. It can radically transform good photos into images that win hearts and minds. — *from the PhotoPills eBook “The Ultimate Photography Guide to Depth of Field (DOF)”*.

Here are some suggestions for us to get a good handle on what we can achieve from our gear.

Just do what you are comfortable with and ask if you would like some help.

i) How close can you focus with your lens - zoomed in - zoomed out - is it the same?

Minimising Depth of Field

- ii) When you are focused at your closest range, take a shot with a wide open aperture to minimise depth of field. How much is in focus?
- iii) Position your subject at different distances from the background to see how much you are able to blur the background while your subject is sharply focused.
- iv) Using the same separation distance between your subject and the background, move back from your subject, re-focus on the subject and take a photo. Observe how the background comes more into focus. The further you move away from your subject the greater your depth of field.

Maximising Depth of Field

- v) Repeat step ii) but this time, progressively close down your aperture and take photos to observe the depth of field you obtain at each aperture for this focus distance.
- vi) Do the same exercise, but this time focus on something that is more distant. Ideally, choose subjects that you would normally photograph to become more familiar with the apertures required to get the desired depth of field. eg Flock of birds
- vi) Now lets go for maximum depth of field. You can use a Depth of Field table to determine the Depth of Field for your camera, lens, aperture and subject distance. There are Android or iPhone apps that make these easy to access, or you can go online to somewhere like <https://www.photopills.com/calculators/dof> or you can just use your camera and observe the results using different camera, lens, aperture and subject distance combinations...however, being familiar with using a Depth of Field table can be quite useful.

It can be really handy to know the hyperfocal distance for your commonly used lens

vii) Take a photo to get maximum depth of field by focusing at (or just past) the hyperfocal distance.

I have added a few snippets below from the PhotoPills eBook “The Ultimate Photography Guide to Depth of Field (DOF).

The eBook can be viewed online or downloaded from the following link:

<https://www.photopills.com/articles/ultimate-guide-depth-field>

There is a lot here and unless you really want to get right into the details, I suggest you just have a quick flick through to see what it covers.

Chapter 1 - Quick answers to Depth of Field Questions may be worth a look

If you are not aware of Hyperfocal distance, the eBook has good coverage of the topic.

Of particular interest is Chapter 2 - Inspiring depth of field examples

Robyn also provided the PhotoPills Youtube Link: <https://www.youtube.com/watch?v=kcmy1F4pyDI>

There are also many resources available on the PhotoPills website that you may find useful. <https://www.photopills.com/articles>

A few snippets from the book:

What affects depth of field?

Depth of field depends on aperture, focus distance, focal length and circle of confusion

(CoC). The latter depends on camera sensor size, final image print size, image viewing

distance and viewer's visual acuity.

Produce more DoF: small apertures (f/8-f/22), short focal lengths (10-35mm), longer focus distances, smaller camera sensors (crop).

Produce less DoF: wide apertures (f/1.4-f/5.6), long focal lengths (70-600mm), short focus distances, larger camera sensors (full frame).

What's the hyperfocal distance?

When focusing at the hyperfocal distance, everything falling from half of this distance to

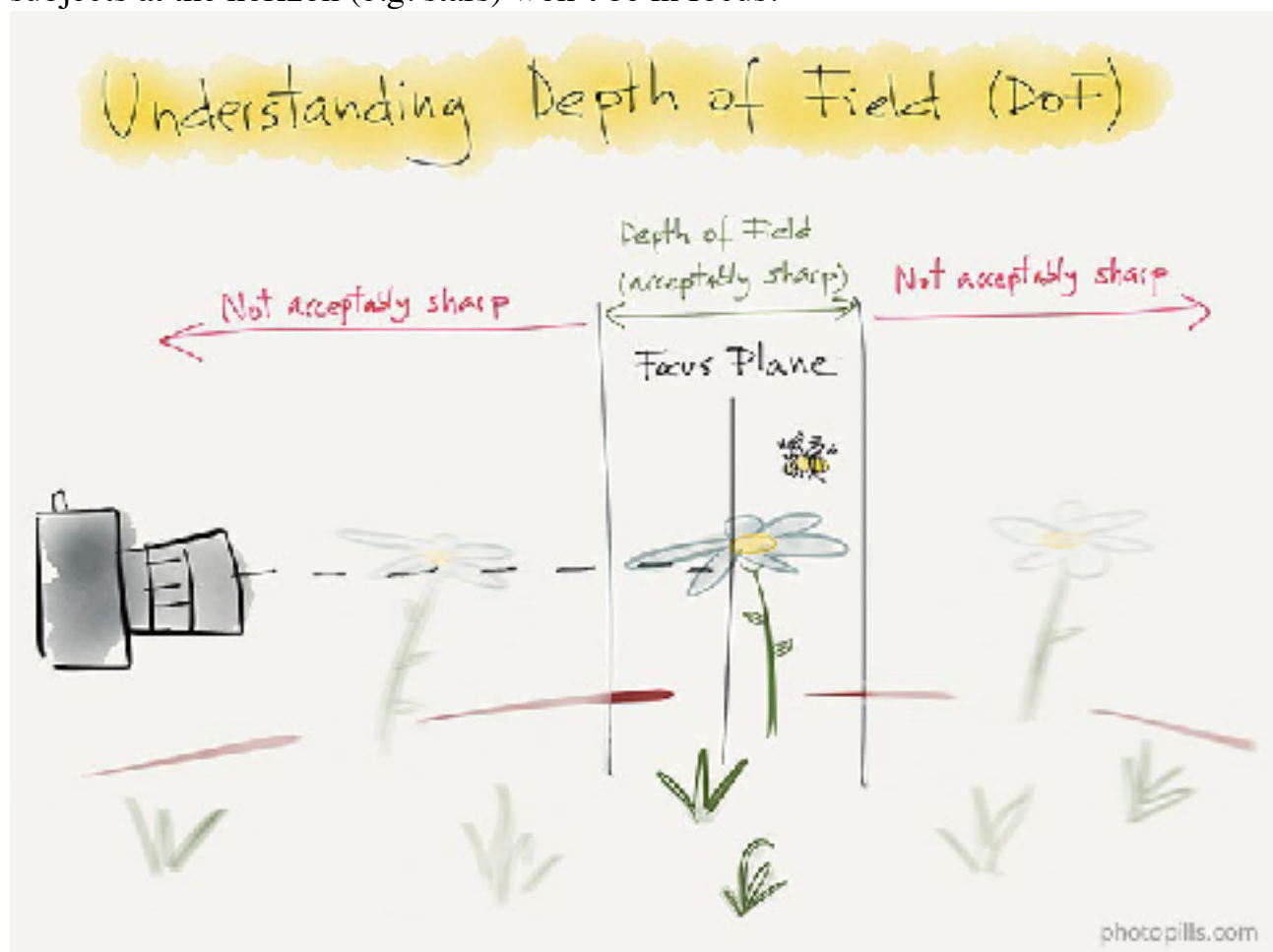
infinity will be in focus. It depends on aperture, focal length and circle of confusion. It does not depend on focus distance (subject distance).

