SUMP RESCUE ORIENTATION PROGRAM JENOLAN CAVES - APRIL 2015

BY DEBORAH JOHNSTON

Participants: Adam Hooper SUSS diver, Alex Boulton SUSS diver, PADI tec diving consultant , Alison Fenton Jenolan Caves guide, CRS team leader, Al Warild SUSS diver, CRS Captain , Brian Hedden SUSS diver, Damien Siviero dive photographer , David Wood CDAA dive, Dean Coleman dry rescue support, Deborah Johnston SUSS diver / VP, CRS team leader, ASFSC rep, SROP coordinator Denis Stojanovic SUSS President, Greg Ryan SUSS diver, former CDAA , NSW rep, SROP coordinator John Wooden SUSS diver Kevin Dawson CRS President , Dr Richard Harry Harris CDAA search and rescue coordinator, medical physician/ anesthetist, SROP coordinator , Rick Grundy SUSS diver, Rod Burton CRS team leader , Rod Obrien SUSS diver, CRS member, Tabitha Blair Jenolan Caves Representitive, Tim Featonby CDAA cave diving instructor.

Apologies Received: NSW Ambulance Service, NSW Police Divers , NSW Police Rescue Squad, Office of Environ- ment and Heritage.

SUMMARY - A two day sump rescue course was run at Jenolan Caves over two days in April 2015. This course was developed by Dr Richard Harry Harris who had held the course previously at Mount Gambier in South Australia.
This was the first cave diver rescue training ever run in NSW. The program was run by Dr Harry with the NSW Cave Rescue Squad (NSW CRS) and hosted by the Sydney University Speleological Society (SUSS). Funding was received from the Australian Cave Rescue Commission (ACRC). The event was supported by Jenolan Caves and the Office of Environment and Heritage, National Parks and Wildlife Service. Invited attendees included NSW ASF cave divers, CRS representatives, Police Divers, Police Rescue, and NSW Ambulance.

SROP Day one theory and gear demonstrations

Dr Richard Harris & Al Warild provide sump rescue theory & gear demonstrations
PHOTO CREDIT: Deborah Johnston

The first day of the course was devoted to Dr Harry's Sump Rescue Orientation Program (SROP) manual. Attendees worked through the SROP manual during nine hours of sessions including lectures, group discussion, practical demonstrations of rescue gear, and group exercises working through hypothetical cave diving rescue scenarios.
Key topics covered included, Overview of Australian and international cave rescue structures and procedures; Self-rescue identification, decision making and procedure; Incident command systems; Cave pre-planning for frequented sump diving sites; Roles and duties of an initial response team; Cave rescue communication systems and technology demonstration; First aid plus medical recommendations and tips (e.g. managing a hypothermic patient); Cave diver first aid kit audit and recommendations; Cave rescue stretcher demonstration; Sump rescue techniques; IUCRR recovery theory and documentation requirements; and a SAREX paper exercise for a complex hypothetical rescue.

Dr Richard Harris and Al Warild provide sump rescue theory and gear demos - PHOTO CREDIT: Damien Siviero

SUMP RESCUE ORIENTATION PROGRAM RESCUE EXERCISE

Day two of the program was a practical sump rescue exercise conducted in a sump of the underground river in Imperial Cave, Jenolan Caves. The scenario given was that a diver (Dr Harry) had been exploring a dry section of cave beyond a sump and was now overdue. The rescue team consisted of eight divers and eight dry rescue team members.

Transporting rescue equipment and diving gear through Imperial Cave to the underground river PHOTO CREDIT: Damien Siviero

Divers are briefed by CRS Captain who delegates team leader roles - PHOTO CREDIT: Damien Siviero

A scribe logs all rescue activites
PHOTO CREDIT: Damien Siviero

A diver prepares to enter the water
PHOTO CREDIT: DAMIEN SIVIERO

A splint created from fins & tape
PHOTO CREDIT: Damien Siviero

After an initial briefing, the group donned appropriate caving gear then accessed the cave via the tourist path before making their way off-track, reaching the river below after some climbing, cave laddering, and crawling across rocks and dirt before reaching a chamber below with the sump and a river running by a gravel bank. The group transported over 30 packs weighing about 7kg each along the way.

