

How well do you know your flashgun?

by Alexander Mustard

The year is 1984, and while the world worries whether "Big Brother is watching", I am splashing about filling my first rolls of film with the out of focus underwater scenery that was commonplace in those days. Meanwhile, events of far more consequence to the world of underwater photography are occurring: Nikon are introducing the Nikonos V. The Nikonos V was more than an evolution of the IVa it replaced; it was a technological revolution. Most notably the Nikonos V made Through-The-Lens (TTL) flash metering available to all us proles!

Eighteen years on and TTL works well. So well in fact, that we are that we are inclined to forget there is another way to use a flash. I am, perhaps, the worst culprit; indeed my current Subtronic strobes have never been set on anything other than TTL since they were new.

Imagine then my horror when I started using my Hasselblad underwater and discovered that, with a camera that lacks electronics, TTL metering was no longer an option! Although at first I thought I had been dispatched to Room 101, in retrospect being forced to switch my flashgun to the previously dreaded manual powers, not only freed several



Lionfish, the Alternatives, Red Sea. Hasselblad 500C/M with Zeiss 80mm and 0.5 Proxar close-up lens. Sea and Sea YS 120 flash on FULL power. 1/250th @ f11 on Fuji Velvia. Even though the lionfish was shot at the same distance as the pool shots, the best exposure was at f11, because of the lack of reflection of the flash light in the sea compared with the pool.

species of incrusting marine life, but also liberated me photographically.

With a bit of dedication, I was able to produce both correctly exposed pictures and control artificial light levels at will. Was I in danger of becoming a better photographer? This article is about making friends with your flash, or in more Orwellian language, becoming fluent in strobespeak.

The most important question to ask your flashgun is

how powerful it is. Although this is a straightforward question, as we ask about we will find that we are offered several answers. Choosing the right one is the difference between success and failure. But more about that in a minute.

Photographers typically quantify the power of a flashgun in terms of the requirements for a correct exposure. The resulting value is the Guide Number, or if you want to impress your friends the GN. Two factors control the

amount of light seen by a camera, when a flashgun illuminates a subject. The first is the distance between the flashgun and the subject and the second is the aperture set on the lens. (The duration of a flash is insignificantly short (about 1/10000th sec) for the exposure time to have any effect on flash exposure, once it is below the flash synchronisation speed.) The GN is simply the product of the distance and the lens aperture.

I think that it is easiest way to understand guide numbers with an example: my flash gives a correct exposure at 10 feet with my lens at f8, so the GN is 80 (8x10). Now the attentive among you will have noticed that there are two problems with that statement. First, the amount of light needed for a correct exposure will also depend on the speed (light sensitivity) of the film stock. And so, a GN should always be quoted with a film speed (usually, but not necessarily, 100 ISO/ASA). The second problem is one of units: what if I had measured the flash to subject distance in meters? 10 feet is about 3 metres so my flash also has a GN of 24 (3x8)! Of course, I should have stated originally that the GN of my flash was 80 (feet) at ISO 100.

Once we have the GN we can use it to calculate exposures. To determine the correct aperture at a given distance, we simply divide the GN by the distance: at 3.5 feet my flash requires an aperture of f22 (80/3.5), while at 20 feet it needs an aperture of f4.

Nearly all flash manufacturers publish GNs in their instruction manuals, specification sheets and/or on

their websites. So we can use this information to get correct exposures, right? Well no, actually! First of all most published GNs are determined on land and second manufacturers are unduly optimistic about their progeny! It seems to me that many manufacturers have calculated their GNs on a "typical reflectivity" scene such as a polar bear drinking a glass of milk in the snow! A good rule of thumb is to overexpose the manufacturer's land guide number by two stops underwater. However, if we want to really get to know our flash properly we should bite the bullet, or at least the mouthpiece, and get it into the water and find out a bit about it for ourselves.

Now the most accurate place to calibrate a flash is in the environment that we plan to use it. Easy! I wanted to use my Hasselblad to photograph lionfish in the Red Sea. So all I had to do was hop on a plane to Sharm do my calibration shots and then I would be ready for my holiday to the Red Sea~ aaah. So for practical reasons we are often forced to do our calibration in more accessible water - the local pool.