What's the practical use of the hyperfocal distance?

The hyperfocal distance is commonly used in landscape and night photography to maximize depth of field when shooting with a wide angle lens (10-35mm).

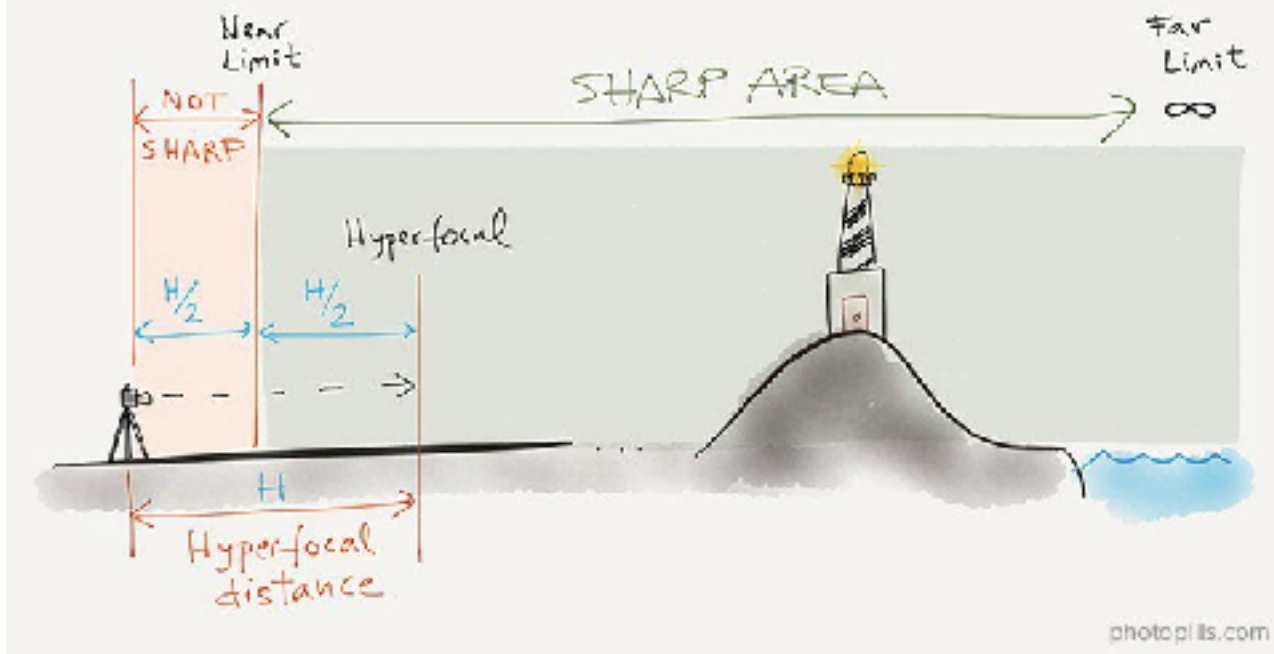
How to focus at the hyperfocal distance?

Focusing the lens at exactly the hyperfocal distance is very difficult. Sometimes, it's not even necessary. Once you've calculated the hyperfocal distance, make sure you focus the lens at a distance that is a little bit longer (2-3ft - 0.5-1m) than the hyperfocal distance. If you focus at a shorter distance than the hyperfocal distance, even by an inch (2.5cm), the subjects at the horizon (e.g. stars) won't be in focus!



