



TZA
CONDENSED
AQUANUTIC
OPERATIONS MANUAL

Version 1

TEAME ZAZZU AQUANAUTICS

DIVE MANUAL

Termination of a Dive

Working dives shall be terminated under the following conditions:

- 1 **Diver requests termination**
- 2 **Diver fails to respond correctly to communications or signals from another diver or tender**
- 3 **Communications are lost between the dive station and diver**
- 4 **Communications are lost between the divemaster or other critical controlling operators (i.e., vessel operator when liveboating, crane operators, etc.)**
- 5 **Air supply system failure or interruption (SSA). Diver goes on bailout supply or topside shifts to reserve or emergency supply, etc.**
- 6 **Diver loses his buddy in SCUBA operations. After one minute both divers should immediately surface. Unless the diver has through-water communications, he or she should inform the divemaster, then follow the lost diver emergency procedure.**
- 7 **Failure of a dive computer or submersible depth gauge in the water**
- 8 **Scuba tank cylinder pressure below 500 psi**

Emergency response and evacuation contacts and telephone numbers for and diving-related accidents: site-specific emergency response contacts for diving and non-diving accidents, evacuation transport options, diving and non-diving related hospitals and clinics
 Physicians available 24 hours a day for consultation

General Emergency Procedures

Depending on the nature of the diving accident, stabilize the patient, administer 100 percent oxygen, contact local emergency medical system for transport to medical facility, and contact diving alert network (DAN) for assistance from a diving physician, as appropriate, (emergency phone numbers are listed in the dive hazard analysis).

Explain the circumstances of the dive incident to the evacuation teams, medics, and physicians. Do not assume that they understand why 100 oxygen is required for the diving accident victim or that recompression treatment may be necessary. Accompany the evacuation team to the hospital.

Emergency Procedures on SCUBA

Emergency Situation	Recommended Action
S EP-1 Lost Diver	Each buddy pair will have one diver designated as the lead diver. Prior to entering the water the buddy pair will agree upon a reunite location in case of separation. If the buddy diver becomes separated from the lead diver, the lead diver will return to the reuniting location and signal by banging on his tank with a dive knife or use other underwater signaling device. If unable to reunite with the buddy within one minute, both divers shall make a controlled ascent to the surface, and remain at the surface. The first diver to surface shall alert the dive master of the separation. The Dive Master will "fix" the position of the lost diver bubbles. If after 2 minutes the lost diver has not surfaced, the standby diver will buddy up with the primary diver on the surface and attempt to follow the lost diver's bubble trail from the surface to the lost diver. If there is no bubble trail from the lost diver, the search team will immediately return to the last known location of the lost diver and begin a search. If the initial search is unsuccessful, notify authorities of possible recovery situation and continue search.
S EP-2 Fouling or Entrapment	Remain calm. Try clearing yourself of the entanglement. If unable to free yourself, signal the buddy diver you have a problem and enlist their help. The buddy diver will assess the problem, if there is no danger of them also getting entrapped, they will attempt to free the entrapped diver and assist them to the surface. If an inherent danger exist, or the buddy is unable to free the entrapped diver. He will signal the diver he is going to the surface for help. Upon surfacing, advise the Dive Master of the situation and take the appropriate action(s) to free the entrapped diver.
S EP-3 Loss of Air	Switch to the alternate air supply and signal the dive buddy to surface. If the alternate supply does not restore breathing air, signal the dive buddy that you are out of air and utilize their alternate air supply (Octopus). Face one another and make a controlled ascent. If no alternate air supply is available, make an emergency ascent to the surface, remembering to continually blow out, to avoid over expansion injury of the lungs during ascent.
S EP-4 In water Trauma	Dive is terminated, dive buddy is signaled of the situation and both divers ascent to the surface. The uninjured diver should assist the injured diver as needed. Once on the surface, immediately signal the Dive Master and Standby diver for assistance. Once on the shore/diving platform, assess the injury and take appropriate first aid measures.
S EP-5 Unconscious Diver	The buddy diver will assist the unconscious diver to the surface as quickly as possible, within the acceptable safe ascent rate, (30 feet per minute). If the regulator is in the victim's mouth, leave it there. If it has fallen out, leave it out. Surface with the victim in an upright position, hold them near the head. Once on the surface, immediately signal the Dive Master and Standby diver for assistance. Once on shore/diving platform assess the condition of the victim and take appropriate first aid measures.
S EP-6 In Water Equipment Failure	Signal buddy of situation, both divers ascent to surface in a controlled manner.

