Aperture Photography Group

Camera Skills

ISO and Exposure

www.aperturephotographygroup.co.uk

Camera Skills

Tonight:

- ISO & Exposure
- Recap the key points from the Nick Rains video
- Q&A

ISO

What does it stand for?

- ISO - International Organisation for Standardisation.
- Camera ISO does not directly refer to the organisation that creates various technology and product standards.
- The two film standards: ASA and DIN were combined into ISO standards in 1974.
- ISO initially defined only film sensitivity, but was later adopted by digital camera manufacturers with the purpose of maintaining similar brightness levels as film.

ASA: American Standards Association
DIN: German Institute for Standardisation

ISO

Is ISO a part of Exposure?

- No, ISO is not part of exposure.
- Shutter Speed and Aperture brighten your photo by **physically capturing more light**.
- ISO doesn't do that; it brightens the photo you have already captured.

ISO

What does it do?

- The ISO control amplifies the signal coming from the camera's sensor.
- Amplification done in the same steps as Aperture and Shutter Speed.
- ISO increases the brightness of the image allowing a higher shutter speed to be used in the same light conditions.

ISO

How Does ISO Affect a Photo?

- Increasing or decreasing the ISO affects both noise levels and dynamic range.
  - At higher ISO levels, noise levels increase and dynamic range decreases.
  - At the lowest ISO setting (Base ISO), your images will have the least amount of noise and the highest dynamic range, giving you the most flexibility in post-processing.

ISO

What is Base ISO?

- The lowest native ISO on your camera is your “Base ISO”.
- Base ISO gives you the potential to produce the highest image quality, minimising the visibility of noise as much as possible.
- Some older DSLRs and a number of modern cameras, have a base ISO of 200, whereas most modern digital cameras have a base ISO of 100.
- **Optimally**, you should always try to stick to the base ISO to get the highest image quality.
- **BUT**, it is not always possible to do so, especially when working in low-light conditions.

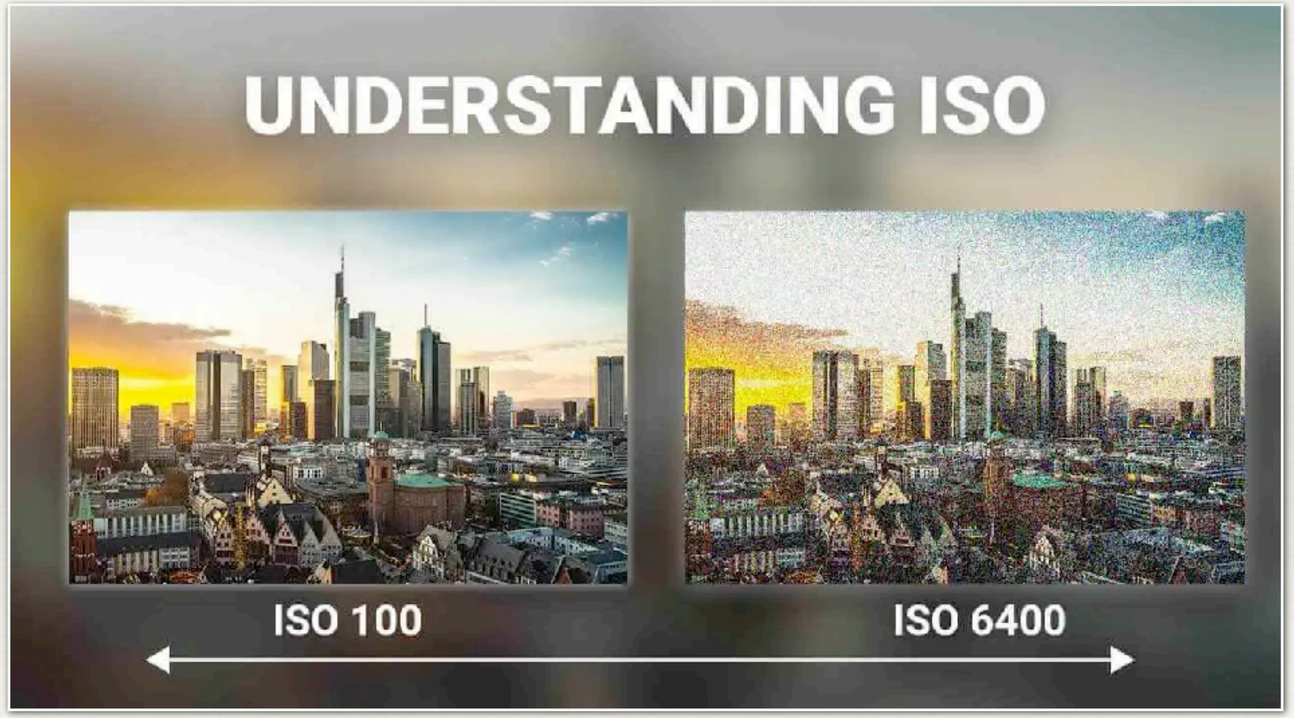
ISO

Setting Auto ISO

- With Auto ISO, set the maximum ISO to its highest level and set a minimum shutter speed that suits the type of subject you're shooting.
- If you allow the highest ISO possible it lessens the need for the camera to reduce the shutter speed below the lower limit .
- If you are using a tripod and nothing is moving, use your base ISO.

