

# “IT’S ALL IN THE MIND...”

## Descending to 180 metres

Last month, Simon and Will highlighted the risks of deep CCR diving with a comprehensive risk assessment. This month, we follow the team’s training progress as they complete a three-dive mission. Their goal was to lay a decent line down the wall to 150 metres. This will enable them to stage bailout cylinders to 150 m, leaving Will to solo dive the final 150 m decent to 300 m. We take a closer look at the technical diver’s mindset, fitness and equipment configuration, as a result of the lessons learned during these dives.

**THE TECHNICAL DIVER’S MINDSET** is a combination of attitude, discipline and mental preparation. In order to be mentally prepared for such deep dives a certain peace of mind is required. This Zen-like state is achieved through self-belief; the inevitable outcome after numerous successful training dives and being in peak physical condition.

“The last thing I want is self-doubt creeping in as I begin my descent, worrying if I have done enough. This could elevate my breathing rate, distract my focus and as previously discussed, relaxation and focus while minimising work rate are critical if I am to safely ascend from 300 metres.”

### TRAINING SCHEDULE

Will’s weekly training schedule comprises two morning yoga sessions, three cardio workouts and three strength-training sessions. This, alongside a healthy diet and total abstinence from alcohol, ensures the best physical condition possible.

The “dynamic duo” (Will and Simon’s new nickname on the Island) trains and work together. This relationship builds admiration and trust for each other – a critical trait your dive buddy must possess.

Strength training is something Will has always enjoyed. He worked as a personal trainer in London before he discovered diving. This is probably the easiest, most enjoyable part of his preparation.

Will first arrived on the tropical island paradise of Gili Trawangan and met Simon Liddiard, owner of Blue Marlin Dive and a technical diving guru. Simon taught Will’s open circuit TDI Advanced Trimix course and soon convinced Will he needed to learn CCR if he wanted to

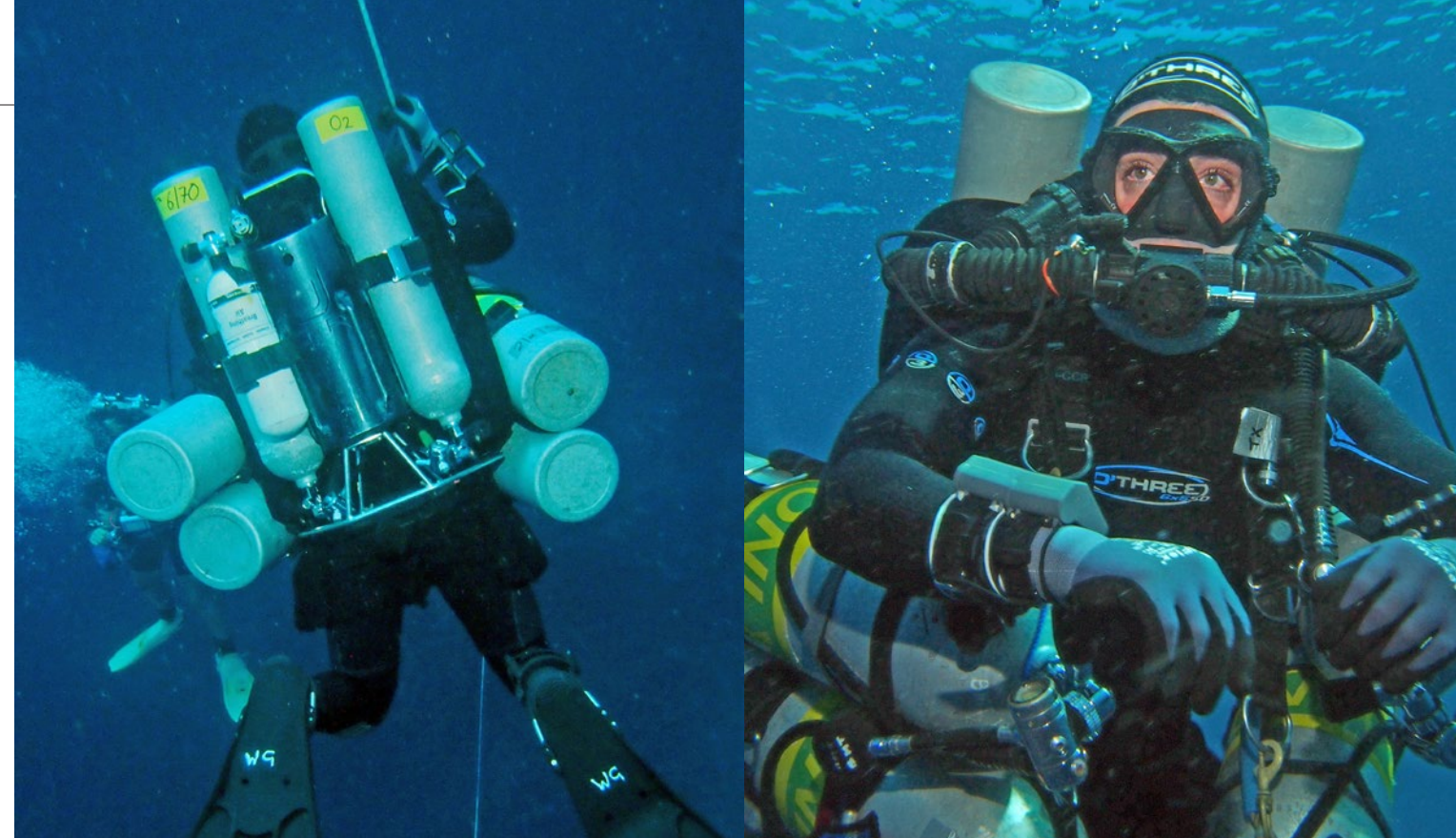
venture deeper. Will completed his CCR and technical diver instructor rating with Simon and the pair soon became friends. Simon invited Will to train at his gym in Kelapa Villas. Now, Will had everything: diving, gym and a training buddy.

