

CMAS 國際錦標賽 CMAS INTERNATIONAL CHAMPIONSHIPS

戒護指南與程序 SAFETY GUIDELINES AND PROCEDURES

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CMAS 國際錦標賽戒護指南與程序

CMAS Safety and logistics guidelines for international competition.

此份文件是由 CMAS 自由潛水委員會精心製作,以美國的 Ren Chapman 之文件為基礎,以及希臘的 Tolis Bellos、義大利的 Michele Geraci、義大利的 Michele Tomasi、烏克蘭的 Natalia Zarkhova、和法國的 A. Ponche 等人之大力協助。 This document has been elaborated by Cmas Free Diving Commission, on the basis of the document of Ren Chapman (USA) with the help of Tolis Bellos (GRE), Michele Geraci (ITA), Michele Tomasi (ITA), Natalia Zarkhova (UKR) and A. Ponche (FRA).

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2. CMAS 國際賽事要求之列表 (List of requirements for international CMAS competitions)

2.1 後勤 (Logistics)

- 「甲板空間夠大的小船」或平台船,需具有吊臂可設置比賽用繩。
- Boat or ponton with bow to install competition line.
 - 平台船或「甲板空間夠大的小船」,其空間要夠大,可容納裁判、攝影師、急救小組及急救裝備。
 - The pontoon or deck boat should be sufficiently large to welcome judges, camera operators and emergency team with equipment
- 反重平衡系統 (Counter balance),電動或人力拉動的絞盤裝置,都要至少 能以最小速度拉起所有比賽用繩。
- Counter balance, electric or manual winch system to pull up all the competition line at a minimum speed.
- 潛水員召回裝置,當「反重 (counterweight)」或「電動絞盤裝置」啟動時可發出訊號,運動員就可抓住比賽用繩進行上升。
- Diver recall system. In case of activation of counterweight or electric winch system, a signal will be emitted so that athlet e can grab the line to ascent.
- 聲納裝置,在運動員比賽過程中,能跟隨監控運動員下潛和上升。
- Sonar system to follow the descent and ascent of the athlete during his performance
- 攝影裝置
- Video system
 - O 水下無人機 (Underwater drone),例如:diveye,能在所有比賽中跟隨著運動員。
 - O Underwater drone (ex: diveye) following the athlete during all the performance.
 - O 深水攝影機 (Depth camera),用以監看折返和取回標記的動作。
 - O Depth camera to monitor turn and retrieval of the tag
 - O 水面攝影機數台 (Surface cameras),用以記錄比賽開始時的出發和結束時的出水程序。
 - Surface cameras to record start and surface exit protocol.
- 一艘緊急撤離用的船隻,按照緊急撤離計畫,隨時能將需要幫助的自由潛水員送往最近的醫院。
- One evacuation boat ready to send a freediver in need to the closest hospital according to the evacuation plan

- 2個訓練浮球,(繩長)深度設在 40 公尺,並配有一個「快速拉回潛水員的人力拉動裝置 (quick retrieval manual system)」(其他機械裝置的滑輪組)
- 2 training buoys set at a depth of 40m and equipped with a quick retrieval manual system (pulley of other mechanical system)
- 音響裝置-潛水員召回裝置。
- Accoustic system diver recall system

2.2 賽事人員 (Competition personnel)

- 裁判長 (Main judge)
 - 0 配合主辦單位,是協調後勤工作的主管。
 - Head of logistical coordination with the help of competition organizer
 - O 配合競賽秘書,規劃參賽選手的出場順序。
 - Organize start list with the help of competition secretary
 - O 發佈「放下反重 (counterweight)」或「啟動電動絞盤」的指令。
 - O Give orders for releasing of counterweight or activation of electric winch
 - 0 確認比賽的結果。
 - Validate the results
- 戒護長 (Safety chief)
 - 0 戒護團隊的主管。
 - Head of safety team
- 競賽秘書 (Competition secretary)
 - 0 配合裁判,處理比賽的結果。
 - Assist judges for processing results
- 水面裁判 (Surface judges)
 - O 確認出水程序執行狀況,以及確認該次比賽的有效性。
 - Validate surface protocol and validity of the attempt
- 聲納技術員 (Sonar technician)
 - O 每一條比賽用繩應設置一人。
 - One person per competition line.
 - 透過聲納,負責解讀並且讀出運動員的深度。
 - Manage reading and calling of athlete depths via sonar

- 水面攝影師 (Surface Camera operator)
 - 0 用官方攝影機記錄水面和出水程序。
 - Manage the official cameras to record surface and exit protocols
 - O 每日將影片下載交給裁判。
 - O Download footage daily for judges
 - O 將所有電池充飽電,處理攝影裝備往返潛水點的運輸作業。
 - O Charges all batteries and transport equipment to and from the divesite
- 深水攝影師 (In depth camera operator)
 - 0 用官方攝影機記錄水下影像。
 - Manage the official cameras to record the underwater videos
 - O 每日將影片下載交給裁判。
 - Download footage daily for judges
 - O 將所有電池充飽電,處理攝影裝備往返潛水點的運輸作業。
 - Charges all batteries and transport equipment to and from the divesite
- 現場實況攝影師 (Live camera operator)
 - 0 用官方攝影機記錄這場賽事中的實況影像。
 - Manage the official cameras to record the live videos from competition
 - 0 每日將影片下載交給裁判。
 - Download footage daily for judges
 - O 處理這場賽事的網路直播。
 - Deal with live streaming of the competition
 - 將所有電池充飽電,處理攝影裝備往返潛水點的運輸作業。
 - Charges all batteries and transport equipment to and from the divesite
- 繩索處理員 (Line coordinator)
 - O 改變比賽用繩的深度。
 - Changes line depth
 - 處理每日的潛水者名單,並將相關資訊與裁判和戒護人員進行溝通。
 - Manage daily dives list and communicate informations to judges and safety
 - O 按照裁判長的指示,佈放「反重平衡系統 (counter balance)」或者啟動 電動絞盤。
 - Deploy counter balance or launch electric winch on the order of main judge

