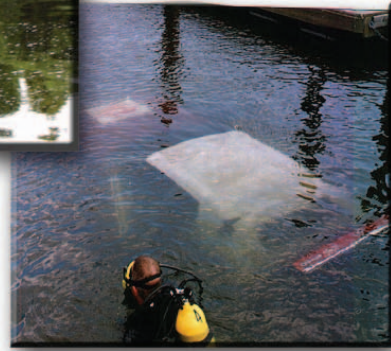


Irish Underwater Council Comhairle Fó-Thuinn



Search and Recovery Training Programme **STUDENT HANDOUTS**



SEARCH AND RECOVERY TRAINING PROGRAMME

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DROWNING STATISTICS

A study of the Drowning Reports submitted to the Irish Water Safety Association by Gardai nationwide reveals some alarming statistics.

Over the past 5 years, there has been 134 Leisure based accidental drownings.

Over the past 5 years a total of 34 accidental drowning victims were directly involved in Marine Leisure boating activities.

The average age of accidental drowning victims involved in marine leisure boating is 44.

There were a total of 39 accidental drownings in the past five years that involved the consumption of alcohol.

There were 34 Accidental Drownings in 2001. Of these drownings, 11 Involved leisure boating incidents.

104 accidentally drowned while engaged in land based leisure pursuits since 1997.

Taken from

www.iws.ie



Search and Recovery Training Programme

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Background

Rescue or recovery?

As an island nation, we have a high incidence of water-related incidents, ranging from boating accidents to crime to suicides. Sadly, a large number of 'search and rescue' callouts conclude as 'search and recovery' operations.

A **Rescue Mode** is used when there is a chance to save a human life

A **Recovery Mode** is used with the goal of recovering a body and/or property

Statutory and voluntary agencies

Statutory bodies: Coastguard, Gardaí, Garda Underwater Unit, Aer Corps, Naval Service

Voluntary bodies: RNLI, Cliff & Coastal Rescue Services; Civil Defence

Where does CFT fit in?

Statutory and voluntary bodies are on hand to tend to such tragedies.

CFT's experienced sports divers are well placed to lend appropriate assistance to a search and recovery operation.

CFT divers will participate in SAR operations within specific units established in a club or region and not on an individual basis

Course aims

This course aims to introduce experienced sports divers to search and rescue skills. The course will enable trained divers to assist in search and recover operations. Such assistance will complement the existing professional and voluntary services.

A logbook stamp indicating course completion will be issued at the end of the 2-day course. The Club Diving Officer will update the SAR register annually. Only those who have completed the SAR course should be considered by a club's diving officer as eligible and trained to participate in SAR operations.

This course does NOT aim to . . .

- Compete in any way with existing services
- Provide a qualification (course completion does not imply a qualification or specific level of competence)
- Assess individuals on completion of course

Entry requirements

Divers undertaking SAR training should have the following as a minimum

- Club Diver Certificate
- Current valid medical certificate of fitness to dive
- CFT registration
- Active Diver status
- Not uncomfortable with zero visibility diving

Rules and recommendations

CFT rules and recommendations apply with some exceptions. These are discussed throughout the course.

DOD must be of at least Leading Diver standard. However, 2003 and 2004, the standard of Club Diver is acceptable. This will allow a run-in period for existing DO's.

In the event of a callout, only those nominated by the club DO may mobilise the group

Course content

Stage 1 – Lectures

- Background
- Introduction to search & recovery
- Callout procedures
- Safety
- Equipment
- Search methods
- Recovery

Stage 2 – Practical

- Bad visibility training
- Current or tidal conditions
- Sample search methods
- Underwater communication methods



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Introduction

Call-out

This could be either a drowning or a missing person / craft in the water. The objective of a call-out is to recover the casualty or craft - without risk to the safety of search team.

Weather conditions

Since one of the factors contributing to marine accidents is bad weather, very often the weather conditions are unfavourable for SAR. It is likely that when the SAR team is called out, it will be on a day when sports diving would be prohibitive due to bad weather. However, it should be borne in mind that the safety of the team should never be jeopardised by risking the lives of the team.

Searches can take considerably longer than the average sports dive thus introducing the risk of hypothermia. This is especially relevant when a search is conducted in shallow waters, which permit a longer 'bottom time'. Fresh water is generally colder than seawater.

