

A thirst for life.
A story of one dive.

Lessons learned

Text and photos
courtesy of Gennady Misan

Not all technical dives end up successfully; unforeseen circumstances often make an elaborate dive plan go completely wrong. What will a person do when it's a question of life or death? Give it all up and submit, or fight until the end, trying to find the way out? On January 9th, Gennady Misan had a 155m dive that could have ended tragically, but due to accurate work of the diver and the support team, we can learn all the details not from a police record, but from the diver's own words.

Deep diving in Lake Baikal
Reaching 1,642 meters at its deepest point, Lake Baikal, located in southern Siberia in Russia, is the deepest and largest freshwater lake by volume in the world. A typical dive site on Baikal is a shallow shelf, 10-200m long, turning into a vertical wall. There are only six sheer walls reaching more than 100-120m into the deep.

Usually, in order to be guaranteed a descent of more than 100m, you have to stand on the edge of a drop-off, move along the surface until the wall is out of sight, and then continue for another 30-40m. In other words, the descent always takes place in open water, with no markers, and



from 110m (even at 50m, if the visibility is bad) —in complete darkness. Ascent will usually take place by following the seabed to the slope, then go up along the wall.

Freedom and beauty

I don't like diving with guidelines (lifelines) and don't practice it. The fall is just a few minutes, and after that, an hour and a half long decompression in deep blue. That's really something special!

Those who have dived on Baikal will understand. Free fall and surfacing allows you to enjoy the incredible beauty of nature when you look up and down from 100m and see picturesque canyons, mountain ranges, grottos. The stark beauty of the lake captures you.

Water temperature in depths of over 60m is never more than 4°C (39° F). On the surface, it depends on the season. In December through January, it's 1°C to 2°C. The thing is that the temperature is the same in all depths available to Trimix divers at this time.

Planned the whole thing

Why did I plan on diving in January? The answer is simple. Such dives need pro-

CONTRIBUTING EXPERT ON THIS STORY
Gennady Misan— instructor-trainer IANTD, Advanced Trimix instructor TDI, instructor CMAS3*; professional diver since 1988; completed more than 8000 dives, most of them on Baikal. Personal achievements: Russian record in cold water diving - 154m (December 2005), 85m night dive (2006, New Year)

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found self-preparation and well-trained buddies. It's not a "why-don't-I-do-it-today?" thing when you wake up in the morning, decide to go to the dive centre, put the equipment into the van, drive one hour, and you're there. Preparation kept me busy the whole summer and autumn.

Perhaps I was wrong

I'd done my previous 154m dive solo. There was only safety equipment on the surface, and in the

middle of the dive, a support diver came down to me to see if everything was going well.

With other 100-140m dives, I only had safety equipment on the surface (except those connected with courses and deep-water support).

I'm not sure I was right then. The shoulder of a buddy is a great emotional support and a real help. Now, I don't dive deep alone.

In September, Andrei Slepnev

and I began preparing for deep dives. Andrei had been doing Trimix diving for quite a while, passing the IDC qualifications for technical instructor.

We needed training to prepare for diving in complete darkness, especially in two's. We'd been doing this for a few months interrupted by routine work at the dive club. In December, we made four 55-60m ER dives; 70-90m trimix dives; and on January 3rd, a 100-meter dive.

Gennady Misan in his 'Sunday outfit'

Malfunction of equipment included only Andrei's Legend, which froze when going into the water (70m dive). The regulator underwent technical service, and the following dives were successful. My equipment never failed.

TECHNICAL SPECS OF DIVE

SUPPORTS: Andrei Mourzin (CMAS 3*, EAN IANTD), Tatyana Oparina (ATD TDI, Advanced EAN Instructor IANTD), Sergey Polovnikov (a diver).

GASES: TM 8/67 (double tank 12*2), TM 14/50 (deco 12l, alum.), TM 32/20, EAN 60 (I use the same gas to inflate my dry suit), O₂ Aboard is spare oxygen and EAN50 in case we lose deco gas.

EQUIPMENT

Suit: HD Pro Dry Trilam Bare and dry gloves

Undergarment: warm woolen underwear and Weezle Extreme+

Computers: VR 3

Torch: Metal Sub 50 plau a spare one, Lola.