Simon became his mentor, friend and buddy and began to show Will the ropes in and out of the water. They have been working together for almost nine years and know each other very well. They don’t only use their gym time for physical fitness. It’s a great way to clear the mind of negative thoughts and develop a positive mental attitude. They chat about family, work concerns and relationships. They make plans, laugh at their own jokes and chinwag about some local gossip. After each training session, they feel mentally better, even if they have not performed their physical best. As Simon always tells Will, “It’s all in the mind...” They conduct a three-day training split to encompass the whole body. This is changed every four to six weeks to keep stimulating the muscles in different ways. The close bond they have developed is essential in choosing a deep diving partner.

Yoga is helping Will to control his breathing regardless of task, he is slowly finding a naturally efficient way to focus and breathe from his diaphragm.

Seventy percent of gas exchange takes place in the lower part of the lungs and diffusion of gas through the alveoli needs to occur perfectly for the necessary on and off gassing to occur.

Cardiovascular fitness must be at maximum if Will is even to consider doing sub 200-metre dives. Therefore, his training sessions are designed to increase fitness, stamina and lung capacity. This also reduces body fat, keeping him lean. He completes timed 5-kilometre



↑ Will begins his descent to 140m

→ Will begins his descent to 180m, this time he is more relaxed

runs, gradually getting quicker as the weeks progress. Hill training and sprints are good for leg strength and overall fitness. The final session is a long and gentle recovery run between seven and 10 kilometres around Gili Trawangan.

### MISSION DIVES

We planned three dives to set up a descent/ascent line we could use for future training dives. The line allows us to stage bailout cylinders down to 150 metres. This reduces the amount of divers needed in the water and ensures familiarity with the environment by conducting the dives in precisely the same location. The dive plans were made using multi deco software from v-planner, incorporating Buhlmann theory with gradient factors of 15/85. We could then match the software to our Liquivision Xeos’ and Shearwater Predator controllers. We changed the minimum stop times to 30 seconds at depth, as opposed to one minute. This meant we could reduce deco by two hours in the shallows. We also set variable ascent rates and a P02 (partial pressure of oxygen) of 1.2 on the bottom and 1.3 for deco, with the last stop at four metres. Our open circuit bail out gasses were all planned to have a P02 of 1.4 at depth and 1.6 for deco.

No modifications were made to the JJ CCRs. Will used onboard S40 aluminum (5.4 litres) tanks to give a large capacity of onboard diluent and O2. An additional 3-litre tank of air was added for wing inflation and a 2-litre O2 supply in case the primaries were lost. Both first stages had low-pressure inflators, allowing us to plug the gas into the breathing loop. We fitted overpressure valves in case the first stage diaphragm leaked.

For the planned 100-metre dive, we used an onboard Trimix diluent of 9/55 and for the 140-metre and 180-metre dives, we used a 5/75. This reduced the narcotic depth and WOB (work of breathing). This was essential, as we knew the dives would entail a lot of effort having to carry and lay a 12 mm rope 150 metres long.

