Chapter 17 - Type III Search Methods - Closed Grid Searches

Upon completion of this chapter, you will be able to:

- Explain the theory, reasoning, and limitations of closed grid searches.
- Be able to mark off an area for a closed grid search with a base line and datum line.
- Demonstrate how to space searchers in the line and the techniques searchers can use to maintain this spacing.
- Outline the responsibilities of individual searchers in the line.
- Demonstrate the commands that are appropriate for use in Type III searches, including the use of whistles.
- Function in a closed grid team.
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Introduction

Some searches will reach a stage where Initial Response and Sweep Searches have been unsuccessful in finding the missing person. A more thorough search of the higher probability areas may be required. This situation will normally result in a "closed grid search" being conducted. The searchers are lined up in a row with a searcher spacing of 10 m or less. Four conditions should be satisfied in order to use this technique:

- The search area should be relatively small area (less than 1 km$^2$).
- There seems to be a high probability of either finding the victim or finding a strong clue to the victim's whereabouts in the search area.
- There should be a large number of trained searchers available who cannot be more effectively used elsewhere.
- The subject is likely hiding, unresponsive or dead.

The necessity for satisfying these four conditions can best be understood by consideration of Table 17-1.

<table>
<thead>
<tr>
<th>Searcher Spacing (m)</th>
<th>Probability of detection</th>
<th>Searcher-hours for 1 sq. km.</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>33% (1/3)</td>
<td>55</td>
</tr>
<tr>
<td>20</td>
<td>67% (2/3)</td>
<td>110</td>
</tr>
<tr>
<td>10</td>
<td>83% (5/6)</td>
<td>220</td>
</tr>
<tr>
<td>5</td>
<td>92% (11/12)</td>
<td>440</td>
</tr>
<tr>
<td>2</td>
<td>97% (29/30)</td>
<td>1100</td>
</tr>
</tbody>
</table>

Table 17.1  POD and Searcher Hours at Several Different Searcher Spacings

The figures in the table are derived from data based on studies conducted in moderately dense bush in Washington State. The original figures may be found in several papers including one on Grid Search Techniques by Syrotuck (1974). The figures are approximate and are intended only as a rough guide.

What should be apparent from the figures is that closed grid searches take a lot of time to cover a small area.

Closed Grid searches should be used as a last resort.

In spite of this, there are search situations, as mentioned above, where closed grid searches should be used. The coordination of this type of search is described in the sections that follow.
Initiating a Closed Grid Search

Closed grid searches will normally involve searcher spacings of less than 10 metres. A closed grid search team will usually consist of between 6 and 10 searchers and a Ground Search Team Leader. Experience has shown that having more than 10 searchers in the line creates an unmanageable situation. The area to be searched needs to be marked out carefully in advance.

In marking out an area for a closed grid search, the first requirement is a base line. Ideally, this base line will be a long straight section of a road or trail, or some natural boundary such as a river. If no such boundary already exists, a base line can be created by hanging flagging tape at regular intervals. A sweep boundary at the point at which the sweep ends should also be marked. Datum lines running at 90° to the baseline should be marked at each end of the search area. The outside boundaries of each search teams swath should also be flagged. When flagging the different lines, the tape should be hung so that from any tape the next 2 tapes can be seen. This procedure prevents searchers wasting time looking for the next tape.

A flagging team can work well in advance of the search team and mark off a large number of strips to be searched. Such a team must be skilled in following bearings precisely. As a result of defining the boundaries just described, the area to be searched will be laid out in a manner similar to the situation illustrated in Figure 17-1. The flagging team will also have the opportunity to conduct a open grid search as they mark the lines.

The flagging of several strips in advance allows the search teams to concentrate completely on searching and permits teams to work in adjoining areas independently. It is also much more likely that the flagged lines will be along the desired bearing.

Figure 17.1 Area Marked for a Closed Grid Search
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The width of each team’s sweep will be the space between searchers multiplied by the number of searchers in the line. For example 8 searchers spaced 5 m apart the sweep width will be 40 m. The two outside searchers are only ½ of the spacing distance (2.5 m) from the flagged sidelines. This maintains the 5 m spacing between this search team and the adjacent search team.

Figure 17.2 Arrangement of an 8 person search team

Closed Grid Team Operation

Searchers must be extremely thorough in this type of search as failure to locate a victim or clue within the area can be taken as reasonably conclusive evidence the victim or clue is not there. After being searched once by a closed grid an area will probably not be searched again.