- 自由潛水戒護團隊,由5名自由潛水員所組成(在長時間的賽事中,戒護 隊每3小時必須安排輪班)。
- Safety freediver team composed of 5 freedivers (In long competition, team change must be schedule every 3h)
 - 01名自由潛水員要攜帶水下推進器。
 - o 1 freediver with underwater scooter
 - O 2 名戒護自潛員要著長蛙和潛水服,避免失溫。
 - o 2 safety freedivers with long fins and divesuits to avoid hypothermia
 - 02名預備人員,需隨時可以下潛,以代替任何其他戒護自潛員。
 - o 2 in reserve, ready to dive to replace any other safety freediver
- 急救小組,位於比賽用船上
- Emergency unit located on the competition boat
 - O 醫師需具有 CPR 證照。
 - Doctor with CPR certification
 - 0 醫療救護人員。
 - Medical assistant
- 訓練用浮球的戒護
- Training buoy safety
 - 每個浮球設有一位戒護自潛員 (能下潛最少 40 公尺之自由潛水員)。
 - One safety freediver per buoy (minimum 40m freediver)

3. 後勤 (LOGISTICS)

3.1 「甲板空間夠大的小船」或平台船 (Deck boat or pontoon)

平台船或「甲板空間夠大的小船」的空間要夠大,可容納裁判、攝影師、急救 小組及急救裝備。

The pontoon or deck boat should be sufficiently large to welcome judges, camera operators and emergency team with equipment

3.2 比賽用繩 (Competition line)

比賽用繩必須在每10公尺處作標示。

Competition line must be marked every 10meters.

在行動 (attempt) 開始之前,戒護自潛員將下潛至水下第一個標示處,並讀取個人儀錶上的讀數,以確認比賽用繩之設置狀況。

Safety freedivers will dive to the first mark underwater and read personnal gauge to verify the setting of the line before the attempt.

3.3 回收裝置 (Recovery systems)

是一種戒護裝置,是指反重平衡系統 (counterbalance)或指以電動或人力拉動的 絞盤,當運動員位於戒護自潛員無法到達的位置時,可用此裝置將運動員拉回。 這些裝置有多種設計,不過,都必須能以至少1公尺/秒的上升速度,將繫有安 全繫繩的自由潛水員從水深至少80公尺處拉回。

The counterbalance, electric or manual winch, is a safety system designed to retrieve an athlete beyond reach of safety divers. It exists multiple design for these systems but it is mandatory to achieve at least a speed of ascent of minimum 1m/s when the freediver is dragged by the lanyard from a depth of minimum 80 meters.

必須注意深度底盤和自由潛水員本身所造的阻力 (尤其是當自由潛水員將安全 繫繩繫掛於腰帶時)。

Attention must be paid to the drag exerted by the bottom plate and the freediver himself (in particular when the lanyard is worn at the belt).

「反重平衡系統 (counterbalance) 用繩」與「比賽用繩」之間的最小距離建議為 6公尺,以避免繩索交叉纏繞。

A minimum distance of 6 meters is recommended between counterbalance line and competition line to limit crossing issues.

戒護團隊在實際比賽場地的訓練中,需評估回收裝置的上升速度,尤其注意該系統的上升時間(的測試)會由深度大於80公尺的地方開始進行,在上升期間,戒護自潛員需潛至20公尺深處並抓住比賽用繩,用以模擬在該處的運動員。

Speed of ascent of recovery system will be assessed by safety team during the training practice in competition real conditions. In particular the time of ascent of the system will be determined from a depth higher than 80 meters, during the ascent safety freedivers will dive successfully to 20 meters and grab the competition line to simulate the presence of the athlete.

3.3.1 「回收裝置」的型式 (Type of recovery systems)

3.3.1.1 不平衡式配重 (Uneven Ballast)

是一種在「比賽用繩競賽側的相反側」上設置較重配重的「反重平衡系統 (counterbalance system)」。「不平衡式配重 (uneven Ballast)」是指在「比賽用繩競賽側的相反側」上所設置的配重重量至少應為「比賽用繩競賽側」之兩倍。 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.

優點:只需拉一下繩索,並放開離合裝置,就可啟動此裝置。

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

缺點:此種裝置在變更比賽用繩的深度時,比較難以變更,因為要拉動這一側 的繩索比拉動另一側更加困難。如果在水深處有水流,兩條繩索尾端出現不同 阻力時,兩條繩索有可能會出現尾端交叉纏繞的情況。

Con: This system makes changing line depths more difficult as one side is pulling harder then the other. In case of current at depth and differential drag of the two ends, it can induce crossing of the two ends.

