



EMERGENCY PREPAREDNESS – SEARCH & RESCUE DRILL

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Ground Search Techniques

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OVERVIEW

There are a number of standard search techniques. The choice of technique differs by the situation. Sometimes the Incident Command staff will dictate the preferred technique, but more often it is expected that the trained SAR volunteer would know which is appropriate.

Ground search modes can basically be divided into two types - *hasty team searches* and *area searches*.

PROBABILITY OF DETECTION (POD)

One important concept in searching is the POD (Probability of Detection), defined as the probability that the subject was noticed if he was in the search area. 'Responsive' POD is that for which the person is able to respond if he notices the SAR team. 'Unresponsive' POD is that where the SAR team would find the subject but he could not respond to them (dead, unconscious, fatigued). Responsive PODs are generally high because our attraction techniques would alert the subject to our presence. Unresponsive PODs vary by the type of search mode we are using.

UNRESPONSIVE POD AND SEARCH MODE

The primary duty of a hasty team is to rapidly cover their assigned area, which is often a trail or other well-traveled area. Their unresponsive POD is usually high in the immediate vicinity of their trek, but much less a short distance from it. The unresponsive POD of other modes tends to be very high throughout their assigned area. Studies show that hasty teams are the ones who most often find the subject.

CLUES

In any mode, the team is looking for clues as well as the subject. Clues might include footprints, clothing, fire remains, and other things which may be associated with the subject. It is important that the teams recognize the likelihood that a clue is relevant to the search. If the clue is obviously too old, or not related to the subject (e.g., a cigarette butt and a non-smoking subject), the team should not waste radio time on it. If there is any possibility that it might be related to the subject, the team should mark it and describe it to the Incident Command staff. Experience is often the best teacher in this respect.

ATTRACTION TECHNIQUES

'Attraction' is a standard approach that should be used during most any mode of searching. Methods of attraction include blowing whistles, calling the subject's name, using flashlights, etc. Caution in residential or camping areas should be used so as not to awaken someone who would take offense to the noise.

HASTY TEAMS AND POD

Hasty techniques generally involve searching on routes where a person most likely would travel, such as trails, canyons, arroyos, ridge tops, etc. A hasty team is not performing their search correctly if they stop to look behind every bush, divert long distances off their assigned route, etc. The expectation for unresponsive POD in the hasty mode is high on the route, but low in the surrounding area. The desire for speed is high, with 2 mph being a common expectation. Provided that speed can be kept up, it is OK for a hasty team to spread out parallel to the designated route, instead of all walking in each other's footprints.

AREA SEARCH AND POD

If the hasty mode is not being used, the search basically becomes an 'area search' of one type or another. The searchers may be in small groups or a large line, but the underlying idea is to spread out a certain distance and search an area. The expectation for unresponsive POD in this mode is high, and the expectation for speed is low. Many times, the directive is to cover at a 65% or better unresponsive POD, thus potentially eliminating that area from further searches. An area search team is performing poorly if they rush through the area and return with a low unresponsive POD. This applies even at night - it just takes more time.

AREA SEARCH TACTICS

If it is a large line search, there will be leaders who coordinate the line's advancement. But even in a small group, the advancement needs to be controlled and methodical so that the area is thoroughly covered. If one person speeds ahead of the group, the area may not be covered to the assigned standard. In this mode, the searchers should strive to investigate every bush, rock formation, downed tree, etc. Often GPS coordinates are used to delimit the area, but it is better if geographical features are the boundaries - the search team can recognize them more easily.

TRACKING

Tracking is a sub-technique of either the hasty team or the area search mode. Tracking footstep-by-footstep is inherently a slow process, so is somewhat improper in a hasty mode. However, this can be mitigated by using the leapfrogging method of tracking. In this case, some members of the hasty team move ahead parallel to the direction of travel, attempting to 'cut sign'. Other team members continue the footprint-by-footprint trailing, but re-deploy if tracks are found further ahead. If tracks are found while in an area search mode, it is proper for some (or all, if the tracks are positively identified as belonging to the subject) members of that team to begin tracking and leapfrogging. Of course, any change in strategy should be approved by Incident Management.

INTRA-TEAM CONTACT

Finally, in any search mode, the members of a team should try to remain in either voice or visual contact. If the assignment causes them to split around obstacles, they should plan to rejoin each other beyond the obstacle. Failure to remain in contact can significantly lower the POD, and also waste time (and radio batteries) while the team tries to find its members.

