DIGITAL PHOTOGRAPHY

+ OVER THE PAST FEW ISSUES WE'VE LOOKED AT WRESTLING CONTROL OF YOUR CAMERA OVER TO YOURSELF AND AWAY FROM THE DECEPTIVELY EASY BUT UNRELIABLE AUTO MODE. IN THIS ISSUE WE'LL LOOK AT APPLYING WHAT YOU'VE LEARNT IN THE DIGITAL CLASSROOM TO THE REAL WORLD.

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Firstly, let's look at a common subject found on many tropical dive trips: the shark. (The principles that follow apply to any subject which is mid toned to dark with a very light or bright area which transforms it into a high contrast subject.) Superficially, sharks look like an easy subject. They aren't emblazoned with bright colours, often they have very little or no patterning and, as is the case with the most common species found on Indo-Pacific tropical reefs, the grey reef shark, they are, well, generally a pleasant and easy mid grey. Maybe even the utopian 18% grey that we covered last issue (Figure 1). So in theory, whacking your camera onto auto should give you a reliable and accurate result. The shark is about mid grey, the water column is pretty close to mid grey (unless you are pointing towards the surface) and even any reef that may be included is usually also fairly close to mid grey.

Figure 1: Grey sharks were given their common name due to their bland colour scheme. This image was shot without strobe while freediving close to the surface. The generally muted tones made an exposure at 18% spot on. However shooting from a lower angle with a strobe will bring our exposure problems to light.

In reality, the lower face/jaw and ventral or belly surface of a shark is usually a pure clean white. And not just any white. It's similar to those fancy roll up screens onto which you project slides or computer presentations. They have a special surface that just loves reflecting back every light particle that strikes it regardless of the light source (Figure 2). Any strobe light striking the underside of a shark is beamed back in it's full glory, providing you with a big, white, blown out patch of nuclear explosion white.

Unless the shark is filling the entire frame, your strobe exposure, when the camera is set to auto, will not do the job. Sometimes you might get lucky and strike it right. But we want to go beyond having our pictures 'come out' by accident – we want perfect results every time. After all, if you've spent somewhere between $1500 and $5000 for a dive trip you want as many 'keepers' as possible.

The first step to take is to stop using your strobe(s) as the main light source. If there's any sort of background light, as there is in any typical daylight reef landscape, that should be your main light source. Exposures which rely on complete strobe lighting should be reserved where no open background is visible, such as when shooting small macro subjects with a long lens or at night where the only available light is your puny torch. Take a mid water light meter reading. That will be your base exposure. Now set your strobes on a manual setting that will give you a strobe exposure 2 f-stops under. As an example, let's assume the mid water background exposure is f8 @ 1/125th second, so our strobe power setting should be selected to produce an output of f4.

At this point a minor diversion is warranted. The shutter speed is of no real importance to the strobe exposure, as long as your strobes will sync at that speed. Most modern cameras will sync at 1/250th or higher. This means that the shutter will be open long enough to expose the entire sensor to the strobe light. If the sync speed is lower than the shutter speed then only part of the sensor will be exposed to the strobe light.

For example, in the bad old days the most used underwater camera was the Nikonos system. They had a top sync speed of 1/90th second. In practice and reality, that often meant using the 1/60th shutter speed to sync with strobes as the 1/90th setting was placed in a different part of the shutter speed dial and also the light meter didn't work when that setting was selected as it was a manual 'backup' speed for when your battery failed. If you used a higher shutter speed, such as 1/125th, a strip of film at the bottom of the frame would not receive any strobe light. If you were relying on strobes to supply all the light, you'd end up with a dark band of black across the bottom of your shot (Figure 3). If you used a higher shutter speed again, the black band would be much larger and in extreme cases you would have just a tiny strip of exposed film at the top of the frame. Many a shot was destroyed when the shutter dial was inadvertently bumped onto a higher speed.

