LESSON

06

SEARCH AND LOCATION TECHNIQUES

Lecture-02 Periods Practical-07 Periods Total-09 Periods

LESSON OBJECTIVES

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

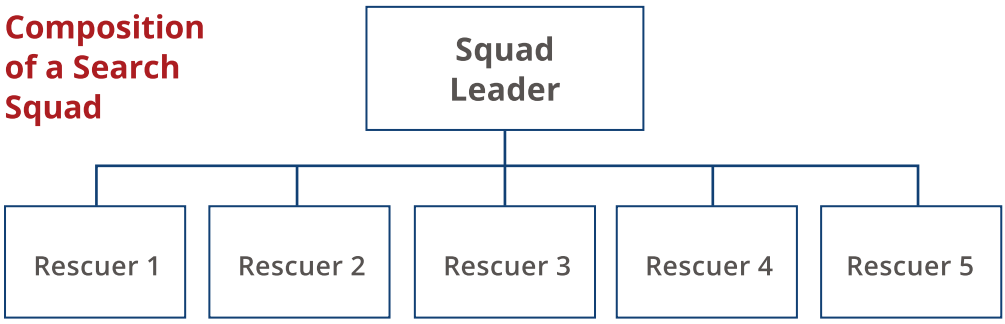
1. Define search and location and describe its importance in the success of a CSSR operation.
2. Describe the composition of a search team and the basic equipment used.
3. List and describe the steps for searching and locating.
4. Define void space and identify probable locations in the four basic collapse patterns.
5. Describe the modes, types and patterns of conducting a search.
6. Demonstrate in two practical exercises the steps for a physical search and location, using two different patterns.

1 Searching and Locating

Notes

A set of techniques and procedures whose purpose is to obtain a response or indication of the presence of _____ in a void space within the collapsed structure.

2 Composition of a Search Squad



▲ *Figure 1: Basic search squad composition*

Squad Leader:

- Responsible for developing the search plan, drawing diagrams, keeping documentation and making recommendations to the _____.
- Performs the duties of the _____ and is responsible for monitoring security during the search operation.

Rescuers:

- Physically carry out the search operation as outlined by the squad leader.

2

Composition of a Search Squad (Cont.)

Basic Equipment Required for Physical Searches

- Complete set of personal protective equipment and emergency medical kit.
- Minimum personal supplies required to function unassisted for at least 12 hours. These supplies includes:
  - _____
  - _____
  - _____
- Basic tools
- Radio equipment to communicate with team members and Command Post
- Portable radios (walkie-talkie)
- Building and work site marking supplies
  - _____
  - _____
  - _____
  - _____
  - _____
- Warning and alert devices
  - _____
  - _____
  - _____
  - _____
  - _____

Notes

2 Composition of a Search Squad (Cont.)

- Reconnaissance and vision
  - _____
  - _____
  - _____
- Search diagrams, pencils, colour pens, clipboards
- Technical search equipment, specialised or improvised
- Additional materials
  - North American Hazardous Materials Response Guide
  - Hazardous gas detector

3 Steps for Searching and Locating

3.1 Compile and analyse available information.

_____

_____

3.2 Secure the scene.

_____

_____

3.3 Inspect and evaluate the structure.

_____

_____

3.4 Rescue victims with _____ access on or near the _____, if this has not already been done.

_____

3.5 Make INSARAG markings on the structure as needed, if not already done.

_____

_____

Notes

3

Steps for Searching and Locating (Cont.)

3.6 Create a _____ of the structure. Refer to handout.

3.7 Select the area to be searched.

3.8 Select a search method.

3.9 Conduct an appropriate search pattern and place INSARAG markings where potential victims are detected, both on the structure and on the diagram.

3.10 Continually analyse the results and re-evaluate the search plan (make necessary adjustments).

3.11 Initiate pre-hospital treatment of the victim.

3.12 Confirm the _____ and _____ of potential victims with the resources and equipment available.

Notes

4 Void Spaces

Notes

> A physical space in a collapsed structure where a person trapped within could remain alive for a short period.

Possible location of void spaces in typical collapse patterns

Structurally resistant areas:

1. Basement
2. Elevator shaft
3. Bathrooms
4. Inside hallways
5. Concrete walls

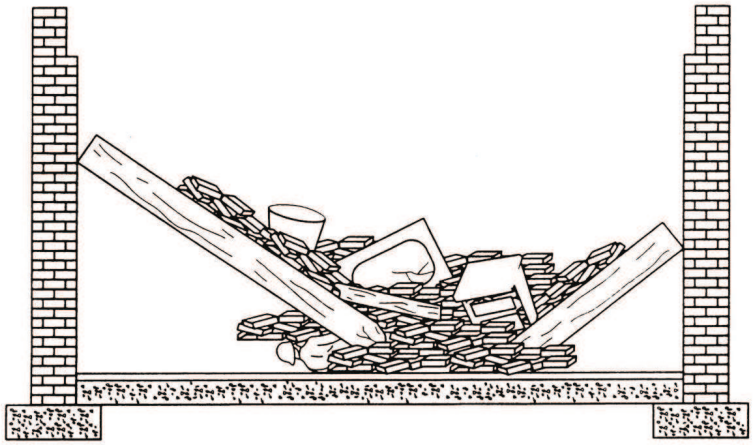


Figure 2 ▸ V-shape collapse.

