Dazed and Confused

n Part 1 of this article I posed the question, 'Does diffusing a light make the light quality softer?', and then went on to answer that no it doesn't. To understand this further and to see how this might affect you, here's more on this ever-so exciting topic.

When teaching I love asking questions, questions are a great way to make people think and of course it is a little power-trip for me. So let's start with another question. 'Why is it that light energy spreads out (180° to be exact) when a piece of diffusion material is placed over the front of a light source, be it a studio strobe or an on-camera-flash or a continuous source such as an LED, HMI, halogen or tungsten hot-light?' To answer this as well as to build some much-needed suspense and drama for such a dry yet important topic, let's start by looking at the spread of light from a point source.

A point source spatters photons (light energy) out over 180°. A soft-box, an umbrella, an octa-box, an on-camera-flash, a studio strobe, etcetera, etcetera, are not considered to be point sources of light. What they really are is multi-point sources; they are made up of thousands, or millions, or billions of photon-emitting points. Any one of these points, emits photons like any point source, over 180°, unless it is choked-down by something like a baffle, a gobo, or a studio strobe's parabolic reflector (a deep bowlshaped dish that fits over the front of the strobe to direct the light). An on-camera flash regulates its spread of light in a different way; it employs a clear glass/plastic lens over its front that narrows the beam of light from 180° to a narrower light path and does so by moving this lens closer or further from the flash tube. It is a little confusing trying to understand or explain a flash's beam-spread (spread of light) because typically you can only find data on flash zoom settings, which are expressed in focal length millimetres and not in degrees for beam-spread. Another frustration is there is nothing about the correlation between the zoom settings and the resulting beam-spread reduction – flash zoom settings relate directly to the focal length of your lens and not how wide or narrow the resulting spread of light is. This makes sense when you consider how flashes are used - you want the flash to spread its energy just wide enough to cover the angle of view of the focal length of the camera lens in use and so having the flash-zoom settings in millimetres instead of beam-spread angles keeps it really simple. The beam-spread of a studio strobe-head (see diagram A), is controlled in a different way, typically with a Parabolic Reflector that attaches to the front of a strobe-head and narrows the light from a 180° beam-spread down to something less - 60° is typical though it may be called 30° because it covers 30° out from either side of the mid-line. A parabolic reflector (see diagram B – the black bit on the front of the strobe head), is like a stainless steel mixing bowl. The strobehead is attached to the narrow bottom end of the 'bowl' in such a way as to allow its strobe-tube to protrude through into the 'bowl' via a hole at this end. With a 60° parabolic reflector, one side of the 'bowl' (looking at it two-dimensionally) blocks all photons travelling on tangents between 0° to 60°, while the other side of the 'bowl' blocks all photons travelling on tangents between 120° and 180°. So, only the middle 60° emits light. I have two different parabolic reflectors, one has a seven-inch diameter opening at its wide end and the other has an 11-inch opening. In the description for these two parabolic reflectors, the manufacturer just tells you the opening diameter, nothing about degree of angle of the beam-spread. One would assume that the 11-inch has the widest beamspread since an 11-inch opening is bigger than a 7-inch opening, but the diameter of the end of the reflector is only part of the story - how deep the 'bowl' is, is the other half of the equation:

- · If the parabolic reflector is deep then the beam-spread will be less the sides will cut more into the beam-spread's angle.
- If the parabolic reflector is shallow, the strobe tube will be closer to the opening of the 'bowl' thus less light is blocked resulting in a greater beam-spread.