3.3.1.2 落重 (Drop Weight)

是一種在「反重平衡側 (counterbalance)」與「比賽用繩競賽側」這兩端具有相等配重的「反重平衡系統 (counterbalance system)」。僅在需要啟動系統的情況下,才放上額外的配重。設置落重時,落重應使「反重平衡側 (counterbalance)的總重量」為「比賽區域重量」之至少兩倍。

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.

「普魯士結 (Prusik)」是一種用來連結落重的結,我們使用此種特殊的打結方式是因為當放下此重錘時,重錘能立即拉緊繩索讓繩索止動,再讓繩索立即開始下降,而不會在重錘拉緊繩索之前,掉出很長一段線。

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.

3.3.1.3 電動絞盤 (Electric winch)

電動絞盤是一種連結於電動馬達之機械式捲動裝置,不僅可以微調繩索的深度,還可以在啟動時輕鬆地拉回自由潛水員。

Electric winch is a mechanical rolling system connected to an electrical motor. It allows to adjust finely the depth of the line but also to recover the freediver without any effort when activated.

此電動馬達應連接至獨立電源。(尤其是,不應與「現場實況攝影機」使用相同電源,因為這樣作可能會降低繩索的上升速度。)

The electrical motor should be connected to an independent power supply. (live streaming cameras should not be powered on the same source in particular as it can reduce the speed of ascent of the line)

3.3.1.4 人力拉回 (Manual recovery)

當發生停電或者機械嚴重故障的狀況時,應當有一組受過訓練的人,能以適當速度(大於1公尺/秒)以人力方式拉回繩索。

In case of power failure, or catastrophic mechanical failure, the line should be ascended manually with a trained team at a sufficient speed (>1m/s)

3.3.2 啟動「回收裝置」的時機 (When to activate recovery system)

如果出現以下情況,應啟動「回收裝置」:

The recovery system should be activated if

- 當戒護團隊、實況攝影師、或者透過聲納裝置看到無動作的運動員(使用聲納裝置時,當我們看到長達至少10秒的停頓時,就啟動此裝置,下潛或上升的速度小於0.2公尺/秒,則視為停頓)。
- Motionless athlete is either visible by safety team, live cameras or visible with sonar (With sonar, the system will activated if we see a stop of at least 10s, a stop is considered as a speed of descent or ascent of less than 0.2m/s).
- 運動員「碰觸深度底盤的時間」比「賽前宣告的觸底潛水時間」晚了至少 30 秒。
- The athletes touches the bottom at least 30s late according to bottom dive time declared at the beginning of the competition.
- 在宣告的潛水時間結束時,運動員不在戒護自由潛水員之視線範圍內。
- The athlete is not in sight of the safety freedivers at the end of the announced dive time.

由戒護潛水員發出的回收裝置啟動信號,係由在水深處的戒護潛水員自行判定。如果運動員出現無意識或者無前進狀態,就應發出啟動信號。

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.

此信號是將雙臂伸直,在頭部上方揮動雙手,揮動方向應與水面呈水平,方便從水面上就能輕易看到水深處的手勢信號 (飛行模式 (FLY MODE))。

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 (FLY MODE).

如果潛點出現能見度不佳的問題,使水面看不到水深處,就應該在水面上可見 範圍內,設置額外的戒護潛水員。

Additional safeties should be placed within sight of the surface as needed if visibility issues are present at dive sight.

發出啟動信號後,必須使用音響信號告知運動員和戒護潛水員「回收裝置已經啟動」。

Upon activation, an acoustic signal must be used to inform athlete and safety divers that the recovery system has been activated.

3.4 安全繁繩 (Lanyard)

所有個人用安全繫繩的長度都必須在80公分到150公分之間,重量必須小於500公克。此場賽事的裁判長 (main judge) 將在技術會議開會期間,以有條不紊的方式檢查安全繫繩 (品質差的魔鬼點,和難以打開的登山扣具都不予接受)。

All personal lanyards must be between 80cm and 150cm long and weight less than 500g. The main judge of the competition will systematically check the lanyard during technical meetings (low quality velcro, carabiner difficult opening will not be accepted).

3.5 聲納裝置 (Sonar system)

在運動員潛水過程中,使用聲納裝置持續密切注意運動員的狀況是一種很可靠 的方式,建議在主辦賽事時要使用這種裝備。為了能妥善地密切關注自由潛水 運動員,下列是聲納裝置應具有的規格:

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:

- 感測器必須至少600瓦,感測器應位於比賽用繩6公尺以內。
- Must be a minimum 600 watt transducer. Transducer should be located within 6 meters of the competition line.
- 具有「A 型陰極線示波器 (A-scope) 」功能。
- Have an "A-scope" feature.
- 其他:建議使用深循環 12 伏特電池,可儲存最低 75 安培小時,如果電壓下降至 12.1 伏特以下,則應進行充電。
- Additional: A deep cycle 12 volt battery with minimum 75 amp hour storage recommended and should be charged if voltage drops below 12.1 volts.

如果有使用水下無人機 (underwater drone) 跟隨運動員下潛和上升時,聲納裝置上所讀到的信號可能會是無人機的信號,而不是運動員的信號,因為無人機的構造主要是金屬元件,因此,在這種情況下,建議無人機在跟隨運動員時,要與運動員保持在相同深度。

When an underwater drone is used to follow the athlete during descent and ascent, the signal read on the sonar system is likely to be the drone signal rather than the athlete one as the drone is mainly composed of metallic parts. In that case, it is recommended that the drone follow the athlete at the same depth.

