

Dive Accident Report - Du'an Guangxi 5/14/2014

by Wang Yuan

On April 18, 2014, there was a cave diving accident at Nine Caves in Guangxi Andaxing, from the north entrance. In this accident, I lost my best friend and dive buddy Wang Tao. After the accident, I sank into deep mourning for my friend and was unable to extricate myself from the grief. Fortunately with the help of many good friends, the funeral was arranged, and with everyone's support and encouragement I gradually began to recover. During this time, I saw on the internet some media coverage and comments online. Most of these were inaccurate or speculative, and strayed far from the truth. (Some media reports added nonsensical embellishments to the story. Even more angering is that they published the victim's name without obtaining consent from his family. This caused trouble for his family and friends at work and at home. For that I express my strongest censure.

As the sole survivor of this accident, I am telling here the entire story of the accident and how it happened, in the hope that through understanding and reflection, from our painful loss, a real life lesson can be learned by all those who are passionate about diving, and future tragedy can be prevented.

Incident date: April 18, 2014

Incident time: 3PM

Deceased diver: Wang Tao, male, age 34 years

Surviving diver: Wang Yuan, male, age 32 years

Dive type: cave dive

Maximum depth: 166m

Cave: Guangxi Andaxing Nine Caves north entrance

Cave conditions:

Cave entrance depth: 18m

Maximum depth: over 170m

Usual visibility: 5-10m

Visibility on day of incident: 2m
Flow: weak
Water temperature: 19 degrees Celsius

Dive goal:
Explore the cave past 170m of depth

Diver information:

Wang Tao

Certifications: WUD CAVE 2 , UTD CAVE 2 , NSS-CDS FULL CAVE,GUE T1

Cave diving since: 2009

Number of cave dives: 200+

First dive in incident location: 2010

Number of dives in incident location: 15

Deepest cave dive: 122m

Maximum penetration: 1000m

Cave diving locations: China, Phillippines, Mexico, USA

Wang Yuan

Certifications: WUD CAVE 3 , PSAI/NSS-CDS FULL CAVE, UTD/NACD CAVE DPV,
TDI CAVE REBREATHING/ ADVANCE TRIMIX

Cave diving since: 2008

Number of cave dives: 400+

First dive in incident location: 2010

Number of dives in incident location: 15+

Deepest cave dive: 122m

Deepest open water dive: 150m

Maximum penetration: 3000m

Cave diving locations: China, Philippines, Mexico, USA, France, Portugal

Zhou Pei

Certifications: WUD CAVE1/TEC DEEP 1

Cave diving since: 2013

Number of cave dives: 15

First dive in incident location: 2013

Number of dives in incident location: 3

Deepest cave dive: 51m

Deepest open water dive: 63m

Maximum penetration: 100m

Cave diving locations: China, Phillippines

Dive Plan:

Gas plan: 1/3rds rule

Maximum planned depth: 170m

Maximum bottom time: 20 minutes

Planned decompression time: 3 hours 50 minutes

Roles: Wang Yuan responsible for navigation, laying line; Wang Tao responsible for arrows, Wang Yuan responsible for deco on ascent

Decompression plan: stage decompression starting at 84m, deep stops using Buhlmann, second half using bubble theory

Gas options: Because bottom time is short, the plan is to use a slightly higher PPO₂, in order to decrease total deco time. Bottom mix to contain appropriate nitrogen to avoid HPNS, and stage gas to contain appropriate helium to avoid IECD.

Direction: cave extends to the northwest

Risk analysis: low visibility requires staying close to guideline, great depth requires checking every minute for gas pressure, gas leaks, and light failures.

Staged gases: 21/35 at 57m, EAN35 at 50m (bottle switch at 36m), EAN50 at 21m, O₂ at 6m

Descend to 75m with 18/45, then drop 18/45 stage on the line, and switch to first bottom stage 8/70.

After finishing first bottom stage, switch to second bottom stage, then use back gas. (Wang Tao has 10% O₂ in his first bottom stage, so he was planning to switch at 150m.) Due to the great depth and limited time, the agreed plan was to do stage switches individually without team cross check. The team will cross check only when switching to deco gases on ascent.

