

Depth of Field

By Scott Gross

Every photograph has a depth of field. That is to say, nearly every picture has an area of sharp focus. Some photos are entirely in focus while others show very little in focus. What is depth of field and how can a photographer affect it? Depth of field ("DOF") refers to the area within a photo that appears most in focus. In a photograph, this is the foreground to background area. There are only **three** ways a photographer can affect his/her depth of field: Focal length of lens, subject-to-lens distance, and aperture.

Focal length is the size or type of lens measured in millimeters. Standard sizes include wide-angle, normal, medium telephoto, and telephoto. Lenses can come in single focal lengths or zooms which cover a range of focal lengths. Wide-angle lenses generally encompass 35mm or wider. Normal lengths include 45mm-55mm. Medium telephotos range from 60mm up to around 180mm. And telephoto lenses are generally anything longer than 180mm. As a rule, the longer the focal length the off DOF. A wide-angle 24mm lens will have much more DOF at f2 than a 120mm at f2. With this in mind, lens selection is very important when composing a photograph.

Subject-to-lens distance is another important factor to consider when shooting a photograph. This is especially important when using macro or telephoto lenses. Distance does not have as much of an effect when shooting wide-angle or normal focal lengths as it does with macro and telephoto lenses.

Anyone who has shot macro photography knows the problems with DOF when getting extremely close to their subject. The area in focus becomes so small a leaf edge may be in focus but the leaf face is completely out of focus. The DOF can be reduced to millimeters or less. Conversely, when increasing subject distance and using a telephoto lens, the same effect can be reached. The DOF can once again be reduced to millimeters. One can witness this in photos of people or animals that show the eyes in focus but not the nose or beak.

Finally, aperture is the last factor affecting depth of field. On a lens barrel, the higher the f-stop number (f16, f22, etc.) the smaller the physical opening in the lens that allows light to fall on the film. DOF is greatest when using the smallest apertures. When using large apertures, such as f1.4 or f2, DOF is less than when using smaller apertures. When shooting with macro or telephoto lenses, one can achieve much greater DOF by stopping down the lens. Stopping down means a smaller aperture is selected such as f22. Of course, this usually affects the exposure such so that a tripod may be required to get a sharp photograph.

A fun experiment to try in order to see the effects of focal length, subject-to-lens distance, and aperture on DOF is to take the range of focal length lenses discussed above and find a scene to photograph. Start with the widest-angle lens and carefully compose the picture. Choose an aperture found on all the lenses. It will most likely be f5.6 or greater. Shoot the scene at f5.6 and switch lenses. Next, use a normal focal length lens and step back from the scene in order to maintain the exact composition of the original. Shoot again at f5.6 Repeat these steps with a medium telephoto and long telephoto. Be sure to maintain the same f-stop. It is also

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important to change distance from the subject in order to keep the same composition. One can easily see how these factors affect DOF when the photographs are compared.