Search conditions

The diving officer will have several factors to consider when deploying the team. Many SAR operations are carried out in zero or poor visibility. Proximity to bridges and piers, particularly in urban areas introduce additional hazards (e.g. discarded bicycles and other rubbish). Polluted waters pose the risk of infection so appropriate precautions and aftercare should be taken.

Strong currents further increase the risk to the SAR team. A diver will have more difficulty controlling the dive and his/her equipment in fast flowing water, particularly in low visibility.

Personnel

All of the factors discussed here (adverse weather and search conditions) indicate that SAR activities should be confined to those divers who possess appropriate skills and experience to deal with a combination of unfavourable conditions. Club Diver (registered / active / medically fit) is therefore considered the minimum grade.

Divers who are keen to assist with SAR but who lack the confidence for zero visibility diving should be

encouraged to assist the team with other tasks. For instance, a properly constituted team will include stand-by divers and cox'n's.

The Casualty

Before the dive takes place, the DO should consider how long the casualty might have been in the water. Deterioration will be slower in cold water. Fresh water will preserve a body for longer than seawater. The longer the body is in the water – the more it will deteriorate. It should be emphasised again that divers uncomfortable with the recovery aspect of the operation should be assigned to other duties.

On locating the casualty

The diver who locates the body should initially notify his/her buddy, using the pre-arranged signals. Sharing the discovery with a buddy will make it easier to proceed. This is why a spirit of teamwork is a vital aspect throughout the operation. If it is impractical to remove the body the surface immediately, the spot should be marked for later.

Recovery

The recovery aspect will be easier for some more than others. If uncomfortable with this task, leave it to others. Decay may make recovery difficult. It may therefore be advisable to mark the spot and return to the surface to discuss the best recovery method.

Confidentiality

Throughout the SAR operation, every member of the team should show respect for the deceased. The team may find themselves the object of a relative's anger, for instance if a recovery operation is taking longer than anticipated. Such relatives should be treated with sensitivity to the trauma that they are experiencing.

For all the above reasons, the team should avoid interaction with relatives.

The SAR Diving Officer is the only person on the team who should liaise with the press. SAR divers should directly queries to the DO or officer in charge. Avoid 'pub talk'.



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Callout

Initial contact

Initial contact will come from a state agency, i.e. Gardaí/Coastguard. This call will be seeking the services of a diving team. Some incidents require search and rescue services while others require search and recovery services. CFT SAR divers should respond only to official calls for assistance. If, for instance, a neighbour, friend or member of the public should call for assistance, they should be referred immediately to the Coastguard or the Gardaí, i.e. they should go through the official channels.

Verifying a callout

- Large numbers are hoaxes
- Caller to identify him / herself
- Caller to provide telephone number
- Call number back to verify
- Mobilise unit only on when contacted by statutory body
- Members of the public – refer to Gardaí etc.

Internal alert callout system

Land telephone line / mobile phone / bleep are all used
Mobile phones most widely used in recent years

How many to call out? This depends on: the nature of the incident, where and when it took place and the possible duration of the search

A back-up team could be required on stand-by if it is envisaged that the operation will be of several hours duration

Meeting point

- Usually clubhouse (or car-park)
- Away from scene of incident
- Privacy for brief
- DO to visit scene before briefing
- Arrive as one group if possible
- A professional approach to the operation will give confidence and assurance to those at the scene

Interactions on site

- Be sensitive to circumstances, e.g. suicide, crime, man overboard or negligence
- Talk to witnesses
- Are we looking for a casualty?
- Are we looking for a car?
- Might recovered items be used as evidence?
- Consider varying accounts of incident

- DO to liaise with Gardaí or officer in charge
- Don't talk to the press
- Don't speculate with onlookers on what might have happened

Decision to dive

- Made only by DO having considered circumstances and conditions
- DO's authority cannot be questioned or over-ruled by the SAR dive team
- DO will decide on best search method
- DO will decide who does what
- DO might ask somebody to step down or assign them an alternative task, e.g. cox'n
- DO will decide on equipment, e.g. is it practical to use a BCD?
- Is it ok to dive alone?