NARRATIVE

1. The Beginning:

From our first dive in 2010 at Nine Caves, Wang Tao and I have been enthralled by the site. Its graceful water plants and the bubbling of the springs drew us back there again and again. From the first dive to 40 meters, then 55 meters, 75 meters, 90 meters, and down to 122 meters, we made many dives here from the south entrance, the north entrance, and the entrance under the stairs, hoping to find the main passage. In winter, visibility here can reach 15 meters, and we made dives of increasing depth. After our dives in the Meizhou caves early this year, Wang Tao and I started brewing up a plan for an even deeper dive here. With deeper dives there are many unknown factors, the greatest of which is decompression planning and physical conditioning.

In March of 2014, the French cave diver PASCAL (world record holder in deep diving) extended the line from the Nine Caves north entrance to 160m in depth. Having heard this, I came especially to Guangxi to consult him about deep diving. I usually use the RD plan, but only to 120 meters. I hoped to get some helpful information from him to develop a reasonable decompression plan.

PASCAL's help was tremendous. Under his guidance, we integrated the dissolved gas model with the bubble model. PASCAL also told us about physiological problems that can develop on dives deeper than 170 meters, including HPNS, shallow water blackout and decompression sickness, etc. The decompression research for these depths is far from complete, but dives less than 170 m is considered relatively safe. I asked Pascal in great detail about his own dives here to 160 m. I ruled out the possibility of a total loss of visibility , and also confirmed the orientation and size of the channel. With further research, Wang Tao and I concluded that a dive to 170 meters is complex but not of

great difficulty. We then continued planning a dive to extend main line to 170 meters deep.

2. The dive

We finished the equipment check on the surface, and began the descent. Along the way, we checked the guideline and the deco bottle labels and pressure. We proceeded smoothly to 75m, hung the 18/45 bottle on the line, and switched to our first stage bottle. At this time, Wang Tao signaled me with his light that my stage bottle first stage was leaking. I closed the valve, tightened the first stage, then opened the valve. The bubbles stopped. (This confirms that at this time Wang Tao's diving condition was normal.) The bottom time was about 12 minutes.

We continued along the steeply descending passage. At 100m we encountered an area where visibility was about 50cm. We quickly penetrated the area of reduced visibility, and the visibility returned to about 3m. We continued descending to 120m, then checked in with each other. We made sure that everything was ok with each other, and continued our descent.

At about 150m I switched to the second stage bottle, and Wang Tao as planned switched to his main bottles. When we arrived at 164m, he placed a line arrow while I went to check out the direction of the passage below. At this point my END was about 40 or so meters, my breathing was a bit faster, and I felt a bit of narcosis. On principle, we should not have been feeling anything other than clearheaded, because we had practiced with many deep air dives to 75m in open water, including night dives. As he placed the line arrow, everything was normal.

3. The ascent (lost line)

About a minute later we started the ascent. At this time the total dive time was about 21 minutes and my second stage bottle had 130 bar remaining. When we arrived at 130m, the visibility was only 2m, and what happened next took my breath away. The line was gone!!! My heart immediately ran cold, we looked at each other for a moment, and I decided to take immediate action, and make use the downward slanting terrain to conduct a circular lost line search along the walls. (At this depth, gas is consumed very quickly, and there was no time to retie the line.)

The time to deal with the emergency was quickly running out. Both of us began to feel stressed, but we had no time for fear. What I wanted to do was to find the line using the terrain. About 2 to 3 minutes later we found the trailing line in the middle of the cave passage. I immediately relaxed.

4. Gas sharing

After we found the line, I finished my second stage bottle, switched to the main gas bottles, and we continued the ascent. As we arrived at about 120m, I suddenly saw a light signal. I looked down and saw that behind me Wang Tao was wedged under a protruding rock, moving the light along his own throat, meaning he was soon to be out of gas. His movements were calm and correct.

It gave me chills that he went through his gas so quickly. I instinctively donated my primary regulator to his mouth, and deployed the long hose. The two of us began our gas sharing ascent.

Now I checked my own gas pressure, only 130 bar or so. I quickly calculated that at this depth, the gas can only support two stressed divers for about 3 to 4 minutes. Suddenly the immensity of the situation hit me. At once I signaled Wang Tao to ascend, he calmly

returned an OK, and we began to ascend. I put the pressure gauge in front of my chest so it can be checked easily at any time.