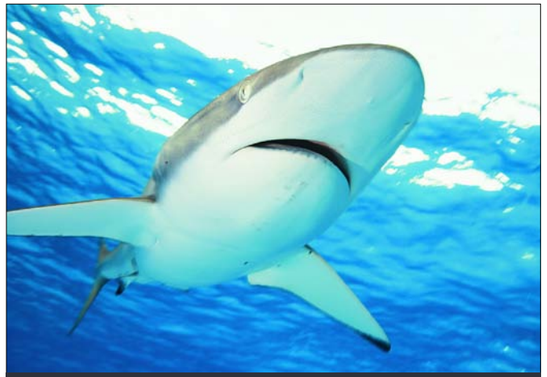

Figure 2: Shot with a single strobe (as you can tell from the light fall-off on the right hand side of the face) in a shallow sandy lagoon with light bouncing up from the sea bed adding fill light and the strobe adding just the slightest touch to show detail of the sensory pits on it's snout and freeze the movement on the face. You can see that there's a small amount of motion blur on the fins. At such close quarters with two strobes, Auto setting may have worked, but in manual mode I knew that the result was going to be spot on every time.

The Nikonos shutter, like all 35mm focal plane shutter cameras, is comprised of two metal curtains, one dropping down to reveal the film surface then the second dropping down to cover the film back up once the right amount of time had transpired. The time between those two events occurring is the shutter speed. At high shutter speeds the time lag between the second curtain being deployed would occur before the first curtain had completely crossed the film surface so that when the strobe was triggered the light hitting the film would only be admitted in that gap between the two shutter curtains. Flash bulbs, (now we're really going back to the dark ages) had a longer burn time so they would be emitting light for a long enough time for the gap between the two curtains to run down the length of the film.

Today, dedicated strobes, those made by the manufacturer to work with a particular camera body, will emit not just one 'flash' of light but a series of flashes that are perfectly timed and adjusted to produce one long burst of light, long enough to emit light for the time taken for the small gap between the first curtain and the second curtain to travel down the length of the sensor (or film). That's why my Canon cameras, which I use for topside photos with a dedicated Canon strobe, will sync at any speed, right up to 1/8000 second. A truly amazing feat which only those of us who struggled with slow sync speeds can really appreciate.

Since a shark I'd be photographing was often taking up space in just the middle of the frame and the bottom quarter was usually empty or of no importance, I'd use a shutter speed of 1/125th to help freeze any camera and/or subject movement. With my background available light providing the main exposure, the area at the bottom of the frame which did not receive any strobe light still looked 'normal' or correctly exposed. If you tried this when shooting macro where the strobe provided all of the light for an exposure, the black strip showed up. With my new digital Nikon >

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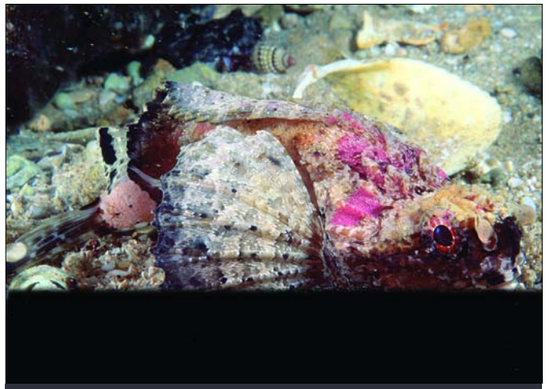

Figure 3: The first shutter curtain is dropping down to expose the film but at 1/125th second on a Nikonos the shutter speed is too fast to make a correct sync. When the second curtain begins to move it triggers the strobes, exposing all of the film except for the small area at the bottom which is still covered by the descending first curtain. A daylight blue water shot, such as Figure 4, would not show the dark bar as the background light 'fills in' the dark area when the first curtain drops clear. But this night shot of one of my favourite bizarre fish, a goblinfish, is lit entirely by strobes so the cut-off is evident.

and Canon bodies providing a higher sync speed (usually around 1/160 or 1/250th sec) this issue no longer causes many problems.

