

# **COMPETITION SAFETY AND LOGISTICS GUIDELINES**

**How to Develop and Maintain a Safe and Prepared Freediving  
Competition**

**Ren Chapman**

## INTRODUCTION

The year was 2007 and competitive freediving was something I had never thought I would be a part of. I became a freediver because I loved the ocean and what she provided through spearfishing. However, safety freediving became a part of my life in 2008 when I took my first freediving course with Performance Freediving International. That same year my wife Ashley and I traveled to Sharm El Sheik, Egypt for the team world championships. One of the things I remembered most was an incident that happened with Ashley in the pool. She was performing a dynamic swim and had a below surface blackout. The safety was, let's just say, below par. It was that moment I realized that maybe formal training should be employed to these important positions. Ashley and I married and she continued to compete. As a result I had found my position in the freediving world as a safety diver. I began with Kirk Krack, founder and owner of Performance Freediving International, assisting with his annual competition in the Cayman Islands. Let me go ahead and give credit where credit is due, most of the techniques presented in this document originated from Krack and have been supplemented with my own personal experiences over the past 10 years.

Below is short timeline of events beginning my career in freediving and culminating in this document:

- In 2007 I took my first Performance Freediving course in Miami, Florida.
- 2008 I attended my first world championships in Sharm El Sheik, Egypt and recognized for the first time inadequate safety.
- 2009-2012 I became a full time PFI instructor and safety diver for annual Deja Blue competition in Grand Cayman.
- 2012-2013 I was safety diver at Vertical Blue in the Bahamas and in 2013 I was the Chief of Safety at Vertical Blue. That is the same year I lost my friend Nic Mevoli to freediving.
- 2015 I was the Chief of Safety for the Big Blue competition in La Paz, Mexico
- 2012-2017 Chief of Safety for the Caribbean Cup in Roatan
- 2016 I was the Chief of Safety for Deepsea Challenge in Bonaire.
- 2017 I was the Chief of Safety and Logistics for the AIDA World Championships in Roatan, Honduras.

This document, "Version 1.0", is meant to be an ever evolving guide for organizers and safety personnel and is open to comments and suggestions. There are many things that can be kept secret in the freediving world but proper safety during competition or at any time during freediving should not. It should not be used for monetary purposes and should be freely distributed to everyone. I am introducing techniques I believe to be best but these techniques may not be the best. I accept that when it can be proven otherwise, other methodologies may be better. So please read through and take what you can take from it. If it prevents a single death then all the time it took me to create it is well worth my time.

I want to thank those of you who have helped me with the document and to those who will continue to contribute and perfect it.

Sincerely, Ren Chapman

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## 1.0 COMPETITION PERSONNEL

### 1.1 POSITIONS AND ROLES

Listed is a minimum number of positions, including job descriptions, needed to smoothly run a freediving competition.

- Chief of safety and logistics
  - Head of safety team
  - Head of logistical coordination
  - Head of safety and Head of Logistics may be two separate positions depending on the experience of the individual.
- Competition Administrator
  - Organizes start list
  - Assists judges in processing results
  - Liaison between organization, athletes and judges
- Camera manager
  - Manages the official cameras
  - Downloads footage daily for judges
  - Charges all batteries and transports equipment to and from dive site
  - Places bottom camera on plate(s) and manages battery changes
- Camera operator
  - One person per competition line
  - Records official topside footage for the organization
- Sonar technician
  - One person per competition line
  - Manages reading and calling of athlete depths via sonar
  - See section 1.5
- Line Coordinator
  - See section 1.4
- Platform coordinator
  - Deploys counter balance if needed
  - Changes line depth
  - Manages daily dive list and communicates athlete information to judges and safeties
- Safety Divers
  - 4 minimum per competition line): Descriptions recorded below
  - For best results 8 divers per competition line is preferable

### 1.2 SELECTING THE SAFETY TEAM

Before beginning let's describe what I consider the most important aspect of a dynamic and successful freediving safety team. The often overlooked concept is "Team". The safety "Team" should eat together, drink together, dive together and practice safety together. The team members must be at the dive site at least one week prior to the start of the competition, practicing and training daily both together and with the training athletes. If a member of the safety team arrives after the mandatory one week arrival window then he or she should not be allowed in direct contact with the competition zone regardless of his or her experience.

The successes of a safety team is reliant upon the relationships created during this one week period and even begins long before that through earlier arrival and/or online communication. The more contact the athletes have with the safety team the more trust and confidence they will develop in the team as a whole. This is the most important part of being a successful safety team. If any member of the team shows poor work ethic he or she should be warned and terminated if problems persist. There is no room for misconduct or insubordination amongst the safety team. The team is a unit that works diligently to accomplish the goals and roles of the competition. Each member must live by the philosophy, "If you are not doing anything you are not seeing what needs to be done."

