

# On Test

## MB Sub Twin LED Cave

Following on from the excellent Photon LED Cave MB Sub have taken a bold and innovative step in the field of torch options and redundancy. The present trend of torches demands a tight beam for signalling / underwater communication and a high lumen output. The needs of cave divers and multi dive divers is for ever longer burn times, preferably without the massive battery packs we required in the past.

Pre 2000 a 60min burn time on a 50W Halogen torch was considered ample light and ample burn time for open water diving. After all, you don't need a torch on deco. However the cave divers were pushing through the dark all the way out and they required a margin of safety on top of the planned dive time. Four hour + burn times meant carrying massive battery packs and the open water divers displayed no desire to be lumbered with those unnecessarily. The advent of very small and very powerful NiMH and lately Lithium Iron battery's changed all this. The want for monster burn times spilled over to the OW diver.

If there is such a thing as a "benchmark burn time" I'd hazard the suggestion it would be considered today even by open water divers to be in the region of 4 hours.

At the same time as this demand for increased burn times occurred we started to demand incredible light power. 50W Halogens were no longer considered powerful enough as 18w HID's became the must have piece of kit.

Again if there were to be a benchmark power output today's I'd suggest it is the 21W HID. There are more powerful lights and there's plenty of diving that doesn't require 21W HID performance but this does appear to be the generally accepted standard among the technical diving community.

Now a well established market, the HID's have suffered from issues with faulty ballasts and fragile bulbs. The loss of a primary light being of great concern to all divers, the market has opened up for the emerging technology of rugged, solid state, high performance LED torches. These satisfied the demands of those who have lost faith in HID bulbs and in some cases for those divers who find the intensity of a HID light to be less than optimal for their style of diving.

If your designing a torch for the diving community today you need to do something quite special to stand out from the crowd of 21W HID's and multi emitter LED heads. You also have to remember the key issues:

- 1: Reliability
- 2: 4 hour Burn time minimum
- 3: 21W HID performance
- 4: A tight focused beam for signalling
- 5: Good general illumination.

Enter the MB SUB TWIN LED CAVE



The new TwinLED head fits on to the standardised Photon battery pack enabling owners of the Photon to upgrade by purchasing the torch head only. Milled from a solid billet of aluminium it is depth rated to 200m and contains a choice of 1000 lumen Ostar LEDs.

The heads can be configured with a 10degree spot bulb and 20degree flood, two spots and of course two floods. In operation the diver has the choice of a single spot on 50% power offering a staggering 12 hours burn time or a single spot on 100% power offering six hours burn time.