### DIVE 1 OBJECTIVE LAY LINE TO 100 METRES

The 100-metre dive was probably the most complicated. First, we had to locate the top of Tunang Wall in a current using the GPS. Raff Jacobs, Ari Martinez and Will then descended to 41 metres and sent up a DSMB once they had found the correct spot.

Simon began his descent with 100 metres of very buoyant rope. It had taken quite some time on land to organise the rope, making it relatively easy to handle. Entanglement and speed of deployment were our major concerns. We needed the rope to unravel easily, as any delay could cause hours of unplanned decompression and entanglement at depth, a serious accident.

Once Simon had tied off to a rock, Will took the loose end over the wall and disappeared out of sight. We allowed a 5-minute decent from 41 metres to 100 metres. Simon continued to unroll and feed Will, as he swam strategically down the wall looking for the most direct route to depth. At 93 metres, Will found a solid rock protrusion approximately 1.5 metres in diameter on the edge of the wall. He began tying off, then Simon soon appeared to help out and tidy up. Once finished, they began their ascent back to the top of the wall, following the line they had just laid





↑ Simon and Will sharing a joke as they kit up

and adding additional tie offs to secure the rope. At 35 metres, SMBs were deployed and decompression completed without incident.

## DIVE 2 OBJECTIVE LAY LINE TO 150 METRES

Despite a good night's sleep and plenty of water the day before, Will woke up that morning with a slight headache. He made his way down to the dive shop to find Simon already tucking into his breakfast of champions (egg and soldiers). The pair had spent the previous day checking equipment functionality, analysing gasses, reviewing the dive plan and team member roles. Will informed Simon of his slight headache and they both agreed to wait an hour. The depth was not the primary concern, but the anticipated workload meant everyone must be on top of his game. We planned to extend the line to a maximum depth of 150 metres. We descended together to 93 metres, where Simon connected the new rope. This had to be executed in four minutes.

Will took the loose end down in search of 150 metres, while Simon worked to keep the line unraveling freely. At 120 metres, the wall became a slope covered in fine silt. Will, with four S80 bailout tanks and a JJ CCR with three steel tanks, had to start swimming down the slope in search of depth. This kind of work at this depth is extremely dangerous, with so much drag, ones breathing can easily elevate and carbon dioxide build up, a major concern. When Will saw a huge rock outcrop at 140 metres on the edge of a shear drop off, he decided to tie off rather than chase the 150 metres and risk not finding a suitable tie off point.

In addition to the swim, the rope being dragged behind him had disturbed the fine silt bed and created an almost zero visibility environment. It was impossible to

see Simon above. Will gave two tugs on the line to signal Simon to join and within two minutes, he emerged out of the silt cloud above. Will signalled that he was feeling over exerted from pulling the line and was also at the end of his planned time. Every second you spend at that depth, incurs a severe decompression penalty, so it was critical for Will to ascend. Will started moving back up the slope, leaving Simon to tighten the loose rope.

The ascent rate was irregular and Will's breathing was faster than he would have liked. In addition, the current had picked up and the visibility was zero. Will had to use all his training and mental will power to remain calm and focused. He ascended through the silt and once he reached 95 metres, visibility and breathing were thankfully back on track. Simon finished securing the rope and once again emerged through the silt to catch up with Will, who was conducting a stop at 87 metres. We looked at each other with wide eyes, both thinking exactly the same: That was tough.

We proceeded up the line conducting our various stops. On reaching 36 metres – a critical off gassing time – we realised the buoy line to the surface was now being pulled under by the raging current. It had been our intention to use this line all the way to the surface,

### Open Circuit bailout gasses were as follows:

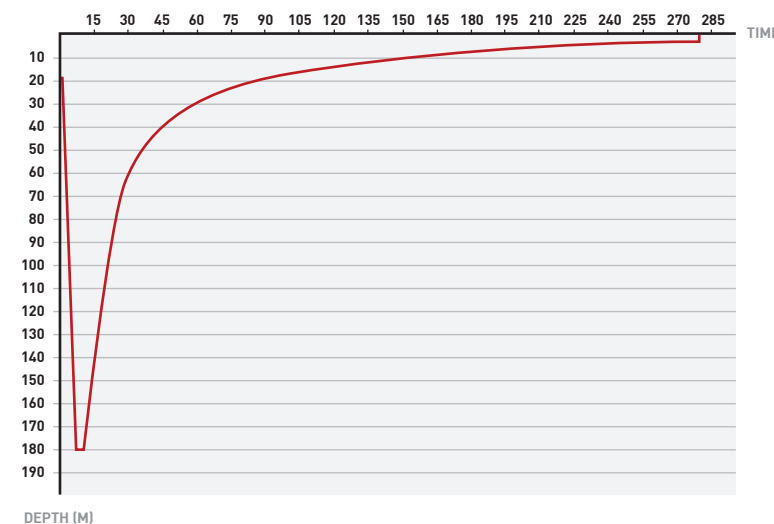
<b>TRIMIX 7/67</b>	<b>From 180 m to 130 m</b>
<b>TRIMIX 10/60</b>	<b>From 130m to 54 m</b>
<b>TRIMIX 24/35</b>	<b>From 54 m to 21 m</b>
<b>NITROX 50</b>	<b>From 21 m to 9 m</b>
<b>NITROX 80</b>	<b>From 9 m to surface</b>