Noise

- The higher the ISO, the higher the level of noise.
- Mid-tones show up the noise more.
- Higher ISOs can reduce dynamic range.



Noise

Don’t be afraid of noise!

- ISO should be a means to get a high enough shutter speed to get a sharp image.
- Blurred images are impossible to fix.
- Noisy images can be mostly fixed in post processing.
- Noise is never as bad as it looks on the screen.
- Only when printing at large sizes could you see noise, but printing removes a lot of noise.

Noise

- Two types of noise: Luminance and Chroma:
  - Luminance noise:
    - Is noise where only the brightness of a coloured pixels is affected.
    - Appears as grainy black and white spots in an image.
  - Chroma (colour) noise
    - Is noise that shows up as clearly coloured pixels (like a pixel green and another pixel red).
    - Appears as colourful dots or pixels.

Exposure

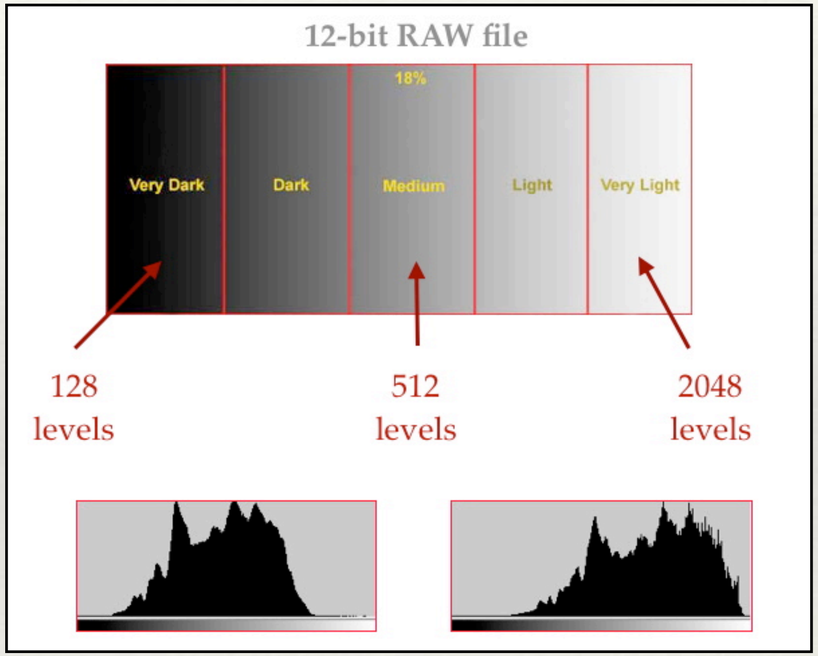
- What is it?
  - Exposure is the amount of light which reaches your camera sensor or film.
  - It is a crucial part of how bright or dark your pictures appear.
  - There are only two camera settings that affect the actual “luminous exposure” of an image: shutter speed and aperture.

Exposure

- What is ‘the right’ exposure?
  - For every scene, a wide range of shutter speed, aperture, and ISO settings will result in a photo of the proper brightness.
  - Even your camera’s Auto mode will do that most of the time.
  - The right (optimal) exposure is a balancing act.
    - Over-exposure leads to over-bright highlights and faded-looking images.
    - Under-exposed images are dark and hard to see.
    - It depends on the mood/atmosphere you are trying achieve.
    - Can be fine-tuned in post processing.