QUIZ ON GROUND SEARCH TECHNIQUES

1. What are the two basic modes of ground search techniques?
2. Under what circumstances might one choose not to use 'attraction' techniques?
3. What are the characteristics of unresponsive PODs that are generally expected of a hasty team?
4. What sort of unresponsive POD is expected of a team doing an area search?
5. What is an example of an improper technique for a hasty team?
6. What is one consequence of a person rushing ahead of his teammates during a line search?
7. What is an example of an improper technique for an area search team?
8. What is the chief drawback of footprint-by-footprint tracking?
9. What should happen if a line search detects tracks that are positively identified as the subject's?
10. How often should team members re-establish contact (visual or voice) with each other?

Hasty Team Search

- Typically follows trails and paths.
- More thorough than hasty team search.
- Less time consuming and more common than line search.

Wedge Search

- Used to check critical points of interest on site.
- Usually sent out as the initial, quick search.
- May be a branch of a larger ground team in the field.
- No set search formation.
- Normally use most experienced personnel.

Line Search

- Last resort.
- Detailed – but very slow – search.

Formation Legend

- Team Leader (L)
- Team Members
 - Wilderness or Experienced Members (W)
 - General or Inexperienced Members (X)
 - Communications (C)
 - Medic/First Aider (+)
 - Navigator (N)
 - Assistant Team Leader (A)

Wedge Formation

Option 1:

```

      N
     X   X
    X   X   X
   W   C   L   +   W
    
```

Option 2:

```

      N
     X   X
    X   X   X
   W   C   A   +   W
                L
    
```

Line Formation

Option 1: W X X X C L + X X X W

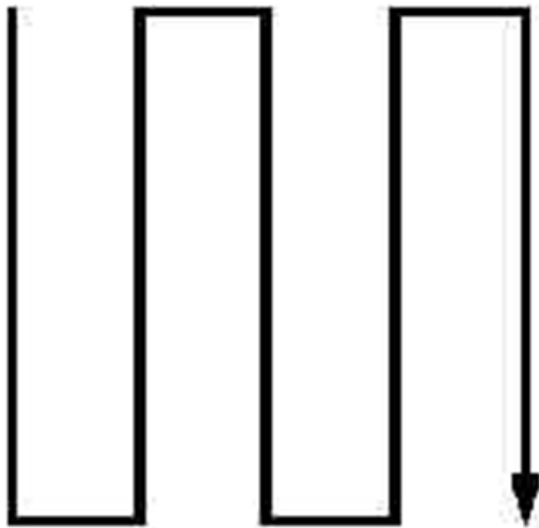
Option 2: W X X X C A + X X X W

Parallel Sweep Search

- Typically used to search specific gridded areas.
- Normally use a Line Search formation.

Material in this section derived from Civil Air Patrol resources ([link](#)).

