Photography Group: Pictorial Session

Hyperfocal Distance
vs.
Focus Stacking

by **Stephen Jones**

What is Hyperfocal Distance?

It is an in-camera technique whereby at a particular focus point, specific for each lens focal length/aperture combination, depth of field is maximised to provide an in-focus image from nearest focus out to infinity.

What is Focus Stacking ?

It is a post-camera technique whereby multiple photos of a subject are taken at different focus points and are then combined to form a single image with greater apparent depth of field than would normally be possible in a single photograph.

Both Hyperfocal distance and Focus Stacking techniques utilise **depth of field** to retain an acceptable focus across as wide a range of subject distances as possible.

The amount of depth of field depends on three variables:

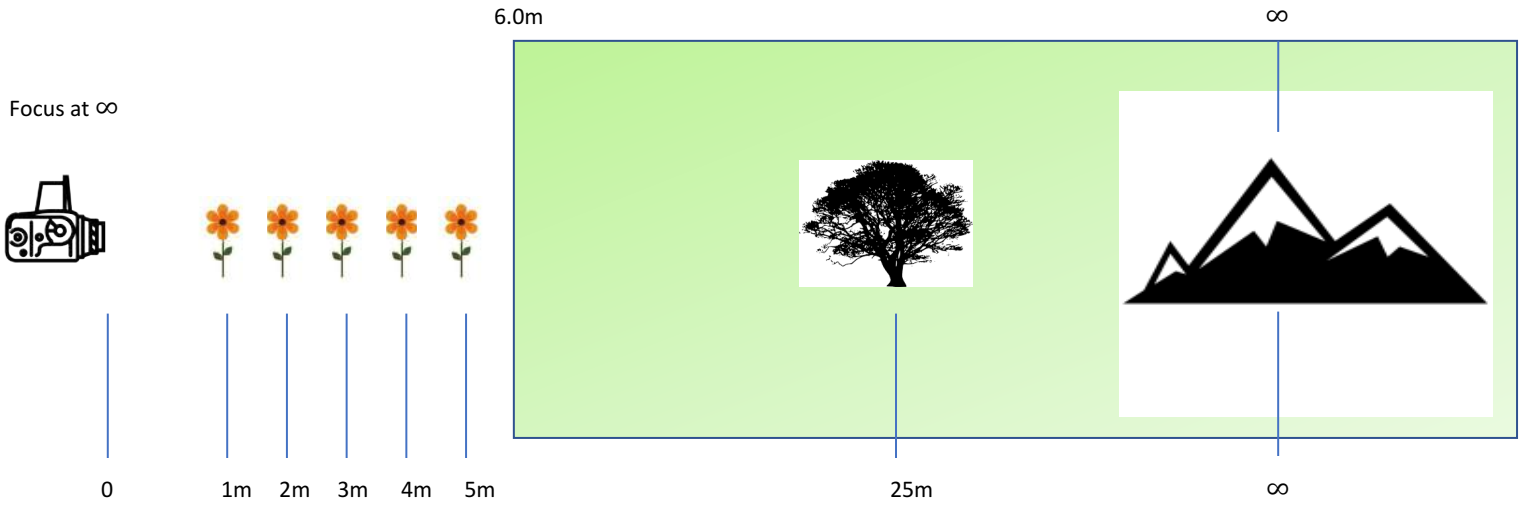
- **The distance of the photographer from the subject:**
  the greater the distance, the greater the depth of field.

- **The focal length of the lens:**
  the smaller the focal length, the greater the depth of field.

- **The selected aperture:**
  the smaller the aperture, the greater the depth of field.