4. 賽事人員 (COMPETITION PERSONNEL)

有關CMAS賽事規則中,裁判長 (main judge)、競賽秘書、水面裁判 (surface judge) 所擔任的任務,請前往 www.cmas.org 網站查看相關文件。

The roles of main judge, competition secretary and surface judges are listed in the CMAS competition rules document available on www.cmas.org website.

4.1 聲納技術員 (Sonar technician)

聲納技術員是戒護團隊中極度重要的職位,他或她對於這個職位應該經驗豐富, 他或她是戒護團隊在水深處的眼睛,確實是可救人一命。

The sonar technician is an extremely important position on the safety team and he or she should be experienced in that position. He or she is the eyes of the team at depth and can in fact save a life.

以下所列是聲納技術員這個角色之工作事項:

The following is a list of task associated with the Sonar Technician Roles:

- 從水下深度 30 公尺開始,每隔 10 公尺逐一喊出運動員的所在深度。
- Verbally call out depths of athlete every 10 meters beginning at 30 meters depth.
- 向團隊報告「觸底達標 (touchdown) 」和「轉身返回 (turn) 」。
- Report "touchdowns" and "turns" to the team.
- 聲納技術員要負責報告運動員的移動是否延遲或暫停,如果運動員發現超過 10 秒沒有前進,則建議大喊要求啟動「反重平衡系統 (counter balance)」。
- 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.

4.2 繩索處理員 (Line coordinator)

- 在每次下潛之間調整比賽用繩的設定。
- Adjust the setting of the line between dives.

- 透過戒護潛水員口頭報告得知深度,進而回報確認深度。當重新調整繩子時, 從水面上目視檢查比賽用繩上的標記。在訓練期間或比賽期間,都應進行這 項檢查,在比賽期間,還應安排裁判團中的一位成員進行額外檢查。
- 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.
- 位於「反重平衡系統 (counterbalance system)」或電動絞盤旁邊並且準備就緒,當裁判長 (main judge) 下令啟動時,可迅速有效地啟動。
- Ready and in position near counterbalance system or electric winch so that activation can be quick and efficient if activation is asked by the main judge.
- •讓「反重平衡系統 (counterbalance system)」周圍保持淨空,當「反重平衡 系統 (counterbalance)」啟動時,繩索處理員要盡快地協助拉起繩索。
- 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.

4.3 急救小組 (Emergency Unit)

4.3.1 醫療小組 (Medical Team)

醫療救護必須確定能作到以下:從意外事件開始起,對發生意外的人提供急救和必要的援助,一直到此人在當地醫療機構恢復健康狀況為止。醫療救護小組與當地醫療機構醫師之間的溝通應包含運動員發生意外事件的原因和情況。

The medical assistance must guarantee the first aid interventions to those who suffer accidents by giving them the aid necessary from the beginning of the accident until the reestablishment of conditions of health in the local health facilities. Communication of medical assistance team to the doctor of local health facilities shall include the causes and circumstances of the accident occurring at the athlete.

醫療救護人員由主辦委員會指派,負責處理活動中醫療相關事項,醫療小組包含: The medical assistants are appointed by the Organizing Committee and they are responsible for controlling the event at the medical level. The medical team is made up of:

- •醫師一名,必須技術精湛、經驗豐富、有足夠配備而且能進行 CPR (心肺復 甦術),還需能進行急救,此人是負責此賽事的人,並且要一直待在比賽區 域。
- One doctor (MD) who must be skilled, experienced, equipped and capable to perform CPR (cardio-pulmonary resuscitation) as well as to provide first aid, who is responsible for the competition and is always present in the competition area,

- 一台救護車在比賽區域待命,車上有一名醫師,停放於靠近醫療中心的陸地上。
- An ambulance reserved for the competition area, with a doctor on board, which must be located on land, close to the Health Centre
- 正式的醫療機構,必須是救護車方便到達之處,並且了解此賽事的緊急撤離計畫。
- An official hospital facility which must be easily accessible for the ambulance and aware of the evacuation plan of the competition

4.3.2 醫療用品清單 (List of medical equipment)

- 甦醒球。
- Bag Valve Mask
- 足以供應兩倍緊急撤離時間的 100%醫用純氧。
- Double Evacuation Time supply of 100% Medical Grade Oxygen
- 口咽輔助氣道多尺寸套件。
- Oral Pharyngeal Airway Multiple Size Kit
- 高級氣道處理套件。
- Advanced Airway Kit
- 手動吸引器。
- Manual Suction
- 自動體外心臟電擊去顫器。
- AED

4.3.3 緊急撤離計畫 (Evacuation Plan)

緊急撤離計畫幾乎與醫師一樣重要,應有周延的考慮和演練,避免在緊急狀況發生時出現混亂。緊急撤離計畫應該鉅細靡遺,包含救傷醫院和救護車所屬單位的詳細路線圖,與其電話號碼,並且應準確量測從撤離地點前往醫療院所的行車時間,連同替代路線,這些都應寫在緊急撤離計畫內。

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.