Unfortunately swimming pools are not an ideal representation of the Red Sea! If we were to specify conditions that would falsely elevate the amount of light reaching a subject from a flash, two of the criteria would be a small body of water and reflective walls. A pretty accurate description of a pool! But nonetheless they are often the best option for getting intimate with our strobes. The procedure is pretty simple: first find a subject of average



An example of a calibration film, Southampton, UK. Hasselblad 500C/M with Zeiss 80mm and 0.5 Proxar close-up lens. Sea and Sea YS 120 flash on FULL power. All exposures at 1/250th on Fuji Velvia. Apertures from top f8, f11, f16, f22, with f16 producing the best exposure.

reflectivity, place it in the pool as far from the surface, walls and floor as possible, and snap away at it from different distances. At each distance shoot at a range of apertures (the manufacturer's GN is a useful guide here) and keep notes! The processed film will then reveal the correct aperture for each distance and let us calculate the GN. But do we really want the GN?

Here is the final twist to the tale: guide number theory was developed on land and underwater there is an important difference. In air, light attenuation is not significant over flash photography distances and its effect on the GN can be ignored. Underwater, light is absorbed and scattered much more rapidly and the GN will reduce with distance from the camera as the light attenuates! In practice, attenuation is not a problem with distances of less than a metre, but if we commonly shoot through at least a metre of water then an exposure table will be more helpful than a GN.

In air an exposure table is simply a long hand GN - a table with the correct apertures calculated and written out for different shooting distances. This may sound like Doublethink, but an underwater exposure table is not just a longhand GN. If we test out our flash at each distance in the UW exposure table, the table will automatically compensate for light attenuation. Tables are also easier to use than stumbling through GN arithmetic while under pressure!

The most important point to remember about exposure tables and GNs is that they are only GUIDES (the clue is in the name). Pool GNs and tables will usually cause an underexposure of about a stop in the sea. But by keeping notes as we shoot in the field we can continue to refine our exposures. Another factor is that underwater subjects are not all of average reflectivity! The difference in flash reflectivity between a silvery barracuda and a light sucking black grouper can be a couple of stops or more. The bottom line is that our exposures still need to be bracketed. When I



The Hasselblad and Alex. Photo by Giles Shaxted. Olympus 3040 in Light and Motion Tetra 3030 housing. SB 105 flash.

first tried bracketing it seemed like an incredible waste of film and time, but each time I get the exposure I wanted on one of the bracketed shots, my addiction grows!

Making friends with my flashgun has not only been a benefit with manual settings, but it has also helped me get the most out of TTL. TTL is still my weapon of choice most of the time, but getting to know my strobe has liberated me from towing the TTL Party line and let me go my own way when I want to. Now that's what I call photographic freedom.

Alexander Mustard

I would also like to thank, my friend, Dan Mayor for his help with the flash calibration.

Alex is a speaker at this year's Visions in the Sea conference, on 16th/17th November, Imperial College, London. Contact Ocean Optics for more details.

Visions in the Sea 2002

November 16/17th 2002

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See page 48 for full details and page 55 for a booking form

HMS Royal Oak video



**“a workmanlike, professional
production, and worth viewing”**
John Bantin, Diver magazine

The wreck of HMS Royal Oak in Scapa Flow is a designated war grave and all diving is prohibited but in 2000 a special permission was granted for the wreck to be filmed as a moving tribute to all those who lost their lives.

This new professionally produced 50 minute video includes underwater images of the wreck which have never been seen before and there are interviews with survivors and Orcadian Sandy Robertson who was the first diver to go on the wreck the day after she sank. Also included is coverage of another unique event when the ashes of Dorothy Golding, wife of Bandsman Arthur Golding, who went down with the ship, were taken down by her grandson, Christopher Kilford, and placed in the wreck to reunite the couple.

The finale is the unfurling of a battle ensign on the upturned hull by a Royal Navy diver on the anniversary of her sinking and the final credits include the names of all those who died in the tragedy.

Running time 50 minutes. Narrated by Tom Fleming. Produced by Ocean Optics Ltd. Directed by Peter Rowlands

The video costs £16.95 (+£2.50 UK postage). Total £19.45. Please send cheques payable to Peter Rowlands and send them to: Royal Oak Video, 13 Langley Avenue, Surbiton, Surrey KT6 6QN. Credit card tel & fax 020 8399 5709

<http://www.hmsroyaloak.co.uk>

I ordered the video and it arrived last Monday. I've only had a chance to view it today. I was so profoundly moved (and I am a hard bitten first world war historian) that I had to email you. I was impressed with virtually all aspects. I thought the balance between interviewees, diving footage and historical context was spot on. This is something not always achieved in documentaries - I know because I used to make them. The interviews with the survivors threw the whole affair into stark relief. I cannot praise this video highly enough. And I thank you for your web site.

**Warm regards
Pamela Armstrong
12/1/02**