Safety selection has for years been fairly simple for competition organizers and for years it has been based primarily on those people who could show up with little expense required by the organization. Experienced, non-experienced, beginner or advanced freedivers were accepted. As long as they could get there they could find a position on the team. A very successful team can and has been made from this criteria. My suggestion is to have at least one highly skilled, experienced, safety chief a background as a freediving educator. Someone that teaches on a regular basis. It is also strongly suggested that the head of safety be responsible for selecting and vetting his or her own team. This will help ensure cohesiveness and will allow the head of safety to design the best possible team for their style and expectations. The safety team members should be at least 30 meter divers with static breath holds of at least 4 minutes. Longer and deeper is better and should be an organizational goal to strive for but the minimums will work. Safety team members should be highly motivated and should have a good work ethic. Without the safety team, the competition will not run.

### 1.3 SAFETY DIVER ROLES

*Below are job descriptions for each member of the safety team*

#### 1.3a Number 1 (Primary Diver)

- Verify depth verbally so judges and platform or line coordinator can clearly hear. This is done by visually verifying markings above and below set depth (Example: For a 53 meter dive, the safety diver must dive to the 50 meter mark and read his or her gauge and it must read 3 meters + or - 20 centimeters. Then he or she must verify the marking along the line above which would be the 60 meter mark). This check should be done during both training and competition and additionally checked by a member of the judge team during competition.
- Verify that lanyard is on and secure by visually and physically testing the security of the lanyard. Make sure lanyard velcro is secure and that male and female velcro are mated properly. A verbal expression of this verification must be clearly heard and understood by judges and platform

or line coordinator. A second verification should be completed by the judges during the competition or the secondary safety diver during training.

- Verify that official gauge is on and secure. A verbal expression of this verification must be clearly heard and understood by judges and platform or line coordinator.
- Meets the athlete at the required depth for the dive (Read “When, where and how of safety diving” for the prescribed times and depths).
- During dive, primary has only 20 seconds additional time from the time he or she reaches his or her position at depth and after that time he or she must wave off the dive if the athlete is not in sight or making progress up the line. The signal is a full arms extended waving overhead and should be horizontal in reference to the surface so that the signal can easily be seen at depth from the surface. Additional safeties should be placed within sight of the surface as needed if visibility issues are present at dive sight.
- In the event of an underwater blackout, the primary has priority over the airway however, if the secondary sees an airway issue and closes the airway then he or she then becomes the primary safety diver and the Number 1 would take over the role of the Secondary (Number 2).
- After dive, Primary diver becomes the Number 4 backup diver and in the event there is a drop weight used as counterbalance, the departing primary controls the Prusik knot for the depth change.
- Safety divers should verbally or non verbally report his or her positions before each dive to ensure all roles have been filled.

#### 1.3b Number 2 (Secondary Diver)

- Verify depth verbally so that judges and platform or line coordinator can clearly hear. This is done by visually verifying markings above and below set depth (Example: For a 53 meter dive, the safety diver must dive to the 50 meter mark and read his or her gauge and it must read 3 meters + or - 20 centimeters. Then he or she must verify the marking along the line above is the 60 meter mark). This check should be done during both training and competition and additionally checked by a member of the judge team during competition.
- Verify that lanyard is on and secure by visually and physically testing the security of the lanyard. Make sure velcro is secure and that male velcro and female velcro are mated properly. A verbal expression of this verification must be clearly heard and understood by judges and platform or line coordinator.
- Verify that official gauge is on and secure. A verbal expression of this verification must be clearly heard and understood by judges and platform or line coordinator.
- Meets the athlete at the required depth for the dive (Read “When, where and how of safety diving” for the prescribed times and depths).

- During dive, primary has only 20 seconds additional time from the time he or she reaches his or her position at depth and after that time he or she must wave off the dive if the athlete is not in sight or making progress up the line. The signal is a full arms extended waving overhead and should be horizontal in reference to the surface so that the signal can easily be seen from depth. Additional safeties should be placed within sight of the surface if needed if visibility issues are present at dive sight. The secondary safety diver must “relay” the message to the surface or to the next safety diver in visible line to the surface.
- In the event of an underwater blackout, the primary has priority over the airway however, if the secondary sees an airway issue and closes the airway then he or she now becomes the primary safety diver and the Number 1 would take over the role of the secondary.
- In the event of an underwater blackout, the secondary will assist the primary by lifting athlete and Primary Safety simultaneously. Pulling the athlete only has the potential to force separation of the primary from the athlete and therefore opening airway of victim. (Explain Details )
- Upon completion of judge presentation of card, secondary will release the lanyard and escort athlete towards pre determined competition zone exit.
- Secondary diver becomes Primary diver for next athlete in line.
- Safety divers should verbally or non verbally report his or her positions before each dive to ensure all roles have been filled.