Because of the limited gas, I decided to ascend quickly to 75m where we had placed the deco bottles, then do some problem solving. So we began to ascend faster along the line. At this point the first deco bottles were still quite far, and I knew that we needed to go faster. I kept the line securely in my left hand, looked up to avoid hitting my head on rocks, and held Wang Tao to my side with my right hand. The depth gauge followed our speedy ascent, and here I began to feel not quite clearheaded.

5. Lost Buddy

Right at 90m or so, I held onto the rock with my left hand, and used the light in my right hand to check depth and gas pressure. There was about 40 bar or so, but we were only about 15m from the deco bottles. The danger would soon be over. Just at this moment I turned and saw Wang Tao floating upward. I reached out to grab him, but did not get a hold of him, and when I looked up again he was gone, and my long hose was dangling. This took only a second, a blink of an eye.

I did not see Wang Tao struggle or make movement to try to grab for me, the line or the wall. Realizing the situation, I grabbed the long hose and followed the guideline up for about 10 m, but did not find him. Because of the limited gas and low visibility, I did not dare to leave the line to look for him. At this point, my thoughts began to be unclear, and I felt like I was dreaming. I closed my eyes, shook my head hard to calm myself, and tried to take deep breaths. The breathing resistance kept increasing, so I checked the pressure gauge again and I only had about 20 bar or so. Then I reached 75m and found the 18/75 stage bottle. Quickly I opened the valve and did the gas switch, then clipped the bottle off to myself.

6. The Search

After I switched to the new bottle, I began to realize the gravity of the situation - my very best friend Wang Tao has has an accident. Suddenly I felt a tremendous loneliness, and I told myself in my heart, that I must find him, I must bring him out of the cave. I quickly covered my light, to see if I could see his light. There was total silence inside the cave. The familiar routes had changed their form. Five times before, I had been to the section of the cave from 75 to 85 meters deep. This section should be very familiar; it basically goes straight downwards. Where did Wang Tao go?

I continued to search in the cave along the guideline for several minutes. Then I checked the pressure gauge and saw there was only 40 bar (because the stage had been used already before) I decided to go get my 21/35. I did not use the 18/45 bottle that Wang Tao placed at 75m, naively thinking that he could still return to the bottle and use it. So I arrived at 57m, and clipped the depleted stage bottle on the line, grabbed my 21/35, clipped it to myself, and switched to it. Then I returned to depth to renew my search. At this time I knew clearly that the mix should not be used past 66m, but I was fixated on one thing - I must find Wang Tao. If he had perished, I did not wish to survive alone.

I descended along the line, covering my light, searching for his light. I felt my thoughts becoming more and more muddled. I made sure to to keep checking pressure and depth - 70m, 80m, 90m. I felt for symptoms of oxygen toxicity. My mind kept replaying lessons on oxygen toxicity, its signs and symptoms. I thought if I lost consciousness then at least I would accompany Wang Tao to the hereafter.

At 90m, I looked all around and recalled the scene at the moment of Wang Tao's accident. Inside I was on the verge of collapse, and it seemed that I passed out for a moment, and lost all sense of reason and awareness.

When the pressure was at 60 bar, survival instinct forced me to begin a rapid ascent to 50m. I grabbed the EAN35 bottle and clipped it to myself, then returned to 36m to switch gas. The plan had been to start deco at 85m, taking 7 minutes to go from 75m to 57m, then 14 minutes from 57 to 36m, but now there was no way I could do all the stops calmly as planned. I blew through all the deco stops as if all rational thought had left my mind. I wanted to tell Zhou Pei the support diver everything that had happened. I ascended quickly from 36m to 21m, and finally saw Zhou Pei's light.

7. Rescue (in part told by rescuer Zhou Pei)

After meeting up with support diver Zhou Pei, I signaled him that Wang Tao and I were separated. He was taken aback, and shouted out loud underwater. He could not accept such a harsh reality. He turned away from me, and descended on the line by himself to try to find Wang Tao's trail.

After seeing Zhou Pei, my nervous tension began to relax. About a minute later, at 21m, I had the sensation that a rock in front of me was spinning. I was disabled at once, and I grabbed onto the rock, feeling that my whole person was spinning.