as drifting decompression of over two hours in that area ran the risk of us hitting a shallow 9-metre reef before we were able to ascend to that depth.

With so much equipment, we were both struggling to hold on to the ascent line. We had to make the decision to let go and deploy our SMBs. Suddenly, Will felt a pain in his elbow and notified Simon of the problem. Will swapped arms and staged off some tanks to Raf. We had no choice but to let go of the line and commence our back up decompression plan. This involved drift decompression with surface boat cover. Once we were free of the line, we were instantly relieved and we decided to descend slightly deeper and extend our stops to treat the elbow bend Will had sustained. Over the next 40 minutes, we relaxed, drifting with the tide. It seemed we had overcome this challenging dive.

This was not the case, however; with nine minutes of decompression remaining at nine metres, the shallow reef we had worried about was directly in front of us. We were approaching it fast and risked being forced into shallow waters. As we hit the shallow area we had to dump all air and were able to find an indentation to hide in until our computers cleared the nine-metre stop. Eventually, we lifted above the reef to six metres and continued to deco. We surfaced after extended precautionary deco, but Will still had a slight pain in his elbow. So it was back on his CCR in O2 mode on the boat journey back to the Blue Marlin. Back on land, pain was still present so the decision was made run US Navy in-water recompression therapy using a full-face mask and safety diver. The nearest camber was Bali, a six-hour journey. Two hours later, tired but happy, Will surfaced, symptom-free, with nothing more than a bruised ego, having re-learned some important lessons.

### The dive Plan:



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### DIVE 3 OBJECTIVE

## LAY LINE TO 150 METRES AND DIVE TO 180 METRES

Simon and Will had to rethink their strategy if they were to safely execute another line extension dive. We decided Simon should do the remaining line work, leaving Will free to relax and descend to 180 metres. The line we had placed allowed Will to stage of intermediate bailout cylinders to reduce drag and exertion and depth. Simon would be dealing with the rope; he would attach a weight to the end at 140 metres, swim it down to 150 metres and drop it off the ledge.

We reduced the one-minute stops down to 30 seconds at depth, which reduced shallow deco by two hours. It allowed for a quicker ascent from 180 metres to 60 metres. The planned dive was over traditional CNS oxygen exposure limits and so five-minute air breaks were conducted every 25 minutes during the last hour of decompression.

The plan worked. Simon agreed to do the bulk work and had plenty of time to conduct it, while he waited for Will to return from 180 metres. Will arrived feeling on top of his game, focused and relaxed. They even managed a few jokes while kitting up.

The dive began well and Will was ahead of schedule throughout the descent, he could even see without a torch all the way down to 180 metres. Although the slope was at about 45 degrees, it was no effort and Will was thinking of the words his yoga instructor instilled in him: "Breathe deeply and relax".

At 160 metres, Will started adding air to his wing to slow down the free fall. This was timed perfectly and he leveled off at 176 metres, a minute ahead of schedule. Will decided not to push it. He took a moment to enjoy the surroundings, so peaceful and unique. Looking up, he saw the image of a mountainside in black and white with perfect visibility. Then he turned around to start the long journey back to his buddy. The ascent rate was 12 metres a minute to 140 metres and was performed precisely. Reuniting with Simon, they began their nine-metre per minute ascent together, passing two huge tunas and an abundance of reef fish on top of the wall.

All was well until 39 metres when Simon felt pain in his shoulder. This may have been a result of the work he had done at depth. To combat the bend, Simon used a technique that had been successful on many occasions. He descended until the pain subsided. This was only four metres, then from 43 metres, he doubled his stop times. Once a stop was cleared, Simon would ascend and if pain returned he would descend until it subsided, the whole ascent conducted on feeling. The current was not as bad and they had water for hydration staged on the line.

Four hours later, Simon and Will surfaced in fine health. We were extremely happy with the way things had gone, especially the flawless functioning of our JJs.