Dive brief

- Out of earshot of the public
- Everybody ok? Since this was an unplanned operation, it is vital that the DO ensures everybody is fit to dive, e.g. no alcohol within past 12 hours / no hangover; dived up to required depth?; carrying a penalty from a previous dive today.
- Depth
- How long has casualty been in the water?
- Chosen search method and if feasible / necessary, a 'dry run'
- What equipment is required?
- Considering tide/current, in which direction would casualty be carried
- Rope signals
- What if you find the casualty?
- Recovery plan
- Emergency plan

Team tasks

- Divers
- Search co-ordinator
- Liaison officer
- Boat handling
- Rope-work
- Bank-work
- Compressor duty
- Logger / recorder



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Safety

Introduction

The safety of each member of the SAR team is No. 1 priority. The ultimate responsibility for the safety of the group lies with SAR DO. CFT's Safety Statement is available from Head Office. Each SAR team should possess a copy and be familiar with its contents. Risk assessment should be fully taken into account when assigning tasks.

Site assessment

Currents / tides / weather should be taken into consideration, as should depth / water quality / visibility. The added problems that underwater obstructions / hazards pose should be considered. The SAR team may be called to a site with which it is unfamiliar. In such cases the DO will explore the various options for boat access / exit points. Other boat traffic using the area should be considered. It may be prudent to notify them of the incident and if appropriate to seek their assistance. The DO will decide if the team has sufficient and appropriate equipment to participate in the SAR operation. A night dive would require additional equipment and personnel.

Stress

A combination of factors such as cold, poor visibility, anxiety and fear will cause a diver to be stressed. A stressed diver on the SAR team becomes a risk to both him/herself and to the safety of the team. There are several ways to reduce stress in preparation for SAR operations:

1. Training (simulations). Repeated training and simulations of SAR operations will increase a diver's skills and competence
2. Increased experience will equip the diver with the ability work effectively and efficiently
3. Fitness will contribute to the diver's ability to deal with demanding exercises
4. Good equipment will increase the diver's confidence in approaching SAR activities
5. Mental preparation, such as anticipating what lies ahead and feeling 'up to the job' will reduce the risk of stress and increase the diver's ability to cope.

Thermal stress

Unlike regular sport diving, the SAR diver may be exposed in prolonged periods underwater, leading to the risk of hypothermia. Hypothermia is one of the many contributory risk factors to DCS. In addition it

exacerbates fear and anxiety and impairs dexterity and decision-making. It is therefore vital that a diver approaching hypothermia be removed from the water before the team has a further casualty to treat. The diver approaching hypothermia should take responsibility for his/her own safety by notifying his/her buddy or diving officer. First - stop - think - control breathing rate - act.

Hyperthermia, i.e. an increased body temperature can be a result of being a long time kitted up on surface in a dry-suit and full-face mask. Hyperthermia leads to fluid loss (dehydration) and heat exhaustion (+4 °C in core can lead to convulsions)

Thermal stress can be avoided by being fit, hydrated and properly rested. Dry suits should be worn in cold waters. All divers should watch for symptoms in his/her buddy as well as him/herself.

Safety equipment

The usual pre-dive planning applies, i.e. emergency plan, VHF radio (agree working channel), first aid, and oxygen. In addition there should be spare breathing gas on site. All equipment should be in perfect working order and where appropriate should be accompanied by the manufacturer's certification.

Health consideration

All divers should be medically fit. CFT's medical officer's recommendations should be followed. Careful attention should be made to personal hygiene and all divers should shower after dive. This is particularly important where the SAR operation required divers to work in polluted waters. All equipment should be hosed and disinfected after each dive.

Should a diver feel unwell after a dive, s/he should seek medical advice immediately.

Standby diver

The standby diver should be experienced as a roped diver in low visibility. S/he diver should be fully equipped and ready to enter water as required. The search diver should enter the water only when the standby diver is ready. Spare gas should be to hand in the event of a diver becoming trapped.

Special situations

In certain situations, the team may have to deviate from CFT's Rules and Recommendations, e.g. diving alone and/or without a BCD.



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Equipment

Introduction

Each item of equipment used in SAR operations must be used only for the purpose for which it was designed, e.g. air cylinders for air etc. In the event of unsuitable equipment, a replacement should be sought or the dive plan should be altered to exclude the unsuitable item.

CFT certification or manufacturer's service certificate should accompany all major items of equipment.

Suits / gloves

Dry suits should be worn where there is a risk of cold from prolonged dive / immersion. They should also be worn in polluted waters where there is a risk of infection. Weil's disease (leptospirosis), a deadly disease passed from rodents to humans via water is a risk in such conditions.

