On The Wreck Of The Milano A World Record Dive In Cold And Darkness

Text by Pim van der Horst Photos by Marco Sieni and Christian Mueller

On the 10th of January, 2008, my mobile phone started to buzz: I was receiving an SMS message. I pushed the button on my phone and read the message, "Pim, do you want to come to the DDE show in Italy in May? Mario." My friend and (extreme) dive partner, Mario, invited me to join the Dynamic Dive Exhibition at Lago Maggiore in Italy. I answered, "If I have time, I will be there." That was the start of a big adventure and a big dive....



Preparation of the dive plan

On the 7th of November, 2007, the Fire Department of Verbiana, together with the Diving Forces of the Regional Directorate of Lombardia, discovered, during a training session with their brand new ROV (Remote Operated Vehicle), the wreck of the famous ship, *Milano*. Belonging to the "Navigazione Lago Maggiore" (Major Lake Navigation Company), the ship sank on September 26th, 1944, under enemy fire while carrying soldiers and civilians from Laveno (VA) to Intra (VB). The damage caused by three Anglo-American aircraft made the *Milano* sink in minutes. There were many casualties. The wreck is more than 50 metres long and 6 metres wide. The ship is broken into two sections lying about 20 metres away from each other. One part is at around 230 ft/35 metres on a flat bottom and the other lies at around 215 ft/20 metres on a slightly sloping bottom. The local television station made a program on the *Milano* and interviewed people from Verbiana who still remembered the disaster.

Marco Braga, program manager of DDE and president of the Italian diving organization PTA (Pure Tech Agency), sent me by email of the preliminary program of the show. He was also planning to add some "tech" events. At that time the scope of the tech event was not known yet. But a couple of days later, Marco sent me a video link of the video made by the ROV of the Fire Department. Marco thought it could be a nice subject for a tech diving event: a world record wreck dive (the old record was set at 205 metres), and more. It would be done on Closed Circuit Rebreathers in cold, fresh water with three divers at the same time!





Left: Preparing the ballout gasses.

Bottom: "Mental check" of the deep divers by a medic. From left to right: Mario, Pim, Alessandro





During the entire time, Nuno Gomes (World Depth Record Holder) was there, as witness for "World Guinness Book of Records." Well, with all that information, we could start to work things out. Is it possible for technical divers to make that crazy dive? What should be the objective of the dive? The divers should ask themselves if the dive is worth the risks. Are the divers up to such a big dive physically and mentally? Do the divers have the necessary experience and skills?

It was immediately clear that the bottom time would be very limited: 3 to 4 minutes at the most. What kind of problems would we encounter? We checked the videos of the wreck made by the ROV. The wreck as such was not very exciting. The "deeper" part was more interesting to dive on. So, after some discussions, we decided to go for the deeper part. We also agreed on the objectives of the dive:

- · Obtaining video footage of the wreck using human cameramen,
- Working as an international closed circuit rebreather team taking advantage of the experience of some of the most famous, expert, extreme rebreather divers active these days in the world,
- Making a "record dive" on a wreck in open water. The maximum depth reached by divers in a similar environment has been 205 metres of water.

Now we needed to get a team of rebreather divers together. Marco and Mario invited Alessandro Scuotto and Cedric Verdier to participate. I knew Mario from some courses. He did his Ouroboros CCR instructor course with me and I did my cave instructor course with him. I didn't know Alessandro personally, but I did meet Cedric on various occasions. I was with him in the Philippines for the Yamashiro dive and I met him only a couple of months before on Mallorca for DIRrebreather and some cave diving. We were going on a DIRrebreather expedition to Lebanon to dive the Victoria. In Lebanon I shared a room with Cedric and we had plenty of time to discuss the world record dive. On that dive we had an extra risk (compared to other extreme dives); hypothermia. The water temperature on the bottom is around 4 to 5 degrees Celsius and somewhat warmer near the surface. One can stay in water at that temperature for about 2-3 hours maximum. As I dive in cold water frequently, I know from experience that after one hour (in a membrane drysuit with a 400-gram thinsulate under suit, thick underwear and dry gloves), it becomes difficult to move your fingers and respond to emergencies in a fast way. With an estimated runtime of 8 to 9 hours, we had to find a solution to solve the hypothermia risk. The solution came from Mario and Marco. They found a company (Palumbarus) that could provide us with a diving bell. In the bell we would be dry and we could run our decompression with a PO2 higher than the "normal" 1.4 to 1.6. In case of oxygen convulsions (CNS poisoning), we would not drown. The PO2 in the bell would be around 2.1.