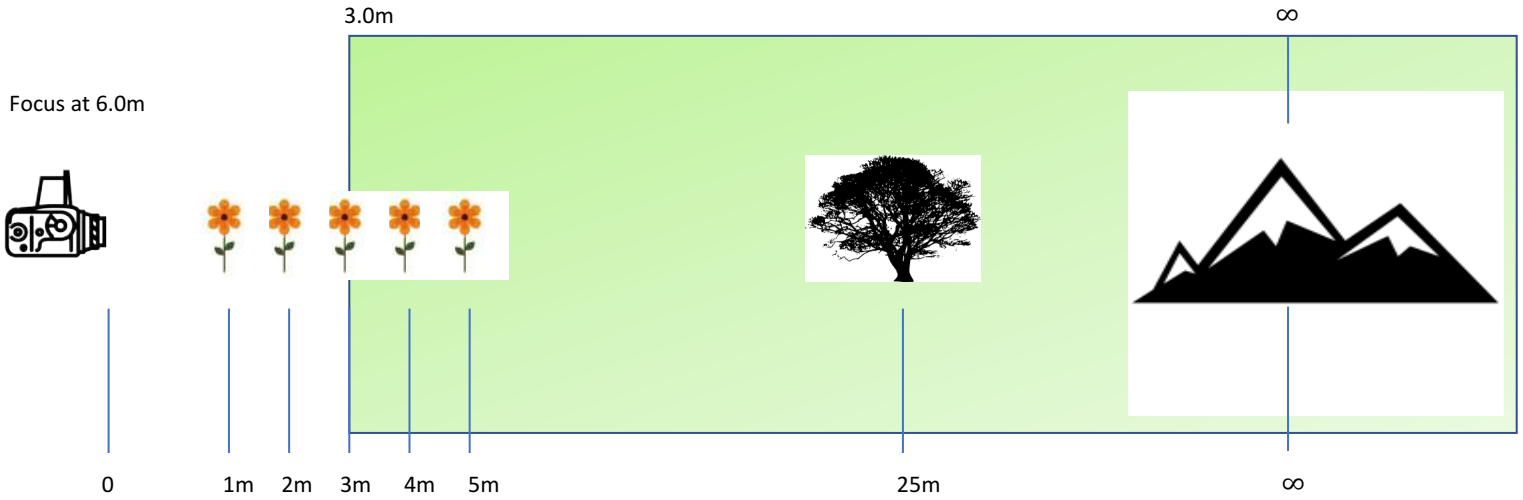
Hyperfocal Distance

For an APS-C sensor and using a 30 mm lens with f8 aperture, 6m is the nearest point at which focus is still satisfactory when the lens is focussed on infinity. The 6m focus point is called the hyperfocal distance. The green-shaded area represents the calculated depth of field.



Hyperfocal Distance

For an APS-C sensor and using a 30 mm lens with f8 aperture, 6m is the nearest point at which focus is satisfactory when the lens is focussed on infinity. The 6m focus point is called the hyperfocal distance and not only is the scene beyond that distance in focus, but the scene is also in acceptable focus down to 3m. The green-shaded area represents the calculated depth of field.



Hyperfocal distance

Hyperfocal distance was very popular as a quick-focussing strategy in the days before auto-focussing lenses and before zoom lenses became popular.