Achieving optimal exposure

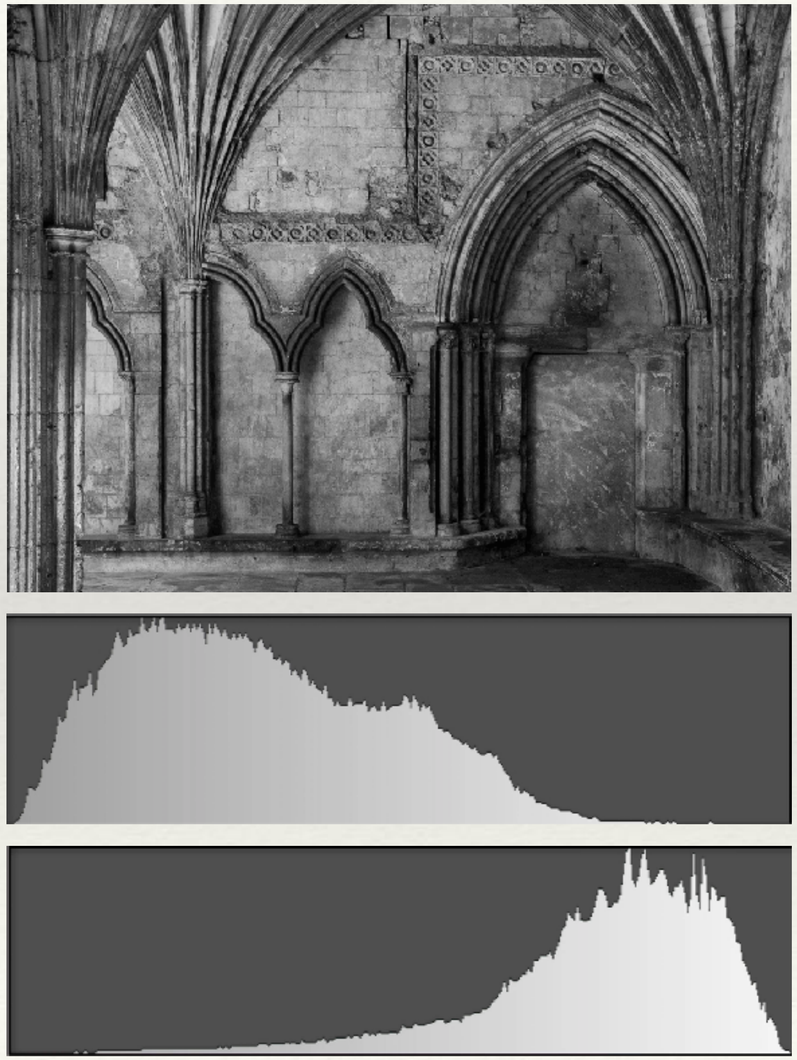
- Digital camera sensors are much more sensitive to brighter levels of light than darker ones.
- This is why we typically see more digital noise in the shadows and not the highlights.
- More light levels in the highlights means more information in the RAW file for us to use in post-processing.
- Gives much better shadow depth, clarity, and improves our overall image quality - especially when printing, or making aggressive adjustments in post-processing.



Achieving optimal exposure

- Exposure in camera: go for highest quality data capture - Expose To The Right (ETTR).
  - The highlights should sit as close to the right border of the histogram as possible
  - Clipped highlights cannot be recovered.
  - Brightening an underexposed image is not as good as darkening a lighter exposed image which is not clipped
  - Give the shadows as much exposure as possible without clipping the highlights.
- Use post processing to create the optimal exposure for an image.