#### 1.3c Number 3

- Verify that the primary and secondary roles are filled and that they have completed their pre-dive surface roles.
- Always ready to dive in the event that Number 1 or Number 2 divers have an issue and are unable to dive (i.e.: Equalization issue)
- In the event of a blackout, dive down to ascending safety diver and remove athlete lanyard. Assist with extraction of athlete. When assisting with underwater blackout it is important that only two safeties have direct contact with athlete. Additional lift should be directed towards the primary safety diver. On any and all blackouts the primary safety diver is considered the diver in control of the airway.
- Safety divers should verbally or non verbally report his or her positions before each dive to ensure all roles have been filled.

#### 1.3d Number 4

- Verify that the primary and secondary roles are filled and that they have completed their pre-dive surface roles.
- Always ready to dive in the event that Number 1, Number 2 or Number 3 divers have an issue and are unable to dive (i.e.: Equalization issue)
- In the event of a blackout, dive down to ascending safety divers and remove athlete lanyard if task not completed by Number 3. Assist with

extraction of athlete. When assisting with underwater blackout it is important that only two safeties have direct contact with athlete. Additional lift should be directed towards the primary safety diver. On any and all blackouts the primary safety diver is considered the diver in control of the airway.

- Assist in the lift of the Primary Safety diver to allow for easy blackout protocols by the Primary.
- Safety divers should verbally or non verbally report his or her positions before each dive to ensure all roles have been filled.

#### 1.4 LINE COORDINATOR

- Adjust the setting of the line between dives
- Verify depth by answering back the verbal acknowledgement of depth from the safety divers. Visually verifying markings above the surface as the line is being repositioned. This check should be done during both training and competition and additionally checked by a member of the judge team during competition.
- Ready and in position near counterbalance system so that activation can be quick and efficient if activation is required.
- Maintain a clear area around the counterbalance system.
- Once counterbalance is activated the line coordinator will assist the line up by pulling as fast as possible.

#### 1.5 SONAR TECHNICIAN

The sonar technician is an extremely important position on the safety team and he or she should be practiced in that position. He or she is the eyes of the team at depth and can in fact save a life. The following is a list of task associated with the Sonar Technician Roles:

- Verbally call out depths of athlete every 10 meters beginning at 30 meters depth.
- Report “touchdowns” and “turns” to the team.
- Sonar technician is responsible for reporting delays or pauses in the movement of an athlete. If an athlete fails to progress after 10 seconds, a call for the activation of the counter balance is recommended.
- See “6.1 Sonar for Competition ” in appendix for details on choosing an appropriate sonar for competition freediving.

#### 1.6 UNIFORM AND EQUIPMENT

- Exposure protection via wetsuit in order to protect diver from sun and or cold. A wetsuit also provides positive buoyancy to assist the safety diver in below surface blackout occurrences.
- Ballast should only be used to compensate for positive buoyancy above 15 meters and the safety should not be negative above 15 meters.

- A white long sleeve lycra to identify each safety as a member of the team and to allow for easy visibility at depth.
- Each safety diver should carry a small, streamlined cutting device and should be worn on the belt.
- Each safety should wear and carry an attached snorkel. In the event that the safety's head needs to be in the water the snorkel should be simply attainable and accessible to the safety's airway.
- Long blade fins are a requirement
- Safety diver should be using a depth gauge with timing device.

### *1.7 IN WATER POSITIONING OF SAFETIES*

- Before official top, safety should be clear of the possible contact of athlete as well as between the visual line of judges and athlete.
- Safeties should be aware of his or her position in the water column at all times.
- Safety should have his or her back to the platform side of the competition line as the athlete approaches from the depth and should maintain this position unless the athlete refuses to face. If athlete refuses to face safeties can attempt to rotate athlete by making eye contact and slowly swimming in position to properly align athlete to face judge. This is not a priority and should only be used as a courtesy to athlete and this courtesy can be discussed with athletes during training with the acknowledgement from the athlete that positioning is the responsibility of the athlete.
- Safeties should maintain eye contact with athlete at all times at the same level as the athlete's eyes. This is the priority.
- Primary and secondary should be positioned at a 45 degree angle from the front of the athlete on opposite sides. Secondary should be aware of the primary's initial positioning and fill in the side opposite the athlete.
- Both safeties should try and surface just in front and between the judges on the platform and while at the same time keeping the line of sight between the judges and the athlete clear.
- Upon surfacing the safeties should back out of the area maintaining a 2 meter distance from athlete. As a safety, it is your place to make a judgement call as to how far you remove yourself from the athlete but once the athlete reaches the surface it is only the judgement of the judge to grab the athlete.