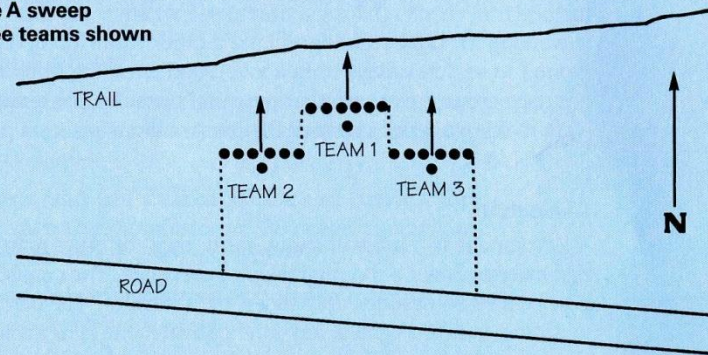
Parallel Sweep Pattern



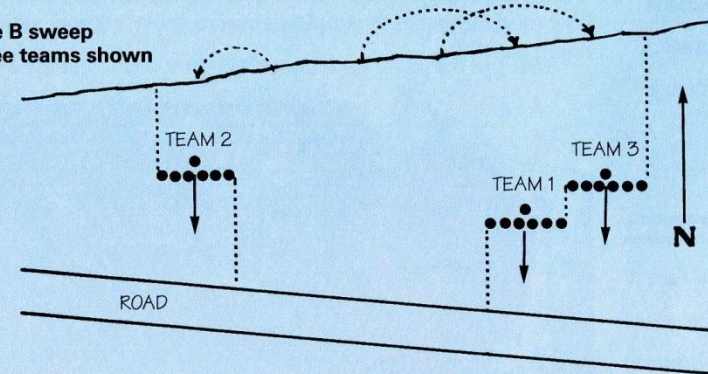
BSA Example

Lost-Person Search Method

Type A sweep
Three teams shown



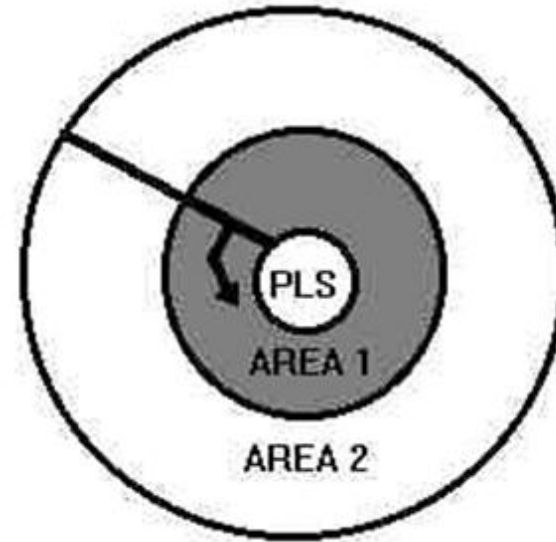
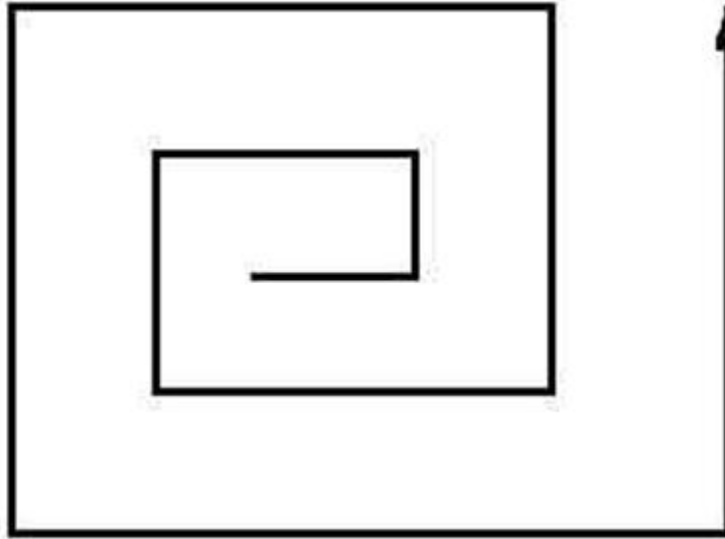
Type B sweep
Three teams shown



In these two diagrams, three teams are searching an area between a road and a trail. Team 1 lays ribbon lines (dotted lines) at the edges of its search lanes. Teams 2 and 3 pick up the ribbons and move them to the edges of their search lanes as they begin searching. The area behind the teams is therefore clearly identified as having been searched, and the area outside the ribbons is identified for the "pivot" and continuing search pattern.

When teams pivot to continue the search, they move to the sides (shown by the dotted arrows) to the outside of the ribbons. Teams move the ribbons again to the outside of the search pattern. As they continue "sweeping" in this way, the searched area will expand farther to the left and right.

Expanding Square or Circle Pattern



Expanding Square or Circle Search

- Used to search small areas for a missing person or clue.
- Typically employs Hasty Team search technique.

Contour Search

- Two types of Contour Search:
 - Search by elevation.
 - Used when top-to-bottom search not feasible.
 - Recognizes that statistically people get hurt climbing, not on the way back down.
 - Searches for hikers along trails or on side of trails
 - Typically employs the Wedge formation.

- Physical Clues:
 - Clothing or equipment,
 - Smoke (sight or smell),
 - Trash,
 - Broken or disturbed brush or other signs of humans passing through an area,
 - Scavengers and
 - Decomposition odors.
- Recorded Clues:
 - Trail registers and
 - Sign-in logs.
- People
 - Witnesses,
 - Trained personnel (like other searchers or Forest Rangers),
 - Family and
 - Friends.