The ascent from the bottom to the bell shouldn't take more than three hours because of the hypothermia risk, but also because of the scrubber duration of the rebreathers (about 3 hours). Given the diving conditions (depth and temperature), this was, in my opinion, the absolute maximum. Depth and the low temperature have a negative effect on the scrubber duration. Also, we tried to stay below 100% CNS when in the water. We chose our setpoint in such a way that in three hours we were below 100%. This resulted in a setpoint of 1.4 on the bottom and 1.5 from 150 metres and up.

We generated some tables with V-planner and GAP. I got a special version of GAP from Kees Hofwegen (the author of GAP), since the "normal" GAP is limited to 180 metres. Taking the three hours in-water time into account, it would mean that we must enter the bell at a depth of 21 metres. From 21 metres up to 12 metres we would breathe 50% nitrox. From 12 metres up to 6 metres we would breathe pure oxygen. After 4 hours in the bell, the total CNS was more than 23,000%. At that time we didn't care very much about our oxygen clock anymore.

Of course, there are many other risks to consider: equipment failure is one of them. Redundancy planning is very important, but one should take care not to create too many logistical complications. I decided to take only three lights: one LED Metalsub light, one LED backup light and one HID light on my video camera. Mario and Alessandro wore helmets with lights on them. Furthermore, the ROV would be waiting for us on the wreck and we would use her lights to show us the direction to the wreck and the shot. We also carried a reel with at least 200 metres of line and an SMB (with a small tank for inflation) in case we had to make a free ascent. In case of a free ascent, surface support would drop a line with bailout gas on it (150 metres) and then drag the diver towards the shot and the decompression station.

Then, only two weeks before the dive, Cedric had to cancel. His diving equipment was stolen when he returned home.

My personal preparation consisted of taking care of my physical condition (training program and food diet) and making deep dives in Lebanon on the *Victoria*. I was not sure which rebreather I





Left: Operating the ROV.

Right: The "landing" on the wreck as seen by the ROV.

was going to dive on the *Milano* - the Megalodon or the Ouroboros. I decided to prepare both rebreathers and take them to Italy. The deep divers prepared their own on-board gasses and personal bailout gasses. We decided to carry our own bailout to bring us up to about 135 metres, where the other bailout gasses were staged. The staged bailout gas was calculated for two divers, because the risk of all three divers having to bail out was regarded as low. Two days before the dives, I made the decision to dive the Ouroboros because Mario and Alessandro were also diving a Boris, the Boris has a radial scrubber, and the (first stage) regulators were Poseidon Extreme regulators (certified for great depths). And I didn't fill the handset of the Meg with mineral oil.

There was still another thing to do: ask permission from my insurance company (DAN Europe) for the dive. I sent them an email explaining the dive and the standard operating procedures. DAN indicated that the dive was high risk and on the border of what is regarded as physically and humanly possible. They stressed the risks of hypothermia, oxygen toxicity and also HPNS (High Pressure Nervous Syndrome). After some email discussions, I got the approval from DAN Europe to make the dive.

Preparation of the dive logistics

On the 6th of May, the preparation of the dive logistics started. The fire department was instructed and they started to put a large tent into place for accommodations. On the 6th also, the large pontoon arrived. Only on the 8th the pontoon would be towed to the location of the *Milano*. Until that day it was in the harbor so all equipment could be taken on board. The 7th of May, early in the morning, Remko van de Peppel, (my Dutch shallow support diver), and I went to the harbor of Verbiana. There we met with Fabio Manganellio, the Dive Marshal. The bell would arrive that day. A vessel with a crane on the deck from the sponsoring diving company, Palumbarus, would put the bell in place. The bell was brand new and had to be fitted with all the hoses for the gasses, communication system and warm water. Alessandro was taking the lead for fixing the bell. We underestimated the job that needed to be done on the bell and it took one day more than expected. Because we wanted to test the bell in a proper way, we decided to postpone the date of the dive by one day. The bell was suspended under the pontoon, so it could not be lifted out of the water. That meant that we had to exit the bell through the water. Because of the risk of oxygen convulsions, it was decided that the deep divers would exit the bell on open circuit, using full face masks.