What's the hyperfocal distance?

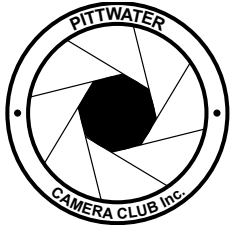
Focus at the hyperfocal distance to maximize Depth of Field (DoF)



Notice that if you focus at a distance that is shorter than the hyperfocal distance, the depth of field far limit will not be at infinite. This will result into blurring the elements at the horizon (or furthest background elements like mountains or stars).

Focusing exactly at the hyperfocal distance is very difficult. So you need to make sure that you're focusing at a distance that is a bit larger than the hyperfocal. Actually, not much larger, one foot (30cm) will do the job. It's better to have a little bit less depth of field in front of the focus point rather than blurring the background elements.

For example, in night photography, if you focus at a shorter distance than the hyperfocal, the depth of field far limit will not be at infinite, which will blur the stars. By focusing at a slightly larger distance, the depth of field near limit will be a bit further from the camera, but the stars will be perfectly in focus.



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CAMERA CRAFT - MEETING 3 EXERCISE



For this week's exercise we will:

i) **Photo review** - review your photo library to determine how you have used various shutter speeds to freeze motion or create motion blur. If you have a particular subject interest, eg waterfalls, wildlife etc, specifically look at these images to determine which shutter speeds have worked best. If you were to take these images again, would you prefer them to have been faster...slower? If you have allowed the camera to automatically determine shutter speed, think how you would control shutter speed to give the image the look that you are after.

ii) **Test your handheld shooting ability** - A rule of thumb to take a photo of a stationary object without introducing camera shake using a hand-held camera is $1/\text{focal-length}$ of the lens. eg for 100mm lens, you should be able to take a photo at 1/100s or faster (eg 1/125s) For cameras with Vibration Reduction (eg Nikon VR lenses) or Image Stabilisation (Canon IS), they can allow you to take photos from 2 - 4 stops slower (depending on the lens) without introducing camera shake. Therefore you may find that you can take images with a 100mm lens with shutter speeds down to say 1/15s. Test this out by using your gear. Take a number of photos of the same subject using various shutter speeds to see how slow a shutter speed you can comfortably use without introducing camera shake. View the results on your large computer screen, zoomed in to 100% to compare the results.

iii) **Photo shoot** - use the ideas developed during your photo review to capture images of a subject that utilise a range of shutter speeds. It can be quite interesting to take this to extremes. Hone in on getting the exact look that you are after. Also try taking really long or really short exposures, you may be surprised by the results. For example, try placing your camera on a tripod and taking a slow exposure of birds in flight or moths flying around a light etc You can use any means or accessories you like to take your photos. Tripod, flash, panning, camera shake etc

Did you know:

- We see the world at about 1/30th of a second? This is the time taken for our eye-brain combo to capture and refresh.
- While our cameras typically enable us to set our shutter speeds up to 30 secs, and longer using bulb mode or external devices, [continuous time exposures up to 3 years](#) have been taken
- Our cameras can take photos with shutter speeds as short as 1/4000s - 1/8000s, but [half a billionth of a second is probably a bit extreme](#)
- The shutter speed selected in combination with the focal length of the lense will determine the amount of motion blur that results. Twice the zoom creates twice the blur for the same shutter speed. Alternatively, shorten the exposure time by one half if you double the zoom to achieve the same motion effect.

Tip - How to Review your photo collection for shutter speeds used

If your photo management software allows you to search the metadata, have a look at the images you have taken using your fastest and slowest shutter speed. Did the shutter speed you used create the effect you were after? Have a look at specific photos that you chose shutter speed to freeze motion or create motion blur.

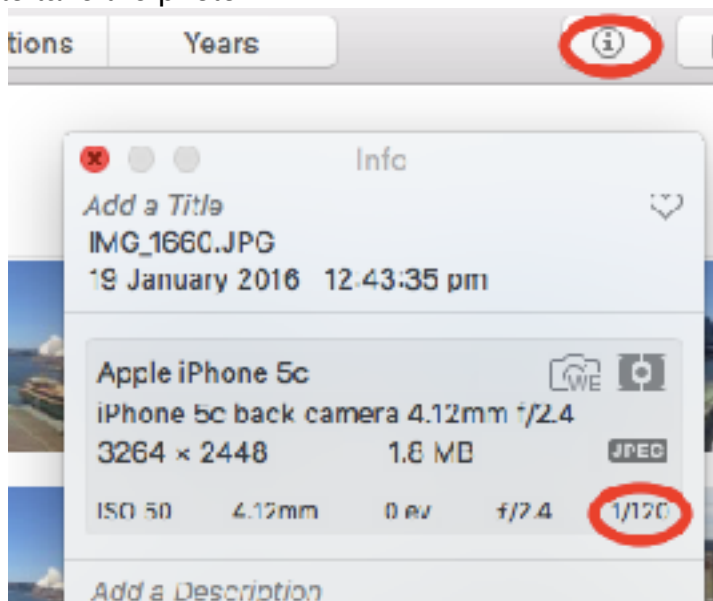
If you are using Lightroom: while in Library mode using Grid View, click on the metadata tab. You will see various columns that you can sort by. If Shutter Speed is not showing, click on one of the column headings and select Shutter Speed.