4.3.4 緊急撤離用的船隻 (Evacuation boat)

一艘專門用於緊急撤離的船隻,在賽前和比賽期間都應該隨時在場待命,船上應指派至少兩名緊急撤離專人,此艘船應能運送 5 名人員,其中包含船長,船上需能提供緊急撤離時所需要的氧氣,並應存放額外的氧氣,船上或急救箱內應放置一支專用電話,電話裡面留有所有相關單位的聯絡電話,並將放置地點和使用方式充分告知戒護團隊裡的每位隊員。

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.

4.4 戒護自潛員 (Safety freedivers)

所有戒護自潛員都應該是經驗豐富的自由潛水員,在任何情況下,戒護自潛員都必須能夠下潛至 40 公尺,並且在 30 公尺處停留 1 分鐘,在戒護團隊練習期間,要以有條不紊的方式評估這些技能。

All safety freedivers should be experienced freedivers. In any case, safety freedivers must be able to dive to 40m and realize a hang dive of 1min at 30m. These skills will be systematically evaluated during the safety team practice.

戒護團隊應於比賽開始前至少一週抵達現場,才能在訓練期間練習所有程序。
The safety team should be present at least a week before the competition to be able to exercise in all the procedure during the trainings.

4.4.1 裝備 (Equipment)

- 濕式潛水服可保護潛水員的身體,避免受到日曬及或寒冷,在水下發生暈厥 (blackout) 狀況時,亦可提供正浮力協助戒護自潛員。
- 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.
- •配重 (Ballast) 應該僅在 15 公尺以上用來補償正浮力,而戒護員不應在淺於 15 公尺內為負浮力。
- Ballast should only be used to compensate for positive buoyancy above 15 meters and the safety should not be negative shallower than 15 meters.
- 可用白色或黄色菜卡 T 恤辨識每一位戒護隊員,在水深處也便於辨識。
- A white or yellow lycra t-shirt to identify each safety as a member of the team and to allow for easy visibility at depth.

- 每位戒護潛水員應攜帶一個體積小又流線型的切割裝置,並應配掛於腰帶。
- Each safety diver should carry a small, streamlined cutting device and should be worn on the belt.
- 每位戒護員均應攜帶一個可配掛的呼吸管,萬一戒護員的頭部需要沒入水中, 應能方便取得呼吸管,並且可通往戒護員的呼吸道。
- 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.
- 長蛙是必需品。
- Long blade fins are a requirement
- 戒護潛水員應使用具有計時裝置的深度錶。
- Safety diver should be using a depth gauge with timing device.

4.4.2 戒護自潛員的任務 (Safety freediver roles)

戒護團隊中,每位隊員的工作職掌如下 Below are job descriptions for each member of the safety team

4.4.2.1 1 號戒護員 (主要潛水員) Safety 1 (Primary Diver)

- 以口頭方式確認比賽用繩的深度,讓裁判、平台、或繩索處理員都能清楚聽到聲音。要執行此工作是需以目視方式檢查設定深度上方和下方的標記。在訓練期間或比賽期間,都應進行這項檢查,在比賽期間,還應安排裁判團中的一位成員進行額外檢查。
- 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. This check should be done during both training and competition and additionally checked by a member of the judge team during competition.
- 以目視檢查和親身測試安全繫繩的安全性,檢查安全繫繩確實有配戴而且很牢固,魔鬼粘兩面確實粘合。這項檢查需以口頭方式進行確認,必須讓裁判、平台、或繩索處理員都能清楚聽到聲音而且能夠理解。在比賽期間,是由裁判完成第二次檢查。在訓練期間,是由「次要戒護潛水員」完成第二次檢查。
- 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.
- 檢查官方深度錶確實有配戴,而且很牢固。這項檢查需以口頭方式進行確認, 必須讓裁判、平台、或繩索處理員都能清楚聽到聲音而且能夠理解。

- Verify that official gauges are on and secure. A verbal expression of this verification must be clearly heard and understood by judges and platform or line coordinator.
- 裁判要根據運動員的宣告時間 (在潛水時間結束前 1 分鐘) 或運動員在 60 公尺處的即時視訊/聲納,由裁判發出下潛信號,則1號戒護員會在大約 30 公尺處與運動員會合。
- Meets the athlete at a depth of approximately 30meters. The signal of dive should be given by judges according to the announced time (1min before the end of the dive time) or video feed/sonar when the athlete is at 60m
- •下潛期間,當「主要潛水員」下潛到達水深處的位置後,只有 20 秒時間, 20 秒過後,如果運動員不在主要潛水員的視線範圍內,或者運動員沒有沿 著繩索上升前進,則必須揮手撤銷此次潛水,此信號是將雙臂伸直,在頭部 上方揮動雙手,揮動方向應與水面呈水平,方便從水面上就能輕易看到水深 處的手勢信號 (飛行模式 (FLY MODE))。如果潛點出現能見度不佳的問題, 使水面看不到水深處,就應該在水面上可見範圍內,設置額外的戒護潛水 員。

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 (FLY MODE). Additional safeties should be placed within sight of the surface as needed if visibility issues are present at dive sight.