### *1.8 STEPS TO BLACKOUT OR LMC RECOVERY*

A blackout can be very intimidating for a new safety diver and many times an overreaction will occur. The following steps should be taken to quickly promote the breathing response in the athlete.

1. Secure the airway above the water
2. Remove any and all facial gear from athlete's face
3. Calmly blow, tap and talk to athlete giving ample time to assess the condition of athlete. Three blow tap and talks should take less than 10 seconds and is sufficient in the assessment period. A tap is defined

as a gentle tapping of the cheek only using the tips of the fingers. An aggressive, heavy slapping can prolong the blackout.

4. Assessment is visual and/or audible. If the athlete's eyes are open wide then he or she is in a blackout state and once the eyes close then conscience has been regained.
5. If breathing is not apparent after blow, tap, talks then two consecutive breaths while holding the nose should be administered to athlete. The first breath opens the possible laryngospasm and the second delivers air to the lungs.
6. If breathing is still not apparent then a breath with nose held every 5 seconds should commence and an immediate evacuation to boat or platform and doctor should begin.
7. Oxygen should be administered immediately along with positive pressure.

#### 1.9 LMC (Loss Of Motor Control) PROTOCOL

*The number one rule in a blackout or LMC (Loss Of Motor Control) is to protect the athlete's airway from contact with the water. This will prevent water inhalation which will complicate resuscitation. The following is a list of procedures to manage an LMC:*

- Remain close and wait for the judges "Grab, Grab, Grab" command.
- Once the "Grab" command has been given, calmly secure the airway by grabbing victim under the arm as close to the torso as possible with opposite hand as the victim. Bring athlete close to your body while placing the your opposite hand above water level and in front of athlete to prevent dipping of the airway. In the event of a blackout the victim will either go forward or backwards and at this point the athlete will be placed on his or her back and the blackout protocol can be initiated. (See Section 1.8 STEPS TO BLACKOUT OR LMC RECOVERY)
- Immediately remove facial gear from athlete.
- Blowing across the athlete's face will stimulate the breathing response.
- Do not force athlete's head backwards in to the blackout recover position but instead only protect the airway from a forward dip. Forcing the head back can prolong recovery and cause blackout.

#### 1.10 BLACKOUT PROTOCOL

The number one rule in a blackout or LMC (Loss Of Motor Control) is to protect the athlete's airway from contact with the water. This will prevent water inhalation which will complicate resuscitation. The following is a list of procedures to manage the three forms of blackout:

##### 1.10a SURFACE BLACKOUT

- Secure the athlete's airway by providing lift under his or her armpit using the prescribed LMC management. (See Section 1.9) If the victim falls forward the opposite hand should be under chin at water level and the

“head sandwich” which is a maneuver by the Primary Safety in which one hand covers and protects both the oral and nasal airways while at the same time the safety’s other hand is placed at the base of the head and neck to create a “sandwich” of the head. This should be employed to place victim on his or her back.

- Removal of the facial gear identifies the primary safety and can be done by either the Number 1, 2 or 3 safety divers depending on positioning of athlete and the first safety to reach athlete one the judges call the “Grab” This should be the first step in recovery.
- Remaining safeties are providing lift to both the victim and the primary safety diver and the victim should be flattened along surface. This maintains airway above the water and allows for easy access to the airway for further resuscitation needs. A flat position also reduces water pressure on chest for easier inflation of lungs.
- All blackout recover should be conducted as close to the competition line as possible and the line should be used as a means of securing the vertical and horizontal positioning of the athlete.
- Removal of the lanyard should be completed by a member of the team not providing direct care to athlete.
- Shading of the athlete’s eyes should be done by a member of the team not providing direct care to athlete.
- A calm, slow blow tap and talk is mandatory for blackout recovery and provides the safety team proper assessment of the severity of the blackout. (See 1.9 “Steps to Blackout recovery”)

#### 1.10b SUBSURFACE BLACKOUT

- Secure the airway using the “Head Sandwich” which is a maneuver by the Primary Safety in which one hand covers and protects both the oral and nasal airways while at the same time the safety’s other hand is placed at the base of the head and neck to create a “sandwich” of the head. This prevents water from entering the airways and provides a streamline means of transporting athlete to the surface.
- Secondary safety provides lift to both the athlete and the Primary safety
- Number 3 and or Number 4 safety diver removes lanyard and provides lift to the Primary safety diver during the ascent.
- Upon arrival at surface, the facial gear should be removed by the primary safety diver. This should be the first step in recovery.
- Remaining safeties are providing lift to both the victim and the primary safety diver and the victim should be flattened along surface. This maintains airway above the water and allows for easy access to the airway for further resuscitation needs. A flat position also reduces water pressure on chest for easier inflation of lungs.
- All blackout recover should be conducted as close to the competition line as possible and the line should be used as a means of securing the vertical and horizontal positioning of the athlete.