Oxygen regulators: Apex ATX 50

Main regulator: Apex TX 100 (connected to the right inflator)

Spare regulator: Apex ATX 50 (on the left inflator)

Wing: Dive Rite Dual Rec with DIR mount, steel back. (I always use the wing as a mount only and as a spare system for buoyancy, inflating only the dry suit.)



160 meter dive

A 160m dive was planned for January 9th. My buddy was Andrei Slepnev (ATMX TDI). It was a great experience diving on Baikal.

Dive site "Baranchiki"

One of vertical walls descended more than 120m. Approximate visibility was 50m (when I had dived there ten days earlier). The water was nearly frozen; sludge ice ran all along the Circum-Baikal Railway.

The plan. The dive boat came to the edge of the drop-off. There have been many dives taking place here before. The wall is about 30m away from the shore.

Andrei and I went into the water and moved away from the wall along the surface. The sheer wall was in sight. We descended together to 100m where Andrei would stay. His bottom time would be ten minutes. His other task was to keep spare decompression



Exploring the rich green underworld of Lake Baikal

I realized that through a spare regulator, at a great speed, my bottom trimix was getting away!



Talk about freezing temperatures! Air tanks covered in ice lay on deck

gasses.

Leaving Andrei I kept descending until I reached 160 meters. I spent one minute on the bottom and started my ascent. At 100m, I met Andrei again, and we ascended to surface together, moving slightly to the right.

At 16 meters, where there is a gas shift to EAN60, we met the first support team member; if needed, we would give him the used travel gas. He supported us up to the 6m stop. At 6m, we met with the second support member. He was there to monitor how we felt and keep and eye out.

The total time of the dive was 98 minutes.

Support team

The support member on the surface has the responsibility of supervising the entire dive. In case a buoy appears or any unplanned situation occurs, he must send a boat and help get divers back on board. There were two other groups of sport divers on board who dived on their own.

What happened

January 9th, 10 am, our live-aboard headed for the dive site. It was cloudy, relatively warm (-8°C), and Baikal was calm. We came across some smaller isolated ice floes. Water temperature was at the freezing point.

While under way, we were kitting up in a warm lounge, checking everything one more time, and running over the diveplan.

We reached "Baranchiki" at around noon where we anchored without any problems. Visibility was zero. We couldn't see the edge of the drop-off but the echo sounder indicated a depth of 70m.

I went into the water. Meanwhile Andrei had problems with his equipment which delayed him. The edge of the drop-off was all a blur, which meant visibility was no more than 20m. I decided not to wait for Andrei, and having co-ordinated with the support stand-by, I commenced my descent.

1st minute. Everything was going according to the plan. At 20m, I switched over to the bottom mix. I couldn't see the wall.

3rd minute. At about 80m, there was no daylight left, and I could only see by torch lights. I was outstripping Andrei a lot and hoped he was descending not too far from me. I reached 100m and descended further. No wall was seen. I turned around to look for the wall in the torchlight.

4th minute. 130m. There was the wall, five meters away. I pointed my torch downward along the wall which just seemed to disappear into the abyss. I started to slow my descent.

5th minute. 150m. I was descending slowly. The wall was still five meters

away but the bottom wasn't visible yet. Somewhere from underneath me, I caught a glimpse of escaping air. I stopped at once and began surfacing. The depth was 155m. I couldn't understand where it was coming from—some stage tank? The current of gas became very powerful, and I realized that through a spare regulator my bottom trimix was bleeding away — and fast!

A couple of seconds later I started to rise. Subconsciously, I realized that it was probably the left inflator; I automatically turned off the valve and did my best to vent. Simultaneously, between the four stage tanks I was carrying, I found the one with the gas I needed.

7th minute. Depth 125m. I have managed to shut down the valve but it



I tried to figure out where the drop-off was and started moving in its supposed direction.



Heading out towards the drop-off

seemed that all the bottom gas was gone. Finally I found the correct regulator. I hectically switched it over—*what if I mixed up the gases?* The regulator started to free-flow but I didn't pay attention. Now I had a far more serious problem in getting the ascent under control. I couldn't see the wall, so I started surfacing in open water.