On the 9th, the pontoon was towed to the location of the wreck. The wreck had been located the day before by the fire department and a shot had been put into place. With the help of the ROV, the shot was placed 30 centimeters from the wreck. Next to the shot, a deco station that went down to 80 metres was put into the water. On the deco station the bailout gas was staged. I made a short dive to 60 metres along the shot to test my descent speed, and check the visibility and the water temperature. The tests of the bell showed that it was working perfectly.

In the evening the whole team assembled in the harbor for the final, big briefing. The whole team consisted of about 60 people. Laminated task lists and decompression tables were distributed amongst the team members. After the briefing we all went to bed for a short night....

The dive

At 7 AM on the 10th of May, Alessandro, Mario, and I went on board the vessel that would take us to the pontoon. We would gear up on the vessel and enter the water from the vessel; the pontoon was about two metres above the water. I did my usual rebreather checks. Then Mario, Alessandro, and I had a short, final talk. We agreed that if, during the descent, one diver had to abort, the other





Top to Bottom: The pontoon from a distance.

Alessandro (left), Pim (middle) and Mario (right) are kitting up.

Just before the descent. View of the pontoon from the shot line.



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The deep divers are ready to go!

two divers would continue the dive. If one diver had to abort the dive on the bottom, all three divers would ascend together. At 8:30 AM we were ready to enter the water. The swim to the shot was a short one. At the shot we got our video cameras, made the last OK sign and started the descent at exactly 9 AM.

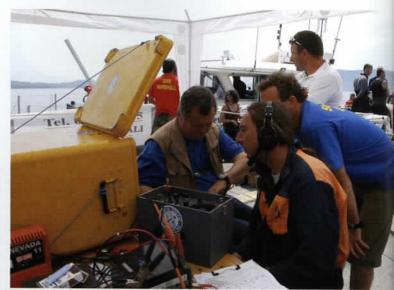
The shot line made a sizzling noise as it slid through my fingers. Meanwhile, my ADV was inflating the loop continuously. I also was continuously inflating my drysuit and adding gas to my BCD. Suddenly, at 140 metres, I got a low-pressure alarm. My onboard, 2-liter diluent tank was almost empty! So, I switched on my offboard diluent and I continued my descent - still 100 metres to go. I also switched to my high setpoint (1.5). Switching earlier to the high setpoint would have caused spikes in the PO2. At around 180 metres, I felt a little shiver going through my body. Could it be HPNS? I decided to slow down my descent speed. The shivering stopped.

At 220 metres I saw a dim light coming from the bottom: the ROV was illuminating the wreck. Mario and Alessandro were swimming around the ROV and the wreck. They both signaled that they were "OK;" I took my video camera and taped them. I was touching the bottom and took some images of the divers from below. At 13 minutes runtime Alessandro made the sign: "1 minute left." At exactly 14 minutes runtime, the three of us started the ascent. The ascent speed was relatively high until 150 metres. From 150 metres up, the ascent speed was the "normal" 10 metres per minute. I was feeling good and very pleased with the new world record. The only thing left was a long deco of almost eight hours.... But then at 120 metres I felt water coming into my drysuit. I immediately felt the cold through my body. I suspected a leak in my OPV (over pressure valve). Later (after the dive) I discovered that the membrane of the OPV had shifted. It went through my mind that it would be a tough ride to the surface. In the meantime, however, I shot some video of the divers and also of the deep support divers at 100 metres. Later I watched the film that was made by Mario. On that video one of the deep support divers wanted to congratulate me with the record. I reacted