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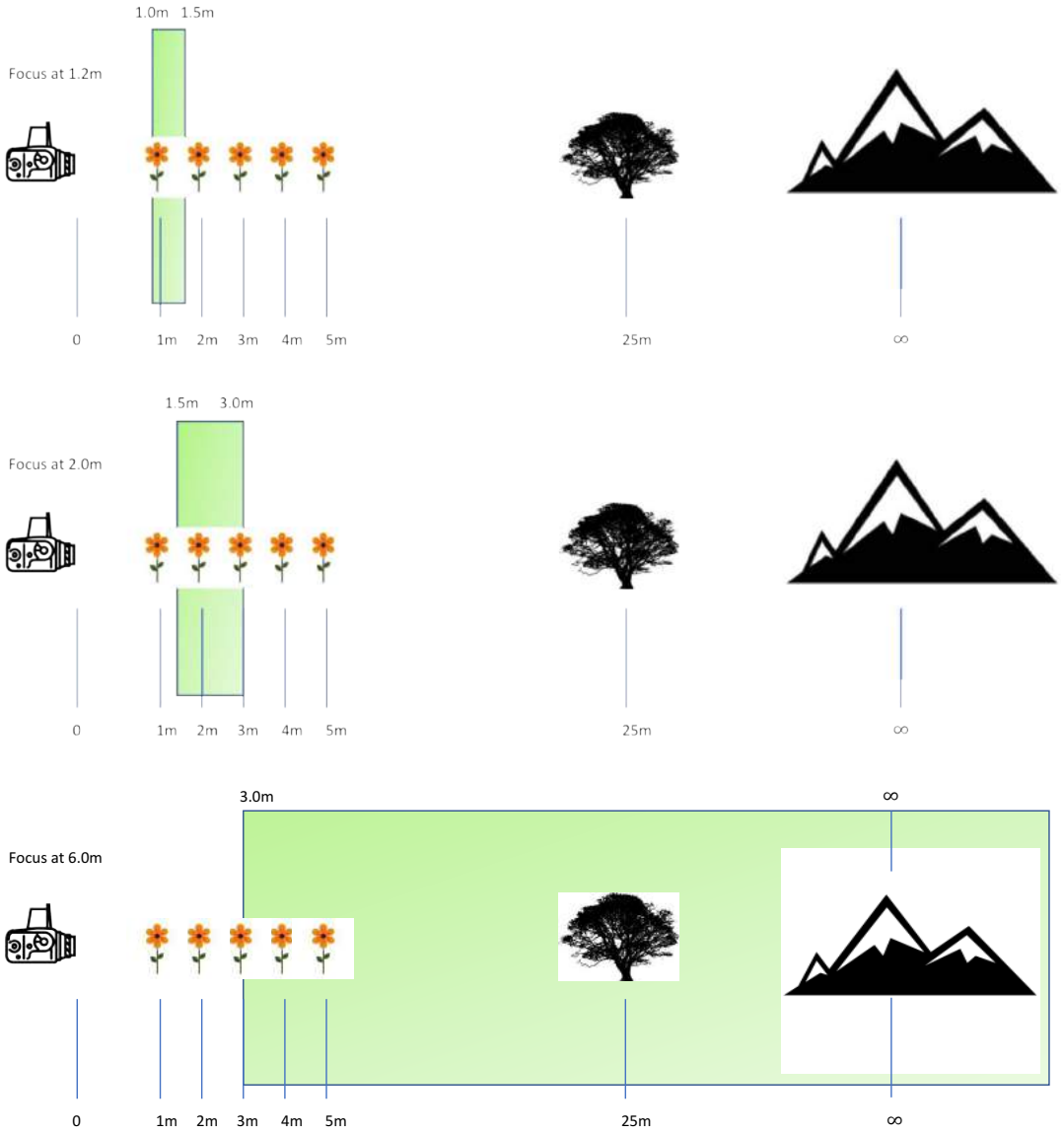
If your lens does not have a distance/depth of field scale, the easiest way to determine hyperfocal length for any focal length/aperture/sensor size combination is to Google it (search for Depth of Field or Hyperfocal Distance) or use a mobile phone app. - I use the Android app. “HyperFocal Pro” by Zendroid which is available free of charge.

With a zoom lens, the depth of field scales are far more complex due to the changing focal length of the lens.