Here you can see how many photos you have taken at each shutter speed.

Shutter Speed	
1/7300 sec	9
1/7400 sec	15
1/7500 sec	11
1/7600 sec	13
1/7700 sec	12
1/7800 sec	11
1/8000 sec	2376

If your photo management software doesn't let you do a find based on shutter speed, you should be able to look at the metadata to see the shutter speed that was used to take the photo.



The shutter speed effects

Depending on the shutter speed, you can freeze motion or show it.

Freeze motion

Use fast shutter speeds to freeze the movement of a vehicle, a person, an animal, etc.



Nikon D4s | 200mm | f/5.6 | 1/1800s | ISO 1600 | 6250K

These are some examples of shutter speeds that you can use to freeze motion.

- Bird flying: 1/800s - 1/2000s.
- Person walking: 1/125s at least.
- Sports (football, etc.): 1/500s - 1/2000s.
- Car at 50 km/h: 1/1000s - 1/2000s.
- Car racing: 1/1000s - 1/8000s.
- Fast vehicles panning: 1/250s.
- Mountain bikers panning: 1/60s.
- Road cyclists panning: 1/30s.
- Runners or animals moving panning: 1/15s.

Show motion

Use slow shutter speeds to show to the spectator the motion in the scene (water, clouds, people, vehicles, Stars Trails, etc.).



Nikon D700 | 200mm | f/6.7 | 0.7s | ISO 200 | 6700K

Here are some examples (you need a tripod).

- Waterfall silky water: 1s.
- Sea silky water: 1s.
- Show people moving, slow cars: 1/15s.
- Slow water motion: 1/2s.
- Fast water motion: 1/8s.
- People walking: 1/4s.
- Short star trails: 1min - 10min.
- Long star trails: 30min - 4h.

Peter Squires
19 March 2018



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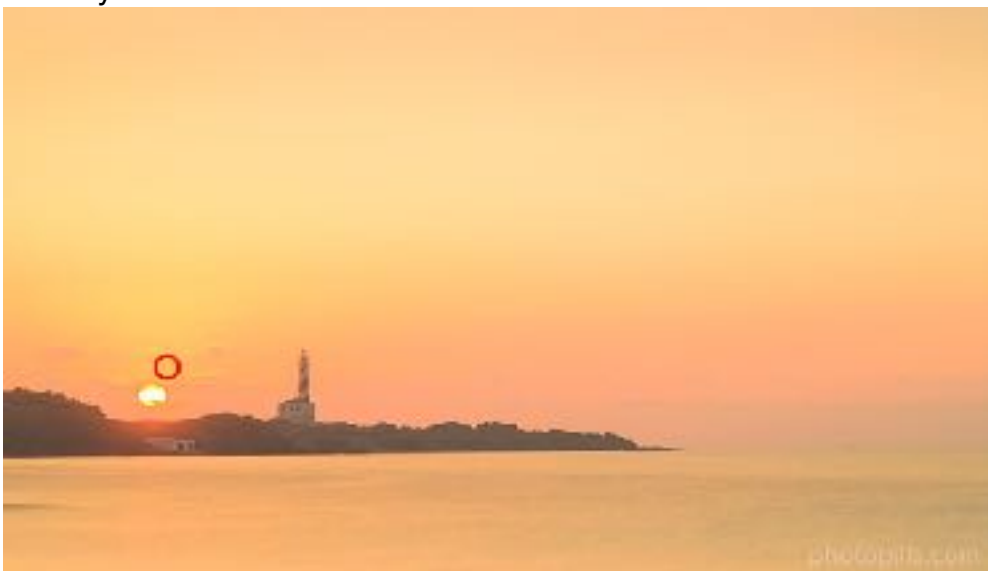
CAMERA CRAFT - MEETING 4 EXERCISE



This week's exercise is all about exposure. (extracted from Michael Freeman's book - **Perfect Exposure**)

- i) **Setup** - set your camera to manual mode and spot metering
- ii) **What do you want?** - choose a scene to photograph. What caught your eye, what attracts you about the shot, and what do you want to convey? Pre-visualise how bright the image should be overall and how the distribution of brightness should look.
- iii) **Likely Problems** - Scan the scene for exposure issues. Think about what is in front of the camera before letting the metering system loose on it. For example, is there a major hotspot likely to blow out? Does it matter if it does? Most problems occur because the dynamic range of the scene is greater than the sensor can capture in a single exposure.
- iv) **Key Tones** - Decide on the important subject (or subjects) and how bright it (or they) should be. In a portrait, this is likely to be the face, but it ultimately depends on your creative judgement. If it is a face, is it Caucasian, East Asian (which needs to be lighter than midtown) or black (which needs to be darker than midtone). The key tone may only be a part of the key subject, or in some circumstances it may be another part of the scene such as the background.
- v) **Is clipping likely? Is there a conflict?** - If there's a conflict between iii) & iv), work out how to resolve it. The choice is between changing the light or the composition, or accepting a compromise in the exposure, relying on special post-processing or both.
- vi) **Apply Metering** - for this exercise use spot metering to measure the key tones and set your exposure in order to capture these tones
- vii) **Review & Reshoot** - review the result on the back of your camera and then adjust your settings and reshoot if necessary.
- viii) **Bring your image along to the next meeting on your camera**

If you haven't already downloaded Photopills - [The Definitive Guide To Always Expose Your Photos Correctly!](#) you can go directly to [Section 18 - How to expose step by step](#) where they take you through a similar exercise showing photos and choices made along the way like the sunset scene below.