Seeing Zhou Pei return, I grabbed him, and told him I had a problem. He started to take me up to 18m, but a sharp pain in the leg joints reminded me of the situation. I knew that there were sure to be helium and nitrogen bubbles expanding in my body due to the rapid ascent.

I needed to return to depth for decompression. I signaled Zhou Pei to descend, and he helped me back to 36m for the first stop. Now the pain diminished. I held onto rock, but still felt dizzy. Zhou Pei was still searching for Wang Tao. I signaled to him that I couldn't go on, and for him to keep watch over me.

Now I realized that my own death was getting ever closer. I tried to find the reason for my current state. I listened to my body and wondered. Was it the rapid ascent, causing bubble expansion? Or was it oxygen toxicity? Or inner ear compression disease (IECD)?

I wasn't sure, but I hoped deeper stops could relieve the vertigo. It had no effect, and with Zhou Pei's help I began to ascend slowly. We spent about 20 minutes at 33m, 30m, 27m, and 24m, then he brought me the EAN50 bottle that had been placed at 21m. The vertigo got worse, and I felt nauseous. Soon I began nonstop vomiting. I was weak all over, but kept trying diligently to make myself breathe.

I suspected oxygen toxicity, so I switched back to the long hose, to see if breathing a hypoxic mix would resolve the symptoms. It was no better, so I switched back to EAN50, then began to have convulsions. I signaled Zhou Pei to take me to the 18m stop. He began to ascend with me. During the convulsions, I held onto him as if my life depended on it. I told myself that I had to breathe. Whenever I felt a bit better, I checked the time and the depth. I knew that if I didn't finish all the stops, then I would die after reaching the surface.

Zhou Pei signaled me underwater that he was going to surface and phone for help. I grabbed hold of him so he wouldn't leave me. It was clear in my mind that Wang Tao was already beyond rescue, and here I was in a life or death struggle. I could not hold my depth. As soon as Zhou Pei left me, my life would be over.

So Zhou Pei stayed with me for the ascent. My limited awareness was focused on breath, line, time, and depth. I willed myself to persevere, and summoned all my energy to finish the remaining stops. Because I was upright, all the gas had vented from my drysuit, and I began to feel cold. I tried to add gas to my drysuit, to add insulation, but the repeated ascents and descents had emptied the argon bottle. I was so weak I couldn't even switch the drysuit inflation hose to the back gas myself.

When we reached 6m, Zhou Pei helped me switch to 100% oxygen, and also helped me to take oxygen breaks every 20 minutes to reduce the risk of oxygen toxicity. At the 6m stop, I had basically lost all conscious thought. I was delirious, and I felt someone patting me. I opened my eyes and saw Zhou Pei signalling to ask if I was OK. I looked at my watch and saw that 10 minutes had gone by. After a while I was unconscious again, and Zhou Pei shook me awake.

This continued for the next hour or so. I decided to surface so I could tell Zhou Pei everything that had happened underwater. Zhou Pei took me slowly to the surface. I briefly explained how events unfolded. Zhou Pei called for the crowd of onlookers to alert the police and to notify 120.

Now I felt a pain in my right arm, and I knew I needed to descend again to continue decompression. I let Zhou Pei escort me to 4m or so of depth, and the pain began to subside. We stayed another 20 minutes or so before ascending. This time the pain was gone, but I was still dizzy and nauseous. Our total decompression time was about 150 minutes or so. (The planned decompression time was three and a half hours).

8. Surface

Zhou Pei unclipped the deco bottles from me, towed me to shore, and removed my gear. With help from a group of bystanders he carried me to the side of the road to await the ambulance. Zhou Pei notified the local government, to get the French team that was also in Du'an at the time to come search for Wang Tao. However because time was needed to mix the gas and prepare, the search was postponed until the next morning.

That night at the hospital, I talked to the French team about the dive accident, and told them to search in the 50 to 80 m range. My dizziness and nausea continued through the second day then improved, but my muscle ached and the veins on my arms were

bulging. I suspected this was also due to decompression sickness. After two hyperbaric treatments, my physical condition stabilized.