Depth of Field

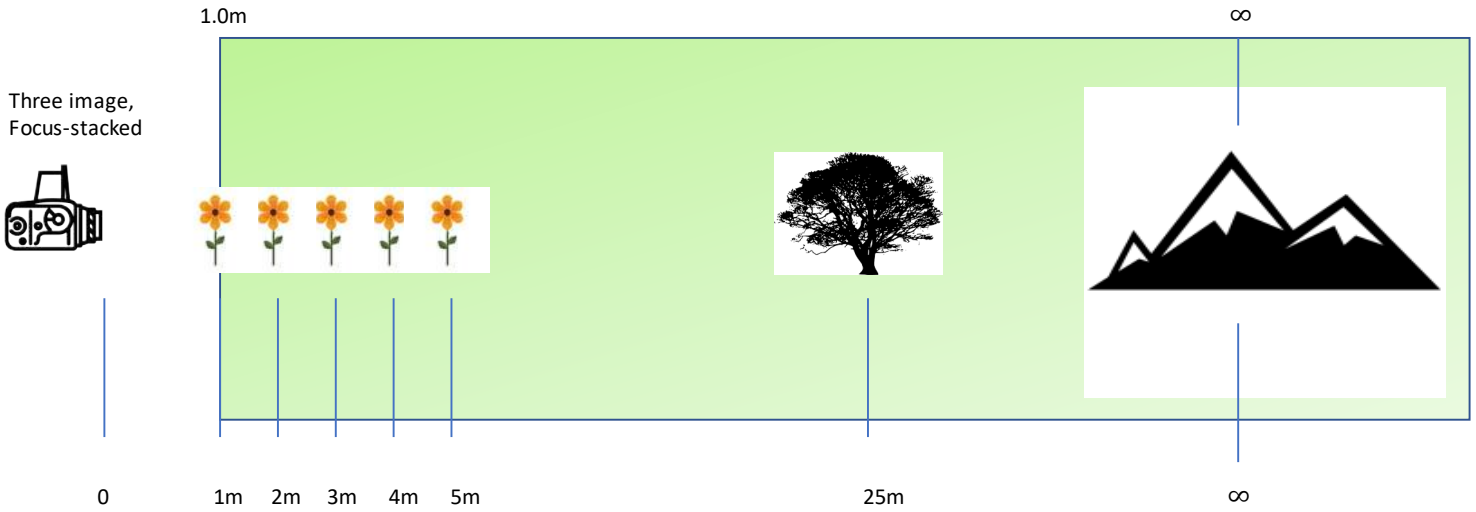
Hyperfocal Distance vs. Focus Stacking



The green-shaded area in these pictograms represents the calculated depth of field when using a camera having an APS-C sensor with a 30 mm focal length lens, set to f8.

Focus Stacking

By mounting the camera on a tripod, you could then take three separate pictures of the previously depicted landscape at each of the noted focusing points. By combining these images using readily available focus-stacking software the resulting image would you provide sharp focus of the scene at all points from 1.2 m to infinity.



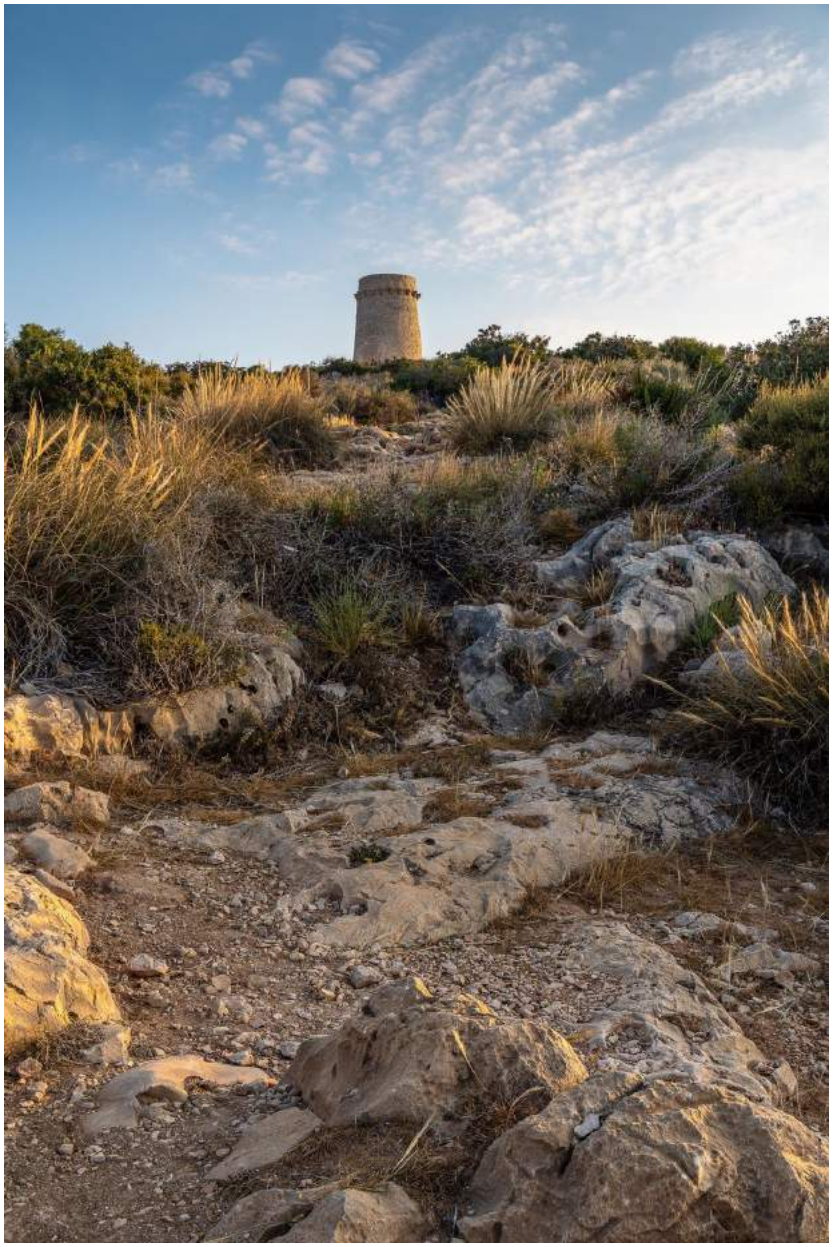
Focus stacking is a relatively new technique made possible only very recently as a result of the tremendous advances made in photo-processing software.