#### **Spot Flood Head**



Spot Spot Head



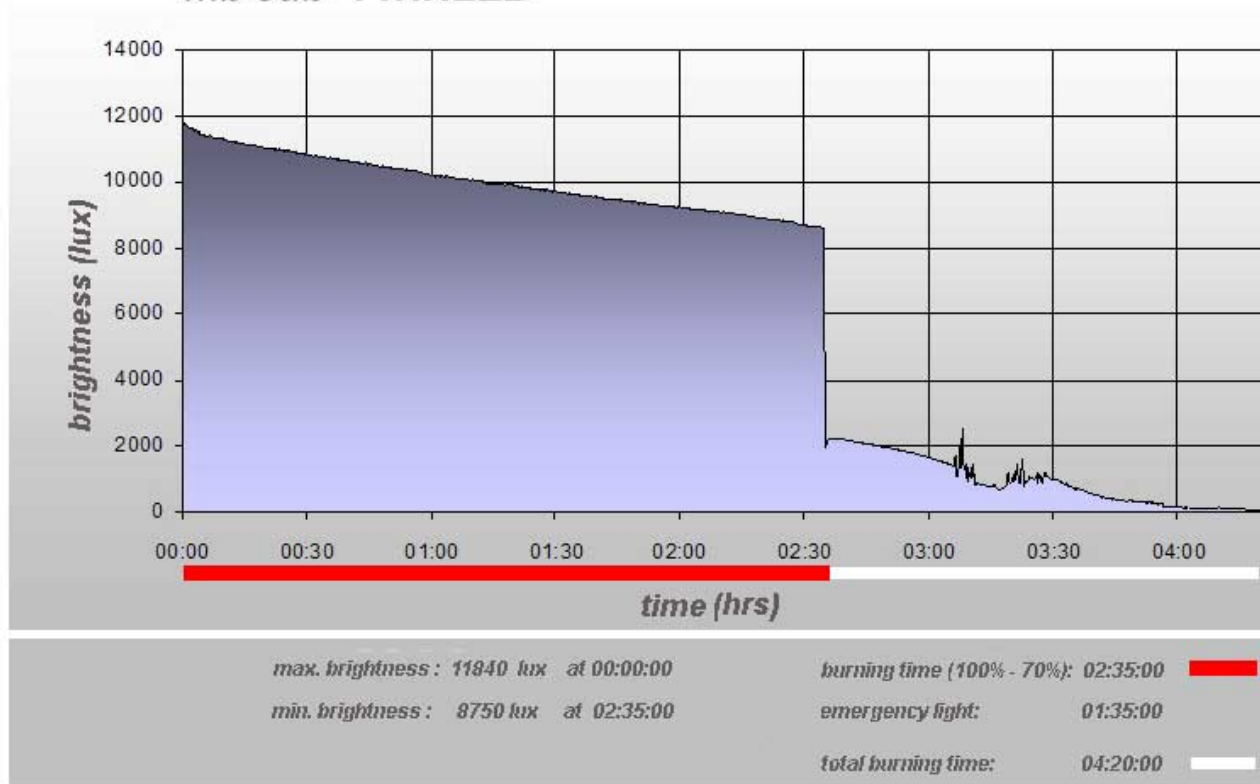
Should a bulb fail the second LED can be switched on with no loss of performance. Each bulb is individually managed to allow complete redundancy in all areas with the obvious exception of the connection to the power source.

For wreck divers and especially cave divers, having this redundancy in the torch head offers real security. Back up torches are able to get you out of a situation where a primary has failed but they are not designed to allow the dive to continue as normal. This twin LED system offers the diver the opportunity to carry what is basically a redundant primary torch covering the main failure areas of the bulb and the controlling electronics.

However, on the occasions when the diver should require optimum power from his torch they have the further option to switch on both light heads and produce 2000 lumens of light. In doing so the burn time will drop to just over two hours thirty five min's on a full charge, which should still be more than adequate for most dives.

In order to avoid total loss of illumination and damage to the batteries by fully draining them the MB Sub has incorporated some clever discharge protection controls. At a pre set power out put level the torch will revert to power save mode giving over an hour and a half of further emergency use.

### ***mb sub TWINLED***



With the range of options available the diver can decide to run the torch in safety mode of a single bulb running for maximum burn time with redundancy in the primary head. At time where more power is required he can simply double the light output by switching on the second bulb and reverting to safety mode again once the moment has passed.

## DESIGN

The new head incorporates the excellent fully adjustable Goodman's handle previously used on the Photon. Adjustment is via Allen bolts which fit a standard scuba tool ensuring you will be able to adjust them at most dive sites even if you left your tools at home. I'd still prefer a simple screw for this which can be adjusted with the edge of a knife or a coin but if you're going to use an Allen bolt, this is the next best choice.

A well thought out loop is designed in for attaching a P clip and the light head controls are lockable to ensure stowed lights are not accidentally turned on. The red knurled knob screws down into the dimples in order to achieve a definite lock on the chosen light option.



Position 1: Half power single bulb. Position 2: Full power single bulb and Position 3: Full power dual bulb. As before the head is attached via a double Oring sealed connector and power is transferred through a gold plated coax type plug.





In use the light head feels very comfortable and controls are easy to operate. However you do need to take care not to over tighten the locking nut making it difficult to undo with gloved hands and limited grip. The switch is a magnetic proximity type offering no failure point for flooding.

## PERFORMANCE

Over the last five months we have tested the torch to a depth of 76m max on a range of dives in visibility down as low as a couple of meters with a high level of particulates in the water and on dives with unlimited visibility. In March we did a full weeks cave diving in Mexico carrying out two dives a day and testing both the twin spot and spot flood combinations.

As usual we started our testing dry and in the infamous Chasey pond. Having previously tested the Ostar 1000Lumin LED against the 10W Halcyon HID it was decided to pull no punches and wheel out the 21W Salvo for comparison.

