

A lens with a view to please a hyperfocal sharp eye (vol 6)

"Technological progress has merely provided us with more efficient means for going backwards." - Aldous Huxley

Most students say "it is all sharp – so it is a good image".

Sharpness may not be a hot topic – not very fashionable but interesting to get it sharp where you want it...

If you have an auto point and shoot camera then this article is not for you, this requires some serious manual input and perhaps labour..., even some brainpower to assist the turning of the focusing ring. Okay here we start, when we focus our manual camera, by focussing on objects within the focusing range, once we hit the infinity mark everything will be sharp beyond that point.

A standard 35mm camera lens of 50 mm (focal length) lens can focus on objects very close to the lens until infinity. The infinity mark ∞ focuses about 12 meters away from your lens. This means that anything beyond 12 meters does not require any manual focusing and will be sharp. When we focus (turning the lens barrel or pushing the manual focus button) within those 12 meters, we can select a point on which we can focus on and create sharpness only on that point of focus.

Now we can introduce our aperture settings, if our aperture is a very big opening [like No F. 2] only the point we have focused on will be sharp. If you have selected a very small opening [like F. 22] not only the point you have focused on is sharp but some area in front of that point and an area beyond that point of focus will also be sharp.

TIP: when you focus on anything, i.e. you are photographing a chessboard only, do focus on a line that is one third from the front, theoretically the remaining two-thirds of the chess board will be sharp in focus too. This will give you maximum sharpness when you use it in conjunction with your selected aperture setting. If you focus only on the front edge or the back edge of the chessboard some off your depth of field would fall outside the chessboard.

This field of sharpness when you use a high aperture number is the well-known depth of field. I assume that most of us are familiar with that expression. Most modern lenses do not indicate on the lens barrel the aperture numbers and the distance scale anymore, everything is #%@^&* automatic. As long as you have any manual focus possibility on your camera, you can use the following technique to maximize your focusing area, that field beyond the depth of field. Sounds a little mystical doesn't it?

We are going to use, believe it or not, the hyper focal distance! Old-fashioned, but it is still a very useful tool when you are working with still life, or outdoors with landscapes that require defined areas of sharpness.

For instance, you may be focusing on infinity to shoot a landscape. Everything beyond 12 meters away from your standard lens on your 35mm camera will be sharp. If you use an aperture of F2, most objects will be sharp from 12 meters onwards. If you use an aperture of F8, only a small change, possibly things will be sharp from 10 meters onwards.

If you use an aperture like F-11, your landscape may be sharp from approx 7 meters onwards; this is the well-known depth of field in practice. In this last instance, it means that if you place a rock 7 meters away from your lens, put your camera lens on infinity and take a photograph - everything including the rock will be sharp. It is normal practice to use a small aperture (read depth of field) to increase the sharpness in your photograph. Because we do know that everything will be sharp beyond 12 meters [because that is where the infinity mark is engraved on our lens barrel] we can now start using our brain or some digital assistance with tables and

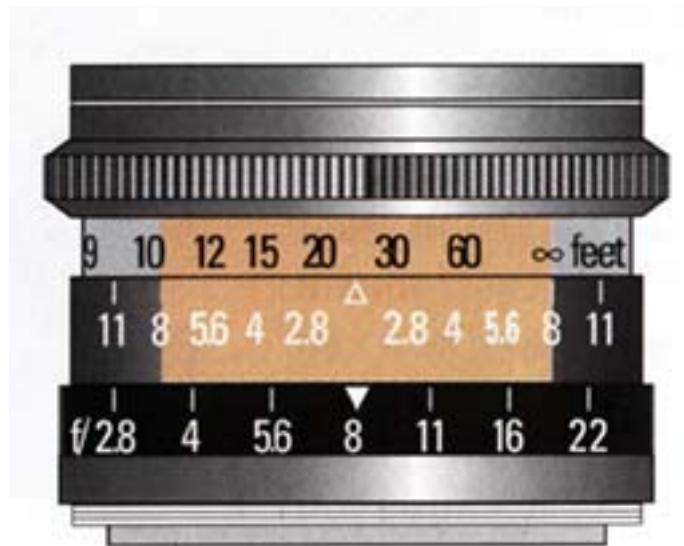
scales.

If we want to create maximum sharpness (using DOF) in our photograph, from almost in front of our lens through to infinity we are better off **not to focus on infinity** and not use a higher aperture like F-22, we instead can use the hyper focal distance calculation.