Did you know:

The typical dynamic range of:

- Human vision with dark adaption is equivalent to 30 stops of light
- Dim interior with view through window to bright sunlight - 15 stops
- Human vision: single view - 13-14 stops
- Digital cameras at base sensitivity - 10-14 stops
- LCD monitor - 9-10 stops
- Photographic Paper - 6-7 stops

(source: Perfect Exposure by Michael Freeman)

Background..... do not read this section - it probably covers what you already know anyway

If you really want to proceed past this point, you do so at your own risk ... definitely don't operate machinery or drive directly after reading it without having a strong cup of coffee

We find ourselves in front of a captivating scene and would love to remember the moment, share it with others or create a truly special image. We feel the breeze, smell the salt air, hear the bustle of the traffic, feel a sense of foreboding and soak up the scene. Our camera's are amazing. The exposure metering system can immediately determine the reflected light from the scene. But should we trust our camera to capture our image in the way that we visualise it? How do we give our image the mood that we are feeling as we take it. Controlling the lighting and exposure is a big part of this and we have a better chance of success by considering how to achieve the right results before we take the image. We shouldn't wait to get the image on our monitor before we decide how we should have taken it..

We could shoot in Auto mode and let the camera determine what our shutter speed, aperture and ISO should be and whether the flash should be used. Easy - just point and shoot. You compose the shot, choose the right moment and press the shutter. How well did your camera do at getting the exposure just how you like it? The histogram looks fine, neither the blacks or the whites are squashed up against the end. The camera calculated an average exposure and well, your shot turned out just average.....

Don't worry, you say. Shooting in RAW gives us a lot of latitude in adjusting exposures to get the image closer to what we had visualised. However, this can compromise the quality of your final image. Lightening shadows will amplify any noise that you have in your image. Highlights overexposed during capture turn to grey flat areas when we darken them. Too bright an image will wash out saturated colours. Don't get me wrong, I love processing images to get them looking their best, but thinking about how you want your image to look before you take it will give

you the best chance of getting the details you need on your sensor and creating that perfect image.

To take control of exposure, you need to choose a suitable metering mode and shoot in manual mode, or be prepared to use exposure compensation if using an automatic exposure mode such as Auto, Program, Shutter Priority or Aperture Priority.

Your exposure meter assesses the scene and sets the parameters you have chosen to be adjusted (eg you may be averaging the entire frame or you may have chosen spot metering to sample just a small part of the scene) to create an exposure that is mid scale on your camera's exposure indicator. Your camera automatically sets an exposure that gives you 18% grey over the metered area, which gives a tone that our eyes perceive as a brightness of 50%.

You have chosen which part of the image that you want to be used to determine the exposure by setting the metering mode in your camera.

Have you chosen to take an average reading from the entire scene? Therefore, if the brightest or darkest areas of your image are outside the dynamic range of your camera, when set at a midrange exposure for the entire frame, they will be rendered with no detail. The overexposed highlights usually cause the biggest problem. Our eye is usually drawn to the brightest part of an image and if the highlights are burnt out they will be noticed. If they are a significant element in your image, they can really damage the end result. If they are specular highlights or add to effect you are after, they have may helped you.

When you decide on which metering mode to use, you need to be aware this this will affect the measured light levels. For example, a metering mode that averages the entire scene, may well render some areas as overexposed and others as underexposed. By using a centre weighted mode, or spot metering mode, you need to ensure that the area that you measure needs to be representative of the key tone/s you are interested in. Metering modes such as Evaluative Metering (Canon) or [Matrix Metering](#) (Nikon) use more advanced techniques such as assessing colours and a database of images to determine what exposure to set.

After setting your metering mode, you also need to decide how dark or light you want to make these key tones. Are you photographing a snow scene? You don't want the camera to set the exposure to 18% grey (midscale on your exposure meter), you probably want the snow to appear 2 stops brighter so it appears in your image as white, not grey.

The message here is ... let's understand how our cameras determine exposure ... when we can let it automatically determine exposure ... and when we need to take full control in order to capture the light and set the right mood.

Peter Squires
16 April 2018



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CAMERA CRAFT - MEETING 5 EXERCISE



This week's exercise is to get really familiar with your camera controls for Shutter Speed, Aperture and ISO.

Exercise 1 - learn how to quickly adjust Aperture, Shutter Speed and ISO and practise this until it becomes automatic

With your camera, you may have to dive into the menus to change ISO and it may take a while to work out how to adjust Shutter Speed and Aperture. This may be because you are used to shooting in a mode that automatically sets 1, 2 or all 3 of these settings. For this exercise you will set your camera to manual mode so you individually set Shutter Speed, Aperture and ISO.