### Test 1: Illumination at a range of 6m

MBSub on single spot 50% power



MBSub on single spot 100% power



MBSub on duel spot 100% power



Salvo 21W HID



TEST2: Light spread in fresh water at a depth of 0.5m

MB Sub Twin LED full power duel spot



Salvo 21W HID



Side by Side

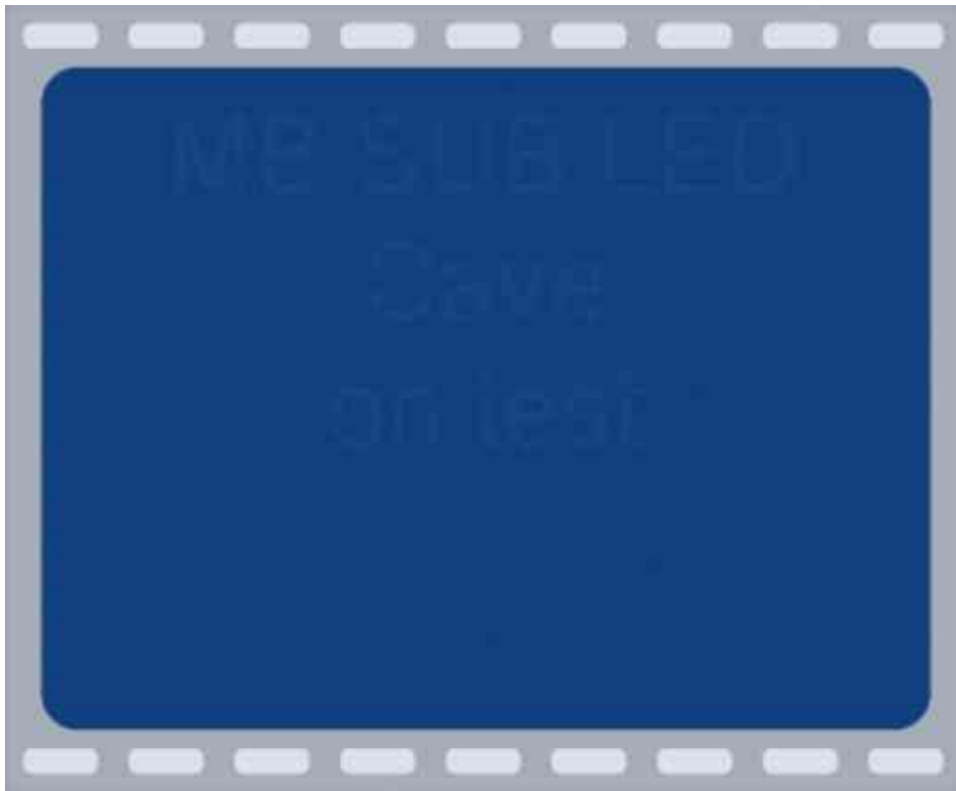


The photos demonstrate a microcosm of what the torches are like to dive. For UK OW diving I used the twin spot LED and found it on its highest setting to be the most powerful LED torch I have ever used. The first position low power single LED became redundant. With over two hours available on full power and my average bottom time in OW being less than one hour I found myself using the full power Twin LED function all the time.

The end result was a truly magnificent beam of light which I felt rivalled the 21W salvo over a range of up to 3-4m. Over 4m the focus of the Salvo would win out and out perform the MB Sub. As a long range signalling device the HID still reigns supreme.

However the blistering intensity of the beam was less useful for seeing what was immediately in front of you. The Twin LED cave had a much brighter peripheral spread of light. Once inside a wreck it gave less of a tunnel vision effect. The MB Sub could also be turned down to a single spot where upon it would give a very pleasing light for rummaging around immediately in front of your self. The Salvo is more a one trick pony. It is epic at long range but as soon as the focus is pulled out on the reflector it becomes weak by comparison with an annoying dead spot in the middle.

Seen here we have a side by side video of the 21W Salvo and the single Ostar 1000lumin spot on full power. Sadly problems with the video system prevented open water shots of the TwinLED in action with both bulbs on the UK wrecks. Fortunately it was fixed and video was shot in the caves but we had to return the torch before we were able to capture and decent wreck footage. We hope to have the cave footage available soon.