- •發生水下暈厥 (blackout) 狀況時,「主要潛水員」應在第一時間前往救援,但是,如果「次要潛水員」的距離較近,並且開始進行救援,則「次要潛水員」就變成「主要戒護潛水員」,而「1號戒護員」要接替「次要潛水員(2號戒護員)」的任務。
- In the event of an underwater blackout, the primary has priority for rescue actions but if the secondary is closer and start rescue actions then he or she then becomes the primary safety diver and the Number 1 would take over the role of the Secondary (Number 2).
- •潛水結束後,「主要潛水員」就變成「次要潛水員 (2號戒護員)」。
- After dive, Primary diver becomes secondary diver (Safety 2)
- 每次潛水之前,戒護潛水員應以口頭或者非口頭方式,報告自己的戒護位置,確認所有戒護工作都有戒護員擔任。
- Safety divers should verbally or non verbally report his or her positions before each dive to ensure all roles have been filled.

4.4.2.2 2號戒護員 (次要潛水員) Safety 2 (Secondary Diver)

- 以口頭方式確認比賽用繩的深度,讓裁判、平台、或繩索處理員都能清楚聽到聲音。要執行此工作是需以目視方式檢查設定深度上方和下方的標記。
- 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
- 檢查安全繫繩確實有配戴而且很牢固。這項檢查需以口頭方式進行確認,必 須讓裁判、平台、或繩索處理員都能清楚聽到聲音而且能夠理解。
- Verify that lanyard is on and secure. A verbal expression of this verification must be clearly heard and understood by judges and platform or line coordinator.
- 檢查官方深度錶確實有配戴,而且很牢固。這項檢查需以口頭方式進行確認, 必須讓裁判、平台、或繩索處理員都能清楚聽到聲音而且能夠理解。
- Verify that official gauges are on and secure. A verbal expression of this verification must be clearly heard and understood by judges and platform or line coordinator.
- 在大約 20 公尺處與運動員會合。(當運動員在 45 公尺處,或者在宣告的潛水時間結束前 50 秒時下潛。)
- Meets the athlete at a depth of 20 meters. (dive when the athlete is at a depth of 45m or 50s before the end of the dive time)
- •發生水下暈厥 (blackout) 狀況時,「主要潛水員」應在第一時間前往救援,但是,如果「次要潛水員」的距離較近,並且開始進行救援,則「次要潛水員」變成「主要戒護潛水員」,而「1號戒護員」要接替「次要潛水員」的任務。
- In the event of an underwater blackout, the primary has priority for rescue actions however, if the secondary is closer and start rescue actions then he or she now becomes the primary safety diver and the Number 1 would take over the role of the secondary.
- •發生水下暈厥 (blackout) 狀況時,「次要潛水員」需協助「主要潛水員」, 將運動員和「主要戒護潛水員」一同拉起。如果只拉起運動員有可能會造成 「主要潛水員」與運動員被迫分開,進而讓暈厥者之呼吸道打開。
- 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.
- 當裁判出示卡片後,「次要潛水員」將解下安全繫繩,取下深度錶,將這些物品交給裁判,護送運動員前往比賽區域預定的出口。
- Upon completion of judge presentation of card, secondary will release the lanyard, take of the gauges and deliver them to judges and escort athlete towards pre determined competition zone exit.

- •「次要潛水員」將為下一位上場的運動員擔任「4號戒護員」。
- Secondary diver becomes safety 4 for next athlete in line.
- 每次潛水之前,戒護潛水員應以口頭或者非口頭方式,報告自己的戒護位置,確認所有戒護工作都有戒護員擔任。
- Safety divers should verbally or non verbally report his or her positions before each dive to ensure all roles have been filled.

4.4.2.3 3號戒護員 (水下推進器戒護員) Safety 3 (Scooter safety)

在深潛的戒護上,水下推進器是非常好用的工具,必須用於戒護工作上。 Underwater scooters are a great tool for deep safety and must be used to provide safety.

使用水下推進器強化比賽安全的指南如下:

The following is a guideline for using underwater scooter for competition safety.

- 當運動員在宣告的潛水時間結束前 70 秒時,或者在 80 公尺處時, 3 號潛水員開始下潛,則可在大約 40 公尺處與返回中的運動員會合。
- Leave the surface with 70 seconds remaining in the announced dive time or when the athlete is at a depth of 80m. This will put you at a depth of 40 meters when you rendezvous with the returning athlete.
- 超過30公尺後,開始降檔,就能以最低最慢的檔位與運動員會合。
- As pass through 30 meters begin the downshift so that you are in the lowest and slowest gear as you rendezvous with the athlete.
- 向下驅動前進,一直前進到與運動員會合的深度,然後折返往上,位於運動員下方,維持與運動員的上升速度相同。因此,如果運動員尚在正常會合深度下方掙扎,水下推進器就能繼續向下驅動迅速拉起運動員。換言之,不是停在某處等待運動員到達,因此,如果在水下更深處發生事情時,則不需為了重建向下驅動力又耗費時間。
- 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.
- 與運動員正面保持 45 度角近距離 (2-3 公尺),略低於視線水平方向,查看運動員是否出現「喪失自主控制功能 (loss of motor control)」或者「喪失呼吸道控制功能 (loss of airway control)」的徵兆。
- Maintain close distance (2–3 meters) at a 45 degree angle from front of athlete slightly below the level of watching for signs of loss of motor control or loss of airway control.

