

Lesson Plan – 5.2-1 Plan Search and Rescue

Date: 12/1/18
Mark Harker
Cowes LTA / Helm

AIM:

Trainer - Explain the information required to plan a Sar, additional information to be sought ;factors of how to decide on the appropriate type of SAR plan / plan; elements affecting the success of SAR.

Crew - to have a broad basic understanding of the factors involved in SAR, how it's planned and the considerations.

Training Shoreside –

- Explanation of the information required and advantageous
- The type of SAR patterns and methods
- Factors affecting the success of a SAR
- How to calculate the DSP and CSP
- How to plot on a paper chart and SIMs CSP and casualty position
- Use of SAR cards
- Crew briefings and crew roles
- Crew should be able to plot the DSP and calculate the CSP on either a paper chart or SIMs unit.

Training afloat - Demonstrate planning SAR pattern and execution; the communication and factors.

RNLI Training - crew course

Initial Information

The vital pieces of information required by the lifeboat to execute a shout are 1) The nature of the incident 2)Where to search or (CSP - Commence Search Position) 3)search Target.

Additional information the help the search be more effective, successful and quicker may include

- Type of vessel / details about the person
- Tides, weather, wind
- Number of persons
- Other vessels or assets involved
- Incident coordinator
- Source of information such as first informant
- where and when were they last seen (position and time)
- What was the reason for the alert call

Information that will assist in the success of a SAR can come from a variety of sources:

- The person reporting the incident (999 or VHF call), they may also continue to provide information through the incident. This person may also be the casualty themselves
- Coastguard or the OSC on scene coordinator can provide instructions on current situation, what the task for the lifeboat is (search patterns and area to search)
- Additionally, the helm should also obtain information on tide, weather before launch from the internet, as well as information on conditions of search area from the SIMs (Depths, hazards)

Factors affecting success

- Crew ability
- Crew fatigue
- Crew search method
- Light
- Quality of information
- Time since incident occurred
- Equipment available and assets involved

Planning a Search

The success of the search is in the planning. Knowing where the casualty is when we get on scene and using the right search method will greatly affect the outcome.

Different search methods or patterns can include

- Datum search (expanding square, sector search)
- Area search (parallel search or creeping line ahead)
- Goalkeeping (useful to stop the casualty leaving the enclosed Solent area or mouth of river)
- Shoreline search (a common method for Cowes Lifeboat given the geography)

Once we know what we are searching for (ie kayaker), where they were last seen and when, we can then start to plot where we should find them. To do this we also need to know tidal information and wind, this will help us to work out the drift with the tide and the effects wind will have had on speed and direction.

The last known position is known as the 'drift start position' or DSP, and once we calculate where they should be when we arrive on scene, this is known as the 'commence search position' or CSP.

A simple example:

Casualty is reported last seen at 11am off Osborne Bay in a kayak, the time now is 11:30am. We now know what we are looking for, the DSP and the length of time since the report. Let's assume, the tide was ebbing at 11am and will be ebbing for another 3 or so hours and that it's a spring tide with a speed of 2 Knots.

If we look on the chart, we can mark the DSP and use chart info to establish the direction of tide; say 285 degrees. Using simple math we can calculate that in 1 hour the kayak will have travelled 2nm based on 2 Knots of tide speed. As it's only been 30 minutes, it would be sensible to therefore halve that to 1nm on a

bearing of 285. However we must also factor in the time it takes for us to launch and arrive on scene, so let's assume 15 minutes. That takes it to 45 minutes which converts to 1.5 nm.

Once on scene if nothing is visible we may commence with an expanding square which allows us to cover a large area quickly. Initially, we will look for the kayak as it's a bigger target though obviously we look for the person at the same time. If we find the kayak first, if considered that the person should be close by and therefore we may change our search to a sector search. This is a more concentrated search where a datum exists. The Datum is any object connected to the incident like debris and which should have travelled at the same speed as the person being search for.

communication - coastguard should be informed at launch or your eta to the scene and where you plan to commence your search or CSP. In many incidents the Coastguard will have calculated the CSP much more accurately and will therefore provide this info. Once on scene CG should be notified of this, the conditions on scene and what is visible, this is known as a sitrep or situation report. At stages through the search, the lifeboat should continue to provide sitreps or may be request to do so ax this will help coastguard to update their search calculations and if need be reset the search area.