The CRS captain assigned a team leader to take over the exercise. This team leader gave a summary of the situation, and appointed the two divers most ready to be the initial response team. These two divers were tasked to dive through the sump with a drytube of first aid and a rescue radio, conducting an initial search with instructions to report back within 40minutes. A scribe was assigned who began recording all group activities at that point.

One team member returned after 35mins reporting that the missing diver had been located in the dry chamber beyond the sump with a suspected broken leg, periodic loss of consciousness, and reduced body temperature. An initial plan was discussed at this point regarding tasks and required supplies.

A second team of two divers was sent to the casualty with additional first aid kit and training plus a small rescue stretcher that could be used to provide thermal insulation from the ground even if not required for a spinal injury. This team provided additional medical updates using the AMPLE procedure (allergies, medications, past history, last ate/drank, event details) which were reported to the advising ambulance staff communicating via radio. Thermal protection was administered to maintain the casualty's warmth.

A third team of two was tasked to place through a michie phone cable to allow communication between the two sumps and provide additional assistance as required, making a team of five divers on the other side of the sump. Communication was maintained between both sides of the sumps with regular situation reports which were all logged by the scribe as well as all group intentions and actions, plus tank pressures before each dive. It was noted that the visibility was almost zero and a request was placed for a more robust guideline.

A fourth team of two was tasked to place a rope guideline through the sump, however after a 20 minute wait for a buddy diver it was decided to send the first diver solo. A diver then returned from the casualty to the exit side of the sump, removing the existing cave guideline to reduce the risk of entanglement during the rescue. They immediately dived back to the casualty checking the guideline on the way to ensure it was an appropriate path for stretcher transport. The patients broken leg was splinted to his good one using his dive fins and gaffa-tape after (virtual) pain medication was administered. The patient was determined to be medically stable and ready for transport, with a path cleared to the sump for a stretcher haul. A team of four divers was in full gear waiting in the sump ready to receive the patient for underwater transport. This team was careful to rehearse their plan and communication strategy in the zero visibility, with several what-if scenarios discussed and responses agreed upon. A signal for aborting the exercise was also rehearsed. When it was confirmed that there was a team at the exit sump ready to collect the patient, the move was radioed in and confirmed. The patient was dragged by a team of three divers to the sump using the inverted stretcher for extra slip and to reduce the risk of injury. It is noted that such hauls are generally completed by a group of six, however space was limited and these divers had above average strength.

The patient had his tanks clipped on and was immediately handed over to the team of four transport divers. The diver was rolled from a face up to a face down position and breathing was confirmed. Once an OK signal was received from all divers the sump move began.

The lead diver was responsible for navigating the path the exit, and hauling the casualty using his harness strap. A second diver was holding onto the patient, maintaining breathing by holding the regulator, and protecting the head during transport ensuring limited additional injury. A third diver was at the feet providing assistance moving and pushing the body as required. A fourth diver swam a short distance behind to provide help if needed.

This move was done in near zero visibility, with several tight, low sections to negotiate. The transporters emerged at the exit side of the sump much quicker than anticipated and had to call for assistance removing Harry from the sump to the gravel bank. Thermal protection was given by insulating him from the ground, and the exercise was ceased at this point due to his genuinely low body temperature. Time from being overdue to successful rescue was 3 hours. Gear was removed from the cave and the group reconvened in the seminar hall for a thorough debrief and group discussion.

CRS Captain & Dr Richard Harris
PHOTO CREDIT: Damien Siviero

Preparing to move the casualty to the sump edge
PHOTO CREDIT: Damien Siviero

DEBRIEFING RESULTS:
A comprehensive debriefing allowed all participants to reflect on the rescue training activities, highlighting areas that went well and areas that may have been improved.

COMMUNICATIONS:
Communications worked well throughout the exercise with michie phones allowing conversation between both sides of the sump and the surface command post. Group names could have been assigned in advance and maintained throughout the exercises which would have avoided confusion as individuals referred to their groups in inconsistent ways. A separate line of communication could have been created between the underground base and surface command instead of having all teams on the one line. Groups could have been given scheduled times to call in with updates however notifying of change in situation worked well also. Groups could have used more standardized radio language for professionalism and clarity, however it was noted that CRS dealings with police rescue and similar squads was that radio communications in the field are fairly informal.