In the absence of the risk of hypothermia or pollution, the diving officer may decide that semi-dry suits are most suitable for the task.

Gloves must be worn on all recovery operations, with latex gloves worn underneath the diving gloves. Latex gloves **MUST** be worn at all times while handling a casualty. Dry gloves (i.e. completely sealed) must be worn in all the following situations:

- Polluted waters
- Contaminated waters
- Risk of injury from sharp objects underwater
- Very cold water

Streamlining

All equipment must be streamlined to avoid snagging. This is particularly important when conducting a search or working in confined, low visibility conditions. Knives, octopus regulators etc. should be easily identifiable and accessible by both diver and buddy.

Harness / lifeline / BCD

The DO should discuss with the dive team the question of using a harness and/or lifeline, particularly when diving in strong currents, rivers, inland waterways and reservoirs.

Full harness

Should have pocket weights and quick release with lifeline to the surface. This lifeline must not be used as a signalling rope, but solely for recovering a casualty to the surface.

Lifeline

Diameter: 8mm; breaking strain: 1120kg; length: 50m max; fitted with 100mm snap karabiner screw type

Buoyancy devices

To be worn on all operations, except in confined spaces or fast flowing waters where there is a risk of snagging

Again, the decision on whether or not to use buoyancy devices is made by the DO in consultation with the team. While this is a deviation from CFT's ruling, it is accepted that some SAR operations may prove safer without the use of a buoyancy device.

Facemask / regulator / octopus

Half Mask

The use of standard scuba mask (half mask) should be used only where there is no risk of pollution in the water. Such a mask would be used together with a standard scuba regulator suitable for the type of dive, i.e. warm / cold / deep / shallow.

Full Face Mask

A full face mask complete with regulator or similar type must be used in polluted waters. These masks should be used following appropriate training in their use.

Octopus Regulator

An octopus regulator must be used in open waters dives. It should be clearly visible and easily accessible to the diver's buddy. It should be kept either in the pocket of the buoyancy device or attached to a lanyard.

Lighting

Torches

Must be used in low visibility and on night dives. Helmet mounted torches are recommended as they keep both hands free for other task. Alternatively, hand-held torch may be used.

Strobes

These are very useful for locating or tracking divers in low visibility. They can also be used to mark the position of a casualty where it is impractical to attempt a recovery on the spot.

Light sticks

Must be used in low visibility and on night dives. They can be used to mark the position of a casualty and to mark swim lines, divers and shot-lines. They should be

attached to both the diver and his/her cylinder. Green light sticks should be used to mark divers and red to mark swim lines and shot-lines.

High Visibility Jackets

Must be worn by divers and surface personnel to make the unit identifiable from the general public. They also portray a professional image for the unit.

Cutting

Knives

Knives are important items of equipment – for cutting ropes or nets – for releasing a diver – for cutting a safety belt in a submerged car. Knives should be kept sharp and well protected.

Shears

Shears similar to that found in a first aid kit should be located chest-high on the diver. These are useful for cutting line or netting.

Net cutters

A hand-held net cutter should be located in an accessible place. These are inexpensive and very useful.

Weights and buoys

Weight belts

All weight belts must have a quick-release buckle and be easily accessible by both diver and buddy.

Harness

Where weight harnesses are used, they must have a quick-release mechanism and be easily accessible and operated by both diver and buddy.

Buoys

Surface marker buoys are required for marking the location of a casualty, shot-lines, searchlights, cars etc. Since many searches are carried out around piers or in rivers with shallow depths, extra weight will be needed.

Communications

Hand signals

As taught by CFT

Recall signal

As taught by CFT – three long engine revs will be used to recall divers, if necessary.

Radio communications

Where possible, full-face masks should be fitted with radio communications.

Rope signals

Use of rope signals should be initially practised in the pool, using a blacked-out mask. The correct type of rope should be used for signalling. This will be discussed and demonstrated during practical training.

Signal rope should be clearly distinguishable and should not be used for any other purpose other than signalling

A bell is a group of 3 quick pulls

All other pulls should be strong pulls with a positive gap between each pull

Rope signals – attendant to diver

1 pull

To call attention / are you ok?