- Removal of the lanyard should be completed by a member of the team not providing direct care to athlete.
- Shading of the athlete's eyes should be done by a member of the team not providing direct care to athlete although this could be considered direct care.
- A calm, slow blow tap and talk is mandatory for blackout recovery and provides the safety team proper assessment of the severity of the blackout. (See 1.8 STEPS TO BLACKOUT OR LMC RECOVERY)

#### 1.10c PRE-DIVE PACKING BLACKOUT

Although not a common occurrence, knowledge of the packing blackout should be known by the safety team so that they are aware of its possibilities. The packing blackout occurs when the athlete's lung volume displaces the normal rhythm of the heart and therefore causes a short term blackout. This condition is very short in duration and normally requires little attention from the safety team. The one occasion I have witnessed the packing blackout the athlete paused right before his entry and immediately came back up with the realization that he had just blacked out. A total blackout duration of about 5 seconds.

#### 1.11 SCOOTER SAFETY

Underwater scooters are a great tool for deep safety and can be used as an additional safety system however, many athletes dislike the use of a scooter for safety because of the added noise in the water column during his or her ascent. With that in mind, the following is a guideline for using underwater scooter for competition safety.

- Leave the surface with 1:10 seconds remaining in the announced dive time. This will put you at a depth between 40 and 50 meters when you rendezvous with the returning athlete.
- As you pass through 30 meters begin the downshift so that you are in the lowest and slowest gear as you rendezvous with the athlete.
- Power downward until you reach the depth of the athlete then turn up and under and maintain speed of athlete on his or her ascent. This will allow for quick retrieval and continued downward direction in the event the athlete is struggling below the normal rendezvous depth. In other words you are not stopping and waiting on the athlete to reach so as not to take time to reestablish descent in the event of issues deeper.
- Maintain close distance (3 meters) at a 45 degree angle from front of athlete at eye level watching for signs of loss of motor control or loss of airway control. Once athlete meets the 30 meter safety and that diver establishes the 45 degree angle at eye level, the scooter can then be positioned behind that safety and in the event of a blackout can give the safety assistance to the surface. Do not assist by dragging athlete. Instead, the scooters upward force should be applied to the safety diver controlling the airway of the athlete.

- Once the diver has passed through 10 meters the scooter safety should carefully drive away from the competition zone avoiding spectators.
- The scooter safety should limit his or her dives to one dive every 12 minutes to avoid DCS related issues.

### 1.11 SAFETY FOR MEDIA

In 2011, I was attending the annual Deja Blue competition in Grand Cayman and there I witnessed first hand the blackout of a videographer covering the event. He was freediving and fortunately was sharing the duties using the same camera and taking turns doing the dives. The first cameraman was filming the descent and the second cameraman was filming the ascent of the athlete. At approximately 3 meters from the surface the second cameraman experienced an LMC and the other cameraman was luckily there for the rescue. Most camera operators act alone and this was the only “camera sharing” I have seen during a competition. So how do we eliminate the risk to the media? One way is to place all responsibility on the cameraman however if something happens to that person the organization will be responsible for that cameraman. Maybe the only thing to do is place a dedicated safety on the media team.

- 1.11a Scuba diving by the media team should be approved by the Chief of Safety and should be conducted using a strict “Buddy” system. Scuba diving in deep open ocean can be a challenge to less experienced divers and can quickly become dangerous when focus is placed on the deep diving apneist.

### 1.12 SPECTATOR CONSIDERATIONS

Spectators are becoming a larger part of the competition scene and if the sport is to grow, so will the spectators surrounding it. Safety guidelines should be established for these onlookers otherwise accidents are bound to happen. The following is a list of suggested rules for spectators:

- No Freediving
  - I have seen many spectators freediving alone during events and if it is eliminated then this particular hazard is eliminated.
- No scuba diving
  - Scuba diving during competition should be eliminated by spectators in and around the competition zone and should be limited to the media team.