While switching over to the travel gas, I lost the venting valve on my dry suit. I was trying to vent the suit and the wing simultaneously. The valve was completely, but it couldn't cope with volumes of expanding air wanting to escape

Run-away ascent

8th-9th minutes. I shot straight up,

while trying to stop. It was completely dark around me. At some point, I must have fainted. I couldn't see anything, everything was hazy.

10th minute. I wondered how I managed to come around and keep fighting for life. 35m. It turned out that apparently I have managed to switch over to Trimix 32/20, and it also was at a freezing point. My ascent slowed down.

At 28m, I finally managed to stop. Exhausted, out of breath... Fits of suffocation. There wasn't enough air. I still felt dizzy. I assumed that I got a respiratory form of DCS.

Assessing the situation

There was a wall of small bubbles in front of me coming from the deep.

I assessed the situation: Bottom gas was spent; travel 32/20 was nearly spent. There was Trimix 14/50, half of EAN60 and pure oxygen left. I felt awful. I didn't want to go deep down and cover the missed stops.

After the assessment of the speed of coming up and its consequences, I decided to switch over to pure oxygen and go for my ascent. I tried to figure out where the drop-off was and started moving in that supposed direction.

Should have's

I should have ascended to where I had switched over to EAN60, then moved on and switched over to pure oxygen. But I thought that in my situation the sooner I started

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Cruising through ice pack on Lake Baikal



breathing oxygen, the better. The tank had no nitrogen, so it was supposed to lessen the degree of DCS, which meant to kill me as soon as I surfaced.

After a couple of minutes of breathing oxygen, moving towards the drop-off and coming up, there were no changes in the way I felt—it didn't get worse. I kept on ascending. After four minutes, I appeared on the surface and saw the drop-off. I gave a signal for help and tried to go down again—at least to 3 or 4 meters; I thought I should have decompressed at that depth. After giving it a try, I realized that, physically, it was out of

the question.

17th minute. On the surface, I looked around, searching for the boat. It was about 70m away from me. I started waving and calling for help. Fits of suffocation came back, I couldn't feel my legs. I tried relaxing while waiting for help. I was breathing oxygen all the time.

Stand-by's

The hose had burst on the boat; it was impossible to use it. It was then decided to send for the ship *Valeria*, which was moored. However, just five minutes earlier, the recreational divers had gone

into the water. In order not to go over their heads when leaving, it was decided to send one of the stand-by's to fetch them.

It took no more than two minutes, since the stand-by was already ready to get into the water. The divers were found by their bubbles and were ushered onto the shore.

The ship headed for me. Twenty minutes after surfacing, help arrived in the form of my buddy who, when realizing that everything had gone wrong, had decompressed as soon as he could and came up to the surface. And help

There is always a chance to survive. Only those who think and prepare have it.

Baikal

was also provided by the *Valeria* crew. I wasn't able to take off the equipment and get aboard myself, besides, it was better not to move at all. My buddy helped me with the equipment; the *Valeria* crew—in icy water up to their knees—were trying to help Andrei.

Finally, I was lifted up, taken to the cabin, released of the equipment, and given pure oxygen. I'm very grateful to the crew and my buddy for their professionalism and cooperation.

Post decompression

My symptoms included numb legs and a feeling that they'd been whipped by nettles. It finally dawned on me that I was truly saved and safe. People usually die of extensive DCS in such a situation. I survived.

On board, I continued to breath pure oxygen continuously. An immediate call was placed to the pressure chamber of M4C (Nicola settlement) and the boat

headed for Listvyanka.

On my way, I drank about two litres of water. The feeling of suffocation was gone, and I could feel my legs again.

People usually die of severe DCS in such a situation. I survived.

Sensitivity to cold appeared. Even a slight temperature fluctuation—like the opening and closing of a cabin door—felt like a burn.

About an hour after getting aboard, I felt extremely tired. Though I didn't feel like sleeping. I didn't observe any other symptoms like aching joints, rash, paralysis, shiver, fever, etc.

When we arrived in Listvyanka, I felt fine, although very tired. We drove to M4C. It had been three hours since I surfaced. As I felt all right, I didn't feel like undergoing any treatment.

Better be safe than sorry

At the time, the symptoms were exhaustion and a creepy feeling in my legs. It was agreed upon that I would undergo a preventive 30m recompression in the pressure chamber, with one hour exposure and the following two hours decom-





Gennady Misan preparing his equipment

pression.

