

Topic 104

Zoom Lens & its Impact

A **zoom lens** is a mechanical assembly of **lens** elements for which the focal length (and thus angle of view) can be varied, as opposed to a fixed focal length (FFL) **lens** (see prime **lens**). A true **zoom lens**, also called a parfocal **lens**, is one that maintains focus when its focal length changes.

Zoom lenses are often described by the ratio of their longest to shortest focal lengths. For example, a zoom lens with focal lengths ranging from 100 mm to 400 mm may be described as a 4:1 or "4×" zoom. The term *superzoom* or *hyperzoom* is used to describe photographic zoom lenses with very large focal length factors, typically more than 5× and ranging up to 18× in SLR camera lenses and 50× in amateur digital cameras. This ratio can be as high as 300× in professional television cameras. As of 2009, photographic zoom lenses beyond about 3× cannot generally produce imaging quality on par with prime lenses. Constant fast aperture zooms (usually f/2.8 or f/2.0) are typically restricted to this zoom range. Quality degradation is less perceptible when recording moving images at low resolution, which is why professional video and TV lenses are able to feature high zoom ratios. Digital photography can also accommodate algorithms that compensate for optical flaws, both within in-camera processors and post-production software.

Some photographic zoom lenses are long-focus lenses, with focal lengths longer than a normal lens, some are wide-angle lenses (wider than normal), and others cover a range from wide-angle to long-focus. Lenses in the latter group of zoom lenses, sometimes referred to as "normal" zooms, have displaced the fixed focal length lens as the popular one-lens selection on many contemporary cameras. The markings on these lenses usually say W and T for "Wide" and "Telephoto". Telephoto is designated because the longer focal length supplied by the negative diverging lens is longer than the overall lens assembly (the negative diverging lens acting as the "telephoto group").

Some digital cameras allow cropping and enlarging of a captured image, in order to emulate the effect of a longer focal length zoom lens (narrower angle of view). This is commonly known as digital zoom and produces an image of lower optical resolution than optical zoom. Exactly the same effect can be obtained by using digital image processing software on a computer to crop the digital image and enlarge the cropped area. Many digital cameras have both, combining them by first using the optical, then the digital zoom.

Zoom and superzoom lenses are commonly used with still, video, motion picture cameras, projectors, some binoculars, microscopes, telescopes, telescopic sights, and other optical instruments. In addition, the a focal part of a zoom lens can be used as a telescope of variable magnification to make an adjustable beam expander. This can be used, for example, to change the size of a laser beam so that the irradiance of the beam can be varied.

Static Shot

In a static shot, the camera does not move or change its aim within the shot, although the camera may move from the shot to the next shot.

There's a certain power and authority to the static shot that means they're used a lot, although you're right that they're not as dominant as they were in the 30s and 40s*. If you're just learning how to compose shots and shoot really great video, it's much easier to think about one thing— the movement in the frame. It's like learning to drive on an automatic before tackling shifting gears.

Static shots prevailed in Hollywood during the '30s by something of a technological accident. Silent directors moved the camera constantly. But when Hollywood started making “talkies” at the end of the '20s, the camera noise could only be kept out of the mics by putting the cameras in, literally, a small room on the set and shooting through glass. Later “blimps” around cameras to silence noise were still big and bulky and hard to move. It took a while to figure out how to make sound cameras small and light enough to maneuver easily.