### LESSONS LEARNED

These working dives highlighted a few critical factors deep CCR divers should be aware of.

↑ Re-hydrating during deco

- Exertion is a real danger at depth. Workload should be kept to a minimum at all costs.
- Every effort should be made to reduce the WOB (work of breathing) and mindset is the key to staying relaxed.
- Conditions make all the difference. The risk of DCS is a statistical reality that needs to be planned for.

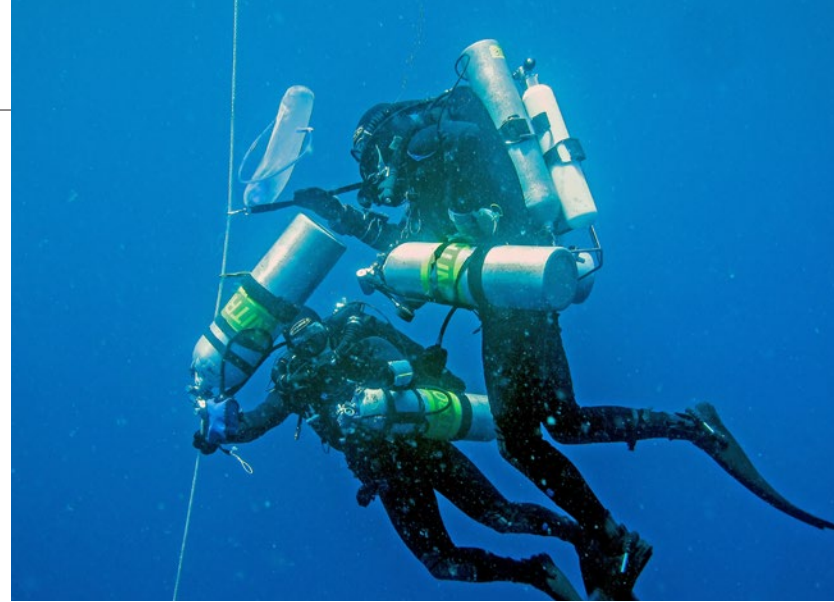
Deep CCR divers should be aware of the danger zone on ascent. After conducting hundreds of sub 120-metre dives, we have identified the 39-metre-25-metre range is critical. An aware diver can treat a minor bend in the water and ascend asymptomatic.

We are already planning our next installment: The need for torches and an on site recompression chamber for sub 200-metre dives. [AD](#)



**WILL GOODMAN** is an award winning TDI Advanced Trimix Instructor, Mixed Gas CCR Instructor, Iart Level 2 JJ CCR instructor, Padi Staff Instructor and currently holds the Guinness World Record for the Longest Open Saltwater Scuba Dive.

**SIMON LIDDIARD** Simon is the Director of PT Blue Marlin Dive located in Gili Trawangan, Indonesia. The company also operates a CCR Dive Resort and Liveboard in Komodo National Park. He is an IANTD Instructor Trainer at Trimix level - both open circuit and CCR, a member of the IANTD Board of Advisors, a TDI Trimix Instructor Trainer, a PADI course director and DSAT Trimix Instructor Trainer. Currently, he is the only IART JJ-CCR level III Trimix Instructor in Indonesia.



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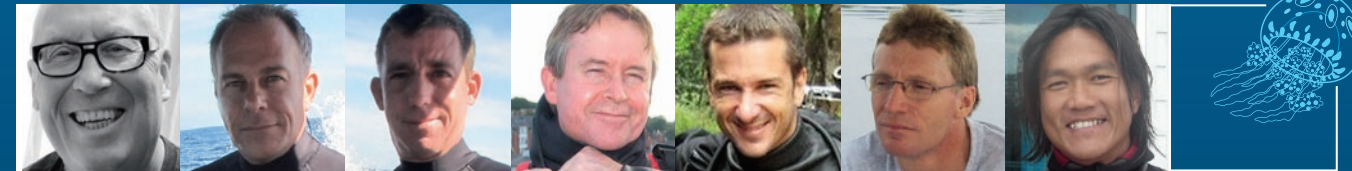
### SPEAKERS

DAVID STRIKE  
Tek Dive Specialist

WILL GOODMAN  
TDI Advanced Trimix and  
Mixed Gas CCR Instructor

BEN REYMENTANTS  
Extended Range Instructor

GIDEON LIEW  
GUE Technical Diving  
Instructor

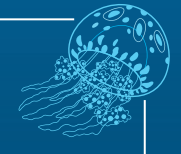


SIMON LIDDIARD  
JJ-CCR Level 3 Instructor

SIMON PRIDMORE  
Director of IANTD

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