At a pressure of 4 bar, the creepiness in my legs was gone, but by 18m, the sensation returned, albeit to a lesser degree. The treatment schedule remained unchanged, however.

After the pressure chamber, I went home and kept on breathing pure oxygen. Around 11pm, the back surface of my thighs and calves got numb. Sensitivity to cold increased. Slight local massage gave some temporary relief. As I

could stay physically active, no measures were taken.

On January 10th, I slept all day, but exhaustion went away by the evening. I didn't breathe oxygen that day. The numbness remained.

January 11th was a regular work day. My muscles were numb, but this didn't affect physical activity.

Serious DCS

These kinds of symptoms—suffocation, numbness, weakness—are signs of a serious form of DCS

Baikal

affecting the central nervous system. The lung form of DCS (that started when I was still underwater) takes place in only two percent of cases. Also, it is a rare thing when all the aforementioned symptoms aren't accompanied by any others.

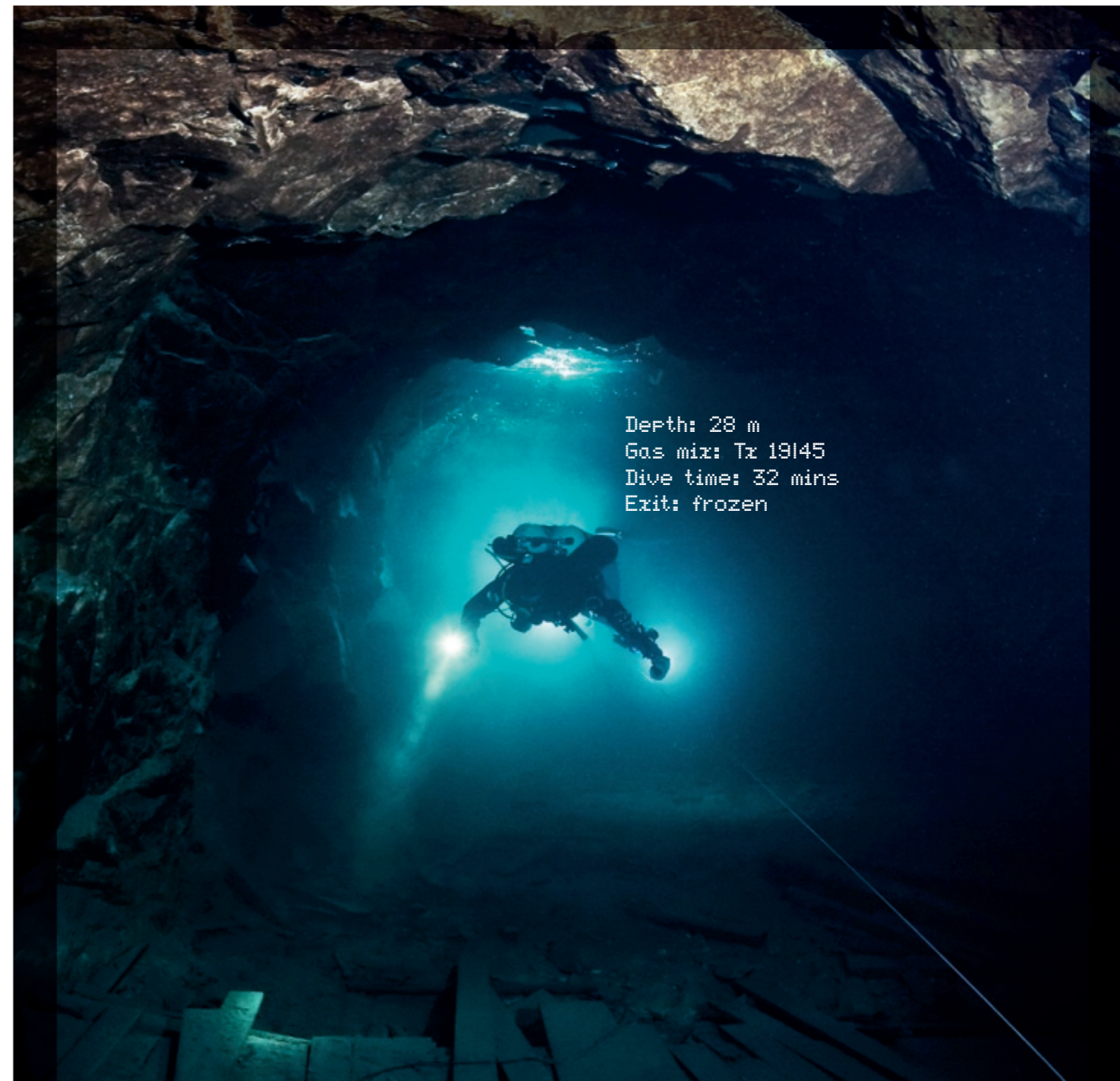
On January 12th, at 11am, I had a 40-minute long session in the oxygen pressure chamber, at a pressure of 1.8 bar. After that, the numbness decreased. On the same day, a diving expert of M4C, Valery Chernikh, phoned Boris Nikolayevich Pavlov. Based on the symptoms, I was considered to have a serious form of DCS. A second regime of medical recompression was recommended. Personally, I thought that I didn't have DCS, but just the remaining signs connected with the trauma of soft tissue.