This video is also on Utube under my name Chasey888

## **IN THE CAVES**

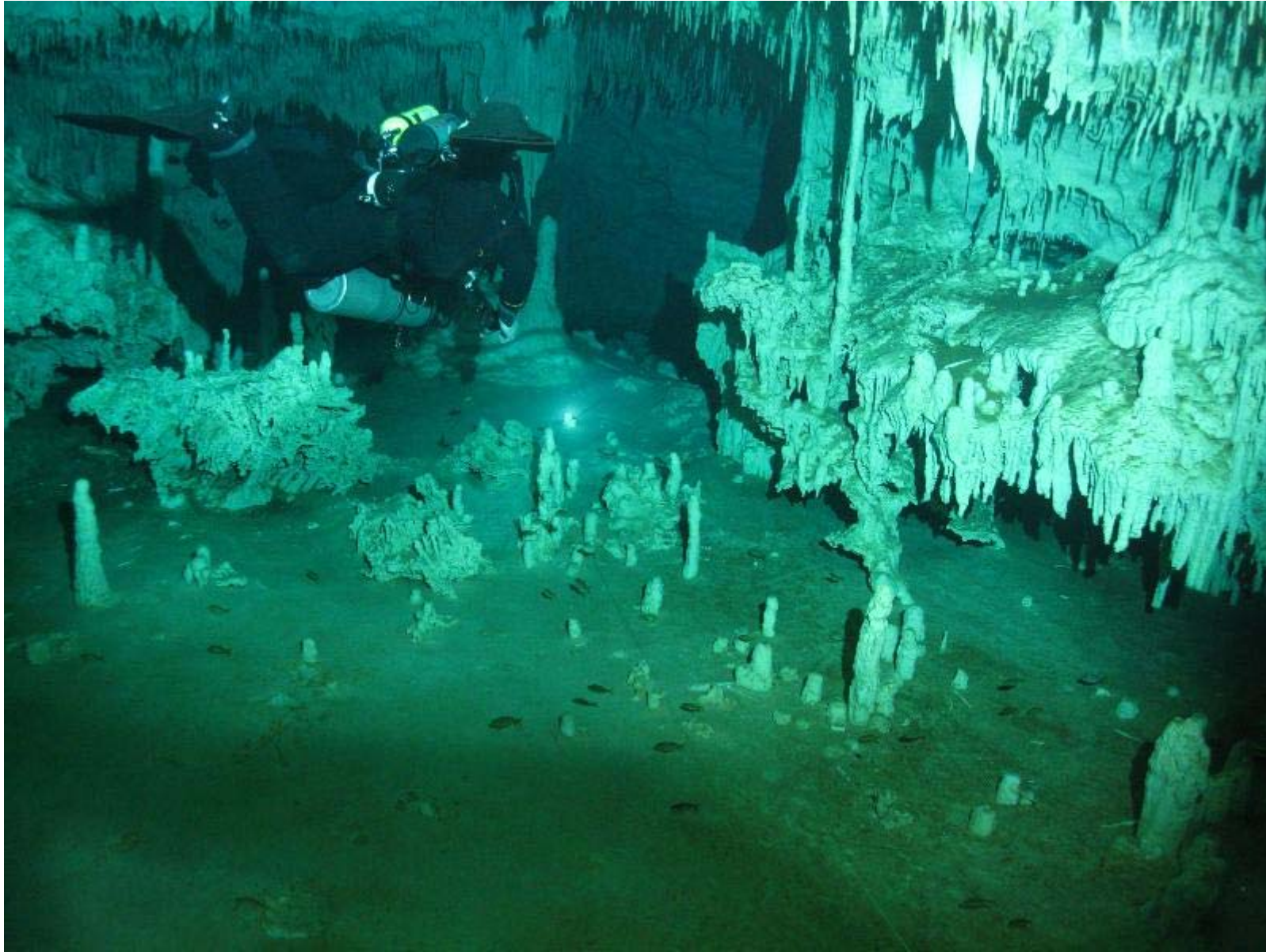
The Twin LED cave deserved to be tested in its design environment and we were lucky enough to be able to use it on a weeks cave diving in Mexico. Here for the first time I tried out the flood spot combination and it quickly became my favourite.