- 如果運動員在30公尺以下需要協助,「水下推進器戒護員」將從手臂下方 抓住運動員,並固定好呼吸道直到水面。「水下推進器戒護員」將位於運動 員後方,必要時,可在上升過程中踢腳以加快上升速度。
- If the athlete needs assistance at a depth below 30 meters, the scooter safety will grab the athlete under the arm and secure the airways above the water. The scooter safety will then be positionned in the back of the athlete. Finning during the ascent will increase the speed of ascent if necessary.
- •當運動員與30公尺戒護員會合後,「1號戒護員」在運動員右側、在視線水平方向上呈45度角,而「水下推進器戒護員」將位於該戒護員後方。如果發生暈厥(blackout)狀況,就能協助戒護員出水。不可使用拖曳運動員的方式來提供協助,水下推進器向上的力量應該施加於控制運動員呼吸道的戒護潛水員。
- Once athlete meets the 30 meter safety and the safety 1 establishes the 45 degree angle at eye level, at the right of the athlete, then the scooter diver will 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.
- 當潛水員上升至 10 公尺以內時,「水下推進器戒護員」應小心駛離比賽區域,避開觀眾。
- Once the diver has passed through 10 meters the scooter safety should carefully drive away from the competition zone avoiding spectators.

「水下推進器戒護員」應限制自己的潛水為每 12 分鐘下潛一次,每日不超過 20 次下潛,以避免產生減壓病相關問題。

The scooter safety should limit his or her dives to one dive every 12 minutes and no more than 20 per day to avoid DCS related issues.

4.4.2.4 4 號戒護員 (備用戒護員) Safety 4 (backup safety)

- 確認「主要潛水員」與「次要潛水員」的工作都有人員擔任,而且他們已完成潛水前的水面工作。
- Verify that the primary and secondary roles are filled and that they have completed their pre-dive surface roles.
- •萬一「1號戒護員」或「2號戒護員」出現問題無法潛水時 (例如:平壓問題),要隨時做好潛水的準備。
- 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)
- •如果發生暈厥 (blackout) 狀況,則下潛以協助戒護潛水員進行上升,並協助 撤離此運動員。協助水下暈厥的重點是,只有兩名戒護員直接接觸運動員,

其他人提供上升協助的對象都應該是「主要戒護潛水員」,在所有暈厥狀況下,「主要戒護潛水員」都被視為控制呼吸道的潛水員。

- In the event of a blackout, dive down to ascending safety diver and 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.
- 每次潛水之前,戒護潛水員應以口頭或者非口頭方式,報告自己的戒護位置,確認所有戒護工作都有戒護員擔任。
- Safety divers should verbally or non verbally report his or her positions before each dive to ensure all roles have been filled.
- •「備用戒護員」將為下一位上場的運動員擔任「主要潛水員 (1號戒護員)」。
- Backup safety becomes primary diver (safety N1) for next athlete in line.

4.4.3 戒護員的水下定位 (In water positionning of safeties)

- 在主辦單位排定之「top time (比賽正式開始時間)」前,戒護員應確保和運動員不會發生可能的接觸,眼睛看著裁判和運動員。
- Before official top, safety should be clear of the possible contact of athlete as well as between the visual line of judges and athlete.
- 戒護員應隨時注意自己在水中的位置。
- Safeties should be aware of his or her position in the water column at all times.
- 戒護員應隨時與運動員保持目光接觸,戒護員的目光應與運動員的眼睛處於 同一水平位置,這是第一優先事項。
- Safeties should maintain eye contact with athlete at all times at the same level as the athlete's eyes. This is the priority.
- •「主要潛水員」與「次要潛水員」應在運動員兩側,與運動員正面保持 45 度角,「次要潛水員」應注意「主要潛水員」最初的位置,而將自己定位在運動員的相對側。
- 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.
- 兩位戒護員出水的位置,應試著位於運動員兩側,而不要位於運動員與平台 上的裁判之間,而且同時還要保持與裁判和運動員之間的視線不受影響。
- Both safeties should try and surface at both sides of the athlete and not between the judges on the platform, while at the same time keeping the line of sight between the judges and the athlete clear.

- 出水後,戒護員應退出此區域,與運動員保持2公尺距離,當運動員浮出水面後,只有裁判才能判定是否要抓住運動員。
- Upon surfacing the safeties should back out of the area maintaining a 2 meter distance from athlete. Once the athlete reaches the surface it is only the judgement of the judge to grab the athlete.

4.4.4 暈厥 (blackout) 或喪失自主控制功能 (LMC) 之恢復步驟 (Steps to blackout or LMC recovery)

量厥 (blackout) 狀況會讓戒護潛水員感到驚慌,很多時後會反應過度,應採取以下步驟,以迅速促進運動員的呼吸反應。

A blackout can be very intimidating for a 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. 在水面上固定好呼吸道。
- 1. Secure the airway above the water
- 2. 移除運動員面部所有裝備。
- 2. Remove all facial gear from athlete's face
- 3. 輕吹鼻部,輕拍,與運動員說話,花多一點時間評估運動員的情況。「吹氣、輕拍、說話」三步驟應小於 10 秒,這段時間足以進行評估。輕拍的定義是使用手指前端輕拍臉頰,太用力或重重拍打會延長暈厥狀況。
- 3. Calmly blow to the nose, 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. 評估包含視覺及/或聽覺。如果運動員雙眼睜得很開,即表示他或她處於暈 厥狀態,因此,當閉起雙眼時,即表示恢復意識。
- 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. 如果在「吹氣、輕拍、說話」三步驟完成後,沒有明顯呼吸,就要進行兩次<mark>《口對口》人工呼吸、或者當關閉運動員口部氣道時進行兩次《口對鼻》人工呼吸</mark>,。第一次吹氣會讓可能痙攣的喉肌打開,第二次吹氣就能將空氣送往肺部。
- 5. If breathing is not apparent after blow, tap, talk then two « mouth to mouth or mouth to nose » rescue breaths while obstructing mouth airway should be administered to athlete. The first breath opens the possible laryngospasm and the second delivers air to the lungs.