On January 13th, at 11am, there was one more session of oxygen therapy (2 hours at 2 bar). At 8pm, I stopped arguing with my wife and M4C experts, and went to the M4C pressure centre. At 11pm, they started medical recompression in the pressure chamber. At 70m, all my symptoms disappeared, but after coming up to 38m, they returned. After consulting the M4C experts by phone, we moved on to the third regime of recompression. My total time in the pressure chamber was 60 hours and 45 minutes.

After all I completed this program, DCS was completely eliminated. Symptoms connected with the trauma of soft tissues lingered on though. Further treatment included vitamins.

Analyzing what happened

This dive should have been cancelled at the beginning when my buddy was delayed by equipment problems. A version of Murphy's



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Baikal

I didn't do what I always mention at all technical courses: Stop diving if something goes wrong



Lake Baikal is stunning and has an unique beauty

Law says: "If a few misfortunes are to happen, they happen in the most unfavorable order." Thus, in diving we can say, "The greater the preparation for an extreme dive, the less chance it will be aborted, even if it turns out to be a failure."

My total time in the pressure chamber was 60 hours and 45 minutes.

This time, I didn't do what I always mention at all technical courses: Stop diving if something goes wrong. I didn't wait for my buddy, and though there was nothing he

could really do to help me in that situation, I started diving anyway. Regardless, this dive happened the way it happened. It was unique in its own way—unique in the fact that the diver survived and is quite well.

The reasons why I am still around:

- The dive was short, and there wasn't great saturation.
- I breathed pure oxygen from 28m and continued to do so on the surface

until my dive buddy and the *Valeria* crew arrived.

- Although I refused to go deep again to cover the missed stops, it was quite possible that the gases were enough, and they might as well have been brought by support divers on stand-by.
- Professionalism of the dive buddy and the *Valeria* crew in taking off the equipment and getting me onboard, resulted in absolutely no physical work on the my part.
- I continuously breathed pure oxygen on board.
- What is important is that despite a near tragedy, I didn't lose my sense of self-control and didn't fuss about, or panic.

The issues to mention about this dive are:

- You shouldn't make experimental dives when the water is about to freeze—my second regulator just froze in the very cold water under great pressure, even without being breathed from.

- The dive buddy, a good security team, an understanding ship crew and good ship. They're more than 50 percent of success. I made the mistake of having starting the dive on my own, but my dive buddy, the support divers on stand-by and the crew helped me finish it more or less safely.

There is always a chance to survive. Only those who think and prepare have it. You mustn't give up, you must fight. But you must fight right. Very often concentrated, persistent, unthinking self-rescuing actions lead to death.

Further plans

Baikal is covered with ice during the winter. Deep dives are closed until May.

Before, we made trimix dives in port Baikal where it is deep and the water is open even in severe frost. But aforementioned story shows that deep dives at temperature of freezing are too dangerous. Deep diving has been planned in April, in Palau. In May – deep sunken ships in the Baltic. In the end of May, we start Baikal deep water training and will practice diving with buddies. 60-80-100-110-120-130. After that... There is an idea to make a 160m dive in two or in three, and exactly on Circum – Baikal Railway where the bottom can offer you so many interesting things. ■

There is always a chance to survive.

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