EXPECTATION PLANNING:
Group could have anticipated the best case, worst case, and most likely scenarios and begun initial preparations for a quick response at the time of IRT reporting. This includes requesting gear and personnel which can take some time to arrive.

FIRST AID:
Up-skilling in advanced first aid would be worthwhile for any cave diver. Many divers could improve their personal first aid kits with additional relevant items. Consideration was given to having pre-packed drytubes with more comprehensive first aid. It was stressed that hypothermia is the most serious threat to the casualty in these scenarios with discussions regarding how additional thermal protection could have been applied. The message was iterated that its far easier to stay warm than to warm up once cold.

PRE-PLANNING:
Pre-developed rescue plans for dive sites would greatly speed up and streamline rescue activities. This includes knowing when to raise an alarm, who to call, plus what to report and request.

GEAR READINESS:
Gear could have been better prepared before entering the cave, such as ensuring all gear is packaged in cave packs for safe transport and following the limit of one tank per pack to avoid unnecessary strain on those transporting gear. Rescue operators should also have their gear in place to be able to undertake assigned tasks in a timely manner (e.g. have dive gear either on or laid out for quick dressing).

INTER-AGENCY LIAISONS:
The importance of relationships between cave rescue and the police was highlighted, with police being in charge of any rescue scenario across Australia. These relationships are strengthened via inter-agency scenarios however unfortunately the police diving unit and ambulance representatives were unable to attend due to a last minute call-out.

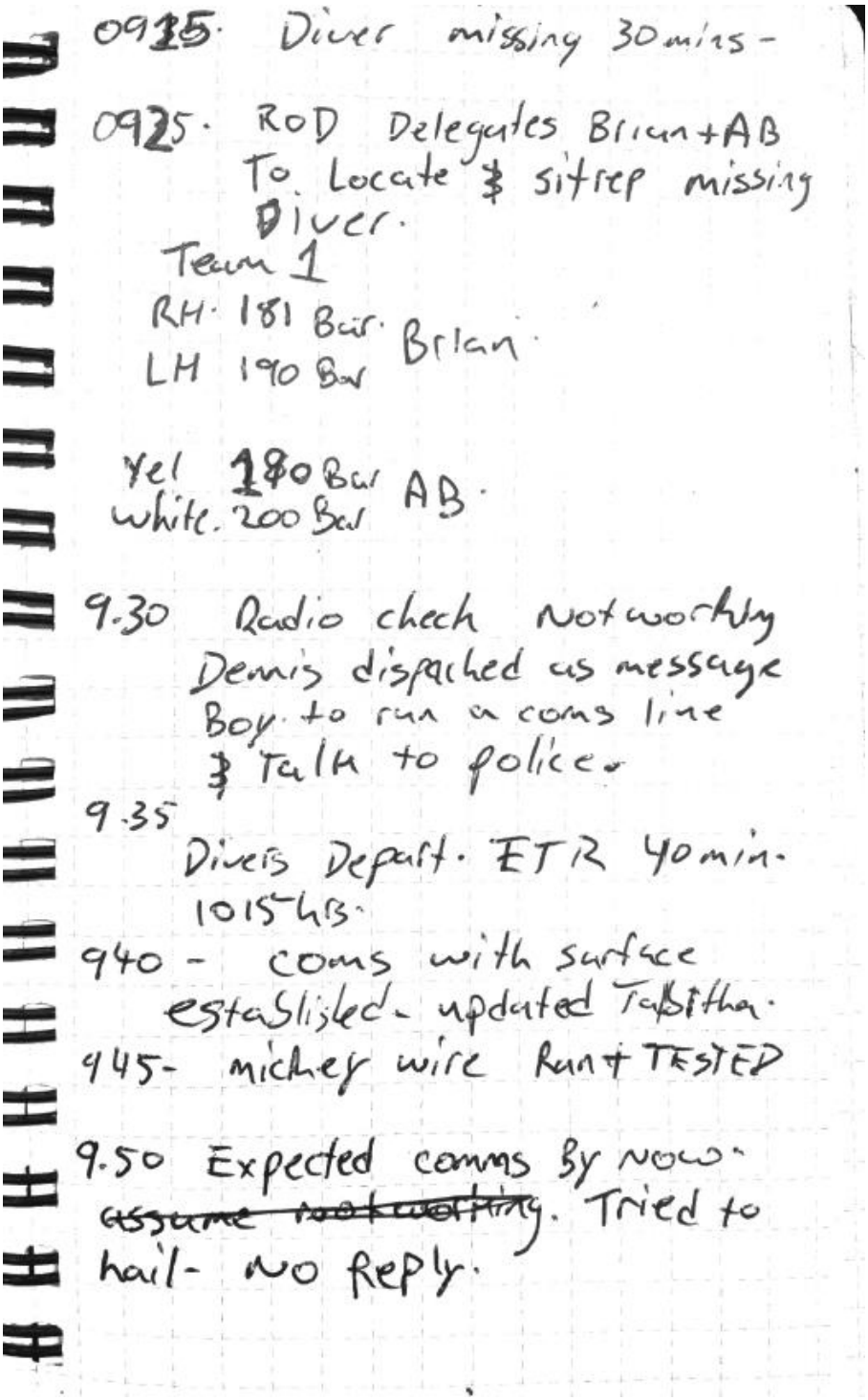
PATIENT CARE:
The patient would normally have a dedicated patient attendant, monitoring and reporting their condition which administering first aid where required. Sensitive conversations such as concerns regarding plans could have been held out of earshot. A couple of times people stepped over the casualty which is to be avoided. Ensuring each team was ready for a handover was essential before beginning the initial move.