Appendix M Scuba Diving Checklist (Example)

Pre-Dive Checklist

EQUIPMENT NEEDED

REQUIRED		OPTIONAL	
	Cylinder(s) w/ valve(s)		Pony Air Cylinder w/ Regulator
	Regulator		Light, Signal lights, Chemical lights
	BC or Life Jacket		Recall Unit
	Face Mask		Dive Computer (vice Console & Tables)
	Knife		Slate w/ Pencil
	Fins		Full Face Mask
	Weight Belt w/ Quick Release		Through-Water Communications
	Console w/ PSI & Depth gauge		Whistle
	Watch or Bottom Timer		Snorkel
	Thermal Protection Suit Wet Dry		Compass
	Dive Tables		

DIVER CHECKS:

	Inspect the Cylinder(s) for cracks, dents, gouges, or defective valves. Check O-ring.
	Verify current hydrostatic test and visual inspection, on all cylinders to be used.
	Gauge Cylinder (s) Charge if necessary. (Reserve UP) Check for leaks. Shut cylinder valve.
	Inspect regulator assembly. Attach to cylinder. Open cylinder valve. Verify operation by breathing regulator. Inspect Face mask
	Inspect BC. (If installed, inspect CO ₂ cartridges. Check firing pins.)
	Inspect all other equipment. Ensure all rubber in good condition. Quick release mechanism operates properly. Knife is sharp. Adequate weight.
	Checkout Thru-Water Communications, if used - headsets and surface units
	Checkout bailout or emergency reserve air, to be used.
	Lay out all equipment ready for use

DIVE MASTER CHECKS

	Conduct pre-dive medical checks on all divers.
	Ensure plans are complete for emergency assistance. Nearest chamber, physician, transport, logistics, hospital, and etc.
	Brief all divers, standby divers, tenders, system operators and others directly involved of the dive plans. Cover dive objectives, depth and time limits for the dive, job assignments, work and dive techniques, tools, and phases of the dive, route to site, anticipated conditions, special signals, safety, anticipated hazards, and emergency procedures.
	Ensure all equipment maintenance has been completed. Verify compressor air samples taken within 6 months are OK.
	Verify all dive tables, logs, and dive records available for use.
	Verify all divers have complete minimum equipment
	Notify all persons concerned or boats and facilities in the vicinity that diving is being conducted. Ensure any underwater hazards presented by a vessel or facilities are secured ("Lockout /Tagged Out") prior to and during the dive.
	Verify diving platform is stable (moored or DPS), and ready for diving.
	Verify as required, stage ready and descent line rigged. If using an open bell: verify air & BIBS supply, handling wires or lines rigged, bell operating procedures complete, crane or winches manned and ready to support operations.
	Verify required dive flags and signals are displayed.
	Verify start up operating procedures have been completed. Banks have been charged, system valves aligned, moisture separators / filters / volume tanks have been drained, compressors started and operating properly. Ensure volume of air available is sufficient for anticipated dive.
	Verify Primary Supply: <div style="text-align: right; margin-right: 100px;">—</div> <div style="display: flex; justify-content: space-between; width: 80%; margin-left: auto; margin-right: auto;"> Source PSI </div>
	Verify Backup Supply: <div style="text-align: right; margin-right: 100px;">—</div> <div style="display: flex; justify-content: space-between; width: 80%; margin-left: auto; margin-right: auto;"> Source PSI </div>
	Verify Rack (Supply Console) Reduced Pressure to Umbilical(s): <div style="text-align: right; margin-right: 100px;">_____ PSI</div>
	Test pneumofathometer(s).
	Ensure rack (supply console) properly aligned and manned.
	Verify tender(s) dress diver(s) properly. Umbilical properly attached to safety harness. Knife free. Weight belt on. All hoses connected. No leaks. Wet or dry suit on properly. Boots on or fins ready.
	Verify bailout (come home) connected properly. (check one) Valve open Valve Shut
	Hat the diver(s). Verify rig(s) breath OK. Communications check.
	Verify standby diver ready.
	Check watches and clocks ready.
	Diver(s) enter water. Ensure divers complete final in-water checks. (Rig breathing OK. Check for leaks and dressed properly. Fins ON. Check mask seal. Buoyancy OK.).



AIRWAY MANAGEMENT ITEMS			
QTY	UOI	ITEM	APPLICATION
2	EA	Oxygen Cylinders (Jumbo D)	Oxygen Administration
1	EA	Resuscitator w/ Elder Valve (or LSP type)	Diver resuscitation
1	EA	Ambu Bag w/reservoir & full face mask	Diver resuscitation
1	EA	Pocket mask (or equivalent)	Rescue Breathing

* adequate for open circuit use from the dive site to the chamber location.
Calculate the quantity per diver required is 50 cubic feet per hour of travel to the chamber.