Perhaps your camera has readily accessible buttons and dials which keep these controls at your finger tips. Do you know which dial you need to turn to adjust each setting? Do you know which way to turn the dial to increase or decrease Shutter Speed? Do you know which way to turn the dial to open or close down your Aperture? Do you need to press and hold a button and turn a scroll wheel to adjust these settings?

The aim of this exercise is that you will be able to quickly and easily adjust Aperture, Shutter Speed and ISO. You should be able to know which way to turn each dial to get the result you are after before you even touch it.

Practise this often so it becomes automatic for you. These skills come in really handy when you quickly need to make some quick adjustments like in the next exercise or are out doing a night shoot and may need to work without a torch.

Exercise 2 - for those who want to take the next step - mastering the exposure triangle

Now that you are able to quickly adjust your Shutter Speed, Aperture and ISO, this exercise will utilise and hone these skills while maintaining the same exposure.

i) With your camera set to manual mode, open your aperture to its maximum (ie smallest f-stop number eg f/4, f/2.8 etc) and your ISO to its lowest setting (eg ISO 100, ISO 200). Now focus on a stationary subject and adjust your shutter speed until you get your desired exposure.

ii) Take a shot with these settings. With a wide open aperture this will give you minimum depth of field.

iii) Now close down your aperture by 1 stop (eg if you were on f/4, go to f/5.6), because this the light by 1 stop, you will need to add 1 stop of light to maintain the same exposure. This can be done by using an exposure that is twice as long, or by doubling the ISO. Re-take the shot. The exposure will be the same as in step ii) but the depth of field will have increased.

iv) Repeat step iii), one stop at a time, through to your minimum aperture (eg f/22).

Review your histogram after each photo to ensure that you have correctly adjusted your settings so that your exposure remains the same.

Continue this exercise so it becomes automatic. For example, you may decide to make a negative four stop adjustment to your aperture, by counting off 12 clicks of your scroll wheel which controls aperture, then count off 12 clicks using the scroll wheel that controls your shutter speed to increase the exposure time by 4 stops.

Did you know:

i) 1 stop is equivalent to doubling or halving of light

ii) For shutter speed - to double the amount of light that reaches your camera sensor - double the exposure time. eg Increase the exposure time from 1/500 sec to 1/250s sec gives twice as much light

iii) For Aperture - to half the amount of light - f/1 - f/1.4 - f/2 - f/2.8 - f/4 - f/5.6 - f/8 - f/11 - f/16 - f/22

f/stops - the water analogy

Did you know:

- 1) Opening a tap twice as much, fills a bucket twice as quick.
- 2) Using a bucket twice as big takes twice as long to fill.

That's all there is to understanding the relationship between ISO, aperture and shutter speeds to determine exposure.

If you want to fill up a bucket of water from a tap, the time it takes to fill up the bucket depends on how much you open the tap (aperture) and the size of the bucket (ISO). **Think of a big ISO number as a small bucket** (or fast ISO - faster to fill) **and a small ISO number as a big bucket** (or slow ISO - slower to fill)

If your bucket is twice as big it will take twice as long to fill it up if you open the tap the same amount. If you want to fill it up in the same time you will have to open up the tap twice as much.

