What is Image Stabilization
By Len Grinke

Photographing in low light, and still getting sharp images, has always been one of photography's biggest challenges. Because of the slow shutter speeds, movement of either the camera or the subject would result in blurry images. And who wants blurry images? So, camera and lens manufacturers went about trying to cure this problem and came up with a technology called Image Stabilization. But not all image stabilization works the same, or even tackle the same problem. So, it is important to have a basic understanding of what the different technologies are and how they work so that you can more effectively use them to improve your photography.

Image stabilization can be grouped into three general categories; optical, mechanical, and digital. Optical and mechanical stabilization work to correct for camera movement. Digital stabilization works to minimize blur caused by subject movement. A camera can have any one of these technologies or it can have a combination of digital and optical or digital and mechanical. Optical and mechanical stabilization do not get along and will not be found together in the same camera.

Optical stabilization is designed to reduce the effects of camera shake. When turned on, an element in the lens is allowed to "float". (It's a little more complicated than that but the term float is a good descriptive). As the camera moves, the floating element counteracts the camera shake, keeping the image sharp. Optical stabilization is built into the lens of the camera. For SLR users, this means that if you want to have stabilization all the time, every lens you buy has to it built in, adding to the cost of the lens. While being a very effective way to get sharp images in lower light situations, it also tends to be the most expensive.

Mechanical stabilization is built into the body of the camera and is also designed to help reduce camera shake. When turned on, the sensor (the part that captures the image) is allowed to "float". (there's that descriptive again). As the camera moves, the sensor is allowed to move so that it counteracts the movement of the camera. Because the stabilization is built into the camera body, any lens that is attached to the camera will have image stabilization, keeping the overall cost of the lens down.

Without optical or mechanical stabilization, photographers would have to put the camera on a tripod to get sharp images in low light. The rule of thumb was that you should put the camera on a tripod when the shutter speed is less than the focal length of the lens. Therefore, if you were using a 250mm lens, any image taken at a shutter speed of less than $1/250^{th}$ of a second would need to be taken on a tripod. With optical image stabilization you can hand hold your camera three shutter speeds slower than the rule of thumb before you need to put your camera on a tripod. So, with that same 250mm lens, you can now hand hold the camera at $1/30^{th}$ of a second and still get sharp images. This is a huge improvement and allows for much more freedom with longer lenses.

While optical and mechanical stabilization are designed to reduce camera shake, they do nothing to reduce blur caused by subject movement. If the subject moves while the shutter is open, the image will still be blurred. The longer the shutter speed, the more likely it is that you will have a blurred image. Digital stabilization is there to help with this challenge.

Digital stabilization is software based and built into the body of the camera. It comes in two forms. The first is a force high ISO and the second is to run sharpen algorithms on the image.

To reduce blur caused by subject movement you need to increase the shutter. In low light situations, shutter speed can be increased by raising the cameras light sensitivity or ISO. Some manufactures call this form of Image Stabilization ISO high while others call it Image Stabilization. Either way, it has the same effect. Usually found in point and shoot cameras, when turned on, it

will allow the camera to use a higher than usual ISO settings for the light situation so that the camera can use a faster shutter speed in order to freeze motion..

Increasing the ISO also increases the noise levels in the pictures. Earlier digital cameras had very high noise levels and relatively small ISO ranges, limiting the value on early digital cameras. But, on more recent point and shoot cameras, it is a very useful tool. This type of stabilization is usually left off of SLR's so that ISO selection can remain a creative decision of the photographer.

The final solution is a total software solution. The camera will look at the image and interpret it and correct for softness, blurriness, camera shake. This form of stabilization is really more of a digital sharpening but can be still very effective.

Even with Image Stabilization, low light photography is still a challenge. When do you use optical or mechanical stabilization? When do you use ISO high? Can you use the two of them together? Well, the answer is, it depends. But here are some guidelines.

- If there is very little movement, use optical or mechanical stabilization
- If there is movement, you need to get the fastest shutter speed. Adjust your ISO to a higher setting. If the shutter speed is still below the rule of thumb in the third paragraph, turn on the optical or mechanical stabilizer.
- If the shutter speed is above the rule of thumb in the 3rd paragraph, turn of the optical or mechanical stabilizer. This will save battery power, reduce wear and tear on the mechanism, allow for even sharper images.
- Use digital and optical together when needed for really low light situations

Low light photography can be challenging and fun. Challenge yourself and make some low light images. You will be impressed with the results.