POLICE RESTRICTIONS:
Concern was raised that the police may impose inappropriate restrictions to dive rescue activities due to a lack of awareness, e.g. not allowing solo diving which is often safer than diving with buddy pairs in NSW. Concern was also raised that police was shut down rescue attempts due to their lack of knowledge regarding cave environments. Importance of doing joint exercises with police was stressed to address these concerns.

PPE:
All attendee maintained safety by ensuring personal protective equipment such as thermals, gloves and helmets were worn. Kneepads on the other side of the sump would have been an advantage during patient hauling. Thermal protection for divers was extremely important in the 14 degree water.

PROCEDURE:
Discussion regarding how ready cave rescue needs to be to respond to a diver rescue. Suggestions were made using military examples of how a standard operating procedures could be set in place in advance.

SAFETY:
Risk was minimized at each step including, using a sump with safe dry exit options on either side; first aid, oxygen, and water on hand in the cave for participants if required; take fives taken to ensure all members were prepared to undertake each step of the rescue; packaging gear across many bags to reduce size and weight for faster transport; and rehearsed signals for effective communication in low/ zero visibility water. A dummy had been loaned by NSW Ambulance for in- water exercises if required.


0935. Diver missing 30 mins -
0925. ROD Delegates Brian+AB To Locate & sitrep missing Diver.
Team 1
RH. 181 Bar. Brian.
LH 190 Bar
Yel 180 Bar AB.
white. 200 Bar
9.30 Radio check Not working Demis dispached as message Boy. to run a coms line & Talk to police.
9.35 Divers Depart. ETR 40 min. 1015 hrs.
940 - coms with surface established - updated Tabitha.
945- michey wire Run + TESTED
9.50 Expected comms by now. ~~assume not working~~. Tried to hail- no reply.

Sample activiy log
PHOTO CREDIT: Dean Coleman

SUMP RESCUE EQUIPMENT:
Dr Harry stressed that a full face mask is the best option for safe egress in the majority of circumstances, particularly for a diver without full alertness.

TEAM LEADER ROLES:
Strong team leadership skills result in more effective group action. A reduction of lengthy ideas discussion in favour of efficient planning and timely action would have been beneficial. Assigning team leader roles to people with less experience allowed good skill development.

CRS Captain, Dr Richard Harris & CRS President - PHOTO CREDIT: DAMIEN SIVIERO

Group photo of day one participants - PHOTO CREDIT: DAMIEN SIVIERO