## 2.0 COUNTER BALANCE SYSTEM

The counter balance is a last ditch effort mechanism to retrieve an athlete beyond the reach of the safety diver. It is recommended that the counterbalance side of the competition line be twice the weight of the competition line. A drop weight is a simple way to keep both the competition side of the line as well as the counterbalance side of the line even for ease of depth changing.

## 2.1 TYPES OF COUNTER BALANCE SYSTEMS

*2.1a Uneven Ballast: counterbalance system designed using a larger weight on the opposite side of the competition side of the line. The uneven Ballast should be at least twice the weight of the competition side of the line.*

*Pro-All that is required is a simple pull on the line and release of the clutch system to activate.*

*Con-This system makes changing line depths more difficult as one side is pulling harder than the other.*

*2.1b Drop Weight: counterbalance system that uses equal weights on both the counterbalance and competition sides of the line and utilizes an additional weight that is only deployed in the event of an activation of the system. Drop weight should bring the total weight of counterbalance to at least twice the weight of the competition zone.*

*2.1c Prusik Knot: The Prusik is a knot used to attach a drop weight. The reason we use this particular knot is that when the weight is dropped, it immediately catches the line which allows the weight to immediately begin assisting the line down without having to fall the entire length of the line before catching the line.*

*\*Both of these systems work in conjunction with a trained platform or line coordinator so that when activated he or she is also pulling the line up. With either of these systems in place, the team should be achieving a 1.5 meters per second ascent rate of an athlete in a belt positioned lanyard.*

## 2.2 WHEN TO ACTIVATE THE COUNTER BALANCE

Motionless athlete either visible by safety team or visible with sonar. With sonar we give the athlete 10 seconds before we activate. The safety diver initiated activation should be done at the discretion of the safety divers at depth. If the athlete appears to be unconscious or not progressing then activation should be signaled. The signal is a full arms extended waving overhead and should be horizontal in reference to the surface so that the signal can easily be seen at depth from the surface. Additional safeties should be placed within sight of the surface as needed if visibility issues are present at dive sight.

## 2.3 WINCHES FOR COUNTER BALANCE

A winch is a convenient way to move a line up and down but should not be used as a counterbalance system. These systems are mechanical as well as most of the time electrical and therefore have the ability to fail.

## 2.4 WEIGHTS FOR COUNTER BALANCE

The size and shape of weights used for counter balance systems is an important aspect to the proper functioning of the system and the Organizer and/or Chief of Logistics and Safety should be aware of such size and shape concerns. When the counterbalance is activated, a smooth fast descent of

the weight is desired and in order to accomplish this the weight system must be small and streamlined. The best form of ballast is constructed from lead and has the shape of a teardrop. Lead is one of the heaviest and least expensive natural elements and can easily be shaped or forged into the desired teardrop shape. Steel would be an alternative to using lead however a larger piece would be required as oppose to using lead. Concrete is not suitable as a drop weight because of it's porous characteristics and the size requirements needed compared to a lead or steel ballast. Shape will determine the direction the item will fall so avoiding flat sides on the drop weight is very important. A flattened weight dropped will not have streamlined characteristics and therefore may slow the descent and cause entanglement of competition side of the line. A minimum distance of 6 meters is recommended between counterbalance line and competition line.

### 3.0 COMPETITION BOTTOM PLATE

The competition plate is an important aspect of the competition line and precise construction considerations should be taken. The first aspect to consider when constructing a bottom plate is the actual size of the plate. The plate should be round and the diameter should be less then 30 centimeters. The larger the plate, the slower the retrieval in the event of a counter balance activation. 4 centimeter diameter holes should be drilled throughout plate to allow water flow which will decrease drag during vertical movements of the competition line. A 5 centimeter wide parameter should be maintained along outer edge of plate for tag attachment. Plate should be constructed using a high density plastic (Minimum thickness 6.35 mm) and edges should be rounded to avoid entanglement and/or injury to athlete. A minimum 2 meter in length tubing should be attached to bottom of plate and the bottom plate camera should be attached to an arm a minimum distance of 2 meters from bottom of plate. This will eliminate the chance of an athlete becoming entangled with camera arm. See Figure\_\_\_\_\_ for diagram of bottom plate minimum requirements.

### 4.0 MEDICAL REQUIREMENTS

It is a requirement of both AIDA and CMAS to have a medical doctor on site during their sanctioned events however, an organizer and or safety chief should consider additional doctor qualifications. Serious freediving related issues are closely related to cardiac and pulmonary emergencies and should be treated accordingly. When choosing a doctor it is important to choose a practicing professional that has experience in emergency room operations. A cardio or pulmonary specialist would be a plus as well as someone with experience in remote emergency medicine. Additional personal should include a professional paramedic trained in preserving life until advanced care can be reached. Although not a requirement, experience with freediving and with blackouts and squeezes should be a consideration when choosing a doctor and or medical personal.