Check your manual to find out what your camera's maximum sync speed is and keep this in mind when setting a background exposure. You can then change the f-stop to a higher number (or smaller aperture size) and lower the shutter speed until you're within your camera's sync speed. So if your camera's sync speed is low, such as 1/125th and your available light exposure you've chosen is f4 @ 1/500th, use f8 @ 1/125th which will provide you with the same exposure but with a shutter speed within your camera's sync range.

So now you're all set to go. Your camera is set to provide a correct exposure of the vista before you. Your strobes are set to fire at an f-stop 2 stops below the available light exposure. Let's say our base exposure is f8 @ 1/125th therefore our strobes are set to emit light that will provide an exposure of f4. OK, so now imagine that our shark swims into frame. We're hunkered down on the reef to keep a low profile so that our subject will swim in nice and close. By default we're shooting upwards a touch, revealing most of the shark's underbelly. We hit the shutter release, our camera records the scene and our strobe(s) puff out a little splash of light which hits the shark's belly, fills in any shadows and provides a nicely balanced result.

Now if we'd set our camera to auto, we'd have saved a bit of mental effort but our shot would have been randomly exposed. Since the shark doesn't fill the entire frame, our auto setting may have pulled off a correct exposure for the background but our strobe would have tried to produce a correct exposure for the entire frame, including all that background water. Of course there's not a whole lot of substance to water, so our strobe light would never have bounced back from those empty areas. Therefore the camera would have told the strobe to keep on pumping out the light right up to it's maximum capacity. By default, the white shark's belly would now be receiving at least as much light as the background was providing and possibly much more. All of that light would bounce back (remember, just like a super white projector screen) producing a big burnt out area.

Maybe our strobe(s) weren't all that powerful, so at full output and with the shark maybe a little more distant than we intended the result would have 'worked'. The amount of light reflecting back was not more than the background exposure. But that is just a fortunate accident. We want to make it work, exactly how we want it, not how some dumb camera and blind chance thinks it should be. By taking control and setting the exposure manually, both for the background and for the flash fill, we can get a whole series of shots that 'work', spot on every time.

Now don't think that auto is no good at all. I use it often but I'm always in control. In our scenario above, if the shark swims behind us and we turn around to follow with our camera, the background exposure may change, particularly if it's early in the morning or later in the afternoon when the light is brighter in one direction than the other. Or when the shark swims overhead and we end up looking directly into the sun. Auto can help us here. When working underwater you need to keep things as simple as possible. The less junk you have to carry or fiddle with the easier it will be to produce good photographs. That's why you have

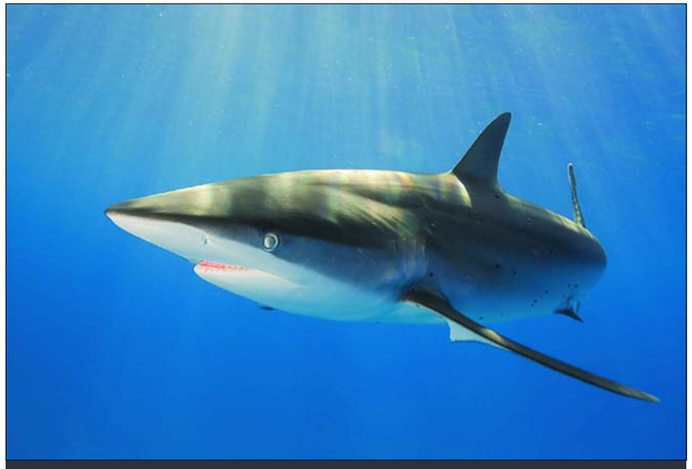

Figure 4: Set to Auto with aperture priority, I was able to follow this Silky Shark around shooting into the light, as in this shot, with side light and front light over a 1 1/2 hour session without having to change any of the camera controls. The auto setting moved the shutter speed as I swivelled around to give me a correct exposure of this average toned setting (this image is shot at f8 @ 1/100) while a slight touch of strobe, set at 2 f-stops lower with an output of f4, gave me enough fill light on the face to add drama, colour and texture. The single strobe (I turned the other one off) gave a spotlight effect which I wanted. The sun beams add visual texture to the otherwise bland background. Every single shot taken during this encounter was exposed "correctly" with some images later trashed due to bad focus or framing as the shark got more frisky in the later afternoon light.