BASIC FIRST AID ITEMS			
QTY	UOI	ITEM	APPLICATION
2	EA	Triangular bandages	Splint / Dressings
2	EA	Splints Moldable (non-pneumatic) 2 sizes	Splinting
12	EA	4x4 Gauze pads, Sterile	Dressing wounds
6	EA	2x2 Gauze pads, Sterile	Dressing wounds / Eye patch
4	EA	Telfa Pads – Non-Stick Gauze	Dressing wounds
2	RL	Roller Gauze (Kling or Elastic) 2" or 3"	Wound pressure bandage
2	RL	Roller Gauze (Kling or Elastic) 3" or 4"	Wound pressure bandage
1	EA	Ace bandage, 4 inches wide	Wound pressure bandage
Various	BX	Band-Aids, assorted & large size	Cuts
12	EA	Butterfly bandages	Cuts
1	BT	Betadine, iodine, (or other disinfecting solution)	Wound cleaning
4	EA	Gel burn dressings	Burn care
2	EA	ABD pads, 5" x 9"	Wound / Burn
1	EA	Tourniquet	Bleeding control
3	RL	Adhesive Tape ½", 1" & 2" -Waterproof	Wound Bandage
10	EA	Swabs, Cotton Tip 6" wooden (Q-tips)	Wound Cleaning

MEDICATION ITEMS			
QTY	UOI	ITEM	APPLICATION
50	TABS	Tylenol 325 mg Tabs	Mild Pain
50	TABS	Aspirin, 325 mg Tabs (not aspirin substitute)	Mild Pain, DCS, Swelling
2	EA	Ammonia Inhalants	Dizziness
1	BT	Hydrogen Peroxide .03%	Minor wound cleaning
2	TU	Triple Antibiotic Ointment	Wound Dressing Antiseptic
1	EA	Hot Pack	Scorpion fish, ray, etc. Stings/ punctures

EQUIPMENT ITEMS			
QTY	UOI	ITEM	APPLICATION
1	EA	Bandage Scissors	Wound Dressing
1	EA	Forceps (i.e. Kelly, etc.)	Wound Dressing
1	EA	Tweezers (or 22 ga needle)	Foreign body / Splinter removal
1	EA	Flashlight (or Otoscope)	Examination
6	PR	Examination latex gloves	Victim handling

ALTERNATE ITEMS TO CONSIDER			
QTY	UOI	ITEM	APPLICATION
1	EA	Ice Pack	Sprains, injury
1	EA	Stethoscope	Examination
1	EA	BP Cuff	Examination
1	BT	Sunscreen	U/V Protection
6	PR	Examination latex gloves*	Victim handling
2	EA	Oral Airways – Adult sizes #4 & #5	Diver resuscitation, airway management

*Additional

REPETITIVE DIVE WORKSHEET

DIVER _____ LOCATION _____ WATER SURFACE ELEVATION _____

DATE _____ WATER TEMPERATURE _____ VISIBILITY (FT) _____ CURRENT _____

<input type="radio"/> DIVE NO. 1 ABT _____ RNT _____ Total time _____	<input type="radio"/> SURFACE TIME _____ hr _____ min DIVE NO. 2	<input type="radio"/> SURFACE TIME _____ hr _____ min DIVE NO. 3	<input type="radio"/> SURFACE TIME _____ hr _____ min DIVE NO. 4	<input type="radio"/> SURFACE TIME _____ hr _____ min DIVE NO. 5
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ACTUAL DEPTH _____ ACTUAL DEPTH _____ ACTUAL DEPTH _____ ACTUAL DEPTH _____
 ALT. CORR. DEPTH _____ ALT. CORR. DEPTH _____ ALT. CORR. DEPTH _____ ALT. CORR. DEPTH _____

ABT = ACTUAL BOTTOM TIME IN MINUTES
 RNT = RESIDUAL NITROGEN TIME IN MINUTES

U.S. NAVY REPETITIVE DIVE & ALTITUDE TABLES ON REVERSE SIDE

REMARKS:

VERIFIED _____ DIVE MASTER _____ DATE: _____

CERTIFIED: _____ TEAM LEADER _____ DATE: _____

DIVE HAZARD ANALYSIS

Feature:

Date: (Haz. Analysis) **Dive Location:**

Date: (Examination)

Dive Purpose:

Dive Area: Lake River Ocean Dam

Canal Other Previous Diving in Area:

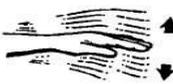
ITEM	NOTE	OKAY	REMARKS
Access			
Exit			
Depth Actual			
Altitude			
Depth Corrected			
Non Decom Limit			
Temperature			
Maximum BT			
Bottom Condition			
Entanglement			
Weather			
Currents			
Vertical Ascent			
Visibility Water			
Lights Required			
Video Recommended			
Camera Recommended			
Surface Support			
Special Equipment			
Team Coordination			
Dive Plan			
Emergency Equipment			
Hospital			
Physician			
Recom. Chamber			
Ambulance			
Radio/Telephone			
Diver's Experience			

Appendix E Hand Signals for Underwater Communication, US Navy (Figure)

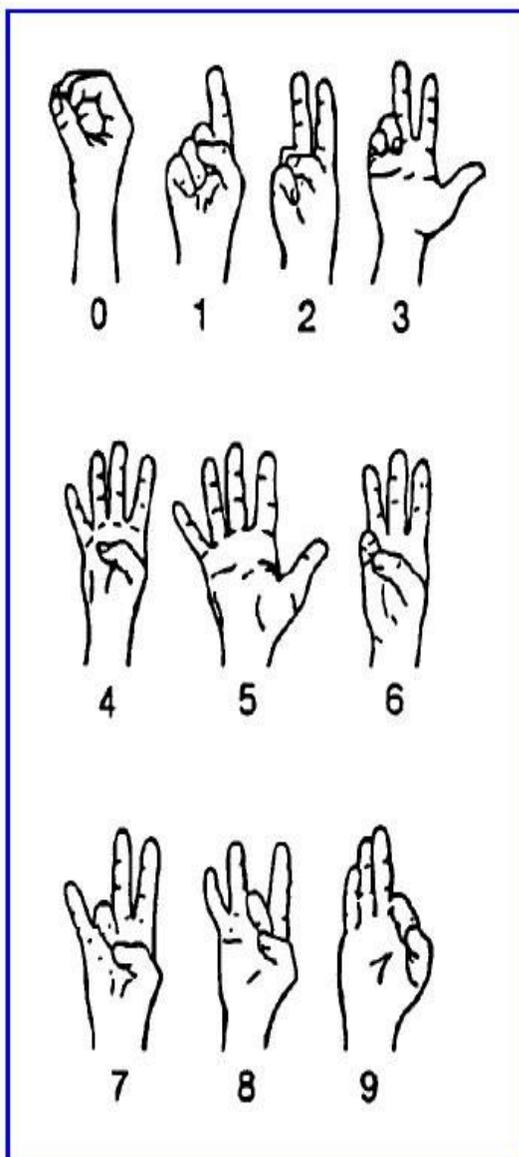
From US Navy Dive Manual, Rev 4

	Meaning/Signal	Comment
	STOP Clenched fist.	
	SOMETHING IS WRONG Hand flat, fingers together, palm out, thumb down then hand rocking back and forth on axis of forearm.	This is the opposite of Okay. The signal does not indicate an emergency.
	I AM OKAY or ARE YOU OKAY? Thumb and forefinger making a circle with three remaining fingers extended (if possible).	Divers wearing mittens may not be able to extend three remaining fingers distinctly. Short range use.
	OKAY ON THE SURFACE (CLOSE) Right hand raised overhead giving Okay signal with fingers. OKAY ON THE SURFACE (DISTANT) Both hands touching overhead with both arms bent at 45° angle.	Given when diver is close to pickup boat. Given when diver is at a distance from the pickup boat.
	DISTRESS or HELP or PICK ME UP Hand waving overhead (diver may also thrash hand in water).	Indicates immediate aid is required.
	WHAT TIME? or WHAT DEPTH? Diver points to either watch or depth gauge.	When indicating time, this signal is commonly used for bottom time remaining.
	GO DOWN or GOING DOWN Two fingers up, two fingers and thumb against palm.	
	GO UP or GOING UP Four fingers pointing up, thumb against palm.	
	I'M OUT OF AIR. Hand slashing or chopping at throat. I NEED TO BUDDY BREATHE Fingers pointing to mouth or regulator.	Indicates signaler is out of air. Signaler's regulator may be in or out of mouth.