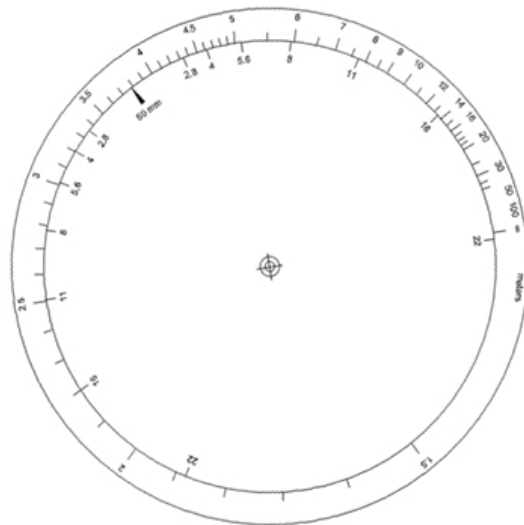
What you do is this: don't put your lens on the infinity mark if [see photograph No. 1 below, that is where we focused on infinity and used an aperture of F 8]



- you can see that everything from 20 feet to infinity will be sharp – brown area. Instead, set the distance scale in such a way that the infinity mark lines up with your selected aperture stop (F stop) on the depth of field scale [see image No. 2 below].



Now you can see from this setting that the lens is still working with an aperture of F8 but everything from 10 feet to infinity will be sharp, not 20 feet = you gained 10 feet of sharpness! That is the major benefit of hyper focal distance. Look at image "calculator", you line up F22 with



infinity and your hyperfocal distance is 3.80 meter (you focus on 3.8 meters away) and your nearest sharpest point in focus is 1.87 (F22 is opposite that scale) meters away!!!

I can hear you scream, "Robert I ain't got a lens that shows me these numbers so what the F#\$@&*\$ good is this to me"?

As long as your camera can focus manually, you can work with this principle. All you need is a brain (not too much of an assumption if you have been able to read this far ☺) and some assistance from the Internet. Go to <http://www.dofmaster.com> and download "the DOFmaster". You can print out and assemble some scales on which you can actually determine the areas of sharpness when you focus on a certain distance while you are selecting a specified aperture. I have downloaded this (always check for spyware with Adaware!, use it in conjunction with Spybot and your computer will thank you); it explains very easily what you have to do in order to make this calculator work, it consists of 2 rotating disks. See images below.

Depth of Field Calculator Assembly

Click a link below to jump to the assembly instructions.



I kept the quality low of the images, so go to these sites and look it up, this is interactive learning :-).

Construct it and enjoy your focused activities! Perhaps you may instead like to look up a hyperfocal depth of field calculator, go to my website <http://www.albanystudios.co.nz/>, it looks like this:

Depth-of-Field - Unit of Measure is meters.

| Film Format | Focal Length (mm) | f/No | Object Distance | Near Distance | Far Distance | Depth of Field | Hyperfocal Distance | We Got Buttons | |
|-------------|-------------------|------|-----------------|---------------|--------------|----------------|---------------------|----------------|-------|
| 35 | 50 | 8 | 12 | 5.58867362 | inf | inf | 10.4166666 | Compute | Reset |

Depth-of-Field Table for the above Focal Length

| Meter | f/5.6 | f/8 | f/11 | f/16 | f/22 | f/32 | f/45 |
|-------|---------|---------|--------|--------|--------|--------|--------|
| "Inf" | 14.8800 | 10.4166 | 7.5757 | 5.2083 | 3.7878 | 2.6041 | 1.8518 |
| 16 | 7.7226 | 6.3211 | 5.1523 | 3.9385 | 3.0705 | 2.2456 | 1.6644 |
| 8 | 5.2143 | 4.5372 | 3.9035 | 3.1665 | 2.5816 | 1.9739 | 1.5114 |
| 4 | 3.1609 | 2.9002 | 2.4432 | 2.2747 | 1.9580 | 1.5893 | 1.2767 |
| 2 | 1.7682 | 1.6846 | 2.4606 | 1.4551 | 1.3203 | 1.1436 | 0.9741 |
| 1 | 0.9399 | 0.9164 | 1.1003 | 0.8457 | 1.2230 | 1.3347 | 0.7327 |

and select Dof calculator. You type in a few facts, lens in use and a few other things and it will tell you what will be sharp etc.

Very useful if you have to go out and you know what you have to photograph size wise and how far away it is from you, you can work out what lens to use and aperture....

Feedback with sharp comments to hotshot@ihug.co.nz

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PS: Definition of hyper focal distance: It is the distance focused upon which produces the greatest depth of field. It is the nearest point which, when focused upon, will preserve the required circle of confusion at infinity. The near point of acceptable sharpness will be halfway between the hyper focal distance and the camera.

You can see I kept it simple, there is a little more to it..... who cares? I do.