Figure 5: A different scenario with the same problem: a mid toned subject on a bright white sandy sea bed. For this stationary subject at Stradbroke I took a mid water background reading, avoiding the sandy bottom, then recomposed and took shots with the twin strobes set 2 stops under. I used my histogram to make sure all was well, taking more shots at 2 2/3 under for insurance. The sand has texture and detail and generally looks much more "natural" that a fully strobe lit image.

Figure 6: A mullet in Izu Peninsula, Japan, has a mirror-like armoury of silver scales which reflect every iota of strobe light. This image was exposed using the background as a base exposure then strobes set at 3 stops under, just enough to add detail without blowing out the "disco ball" silvery scales.

strobe arms. You set them up and forget about them. No waving away with one arm holding a strobe while we try to fiddle with our camera knobs, especially when there's surge or current. If you have to manually change the exposure every 5 seconds you'll never have time to take a photo.

This is where the auto setting really shines. Set the camera to aperture priority. With the aperture set at f8, as we move the camera around the auto system changes the shutter speed to suit. So if we are shooting in the morning or afternoon when the exposure changes significantly depending on which way we are facing, the camera may provide exposures such as f8 @ 1/60th all the way through to f8 @ 1/500th. If our sync speed is lower than 1/500th then just choose a higher f-stop, such as f11 which will now give us f11 @ 1/30th-1/250th. Now with our strobes set at two stops down from f11 (making our strobes output light at f5.6) we track the shark as it circles us, giving us exposures that vary in shutter speed but with a set aperture that suits our subject and our strobe output (Figure 4). No need to change or fiddle with anything. Sweet.

Yes, if your camera drops the shutter speed down to 1/30th or below, you will get camera/subject movement. However the flash fill is of such short duration that the area lit by the strobe is 'frozen', providing us with areas of sharp definition while other areas have motion blur. This combination can be quite attractive, giving the image a feeling of motion while still providing areas that are tack sharp to provide us with a visual 'anchor'.

If you're in a situation where the shark's belly becomes a large part of the image, such as shooting up at a slow moving grey nurse, you may find that a strobe-to-camera exposure of 2 f stops is still too much. I often use a gap of 3 f-stops, even 4 on rare occasion. A shark's belly really is that reflective.

This same technique can be used wherever a highly reflective surface is included with a 'normal' subject. One of my favourite dive sites is Stradbroke Island, out at Manta Bommie. The bottom is often littered with rays, nestled in the blindingly white sand bottom (Figure 5). Again, you can put it on auto and maybe if the grey ray takes up a large area of the frame or if you're shooting far enough away that your strobes aren't powerful enough to overexpose the subject, you may 'get away' with your auto exposures. But by applying the above principles you'll get keepers every single time. Shooting up at the surface through the white lattice of acropora coral, a portrait of a dark-suited diver with light skin, a pale cuttle hovering over the reef – all will benefit from using your strobes to fill, not overpower, your base exposure set to the ambient light.

For those of you that have strobes dedicated to your camera you may be able to dial in our 2-3f-stop compensation directly into the strobe either through the camera or by using the appropriate strobe controls. That way you can be lazy and just have everything set to auto. But in effect you're doing it all to match the manual system described above so no real advantage is gained and there's more chance of you forgetting to change everything back later.

And finally, don't forget to check your histogram. That will show you a spike in the highlight or lighter areas where your shark's white underbelly is throwing back some light. Make sure it does not slide off the right hand edge of the graph. If it does, drop your strobe exposure another 1 f-stop.

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