Creating a Standard

Tone reproduction defines the boundaries and target values of the Zone System

A fine print can only come from a quality negative, and the Zone System is a fantastic tool to create such a perfect negative. Over the years, many Zone System practitioners have modified what they had been taught, adjusting the system to fit their own needs and work habits. This flexibility for customization has left some photographers with the perception that there are many different Zone Systems. That is not the case, but different interpretations and definitions of some key target values and boundary conditions do indeed exist. It is, therefore, beneficial for the rest of the book and the reader's understanding to create a 'standard' for some of the exposure and development assumptions, when using the Zone System. This will help to create a consistent message, eliminate confusion and build a solid foundation for your own customization in the future.

Reading Shadows and Highlights

Expose for the shadows. This means that you have to select a shadow area, read the reflected light value with your spotmeter and then place it onto the appropriate zone to determine the exposure. This process is very subjective, because the appropriate zone is found through visualization alone. You find photographers using any one of Zone II, III or IV as a base for the shadow reading. Ansel Adams suggested Zone III, due to the fact that it still has textured shadows with important detail. Zone III creates a fairly obvious boundary between the fully textured details of Zone IV and the mere shadow tonality of Zone II. My experience shows that Zone IV is often selected with less confidence and consistency, and Zone II reflects only about 2% light, making accurate readings challenging for some equipment. Consequently, we will standardize on Zone III as the basis to determine shadow exposure.

Develop for the highlights. This means that you have to select a highlight area, read the reflected light value with your spotmeter and determine what zone it 'fell' onto. If that is not the visualized zone, then development correction is required to get it there. To

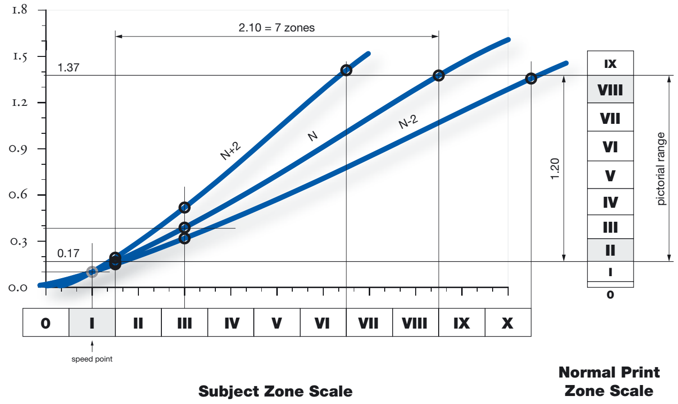

fig.1a Setting the speed point at Zone I allows for some fluctuations in low shadows (Zone I·5), and N-2 development leads to slightly weak shadow densities.

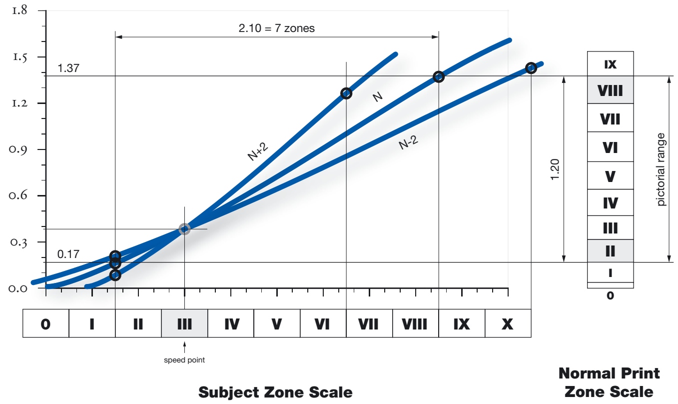

fig.1b With the speed point at Zone III, low shadow densities are inconsistent and far too weak with N+2 development. Highlights fluctuate by about one paper zone.