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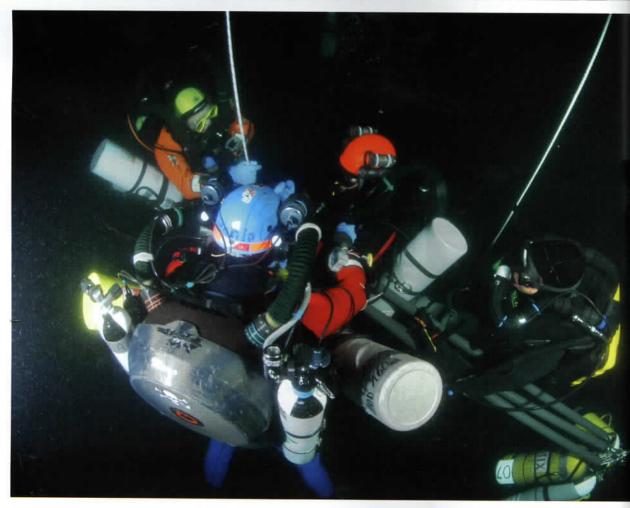




Top to Bottom: A rescue helicopter looking for divers in case of a free ascent.

The medic (left) checking on the condition of the deep divers in the bell through communication equipment.

The deep divers meet the deep support divers at 100 metres.



very slowly. Hypothermia was having its effect already. Around 80 metres we went off the shot to the deco station. There I saw that Alessandro was having problems. He was signaling that he was suffering from dizziness and vertigo. Mario was already assisting him. At a depth of 60 metres, Alessandro had to bail out. He stayed on open circuit until the bell. I was getting colder and colder. My sight turned bad, and I had difficulties reading my decompression tables. My fingers felt numb and pressing the inflators and holding onto the deco station was getting difficult. At 40 metres I met Remko. In the meanwhile, I ran out of argon with still one hour to go before entering the bell. I told myself to hold on for another thirty minutes. I skipped thirty minutes of deco to enter the bell earlier. I decided to compensate for the time when I was in the bell.

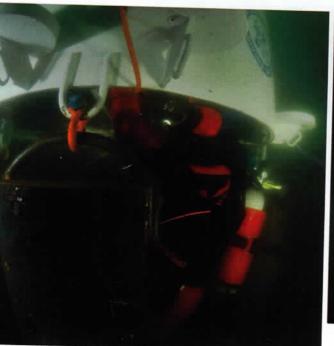
Remko accompanied me to the bell. Together with another shallow support diver he took off my Ouroboros. I could barely move. I was trying to get into the bell, but almost every power had left my body. Only when Remko signaled that the other divers needed to enter the bell, was I able to push myself inside. In the bell I opened the oxygen valves and put on a breathing mask. I felt very dizzy and had to vomit once. Ten minutes later Alessandro and Mario were entering the bell. Alessandro was not in good shape and he vomited frequently. Mario and I ate and drank something. Mario was communicating with the surface through the communication system and was keeping the surface medics informed on the condition of Alessandro. Every thirty minutes we did our airbreaks and after a while the bell moved up to the next deco level. After almost five hours I was going to be the first diver to exit the bell. Two fire department divers guided me to the surface. There, a large crowd was waiting for us. Surface support laid me down on the warm deck of the vessel. My wet suit was removed and a medic checked my blood pressure and did some "sanity" tests ("What is your name? Where are you coming from?"). I was feeling pretty dizzy and getting up on my feet was not easy. I was wrapped up in an aluminum blanket to prevent loss of body heat. Cameras were clicking and zooming. TV teams from Italy, Russia, US and South Africa were filming the whole event. Within a couple of minutes, Alessandro and Mario emerged. Alessandro was taken care of immediately by the medics. In spite of his physical condition, he was smiling and waving to the crowd. He was transported to the nearest recompression chamber. Mario and I gave some interviews and posed for pictures. Slowly the people were leaving the vessel and the pontoon. Mario and I were transported back to the harbor. We had a lot to talk about, but we saved it for later. It took me another two days before my dizziness disappeared completely.