In the crystal clear waters of the Mexican Cenotes the power of the 21W HID's became a bit superfluous. I was at first very pleased to note the twin spot option took full advantage of the clear water and began to rival the HID's for long range signalling. On full power with both LEDs lit it appeared a match for the Salvo over a far greater distance than it achieved in the murky UK waters.

Peripheral light levels were still much nicer than the HID. On the last dive of the trip I reverted to the Salvo HID for comparison having dived combinations of the Twin LED all week. I found it reduced the pleasure of the dive for me as it failed to light up the surrounding area as well as the MB Sub.

There was no doubting if I needed to signal someone 15m away the Salvo was still king, but for a pure diving experience I enjoyed the way the MB Sub delivered the light a lot more. My dive buddy Howard said that he never needed to cover his torch to see if I was behind him. He just knew I was there by the way the whole cave was lit up.

The spot flood combination had this effect in spades. The way the flood lit the white walls of the cave was fantastic. Photography was made much easier as getting a focus on the subject in the peripheral light was so much easier than with the pencil beams of the HID's.



Having experienced the joy of lighting up the whole cave passage with the spot flood combination I became a little frustrated that I couldn't have the flood option on as a single beam. With three to four hours diving planned each day I was acutely aware that I couldn't leave the torch on spot floods combination all the time.

It would be quite selfish to purchase a flood flood combination because in flood mode the signalling power was greatly reduced. In order to signal OKs to the dive leader without him needing to turn around and check, I would drop the torch back to full power single spot mode for a clear signal.

For general signalling I found within 5m waving any light source around would attract attention but I also found that if I had the torch in flood mode I could easily blind the diver now facing me with just my peripheral light.

For my two dive buddies Howard (The Dude) found the MB Sub to be perfectly acceptable but he still felt the long range punch of the Salvo was better for murky UK diving. He did however very much enjoy the way it lit up the caves. Janos is more of a died in the wool 21W HID fan and he couldn't see a benefit in the way it lit the cave and only really commented on its lack of tight beam long range signalling power.

I on the other hand, loved it.

I would prefer a bigger battery pack to extend its full power twin bulb capability to 4 hours. In doing so it would negate the need for improvements in the light options. However if it were possible to chose to have the spot or the flood on separately as well as combined I would think this a great improvement.

I would happily sacrifice the 50% power option (which I never used apart from for brief tests) in order to have this additional function.

In order to test its safety features I carried out my final dive on the MB Sub using the twin spot on full power all day. According to my dive notes, after two hours forty six min's of continual use I noticed one of the bulbs flashing. Realising this was a power warning I turned the bulb down to single spot but still on full power and completed the remaining 32mins on the single spot without issue.

Having now finally reduced my collection of primary torches down to a Solus 1250 LED and a new type 21W Salvo I have to ask my self what would make me want to buy another new torch? I seem to have out grown the childish pleasure of the epic light sabres and I have no interest in 31W or 50W Salvos. They are just too powerful and despite their amazing performance they don't seem to enhance my diving in any way.

This twin MB Sub Twin LED torch offers primary bulb redundancy, variable lighting options that actually work well. It has rugged solid state design and massive burn time on lower power settings for that mad planned six hour cave dive or for 12 hours surface signalling at night, god forbid I should find my self floating lost in the sea one day.

That is quite an impressive feature list when combined with the superb quality of construction and design and the excellent support on offer from MB Sub. This would make the Twin LED a serious contender for my next primary light.

For further information and costing please visit:

#### MB Sub TwinLED Cave Technical Specification

- rechargeable battery: 12,6V - 9,6Ah Lithium-Manganese
- LED-head with 2 x OSRAM Ostar 1000 Lumen LED
- light power like 2 x 50W halogen
- burning time: approx. 12 hrs. at power step 1
- burning time: approx. 6 hrs. at power step 2
- burning time: approx. 2,5 hrs. at power step 3
- emergency light: > 1 hr.
- light colour: 6000°K
- body: aluminium, black hard anodized
- canister: ø=66mm; L=235mm
- 2 years warranty time
- travel-charger
- pressure resistant: 200 meter

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#### Tekst af Kevin Juergensen

Kopi af rapport fra <http://www.rebreatherworld.com/dive-lights-torch/26218-mb-sub-twin-led-cave-test.html>