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Appendix E Cont

	Meaning/Signal	Comment
	COME HERE Hand to chest, repeated.	
	ME or WATCH ME Finger to chest, repeated.	
	OVER, UNDER, or AROUND Fingers together and arm moving in and over, under, or around movement.	Diver signals intention to move over, under, or around an object.
	LEVEL OFF or HOW DEEP? Fingers and thumb spread out and hand moving back and forth in a level position.	
	GO THAT WAY Fist clenched with thumb pointing up, down, right, or left.	Indicates which direction to swim.
	WHICH DIRECTION? Fingers clenched, thumb and hand rotating right and left.	
	EAR TROUBLE Diver pointing to either ear.	Divers should ascend a few feet. If problem continues, both divers must surface.
	I'M COLD Both arms crossed over chest.	
	TAKE IT EASY OR SLOW DOWN Hand extended, palm down, in short up-and-down motion.	
	YOU LEAD, I'LL FOLLOW Index fingers extended, one hand forward of the other.	

Appendix E Cont.



**NIGHT DIVING SIGNALS
(Buddy at Distance)**

When buddy is near, use regular hand signals in front of light.



Something is wrong.
I require assistance.
(Large, rapid up-and-down motions with arm extended.)



I am Okay.
Are you Okay?
(Large, slow circles with light.)

Appendix E1 Line Pull Signals , US Navy(Table)

From US Navy Dive Manual, Rev.4

Line-Pull signals

From Tender to Diver		Searching Signals (Without Circling Line)	
9 Pull	"Are you all right?" When diver is descending, one pull means "Stop."	7 Pulls	"Go on (or off) searching signals."
10 ulls	"Going Down." During ascent, two pulls mean "You have come up too far; go back down until we stop you."	1 Pull	"Stop and search where you are."
11 ulls	"Stand by to come up."	2 Pulls	"Move directly away from the tender if given slack; move toward the tender if strain is taken on the life line."
12 ulls	"Come up."	3 Pulls	"Face your umbilical, take a strain, move right."
2-1 Pulls	"I understand" or "Talk to me."	4 Pulls	"Face your umbilical, take a strain, move left."
3-2 Pulls	"Ventilate."		
4-3 Pulls	"Circulate."		
From Diver to Tender		Searching Signals (With Circling Line)	
1 Pull	"I am all right." When descending, one pull means "Stop" or "I am on the bottom."	7 Pulls	"Go on (or off) searching signals."
2 Pulls	"Lower" or "Give me slack."	1 Pull	"Stop and search where you are."
3 Pulls	"Take up my slack."	2 Pulls	"Move away from the weight."
4 Pulls	"Haul me up."	3 Pulls	"Face the weight and go right."
2-1 Pulls	"I understand" or "Talk to me."	4 Pulls	"Face the weight and go left."
3-2 Pulls	"More air."		
4-3 Pulls	"Less air."		
Special Signals From the Diver		Emergency Signals From the Diver	
1-2-3 Pulls 5	"Send me a square mark."	2-2-2 Pulls	"1 am fouled and need the assistance of another diver."
Pulls	"Send me a line."	3-3-3 Pulls	"1 am fouled but can clear myself."
2-1-2 Pulls	"Send me a slate."	4-4-4 Pulls	"Haul me up immediately."

ALL EMERGENCY SIGNALS SHALL BE ANSWERED AS GIVEN EXCEPT 4-4-4

U.S. Navy Dive Tables (Unlimited/No Decompression)

From U.S. Navy Diving Manual, Rev. 4

Depth (feet/meters)	No-Decompression Limits (min)	Group Designation														
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
10 3.0	unlimited	60	120	210	300	797	*									
15 4.6	unlimited	35	70	110	160	225	350	452	*							
20 6.1	unlimited	25	50	75	100	135	180	240	325	390	917	*				
25 7.6	595	20	35	55	75	100	125	160	195	245	315	361	540	595		
30 9.1	405	15	30	45	60	75	95	120	145	170	205	250	310	344	405	
35 10.7	310	5	15	25	40	50	60	80	100	120	140	160	190	220	270	310
40 12.2	200	5	15	25	30	40	50	70	80	100	110	130	150	170	200	
50 15.2	100		10	15	25	30	40	50	60	70	80	90	100			
60 18.2	60		10	15	20	25	30	40	50	55	60					
70 21.3	50		5	10	15	20	30	35	40	45	50					
80 24.4	40		5	10	15	20	25	30	35	40						
90 27.4	30		5	10	12	15	20	25	30							
100 30.5	25		5	7	10	15	20	22	25							
110 33.5	20			5	10	13	15	20								
120 36.6	15			5	10	12	15									
130 39.6	10			5	8	10										
140 42.7	10			5	7	10										
150 45.7	5			5												
160 48.8	5				5											
170 51.8	5				5											
180 54.8	5				5											
190 59.9	5				5											

* Highest repetitive group that can be achieved at this depth regardless of bottom time.