Search and recovery:

At 9am on April 19, the search and recovery began. The search team was led by the Frenchman Pierre. The first dive team descended for the search, and quickly arrived at 51m, where they found Wang Tao's body. Since this was a horizontal passage, Wang Tao could very well have been carried here by the flow until he got stuck.

Next the second dive team worked for about an hour to bring up Wang Tao's body and all the stage and deco bottles. Wang Tao was found with his dive mask on his face, the regulator out of his mouth, and both hands extended. There were no signs of struggle.

Then, we went over Wang Tao's equipment together:

8/70 back gas: 0 bar remaining, Halcyon H75 first stage enclosure was damaged from impact, and was jammed with a large amount of rock, but there was no leakage.

8/70 stage bottle: 0 bar remaining, normal function.

10/65 stage bottle: 195 bar, normal function.

18/45 deco bottle: 120 bar remaining, normal function.

21/35 deco bottle, 200 bar remaining, normal function.

EAN35 deco bottle, 200 bar remaining, normal function.

EAN50 deco bottle, 40 bar remaining (used by Zhou Pei), normal function.

O2 deco bottle, 200 bar remaining, normal function.

Drysuit inflation bottle, 100 bar remaining.

Primary light turned off. Functioned normally when turned on.

Backup light normal.

After the accident:

When Wang Tao was reported lost, the French dive team came immediately to help begin the search and recovery. Pierre explained that "Cave divers are a strong community. We will help each other. I think you will do the same if this happens to us."

From the Guang deep diving group and from WUD, many divers put down important tasks at hand, and rushed to Guangxi to volunteer their help. They gave Wang Tao's family and myself tremendous emotional support. The evening of April 19th, more than a dozen of Wang Tao's diving friends kept vigil for him. On the morning of April 20th, Wang Tao's remains were cremated at Nanning and a memorial service was held. Many friends from the dive club had flower wreathes placed or sent their condolences. With everyone's help, Wang Tao made the last step of his solemn journey. In this, special thanks go to those who helped in the aftermath of the accident in Guangxi - 老高、陈晖、李赞奇、兴旺、老叶、周沛、北平、豆豆、泉哥、周毅、刘剑、巴特 , and those who helped afterwards - 老万、Morgan、李钰、小鱼、陈昊、舒扬。 .

After the accident, friends from GUE, SSI, Mares, and PSAI all gave us much comfort and encouragement. The Navy and LEO were very helpful in providing decompression treatment.

Reflections:

What exactly did we do wrong? How did this happen?

1. Overconfidence. We were not mentally prepared enough for potential hazards. Wang Tao and I had made many dives here, and we thought we thoroughly understood the layout of the cave. Even after seeking advice from Pascal, a deep diving record holder, and Richard, a deep cave diving expert, we still underestimated the adverse effects on the body that can occur in a deep diving situation. Especially when a stressful situation emerges, which was an important factor in this accident.

2. We did not organize a sufficient support team. If we had support divers at 100m, the accident might have been avoided. However, it is not easy within our own country to find reliable support divers who can go to 100m in a cave.

3. Wang Tao and I had done many dives with stage bottle rotations, so we did not rehearse the entire dive sequence in advance. Under stress and with narcosis, Wang Tao did not switch to his second stage bottle, leading him to think mistakenly that he was out of gas (the second stage bottle was recovered from the water and had 195 bar). During a deep cave dive, stress becomes magnified. And stress is the enemy of this kind of diving.

4. We did not follow a gradual approach at all. This was an exploration dive that was far beyond our diving experience. In an extreme dive like this, every diver needs to be self sufficient. The dive partner's help is very limited. So when Wang Tao had a problem, even though I tried to help with everything I had, in the end I failed, and I almost put myself in a crisis that was just as perilous.

According to the technical analysis of the accident, the root cause for Wang Tao's accident could very well have been stress-induced rapid breathing causing accumulation of carbon dioxide, and increasing the effect of nitrogen narcosis. Also, during the expedited gas sharing ascent, helium and nitrogen bubbles formed rapidly in the body (nitrogen is a low solubility gas, and can quickly come out of solution), causing mental confusion and even loss of consciousness, until finally he let go of the regulator mouthpiece, and went into an uncontrolled ascent, without even trying to grab onto the rock, the long hose, or his dive partner, and without any struggle.