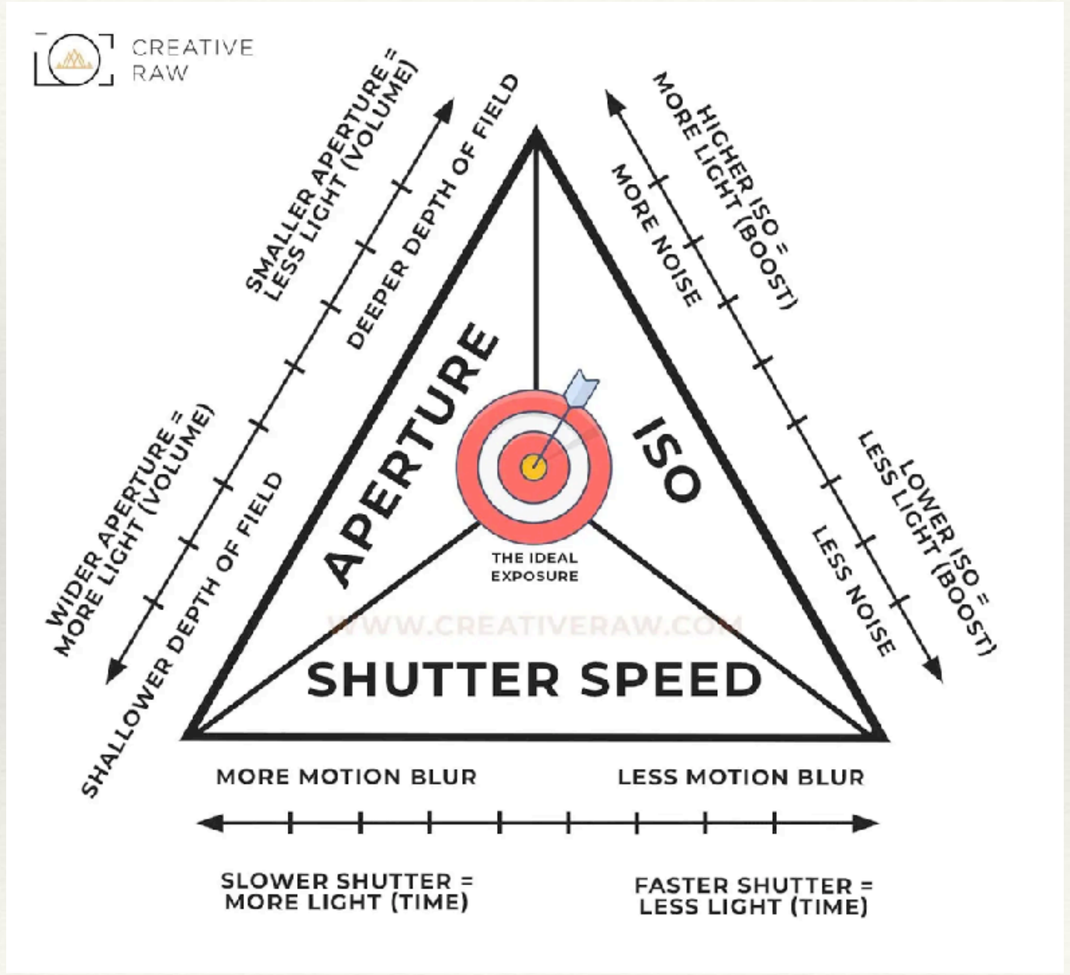
Achieving optimal exposure



- The first histogram is the “correct” exposure for the columns photo — everything is at the correct brightness level.
- The second histogram is the optimum exposure:
  - It contains more data than the first.
  - None of the highlights in the image are completely white.
  - It can be darkened in post processing to match the first histogram.

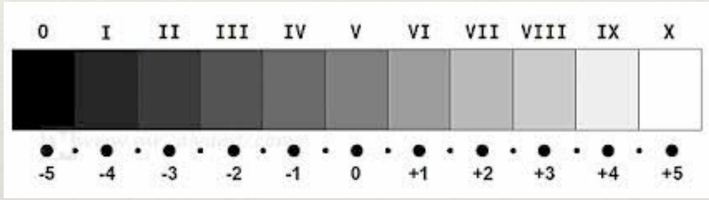
The Exposure Process

- Changing the aperture, shutter speed or ISO will require you to change one of the other settings
  1. Choose an aperture to control the look of the image
  2. Make sure the shutter speed is appropriate for the lens and subject
  3. Use whatever ISO is necessary to achieve 2 above
  4. Adjust after exposure to optimise data quality
- Ignore specular highlights when setting exposure

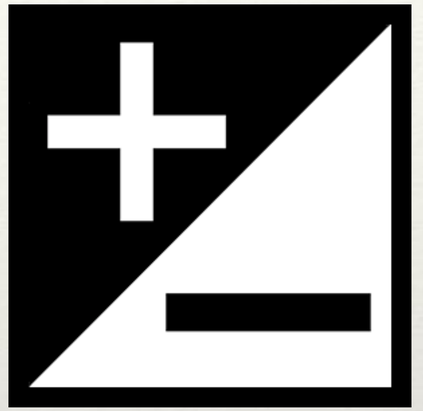


Exposure Metering

- Camera meters work by evaluating light reflected off subjects and are standardised on middle grey (also known as 18% grey).
  - If a camera is pointed at something very dark, the meter will work the opposite way by brightening up the exposure.
  - If a camera is pointed at something a very bright subject the meter will darken the exposure.
- Cameras try to get as close to the middle grey as possible, so that the resulting image is not too dark or too bright.
- Although the metering is acceptable in most cases, you might experience overexposure or underexposure in more challenging lighting conditions.



Exposure Compensation



- Exposure Compensation allows you to manually take control of the brightness of the image.
- It works by adjusting one or more of the exposure variables, depending on what camera mode you are using.
- When shooting in Aperture Priority mode, the photographer sets the camera's Aperture, while the camera automatically sets the Shutter Speed depending on the reading from the camera meter.
- When adjusting exposure via exposure compensation, the photographer essentially overrides the shutter speed set by the camera.
- And vice versa.

ISO and Exposure

- Summary:
  - The higher the ISO, the higher the level of noise.
  - Don’t be afraid of noise - It is never as bad as it looks on the screen.
  - ISO should be a means to get a high enough shutter speed to get a sharp image.
  - ETTR - go for highest quality data capture
  - Clipped highlights cannot be recovered.
  - What is correct exposure? - It depends……

Shutter Speed

- Q&A