It's critical that crew are properly briefed on their role, what they are searching for, where to look and how (search techniques). This may include various tools available such as Binoculars night sights etc (see locate and assist lesson plan). The state of the crew, fatigue, light, weather and sea conditions will affect the effectiveness and success of the search.

Visual scanning is dependent on crew fatigue/boredom and scan-focus-scan in 10 to 15 degree increments reduces this, also periodically focus on a closer object. Spray and wind will also affect vision. Night vision develops slowly (up tp 30 mins) but is lost quickly. Closing one eye can help preserve night vision, use of red lights is better. At night peripheral vision is better than point of focus.

Pre empt how long the SAR may take, equipment that may be needed and crew welfare. Having searchlights , warm clothing and second crew if needed is invaluable.

Know the operational capability of the SAR unit and crew, duration , depths etc will help to manage the tasking effectively.

Lastly, if operating in a busy or hazardous area then its important that the appropriate people are informed. In the solent it may be advisable to notify Southampton VTS if working in the shipping lanes so that they can issue a communicate to make all shipping aware and advise the lifeboat of any pending vessels to enter the search area.

What Other Assets can be Utilised

CRT - Coastal Rescue Teams/cliff rescue

ALB – All weather Lifeboats Yarmouth and Bembridge

Helicopter – Coastguard 175

Vessels in the area

SAR Planning Skills

Plotting position of casualty on the chart Paper/Electronic

DSP – Drift start Position (Position target started to drift)

CSP – Commence Search position

DST - How long since DSP reported. Time difference including our travel time.

Tides – Springs, Neaps, Tidal flow chart. High water time before and after.

Choosing a Search pattern

Require search area coordinates, CSP, Track spacing, Leg length and direction of first turn, Search pattern required, width of search legs or number of legs, search speed. SMC – Search and Rescue Coordinator will advise on these and will have planned the search based on the speed of the lifeboat, size of search area, duration and fuel consumption, requirement to maintain a steady platform to enable crew to search effectively. This speed is determined by type and size of object/person being tracked. Must inform the SMC if a planned speed is not feasible so search pattern can be re-calculated. Type of search initiated can also be affected by local knowledge of shallows, cliff faces, obstacles and hazards.

Sometimes the lifeboat will be required to independently make a decision on the most suitable search method / pattern, and the helms are trained to make these decision based on a dynamic risk assessment and on scene information.

NB: IRPCS Rule 6 (safe speed) & Rule 19 (Conduct of vessels in restricted Visibility) always still apply

Area Search (4 sets coordinates starting top left, going clockwise)

- Parallel track (Longest leg parallel to search box) Target could be anywhere in search area.
- Creeping line ahead (When greater probability target is closer to one end)
- Shoreline
- Goalkeeping (Backwards and forwards across the down drift path)
- Keyhole (Creeping line ahead used in estuaries or rivers, leg length determined by width of river/lock etc)
- Line Abreast (Multi vessel search, similar to parallel track)
- Track line (Along the last known intended or likely track of a vessel)

Datum search (requires a point in the water from where to start: last known position, GPS, Debris field/oil slick)

- Expanding Square – Best used when the search object is confidently anticipated to be within a relatively small area. Starting at the datum point, its carried out by a series of timed legs, increasing in legs after every 2 legs. The distance of the timed leg is equal to multiples of the track spacing supplied by SMC. Turn is 90 degrees to starboard.
- Sector Search- Best used when datum information is fresh for Man overboard or upon location of debris/wreckage. A series of timed legs turning 120 degrees to starboard at the end of each leg to form a series of triangles. The 3rd leg of each triangle returns to the datum position. The distance of the timed leg is equal to the track spacing supplied by SMC. Speed and course must remain constant. First leg made down tide (if inflatable empty dingy

consider upwind for person in water). After 9 timed legs the first sweep is complete. Second sweep offset by 30 degrees.

Plotting / Setting up a search pattern using the SAR check cards

The check cards are guides to aid in the search patterns and have the calculations and sweep widths written down. They also have check cards for sector search and expanding square to enable a visual aid

Planning a Search pattern

Sea state, Glare from sun, benefit from moonlight can all affect preferred search direction. Weather, precipitation. Tidal flow, direction, rate and eddy's. Local knowledge of unusual tidal features and shallow rocky coast line. These can affect choice of search pattern.

Orientation of search patterns is used to maximise target exposure.

Other Search methods

Reference Material:

Video Clips -

Horizon Guidance -