2 pulls

Have you found the casualty

3 pulls

Go down

4 pulls

Come up

Rope signals – diver to attendant

1 pull

To call attention / I am ok

2 pulls

I have found the casualty

3 pulls

I am going down

4 pulls

I am coming up

4 pulls followed by 2 bells

I want to come up – assist me up

Succession of pulls (>4)

Emergency signal – pull me up immediately

Succession 2 bells

Am foul and need the assistance, e.g. of another diver



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Search Methods

Search essentials

A selection of search methods will be demonstrated during Module 2 (practical training).

The key to a successful SAR operation is teamwork. Each diver is backed up by a team consisting of cox'n, shore marshal and cover diver.

Aim for 100% coverage. Unless a particular area, no matter how small, can be ruled out as having been 100% searched, there is little point in proceeding. It is therefore vital that the search method chosen by the DO is appropriate to the circumstances. Complex search mechanisms can be ineffective – simplicity is vital, as is the team's understanding of precisely what the chosen search method entails. It may be useful to do a 'dry run' of the search method during the brief. It is easier to clarify difficulties at this stage, rather than when under water.

The team may also consider switching to an alternative search method if the chosen one becomes unworkable, perhaps due to unpredictable changes in weather, currents or personnel.

Swim line search

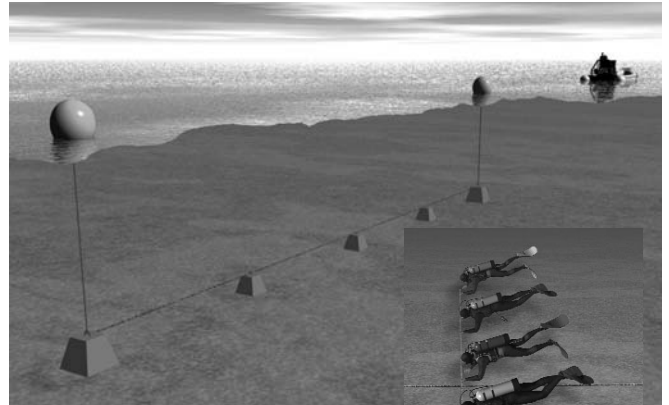
This type of search is best suited when working within specific parallels, for example in a canal or river, where the extent of the search is limited by the canal or riverbank. The search can be conducted from shore without the use of boats. In open sea, the method can be used using parallel jackstays.

An 'anchor diver' is placed at either end of the line, with the other divers spaced at regular intervals. Swimming with the current will save energy. However, swimming against the current will leave behind any sediment stirred up which might hamper visibility.

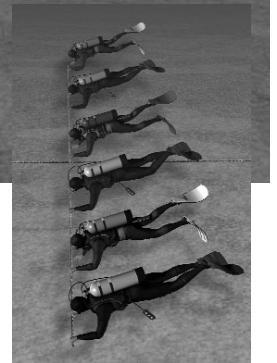
Bottom line search

Similar to swim line search, this method provides quick coverage of large area. Up to eight divers can be used thus maximising manpower. However, a large number of divers can be difficult to manage.

The distance between each diver will be determined by the visibility. If spacing between divers is too big, 100% coverage cannot be guaranteed.

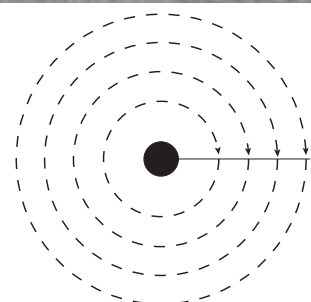
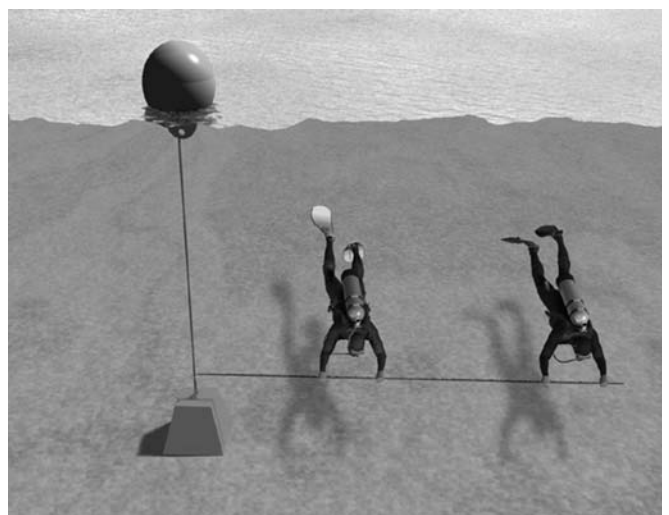