Medical supplies and equipment are an important aspect of the safety preparation and obtaining this equipment can be a difficult task and should be completed months before the competition.

#### *4.1 LIST OF REQUIRED EQUIPMENT*

- Bag Valve Mask
- Double Evacuation Time supply of 100% Medical Grade Oxygen
- Oral Pharyngeal Airway Multiple Size Kit
- Advanced Airway Kit
- Manual Suction
- AED

### 5.0 EVACUATION PLAN

An evacuation plan is almost as important as the doctor and should be well thought out and practiced to avoid confusion in an emergency situation. The evacuation plan should be extremely detailed to include a detailed route map, phone numbers to hospitals and ambulance services. Driving times from extraction site to advanced hospital care should be measured accurately and listed on the evacuation plan as well as alternative routes. An example evacuation plan is located in the appendix of this document. A dedicated evacuation boat should be on site at all times before and during competition and at least two dedicated operators should be assigned to the boat. The boat should be able to carry 5 personal to include the captain as well as an evacuation supply of oxygen. Additional oxygen should be stored on board the evacuation boat. A dedicated phone with all pertaining contact numbers should be located on boat or in medical kit and each member of the safety team should be well informed of its whereabouts and how to use.

#### 5.1 EVACUATION PLAN OUTLINE

### 6.0 NATURAL CONSIDERATIONS

#### 6.1 WEATHER CONSIDERATIONS

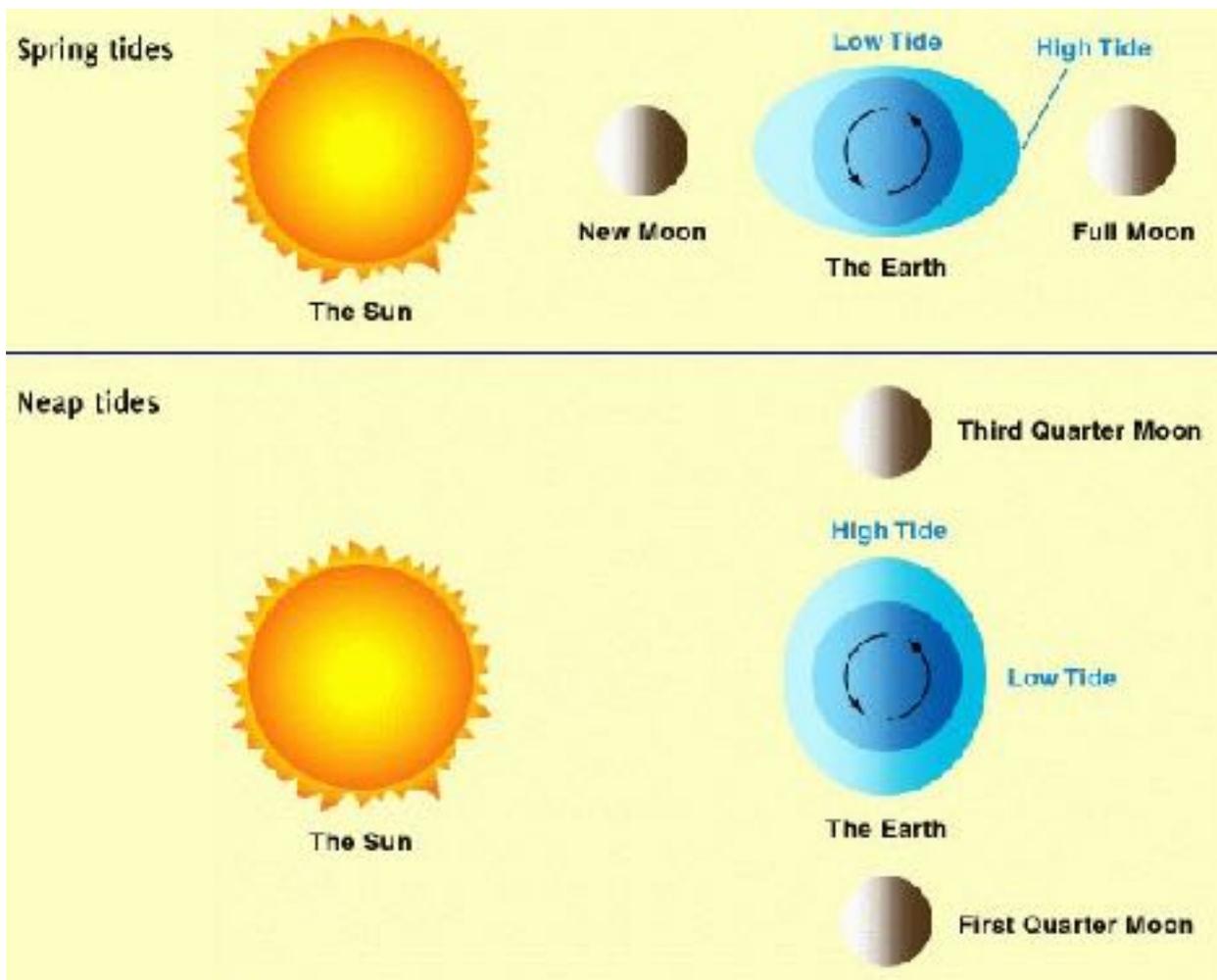
Weather is a major consideration to safety of a competition and weather patterns should be a consideration when planning a freediving competition. The most important aspect of the weather to consider is wind. Like tides and current, wind and other weather can be somewhat predicted by observing historical records. Rainy seasons and dry seasons have been observed for hundreds of years and at the same time wind patterns have been observed. Today, modern forecasting has made weather predictions easier and more accurate and if you want to be successful at forecasting winds you have to use what sailors use. The following is a list of websites used by sailors to predict wind and weather:

[www.passageweather.com](http://www.passageweather.com)

[www.windfinder.com](http://www.windfinder.com)

## 6.2 MOON PHASE CONSIDERATIONS

The lunar cycles have the largest gravitational influences on our oceans and can cause undesired currents and tides. The strongest influences in the lunar cycle occur during the New moon which is when the moon and the sun are in alignment. The second most influential lunar cycle is during the Full moon which is when the moon is on the opposite side of the earth as the sun and the two bodies work against one another. Knowing the moon cycles can help with planning of dates and should be a major consideration. The midpoint of the competition schedule should be on the First Quarter or Last Quarter of the Lunar cycle. (i.e.: If the First Quarter falls on the 21st of September then a six day competition should begin on the 18th of September and end on the 23rd of September.) Read more about Tides and currents at <http://oceanmotion.org/html/background/tides-types.htm>



## 6.3 WEATHER MITIGATION

Weather is an uncontrollable factor however, an organization can mitigate its effect on the completion of a competition. This mitigation can be done by

choosing fair weather times of the year or by choosing a First or Last quarter of the moon phase. Even with proper planning, poor conditions can arise and we must be able to adapt to such conditions. As mentioned earlier, wind and tides are the major causes of competition delays and the following is a list of possible solutions:

#### 6.4 WIND

Wind is the most common weather related concern for a freediving competition however, it can also be an asset. For instance in Roatan and in Bonaire, we use the wind as a means of keeping all of our boats and platforms aligned and straight. Without wind, the system becomes loose and boats, platforms and lines go in all directions. We also used the prevailing winds to determine our dive locations. A diving rig situated in the lee of an island makes for calm waters even if the wind is blowing very hard. The closer to the body of land the better. Boats turned sideways to the wind creates an amazing slick for a competition zone

#### 6.5 CURRENT

Current is a very difficult force to manage and only proper planning around the Lunar cycle can mediate this force. Depending on the type of setup used, whether it be a platform or boat setup or a floating rig, drifting can be an option. When drifting, consideration must be taken in distance and direction of drift. In locations with current, a float based competition system should be used to limit influences from wind and will eliminate current influences. An additional consideration is that of differences in surface and bottom currents. Consistent current throughout the water column is a rarity especially close to shore and can be a challenge to the logistics and safety of the competition. Again, proper Lunar cycle planning is all we have to predict such currents and floating competition systems may or may not be the system of choice. Strong currents on a stationary competition system must be dealt with on a case by case bases and if safety is a factor then postponement must be considered. Depending on the location and type of tidal influences in that location, a scheduling change may clear up negative tidal and current influences. Read more about tides and currents here <http://oceanmotion.org/html/background/tides-types.htm>

## 6.0 APPENDIX

### 6.1 SONAR FOR COMPETITION

Sonar is a fairly reliable means of keeping tabs on an athlete during a dive and it is a recommended piece of equipment when organizing an event. The following is a list of specifications a sonar should possess for proper following of a freediving athlete:

- Must be a minimum 600 watt transducer. Transducer should be located within 6 meters of the competition line.
- Have an “A-scope” feature.
- Additional: A deep cycle 12 volt battery with minimum 75 amp hour storage is recommended and should be charged if voltage drops below 12.1 volts.

### 6.2 EVACUATION PLAN OUTLINE