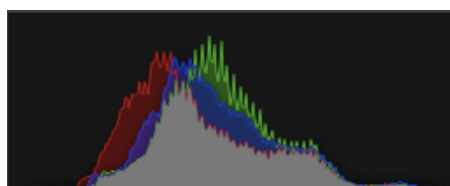
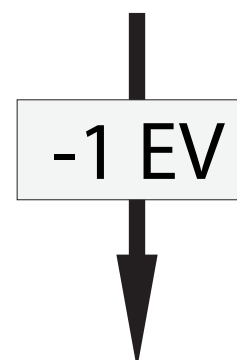
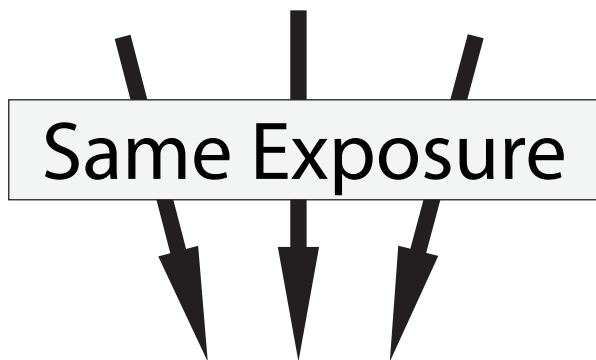
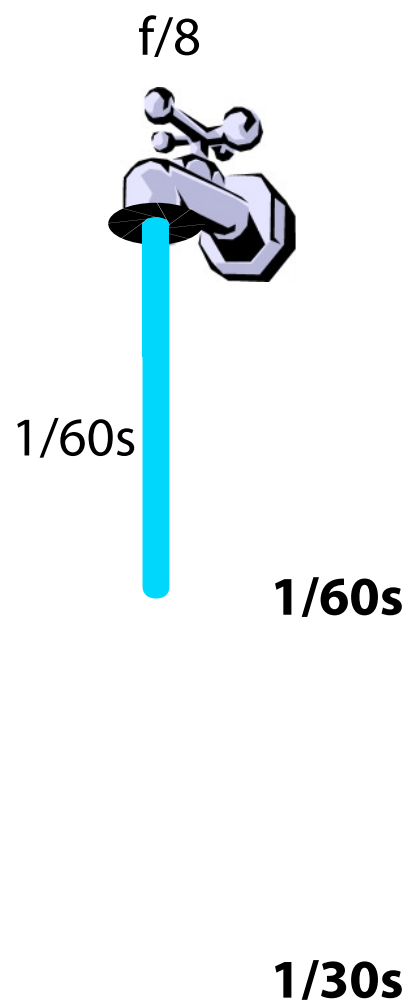
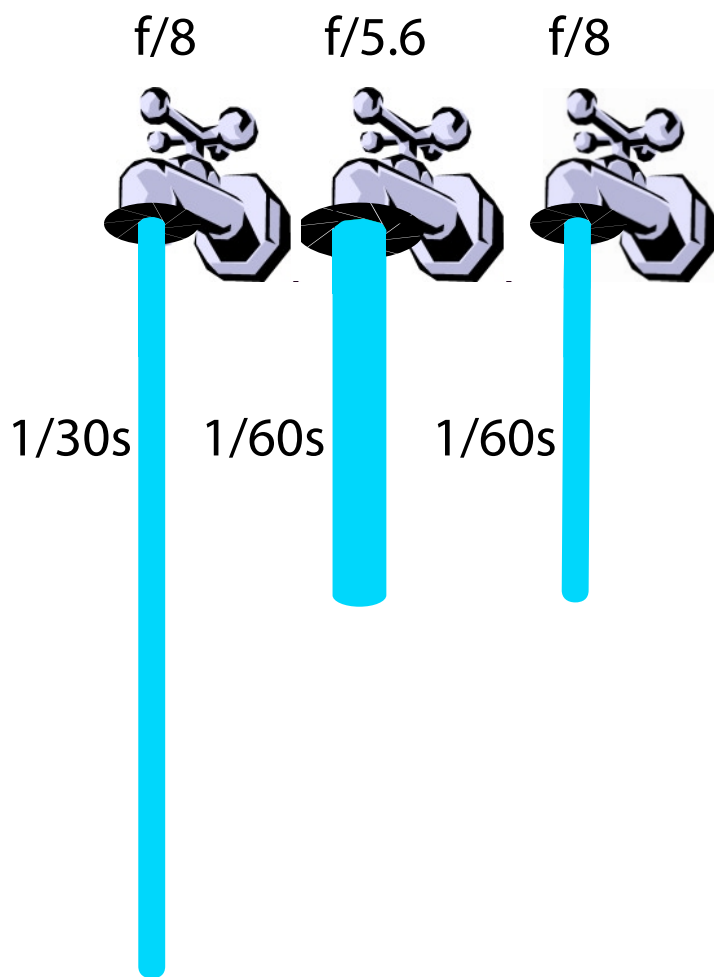
Back to the camera, the aperture determines how quickly light can "flow" through to your camera sensor. Opening the aperture more, say from f/8 to f/5.6 - lets more light (in fact, twice as much in this case) through to the sensor in the same amount of time.

Your shutter speed determines how long light can pass through to the sensor. Doubling the shutter speed (ie halving the exposure time) only lets in half the light. Halving the amount of exposure is called reducing the exposure by "1 stop" or -1EV (Exposure Value). Likewise, a doubling of exposure is an increase of +1EV (or 1 stop).

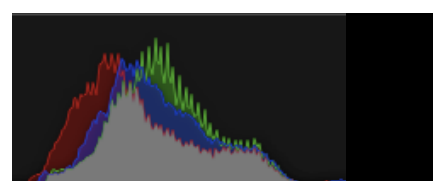
Your ISO setting determines how much light is required to correctly expose your image (ie fill your camera sensor with enough light to see detail in the areas of interest). Halving the ISO setting means that the sensor will be half as sensitive to light, requiring twice the exposure time or 1 stop larger aperture for the sensor to be "filled".

How do we know when the bucket is full?

Its easy to see when the bucket is full. On your camera, you need to look at the histogram on the back of your camera after taking a shot. The histogram should not be squashed up against the left or right hand side of the chart. Hard up against the left side means you need more exposure (as detail in the dark areas has not been captured and will appear as solid black), hard up against the right means you need less exposure (as detail in the light areas has not been captured and will appear as solid white).



histogram



1 stop darker

For those who like the Techy Bit:

Why does a smaller aperture have a bigger f number?

f/22 means that the size of the aperture is the focal length of your camera 'f' divided by '22'. This means that if you are using a 50mm focal length lens, the diameter of your aperture at f/22 is $50/22 = 2.3\text{mm}$

If you change your aperture to f/5.6, the aperture is $50/5.6 = 8.9\text{ mm}$ diameter.

What is 1 stop?

Halving or doubling the amount of light received by your sensor is equal to a 1 stop adjustment. eg at f/5.6 and ISO 100, halving your shutter speed from 1/60s to 1/30s, doubles the exposure time and therefore the amount of light received by the sensor, giving 1 stop more exposure. Alternatively, at 1/60s and ISO 100, changing your aperture from f/5.6 to f/8, halves the amount of light received by the sensor, giving 1 stop less exposure.