Bottom line search



Circular search

Ideal for searching the seabed where the search area is small and there is poor visibility. No special equipment needed. Best used where seabed is sandy and unobstructed, rather than a rocky bottom. Usually, the divers use a weighted shot line as the centre and from there, reel out a buddy line. Arrival at a fixed bottom line from the central shot line indicates that a full circle search has been completed.

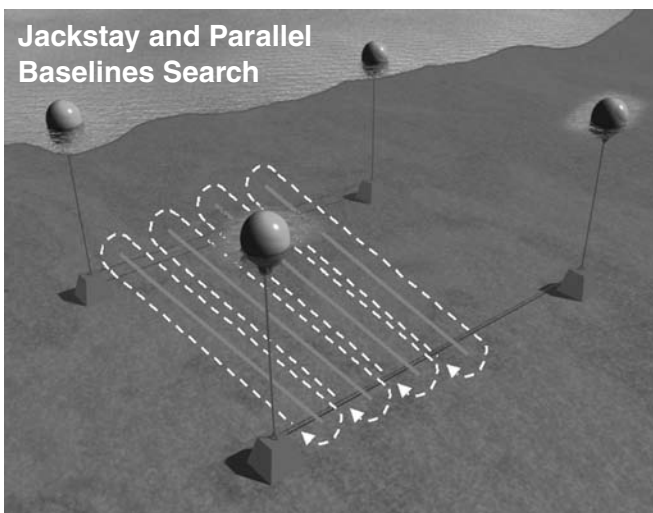
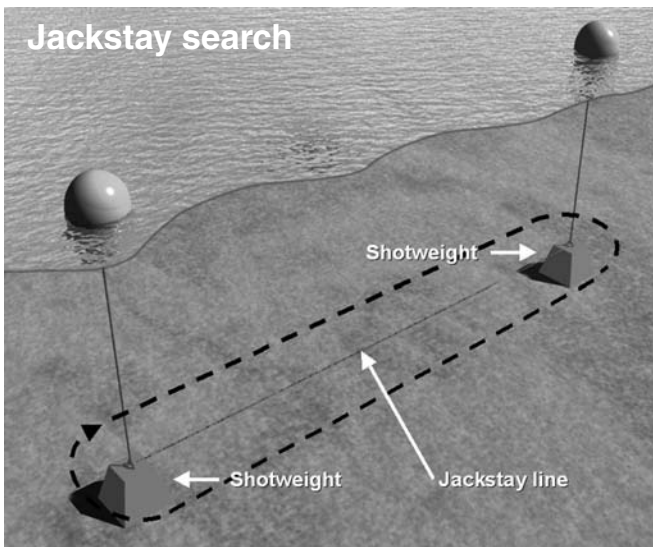


Circular search

Jackstay searches

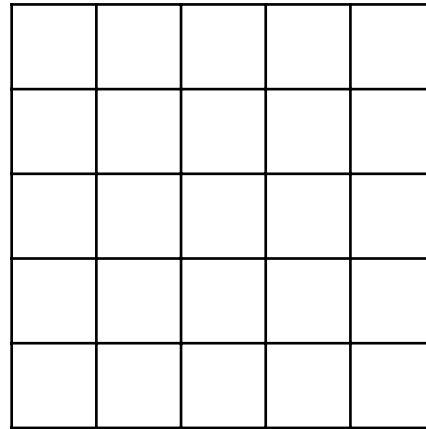
A jackstay is a weighted line sitting on the seabed. Two jackstays confine an area to be searched. Good coverage is an advantage of this method. However, it can be time consuming and takes some time to set up. The jackstay can be fixed if the area to be searched is small; otherwise it can be moved along the bottom as and when the previous area has been searched. It is important to ensure there is sufficient rope for this method.

The search method can be hampered by bad weather where it is difficult to manage shots and boats. Setting up a jackstay takes skill and patience and should be practised in calm conditions. In open sea, the method can be used using parallel jackstays.