Since parabolic reflectors are designed to block all light or photons from whatever their beam-spread cut-off is, you are probably thinking, 'What a waste of energy,' but these photons aren't lost, they bounce off the highly reflective silver finish of the reflector's interior and eventually spatter out of the 'bowl's' front opening. By the way, there are some parabolic reflectors that sport a zoom control which slides the reflector either out from, or in towards the strobe tube allowing the spread of light to be finetuned over a range of many degrees of angle. You can also buy strobes that have a zooming lens called a Fresnel Lens on their front; this is the same as any stage spotlight only it is fitted with a strobe tube instead of a tungsten, HMI, halogen or LED light source. By changing the distance of the Fresnel Lens from the strobe tube using the provided lever, slider, etcetera, you can increase or decrease the beam-spread of light from spot to flood

Part 2

Well that's all very interesting, but why do you need to know all this? Think about soft-light; in part one of this article I discussed adding diffusion material to the front of a light source. I went on to say that while this diffusion material spreads the light, it doesn't actually make the light any softer because it hasn't changed the size or distance of this source. Size and distance are the two main controls for changing light quality from hard to soft or soft to hard.

I started out my professional photo career shooting weddings. I had a couple of good wedding photographers mentor me to get me started. However, they did feed me one misleading tidbit; they told me that if I wanted to soften the light emitting from my on-camera flash, that I just had to place a white hanky or a napkin over the flash; they claimed this would diffuse the light making it softer. I think you will agree based on the above, that this is complete balderdash! These photographers were confusing Shadow Contrast with Shadow Edge Transfer - that is mixing up shadow brightness with how sharp or fuzzy the edges of shadows appear. Another bit of misleading lighting information is the advertising for after-market on-camera flash dome diffusers (a little white plastic/ rubber dome that fits over the business-end of your flash). The advertising claims that it softens the light. It can't, or at least not directly because it doesn't actually enlarge the size of the light source, or least not enough to make any real difference. What it does do, which is the exact same thing that the hanky-over-flash method does, is spread the light out more than the bare flash does so that there is more light bouncing off the ceiling, walls, and floor (if indoors) and so fills in the shadows making them less dark (lowering Shadow Contrast). In a way this modifier could create softer light, but not directly - if this rig bounces more photons off the ceiling onto the subject than the photons coming directly out of the flash-diffuser-dome onto the subject, then the dome is no longer the main source, the ceiling is. And chances are it is a much bigger source of illumination than the flash-dome. So, in this way a flash-dome can help to create softer light, but really it is not the flash-dome, it is the ceiling because the ceiling is the main source of illumination and so it is the ceiling that is responsible for the softer light not the flash-dome. Of course, a flash, without the diffusion dome, tilted up to bounce light off the ceiling would achieve pretty much the same result. Here's the underlying principle involved: A source of illumination is the last thing that light bounces off or emits from before striking the subject. The source of illumination to a subject lit by a bare flash or bare strobe, is the flash/ strobe tube. If you attach a lighting modifier like a soft-box, the strobe is no longer considered the source of illumination: the white material on the front of the box is now the source and the strobe tube is now considered the origin of the source. It is the source that affects light quality (hard/soft) and so you have to consider what is the actual source of illumination to your subject. A bare flash directed at a subject is the main-source and is



the origin; if you fire it through something like a panel or a shoot-through My favourite bit of the above rant is the distance of origin from source; this umbrella, it is the fabric of the modifier that is the source, not the flash, the is the key to absolutely beautiful Specular Highlight (shine) light-sculpting flash is now just the origin. How big that modifier is and how far it is placed on smooth and/or shiny surfaces like automobiles, jewellery, liquids, and from the subject determines how soft or hard the light appears. Also, how liquor or wine bottles. far the origin (flash in this case) is from the white diffusion material of a panel or shoot-through-umbrella affects this: Well, there you go, now you have some new material to bore your family

flash will cover a smaller area of the fabric thus making a smaller source of illumination creating a harder light quality.

• If the flash (origin) is closer to the fabric (source), the light from the and friends with, but more importantly remember it when you are lighting. And, when you do have the opportunity to corner some poor unsuspecting sod with this new-found knowledge, remember to badger • If it is further away then it will cover a larger portion of the fabric thus them with lots of bewildering questions like I do when I'm feeling down making a larger source of illumination creating a softer light quality. and need a little ego top up!

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