Likewise, doubling or halving the sensitivity of the sensor to light (ISO), is equal to a 1 stop adjustment. eg, at f/5.6 and 1/60s, changing from ISO 100 to ISO 200 doubles the sensitivity of the sensor to light, giving 1 stop more exposure.

Its easy to know that a shutter speed of 1/30s is 1 stop more than 1/60s, but how do I remember that f/5.6 is 1 stop more than f/8? Doesn't f/4 give twice as much exposure as f/8? (For the Super Techy)

For a 1 stop increase in exposure, the amount of light reaching the sensor needs to be doubled. As the aperture approximates a circular opening, the area of a circle is proportional to the square of the diameter (remember from school $\text{Area} = \pi \times d^2/4$) So doubling the diameter would mean that the area of light is

$2 \times 2 = 4$ times bigger, not 2 times bigger (ie f/4 to f/8 is 2 stops) To double the area of a circle, multiply the diameter by $\sqrt{2} = 1.4$ (ie $\sqrt{2} \times \sqrt{2} = 2$)

So, an aperture 1 stop less than f/1 = $f/(1 \times 1.4) = f/1.4$,

1 stop less than f/1.4 = $f/(1.4 \times 1.4) = f/2$

1 stop less than f/2 = $f/(2 \times 1.4) = f/2.8$

Hey, how am I going to remember that, its far too complicated!

Just remember, 1 & 1.4 (hey, thats $1 \times \sqrt{2}$), then double the previous number, ie 2, 2.8, 4, 5.6, 8, 11, 16, 22, 32

- beware when you are making adjustments on your camera, f/stop adjustments are often in 1/2 or 1/3 stop increments, not full stops, so don't just click up to the next setting, thinking that you have gone one stop - look at the numbers. If you know your camera has 1/3 stop adjustments, you will be able to count the clicks and know your adjustment.



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PITTWATER CAMERA CLUB INC.

CAMERA CRAFT - MEETING 6 EXERCISE



In this session we discussed how to maximise the sharpness of our images.

For optimum sharpness we need to ensure that we have sharp focus on the area of interest and use a high enough shutter speed to freeze relative motion between our camera and the subject. The quality of our equipment will also have a part to play. Lenses will have a sweet spot or range which yield the sharpest image.

We discussed quite a few methods to maximise image sharpness:

Ensuring your camera is steady: camera holding techniques and shutter release techniques, steady stance, utilising stationary structures and objects for support, using tripods, setting your camera on a surface and using a time delay to fire the shutter (self timer mode), using a cable release, mirror lockup etc

Ensuring your focus is sharp: selecting focus points, single or continuous focus, locking focus and recomposing your shot, choosing aperture for required depth of field

Ensuring that your shutter speed is fast enough to freeze the relative movement of your camera and subject: rule of thumb for a stationary subject is to use a shutter speed of $1/(\text{focal length of lens})$, however this will depend on inbuilt camera & lens image stabilisation (IS) or vibration reduction (VR), your ability to keep your camera steady (or tracking a moving subject), the movement of the subject and the result that you are after. For example you may wish the head of a bird in flight to be sharp, but may wish to show movement in the wings.

Ensuring that you use the optimum settings for your lens: using your minimum lens aperture (eg f/22) will result in a softer image than if you use an aperture that is more mid-range, like f/11 - f/8. Sharpness is also very dependant on the quality of the lens. The professional range of lenses are significantly more expensive. If absolute image sharpness is critical for you, it may be worth investigating the results obtained using higher quality lenses.

Here is a link that offers some good tips to achieve maximum image sharpness:

<https://www.photographymad.com/pages/view/17-tips-for-taking-tack-sharp-photos>

The exercise for this session is to hone your panning technique:

The aim is to capture images in which your subject is sharp or partially sharp and the background shows motion blur to portray an impression of movement.

Your camera needs to follow the subject and the shutter is released while your camera is still moving and tracking the subject. If everything is blurred, your shutter speed is too slow, if everything is sharp your shutter speed is too sharp.

This will require a quite a bit of practice and will result in many shots being unsuccessful. Don't let this put you off, persistence will be rewarded with some stunning images.

The following links should help you on your way.

<https://www.adorama.com/alc/?s=panning>

<https://digital-photography-school.com/mastering-panning-to-photograph-moving-subjects/>

<https://www.youtube.com/watch?v=sXzNtp1shXU>

Bike riders regularly ride out past Church Point in the early morning, especially on the weekend. It is a great place to hone your panning skills. Just choose a spot and have fun capturing cars and bikes.



We normally try to freeze the motion of surfers, but some nice effects can be achieved by using a slower shutter speed and panning.



At the racetrack, or just on the side of the road, see how slow a shutter speed you are able to manage while getting your subject acceptably sharp while maximising the background motion blur. A great tip from an ex-member Darryl Bullock was to twist your body as far as you can in the direction that the vehicle is coming from, so you unwind as the car passes you. In this way you can get a steady and controlled body movement to assist in smoothly tracking your subject.



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