Grid search

This type of search is more appropriate for locating small items, for example archaeological excavations rather than SAR operations. It is effective for very small areas and 100% coverage can be achieved. However, a grid search is very labour intensive and can be tedious to conduct.



Compass search

This method is ideal for searching for a large object and can be commenced immediately. It relies on the navigation skills of the diver and requires good visibility. A current or strong tide can make the search inaccurate and it is therefore best to conduct such a search at slack tide. Fin strokes or timing will enhance accuracy. This method can be practiced, even in the swimming pool.

Single diver search

This is an ideal starting point for a search and can be commenced immediately. It may be used when searching a river or confined area. Such a method would over-rule CFT's teaching of the buddy system and for this reason, the diver must be fully prepared and briefed on the exercise.



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Recovery

Recovery – the final step

Once the casualty has been located, it only remains for the team to recover the casualty and pass to the authorities. Only those who are confident with an exercise such as this should undertake the physical removal of an apparently deceased casualty. The condition of the casualty may have deteriorated as a result of prolonged immersion.

It is important not to assume a casualty is dead. Only a qualified medical doctor can pronounce a casualty dead.

The condition of the water will determine how the casualty is removed from the water. If it is a fast flowing river, taking the casualty towards the nearest bank is suggested. In calmer water a boat may be used. If not already done so, the casualty should be placed in a body bag as soon as possible. Try to keep the casualty out of view of the public. Body bags should be organised in advance of the search. If the casualty has been taken from a deep depth, the recommended rate of ascent should not be exceeded.

The casualty should be approached from behind by placing your arms under the casualty's arms and around the chest. Use the assistance of your buddy, if necessary. During the lift, your fining technique should be as normal, with some air in the BC if necessary.

If in an advanced state of decay, it may be necessary to bring a body bag down underwater and place the casualty inside before attempting to lift.

If a vehicle was involved:

It is important to remove casualty from vehicle before vehicle is removed from water.

1. Was there more than one casualty in the vehicle
2. Was seat belt on casualty?
3. Were windows of vehicle open, if yes – which windows?
4. What gear was the car in?
5. Were the lights switched on or off?
6. In what position was the ignition key?
7. In what depth of water did you find the vehicle?
8. Was the vehicle upside down?
9. What was the registration number of the vehicle?
10. Any items floating about that should be recovered, e.g. for evidence?

It may be useful to take underwater photographs of the vehicle, if practical.

Reporting to authorities

It now becomes your responsible to formally hand over the casualty to the authorities. This should be done out of the view of the general public. You should give details of the recovery:

- Time
- Conditions
- Exact location

You may be called on at a later stage to provide a witness statement for an inquest. For this reason, it is vital that your record of events is accurate and clear.

A relative may approach you asking to see the casualty. It is best to refer such requests to the appropriate emergency service in charge of the scene, e.g. Gardai or Coastguard. They are best trained to deal with the stresses and obvious difficulties that might arise in such a situation.

Removal of vehicle

You may be required to assist with the removal of a vehicle from the scene. Two divers could be assigned to this task. Nylon webbing is preferable to chains, which are difficult to work with underwater. Tow cables can be an extreme hazard underwater if they snap. Lifting bags can be of assistance, however extensive training/practice is highly recommended prior to trying to lift any large objects.

The towrope should be tied on to the car axle if possible. If this is not possible, run the rope or chain through the windows and lift the vehicle by the roof. Do not use a pillar between the back door and front door on vehicle for lifting, as they tend to break. Once the vehicle is lifted to the surface, it should be allowed to drain of water before lifting further. Stay well clear.

Record keeping

Record all details of the operation in the club's SAR logbook. Pass a copy of this record to the coastguard. This record may be of value for searches in the future. Every new search is a learning experience and will increase the skills and abilities of the search team.

A short debrief should take place at the site. Check that all divers are out of the water, that all diving gear has been recovered, and that all divers are feeling ok. Leave the area as soon as the team's job is completed. Avoid entering into discussion or speculation with the public about the casualty or the circumstance surrounding the operation. Any discussion should be held at a pre-arranged location, for example clubhouse or restaurant.

There the team should talk about the operation, how it went and what problems were encountered. Every team member should be involved in such discussion, which should be led by the diving officer. Each should be given an opportunity to discuss any problems that arose during the operation. This should be seen as a confidence building measure. If someone needs counselling, it should be arranged as soon as possible.