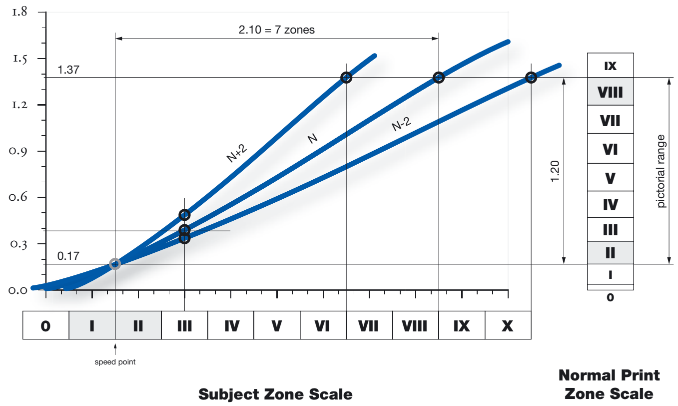

fig.1c Setting the speed point at Zone I·5 secures consistent densities for shadow and highlight tones regardless of development compensation. It is best to always place the speed point at the shadow anchor of the Zone System.

standardize on this zone for highlights is not simple, because it depends entirely on the subject. It could be a Zone V in a low-key image and it could be a Zone XI in the highlights of a snow filled scene. However, most of these situations are special cases, and we can safely assume that we will standardize on a scene with a complete tonal range from black to white. Ansel Adams suggested Zone VII, due to the fact that it still has textured highlights with important detail. Many beginners are surprised how 'dark' Zone VII is, and it seems to be far easier to visualize a Zone VIII, where we still find the brightest important highlights, before they quickly disappear into the last faint signs of tonality and then into paper white. We will standardize on Zone VIII as a basis to determine film development.

Practical Boundaries

We have to remind ourselves that, in analog photography, the print is the only means of communication with the viewer of our photographs. Therefore, negative density boundaries have to support, and are limited by, the paper density boundaries. They have been defined in 'Tone Reproduction' and will be covered further in 'Fine-Tuning Print Exposure and Contrast'. We know from both chapters that modern printing papers are capable of representing 7 zones under normal lighting conditions. We will standardize on a normal subject brightness range to have 7 zones from the beginning of Zone II to the end of Zone VIII with relative log transmission densities of 0.17 and 1.37, respectively. These values assume the use of a diffusion enlarger and need adjustment if a condenser enlarger is used. Consequently, our standard negative density range is 1.20.

The log exposure range of grade-2 paper is limited to 1.05, but this ignores extreme low and high reflection densities. We have no problem fitting a negative density range of 1.20 onto grade-2 paper, if we allow the low end of Zone II and the high end of VIII to occupy these paper extremes. Our standard paper contrast is ISO grade 2.

A simple definition for compensating development is also required. Despite some existing textbooks with rather complicated definitions, we will use a very simple but useful interpretation. As stated above, normal development (N) will capture 7 zones (2.10 log exposure) within the fixed negative density range. N-1 will capture one zone more with reduced development, and N+1 will capture one zone less with increased development. A complete list can be seen in the bottom half of fig.2.

Speed Point

We saw in the chapter 'Development and Film Processing' how the development time changes the average gradient and how it allows us to compensate for different lighting situations. Shorter development captures more subject brightness zones in a fixed negative density range, and longer development has the opposite effect. Of course, we are doing so to keep almost all maximum negative density at a fixed level, allowing all lighting scenarios to be printed on grade 2 paper. This leaves us with maximum paper contrast control and creative flexibility. In a dull low-contrast scene, the contrast is increased, and in a high-contrast scene, the contrast is reduced. In the dull scene, Zone VI might be the brightest subject 'highlight', and the increased contrast will lift it to a density level typically reserved for Zone VIII. In a high-contrast scene, Zone X might be reduced to a Zone VIII density, to keep it from burning-out in the print.

The entire negative zone scale is affected when highlight density is controlled by development. The individual zone densities 'move' within their proportional relationship. However, we can select one common point for all development curves by controlling the film exposure. They will all intersect at this point, and all curves will have the same negative density for a specific subject zone. This point is called the 'speed point', because it is controlled by the film exposure in general and the film speed in particular. It is also often referred to as the 'foot speed', because it is most likely found near the toe of the characteristic curve, where exposure has more influence on negative density than development time.