5. The gas planning was not conservative enough. At this kind of depth, using the one thirds rule, if one diver is out of gas there should be enough for a shared gas ascent. However, we did not consider the scenario where the problem itself is insufficient gas. There are also other unforeseeable circumstances, such as the broken guideline that we encountered. At this kind of depth, to have two failures occur, the diver has very little time to address them, which led to our increased psychological stress. Under this kind of stress, the diver has perceptual narrowing. For example, with my entire focus I could only manage to do one thing - watching my pressure gauge. Under this sort of condition, I was fully occupied with watching the pressure gauge and staying with the guideline, and I was unable to also take care of my dive partner Wang Tao.

6. When the accident happened, as soon as I lost mental clarity, and started ascending and descending to look for my dive partner, and using 21/35 to depths of 90m, and skipping deep stops, the result was the development of severe physiological reactions.

And my fortunate survival and return hinged on the following factors:

1. Having Zhou Pei as our support diver. He had experience with decompression diving and was capable of dive rescue. Together we thoroughly reviewed the dive plan. He knew the duration and depth for all the deco stops, as well as the location of all the deco bottles.
2. Using the appropriate equipment, preparing sufficient deco gases, and correctly placing each deco bottle.
3. When the line was broken, calming resolving the stressful situation by following the terrain.
4. Maintaining heightened awareness of the guideline throughout the entire dive, especially when I was mentally unclear.
5. When Wang Tao had an out of gas situation at 120m deep, he had the capacity to signal calmly and initiate the gas sharing protocol, which showed that he had excellent presence of mind and emotional control. If this had been a panicked diver, there would have been two fatalities.
6. When I was closest to death, I told myself not to give up fighting for survival. No matter how difficult it got, I had to persevere. This allowed me to endure over 150 minutes of decompression while experiencing severe symptoms.

How can we improve dive safety?

Dive safety is an issue for everyone's continued discussion, in recreational and technical diving alike. Though we are always researching and analyzing the causes of an accident, in the hopes that it will give us precaution, these still feel like very remote occurrences, and we do not gain deep insight. Through American studies of cave diving accidents, we already knew that the number one reason for cave diving fatalities is lack of qualification.

However we still thought, this can't possibly happen to us, and we did not prepare sufficiently.

Many divers do not have proper respect for diving. They think diving is a simple affair, and that accidents can't possibly happen. When they hear about accidents they still think that it can't happen to them, and so they do not follow the most basic diving procedures and principles. For example: not checking equipment before diving, not checking gas pressures underwater, not staying with the dive partner, casually deviating from the the planned depth and duration, ascending too fast, etc. However, accidents lurk in the shadows unexpected. So I hope that our diving accident can serve as a precautionary lesson for others, and play a role in preventing more accidents from occurring. This lesson was gained at great cost and with many tears shed by family and friends.

This lesson written in blood also compels me to warn everyone to always follow these safety principles:

1. Be mentally prepared for every dive, plan and prepare thoroughly, and make gradual progressions.
2. Make a conservative plan, and then make it even more conservative. The thirds rule is just the minimum for cave diving.
3. Practice over and over again, until you can handle emergencies instinctively.
4. Cultivate a good state of mind.
5. There should be one plan for the team. There should not be different plans within the team.
6. Use appropriate equipment and conduct equipment checks.
7. Increase vigilance when diving; be on heightened alert underwater.

The above is a full narrative of this accident. My buddy Wang Tao was an outstanding cave diver and a bona fide hero. When a problem arose at 130m deep, he did not panic at all, and he was very calm and collected in following emergency protocol. Even in the face of death, he had no fear. If at the time he had shown any unrest or panic, then death would have taken both of us. I feel tremendous gratitude for Wang Tao; he is my hero. He gave his life to advance cave diving in China.

After the accident, friends from the dive community started a charity drive for Wang Tao's family, so that we could express our care and grieving with donations. We can not bring Wang Tao back, so we only had this way to express our sympathy for the family, a token of our sentiment.

I also had close friends who rushed to Shenzhen to see me, worried that I had suffered a blow and would not dive again. I am very grateful for everyone's help, but I think that I will certainly continue dive exploration, not just for myself, but for my buddy Wang Tao. I must return to the place of the accident, and place a memorial plaque for Wang Tao, in his memory.