Hyperfocal Distance vs. Focus Stacking

Focus stacked (4 photos)
1/30th @ f8, ISO125
(16 mm lens)

Hyperfocal Distance vs. Focus Stacking

Focus stacked (3 photos)
1/250th @ f5.6, ISO100
(22 mm lens)



Focus stacked (5 photos)
1/250th @ f5.6, ISO100
(22 mm lens)

HFD,
1/500th @ f5.6, ISO100
(73 mm lens)

Focus stacked (4 photos)
1/500th @ f5.6, ISO100
(73 mm lens)

Camera set to Fully Auto
1/350th @ f4.5, ISO100
(28 mm lens)

1/30th @ f22, ISO100
(28 mm lens)

Focus stacked (4 photos)
1/350th @ f8, ISO100
(28 mm lens)

HFD
1/60th @ f22, ISO100
(34 mm lens)

Focus stacked (5 photos)
1/250th @ f8, ISO100
(34 mm lens)

Observations (Hyper focal distance)

Before the advent of auto-focus systems and zoom lenses, hyperfocal distance focussing was a technique which allowed the photographer extra speed to capture a shot without the need to first estimate distance to subject and then alter the focussing ring on the lens to the correct distance.

Modern cameras with fast auto-focussing lenses mean that the use of hyperfocal distance focussing as a quick-focus strategy is unnecessary.

Hyperfocal distance focussing relies on depth of field for its use.

A knowledge of depth of field is essential for photographers, so that photographers can isolate or include subjects in their photographs.

Therefore a knowledge and understanding of hyperfocal distance can still be very useful and it still has a part to play in photography today.

Observations (Focus stacking)

Focus stacking requires a fixed camera position prior to taking multiple photos of the subject at varying subject distances. Software can then combine the photos to make one image which is sharp “from front to back”. During the photo-taking, not only the camera should be kept steady in one fixed position, but the subject should not move either.

Camera or subject movement will result in blur or ghosting.

The latest versions of some cameras are now being produced with a photo-stacking programme such that the photographer can first specify the depth of the subject distances to be covered and then the number of shots to be taken - which are then done on motor-drive in very quick succession so as to minimise camera movement. Subject movement is still a problem.

Use of focus stacking is very limiting - generally you must use a tripod and you cannot use the technique to take pictures of moving subjects.

Conclusions

Both hyperfocal distance focussing and focus stacking techniques rely on depth of field to be effective.

It is probably best to develop your understanding of, and learn how to control and manipulate, depth of field, to get the best out of your photos.

To achieve the greatest depth of field possible, always use as small an aperture as possible:

1. If you have a moving subject use hyperfocal distance focussing (and increase ISO if necessary to allow use of a fast shutter speed to freeze the subject.
2. If you have a static subject (and the time !), set up your tripod and use focus stacking.

Hyperfocal distance focussing and focus stacking are both valid techniques for general photography which you can call on in the right circumstances.