It is up to us where to set the speed point on the subject zone scale, but some locations are better than others. Fig.1 illustrates some possible locations. In fig.1a, the speed point is located at Zone I. This is a popular choice, but it allows for some density fluctuations in low shadows around Zone I·5, and N-2 development leads to slightly weak shadow densities. Highlight densities are fairly consistent and the density variations for Zone III are of little concern. In fig.1b, the speed point is located at Zone III. This seems to be an obvious choice at first, because it secures consistent Zone III densities. However, the low shadow densities are highly inconsistent and far too weak with N+2 development. The highlight densities fluctuate by about one paper zone. In fig.1c, the speed point is located at Zone I·5. This secures consistent densities for shadow and highlight tones regardless of development compensation. The textural density variations for Zone III are less than 1/3 stop, which is unavoidable and of no concern. It is best to always place the speed point at the shadow anchor of the Zone System. For us this means that our standard speed point is at Zone I·5 and has a negative density of 0.17.

Average Gradient

The relationship between subject brightness range and average gradient in the Zone System can be taken from the two graphs in fig.2. This relationship is fixed to the Zone System development-compensations values if our standard values are assumed. In the subject-brightness-range graph (top), the normal scene is assumed to have a 7-stop difference between shadows and highlights. The average-gradient graph (bottom) is based on a fixed negative density range of 1.20. This negative density range assumes the use of a diffusion enlarger and an ISO grade-2 paper contrast as a desirable aim. You may want to lower the average gradient if you are working with a condenser enlarger. Their optics make a negative seem to be about a grade harder, but print with the same quality once the negative density range is adjusted. Use a negative density range of 0.90 as a starting point for your own evaluations. You may also want to make other adjustments to target average gradient values if you have severe lens and camera flare, or if you experience extremely low flare. The nomograph in 'Customizing Film Speed and Development' will help with any necessary adjustments.

We now have standard Zone System boundaries and target values. They can be used as a guide or as a rule, and they work well in practical photography. More importantly, we are using them throughout the book to be consistent.

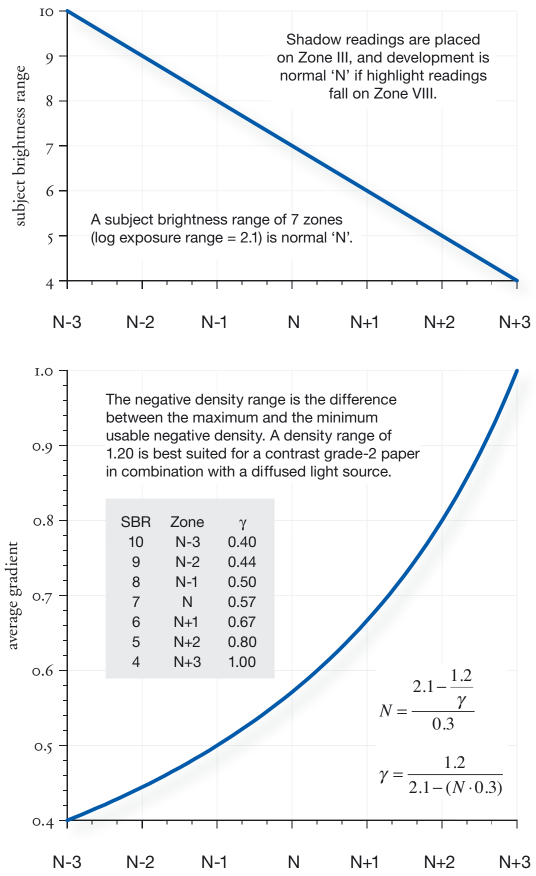

fig.2 Subject brightness range (SBR) and average gradient (γ) have a fixed relationship to the Zone System development compensations when a few assumptions are made. In the subject-brightness-range graph (top), the normal scene is assumed to have a 7-stop difference between shadows and highlights. The average-gradient graph (bottom) is based on a fixed negative density range.