Being thorough involves looking in all directions, including backwards and even upwards in the trees. It also involves checking any possible hiding place, and as with all types of search, looking not only for the victim, but also for clues. Anything that does not appear natural should be reported. Searchers should approach their work with the positive expectation of finding something of significance rather than with the pessimistic attitude of finding nothing.

In order to begin a closed grid search, the searchers line up along the baseline. The end searchers are at ½ the searcher spacing from the flagged sidelines. For a team of 8 with a searcher spacing of 5 m, the line would appear as in Figure 17.2.
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Before starting, the Ground Search Team Leader, (GSTL), reminds all the searchers of the signals to be used.

- One whistle blast from anyone means stop
- 2 whistle blasts from the GSTL means go
- 3 whistle blasts from the GSTL requires the searchers to number off (see next page)

The GSTL then floats behind the searchers, giving the commands for starting and stopping, and working to maintain uniform spacing.

In a closed grid search, searchers try as much as possible to walk a straight line parallel to the datum line. To achieve this, the end searchers (1 and 8 in the diagram) follow the flagged boundaries as a guide. The searchers on the left side of the line (2, 3 and 4 in the diagram) use the searcher immediately to their left as a guide. The searchers on the right side of the line (5, 6 and 7 in the diagram) use the searcher immediately to their right as a guide.

The biggest problem in co-ordinating a closed grid search is maintaining correct spacing. One way of reducing this problem is staggering the line. Each searcher follows several metres behind the neighbouring searcher who is her guide. With this arrangement the searcher does not have to turn her head completely left or right to see her guide. The guide is more frequently in view and maintenance of correct spacing should be slightly more automatic. The appearance of the resulting line will be similar to that shown in Figure 17.2. For this method to work, the "sagging" line must be maintained.

The team leader monitors the spacing and orders corrective action when necessary. For spacing to be maintained in this way, it is essential that no searcher get too far behind or too far ahead. If a searcher does get too far behind, a stop command should be given to the team so this person can get back in line.

ADDITIONAL CONSIDERATIONS

String Lines

One method of marking boundaries that can define areas quickly and accurately is the use of string lines. Hip chains or large rolls of light string, preferably brightly coloured, can be used to divide a search area into distinct blocks. As with flagging tape, every attempt should be made to remove such lines when the search is completed.
Communications

It may be difficult for the Ground Search Team Leader (GSTL) to communicate directly with all members of the team when the bush is dense and the spacing is large. An additional command may prove useful in these circumstances. Before starting the sweep, the searchers number off from one end of the line to the other. Later, when the line has stopped (1 whistle blast) for some reason, the GSTL may give 3 blasts of a whistle. **Three (3) blasts of a whistle requires searchers to call out their numbers in order.** The searcher who gave the stop signal does not respond when the count reaches his or her number. The leader then knows the source of the stop signal and can respond accordingly. Again, the GSTL must be sure this signal is fully understood before searching commences. The numbering off procedure is not recommended when more direct communication is possible.

Once the GSTL has determined that the line can move again he gives 2 whistle blasts.

Difficult Areas

Whatever method is used, maintaining the line is the responsibility of every searcher in it. A searcher getting behind must not be forced into superficial searching in order to catch up to the rest of the line. Any area within a search grid that proves so difficult to search that the line will be held up for an extended period of time should be flagged off, noted and searched later by a different crew.

Multiple Teams

When several teams are working in adjoining sections, it is most unlikely that they will reach the sweep boundary simultaneously. To avoid confusion with signals between two teams, it is best if the teams are staggered in the search area.

Before starting a return sweep in a different section, the GSTL must be sure that another team is not already searching the new area. Co-ordination between GSTLs is obviously essential and each GSTL must carry a radio. Attaching a special tag at the ends of a completed sweep can provide useful information to other teams. This tag may be a card with relevant information filled in, or it may simply be some additional flagging tape attached according to a standard code known to all teams.

Closed Grid searches do not represent an efficient use of SAR personnel. They should only be used in the exceptional circumstances as previously outlined.
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Additional Reading


Further references listed in the Bibliography.

Chapter Review

Please answer the following questions on a separate sheet of paper so that another student can use this manual. The answers to these questions are located at the end of the manual.

1. When is a grid search appropriate?
2. How is line spacing maintained in a grid search?
3. Draw how an area is flagged before a grid search is conducted?

Answer **True** or **False** to the following statements:

4. One whistle blast means go and two whistle blasts means stop.
5. The grid team waits for searchers to search difficult areas.
6. Closed grid searches should be used as a first resort.
7. When the search line is stopped, three blasts from a whistle signals the searchers to number off.