I sincerely hope that our accident can serve as a warning to all divers in China, to keep firmly in mind the principles of safe diving. So that while partaking in the full measure of enjoyment of diving, they will still make safe, responsible dive explorations. Together we can advance this our beloved pursuit and help it continue to flourish in China.

Finally, here is a poem in remembrance of Wang Tao by our good friend William.

《涛声依旧》

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惊闻噩耗自桂来，月下悲思不得安。
同是海角逐浪人，相惜怎奈怪半缘。

遥望明月破云出，幻听浪涛声依旧。
人间至今失一帅，龙宫从此易主新。
碧水深潭若有心，应识英雄谈笑声。
后来新人翻江时，勿忘岸前祭旧人。
莫道华夏无龙蛟，潜魂鸿志终不阿。
安得吴钩龙鳞甲，踏破黄泉斩阎罗！

Wang Yuan

May 4, 2014

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Appendix: Equipment List

Diver: Wang Tao

1. Main cylinders: 8/70, 180 bar

Regulator: First stage HALCYON H50/H75, Second stage APEKS XTX 40

Pressure gauge: SCUBAPRO SPG

BCD: HALCYON ECLIPSE, EVOLVE 60

Primary light: EZ JAEGER 1500

Backup light: EZ JAEGER 600 , EZ JAEGER 1000

Knife: HALCYON H Knife /EZ Z Cutter

Drysuit: EZ ENCHANT

Undergarment: EZ PENGUIN 200

Fins: GULL MANTIS

Primary and backup masks: TUSA M17/ MARES

Gloves/Hood: SCUBAPRO 5mm

Line markers: RAMP cookies and arrows

Gauge: BOTTOM TIMER

Compass: SUUNTO

Spool: EZ SPIDER 30 (two spools)

Wet notes: HOLLIS

Drysuit inflation bottle: ARGON BOTTLE, air, 200bar

2. Stage cylinders: 8/70 210 bar, 10/65 210 bar

Regulator: First stage SCUBAPRO MK25/EZ FALCON; Second stage EZ FALCONET

Pressure gauge:HALCYON

3. Deco cylinders:

18/45 190 bar - Regulators EZ FALCON / FALCONET

21/35 200 bar - Regulators EZ FALCON / FALCONET

EAN 35 200 bar - Regulators UTD P75

EAN 50 200 bar - Regulators APEKS XTX 200

O2 cylinders (two cylinders) 200 bar each - Regulator first stage SCUBAPRO MK2 /EZ FALCON; second stage R295 /FALCONET

Diver: Wang Yuan

1. Main cylinders: 8/70, 180 bar

Regulator: first stage EZ FALCON (two units); second stage EZ FALCONET (two units)

Pressure gauge: EZ HIPPO

BCD: EZ SEAL 50

Primary light: EZ JAEGER 1500
Backup light: EZ JAEGER 600 (two units)
Dive knife: EZ SWIFT Knife; Z line cutting tool
Drysuit: EZ ARCTIC TERN
Undergarment: EZ PENGUIN 200
Fins: SCUBAPRO JET FIN
Primary and backup masks: TUSA 110/M17
Hood/glove: EZ 7mm
Directional markers: RAMP cookies and arros
Dive computer: D6 GAUGE, BOTTOM TIMER
Compass: SUUNTO
Fins: EZ SPIDER 30 (two sets)
Wet notes: 无品牌
Drysuit inflation bottle: ARGON BOTTLE, air, 200 bar

2. Stage cylinders: 8/70 190 bar (two cylinders)
Regulator: EZ FALCON / FALCONET

3. Deco cylinders
18/45 190 bar - regulator EZ FALCON / FALCONET
21/35 200 bar - regulator EZ FALCON / FALCONET
EAN 35 200 bar - regulator EZ FALCON / FALCONET
EAN 50 200 bar - regulator EZ FALCON / FALCONET
O2 cylinder (two) 200 bar each - regulator SCUBAPRO MK2/EZ FALCON

Support diver: Zhoe Pei
Carried backup deco gas pure oxygen 100 bar, EAN 50 200 bar
Main cylinders - doubles, air, 170 bar

Translated by TSL@thusly.com, v1.0 5/17/2014