- 6. 如果依舊沒有呼吸,則應開始進行每 5 秒吹一次鼻部,並且應立即撤離到 船上或平台,醫生應開始進行相關工作。
- 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. 立即以強迫給氧的方式提供氧氣。
- 7. Oxygen should be administered immediately with positive pressure.

4.4.5 量厥 (blackout) 標準恢復程序 (Blackout Protocol)

處理暈厥 (blackout) 或喪失自主控制功能 (Loss of Motor Control, 簡稱 LMC) 的首要原則就是保護好運動員的呼吸道,不要讓呼吸道接觸到水。這能避免吸入水,吸入水會使情況複雜化。

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.

以下所列是三種暈厥類型的處理程序:

The following is a list of procedures to manage the three forms of blackout:

4.4.5.1 水面暈厥 (Surface Blackout)

- 將運動員從腋下抬起,以保護運動員之呼吸道。如果暈厥者向前倒下,則 另一支手應在水平面位於下巴下方,由「主要戒護潛水員」作出「頭部三 明治」的動作,即戒護員用一手覆蓋和保護口鼻呼吸道,同時另一手放在 頭頸部底部,就成為手把頭部包起來的三明治,應採用此方式讓暈厥者仰 躺。
- Secure the athlete's airway by providing lift under his or her armpit. 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.
- 由「1號戒護員」卸除面部裝備,當裁判喊出「抓住」時,恢復的第一步驟 就應這麼作。
- Removal of the facial gear is done by the safety 1, once the judges call the "Grab" This should be the first step in recovery.
- 輕而緩慢的「吹氣、輕拍、說話」是處理量厥狀況必須執行的恢復程序,還 能讓戒護團隊評估量厥的嚴重性。

- 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
- 其餘戒護員就是協助將暈厥者和「主要戒護潛水員」扶好,暈厥者應平躺於水面,這樣可保持呼吸道在水面上,並且方便執行進一步復甦動作,平躺姿勢也可降低對胸部的水壓,讓肺部易於膨脹。
- 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.
- 所有量厥狀況的恢復程序執行地點應盡可能靠近比賽用繩處,而且應使用此 繩作為運動員固定在垂直面和水平面的定位依據。
- 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.
- •由「2號戒護員」卸除安全繫繩。
- Removal of the lanyard should be completed by the safety N2
- 戒護團隊中應有一名隊員幫運動員的雙眼遮擋陽光,此隊員是不需直接照顧 運動員的人。
- Shading of the athlete's eyes should be done by a member of the team not providing direct care to athlete.

4.4.5.2 水下暈厥 (Subsurface blackout)

- 由「主要戒護潛水員」作出「頭部三明治」的動作以保護呼吸道,「頭部三明治」動作是指戒護員用一手覆蓋和保護口鼻呼吸道,同時另一手放在頭頸部底部,就成為手把頭部包起來的三明治。這樣作能避免呼吸道進水,而且在將運動員送往水面的過程中也可讓身體保持流線型。
- 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.
- •「次要戒護潛水員」協助運動員和「主要戒護潛水員」進行上升。
- Secondary safety provides lift to both the athlete and the Primary safety.
- 浮出水面時,執行 4.4.5.1 所述之程序。
- Upon arrival at surface, the actions described at 4.4.5.1 are followed.

4.4.5.3 「潛水前填氣暈厥」或「血管張力失調性昏厥」 (Pre-dive packing blackout or vasovagal syncope)

雖然不常發生,但是戒護團隊應當知道「填氣暈厥 (packing blackout)」,才能知道這種情況有可能發生。當運動員肺部容積的改變已經影響到心臟正常心律時,就會發生「填氣暈厥」,暈厥的時間很短暫,在比賽開始時,戒護團隊需多加注意。

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 athletes'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 requires attention from the safety team at the beginning of the performance.

4.4.6 媒體工作者的安全 (Media safety)

媒體工作者的水肺潛水應徵得戒護長同意,並且應嚴格執行「潛伴」制。經驗較少的潛水員在開放的深海進行水肺潛水可能會出現問題,當專注於深潛的自由潛水員時,可能很快地就會陷入危險。

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.

如果有攝影師要以自由潛水方式取得影像,也需執行潛伴制。

The buddy system will also be used in the case of photographers freediving to get images.

4.4.7 觀眾的安全 (Spectator security)

在比賽現場,觀眾的比重開始變大,如果這項運動日益成長,圍繞的觀眾也會成長,要為觀眾訂定安全規範,否則必會發生意外事件。以下所列是觀眾應遵守的建議規則:

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:

- 觀眾不可進行自由潛水。
- No Freediving for spectators
- 在比賽期間,除了媒體工作者以外,不可進行水肺潛水。
- No Scuba diving during competition except for the media team.