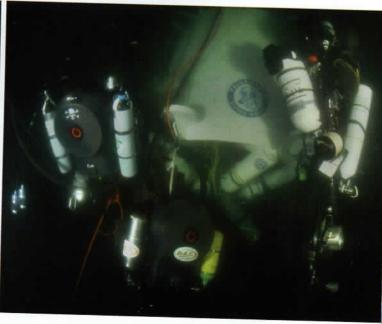
Official World Record Wreck Dive 236 metres (241 meters height compensated)

During the entire time, Nuno Gomes (World Depth Record Holder) was there, as witness for "World Guinness Book of Records." A list of official record dives can be found on: www.nunogomes.co.za/rec.htm

Left: The bell at 21 metres. Support divers are checking bell.

Right: Ouroboros rebreathers outside, deep divers inside the bell.





About DDE

For many years diving exhibitions have been organized around the entire world, but what happened in May 2008 will be considered an innovative and outstanding event - literally from another planet. From the 9th to the 11th of May, thousands of divers from all over the world gathered in Maccagno, a cozy, welcoming town on the north coast of the "Lago Maggiore," just a few kilometers from Switzerland, to "physically" participate in the most exclusive and new-concept exhibition. http://www.ddexhibition.org/ A world record wreck dive.

About Pim van der Horst

Pim started diving in 1983 at the University of Tilburg (The Netherlands). He came in contact with technical diving when nitrox was introduced in The Netherlands in the early nineties. A next step was rebreather diving. He had to seek technical training abroad (UK and the US). Technical diving and especially rebreather diving got Pim's interest and he continued his technical training. He started up his own technical diving school in The Netherlands: Pim's Tekdiving (PTD). PTD has several facilities in The Netherlands and instructors abroad. Pim is Tri-Mix Instructor Trainer Closed Circuit (more then 10 different rebreathers) and Open Circuit for several agencies (DIRrebreather, ANDI, IANTD, PADI, PTA/CMAS and WOSD). Pim has trained over 1000 divers. Pim publishes on a regular basis in Dutch and Russian diving magazines. He is the author of several books on technical diving and rebreathers.

Contact: +31647940668, pim@tekdiving.nl, www.tekdiving.nl







About Mario Marconi

Mario began his diving activities in 1993. In 1997 he accomplished his first diving training with IANTD. In 2001 he became a PSA Advanced Deep Air Instructor and then started with his deep cave explorations, with open circuit first and then moving to closed circuit. He is also using and studying the advantages of Heliox diluents for closed circuit, deep cave exploration. In 2002 he co-developed and tested the SCR Passive addiction EDI2002 specially projected for cave dives in extreme conditions. Mario is a P.T.A./C.M.A.S Extended Technical Instructor, Full Cave Instructor Trainer and Ouroboros Rebreather Instructor. Contact: +393473027647, mar.marconi@libero.it

About Alessandro Scuotto

Alessandro had his first dive at 6 years old, and his first scuba certification at 12. At 18 years old he already was a recreational diving instructor. In 1996 he had his military underwater certification with "Com.Sub.In" from the Italian Navy. In 1997 he achieved his first technical Instructor certification. Using Rebreathers from the very beginning, he experienced lots of hours on different machines. In addition to that, Alessandro is an OTS (Commercial Diver), Hyperbaric Chamber Operator, R.O.V. pilot, UW submarine pilot. Now he is the vice chief of Napoli's section of the underwater team of the Italian Police. He is also the chief executive officer of Deep Sea Technology (commercial diving company). Alessandro is Instructor Trainer for PTA/CMAS, NASE and PSA. Contact: +393355646355, info@deepseatechnology.com, www. deepseatechnology.com

The Media

The dive had a large media exposure (television, press) from Italy, Europe, Russia, US and South Africa.

Documentation and further information about the preparation and execution of the dive can be found on: www.ddexhibition.org/DVD_Video.html

www.ddexhibition.org/Foto.html

Footage of the wreck discovery (by ROV of VVF), wreck history and general information:

www.ddexhibition.org/RecordMondiale.html DDE Sponsors, Supporters, Partners: www.ddexhibition.org//SponsorUK.html www.ddexhibition.org/SuppoortersUK.html www.ddexhibition.org/PartnersUK.html

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