Figure 3 ▸ Pancake Collapse

Notes

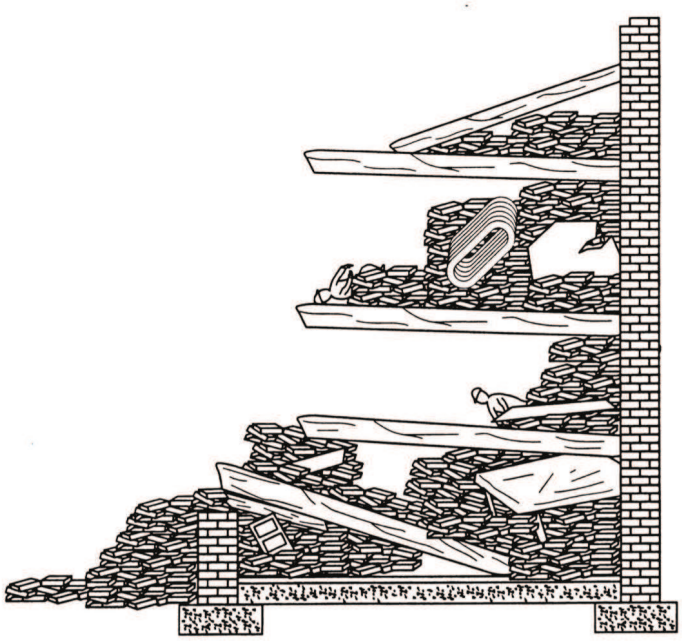


Figure 4 ▸ Cantilever collapse

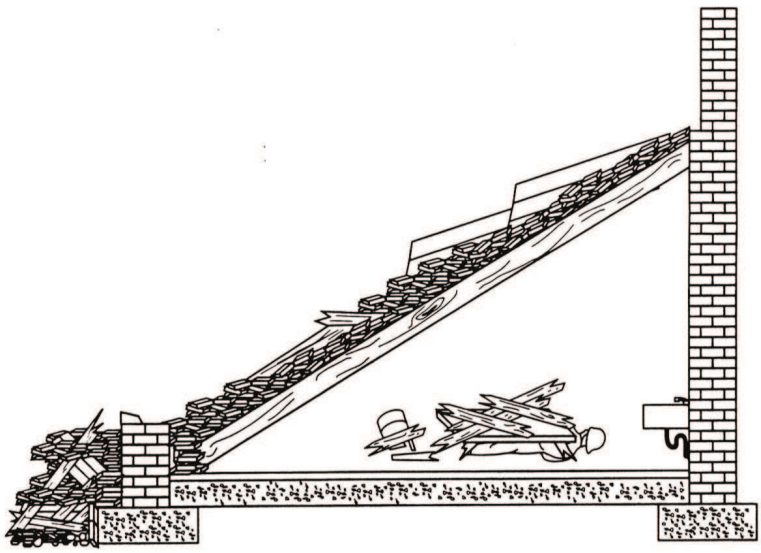


Figure 5 ▸ Lean-to collapse

5

Search Modalities

5.1 Hasty Search (Primary)

This type of search is conducted to _____ detect the presence of survivors on the _____or easily accessible void spaces. Hasty search accomplishes the following:

- Rapid detection of victims
- Scene assessment (information gathered as a result aids in size-up of the rescue problem)
- Sets priorities

_____

_____

_____

_____

5.2 Extensive (Grid) Search (Secondary)

This type of search is conducted in a methodical manner to pinpoint the exact location of victims. It is designed to cover the _____ carefully and in detail. An extensive or grid search accomplishes the following:

- A thorough, systematic search
- Redundant checks
- Allows for use of alternate search resources

_____

_____

_____

_____

This process may need to be repeated as new information is received and/or as the condition of the structure changes.

Notes

6

Search Methods

6.1. Physical Search

Physical search operations do not require _____ or unique, expensive equipment. They only require the _____ and some established procedures.

Figure 6 ▸ Physical search over a rubble pile

_____

_____

_____

This search tactic is the first, and sometimes the only, search method used by local emergency service agencies that do not possess technical or canine search resources.

Local first responders must rely on fundamental search techniques. A readily accessible and willing group of volunteers can be quickly trained and supervised to safely conduct physical search operations after a disaster. Basic physical search is usually performed immediately after an incident, and may be done by locals.

Search Methods (Cont.)

Figure 7 ▸ Physical search over a pancake collapse

Physical/Void Search

Figure 8 ▸ Void search

A search team may need to modify and adapt modes to fit their specific needs.

Notes

Notes

6.2 Canine Search

Uses the _____ of dogs specially trained to detect live humans.

Figure 9 ▸
Initiating a canine search

Certified canine teams with highly specialized dogs provide the best way to locate trapped victims in a large area in the shortest amount of time. They are able to access areas too small or too unstable for humans to enter. Canines can be used for hasty and extensive operations.

A thorough site search with two well-qualified search dogs has a high probability of conclusive results. The disaster trained search canine is trained to detect those victims that are still alive. Rescuers should coordinate their activities with that of the canine team during their search operation.

6.3 Technical Search

Requires highly trained personnel and _____ for sound and temperature detection, video, vibration, etc. Can be carried out using specially manufactured or locally improvised equipment.

6 Search Methods (Cont.)

The latest state-of-the-art electronic search equipment has added a new dimension to the search function by extending its range. Whenever possible, dogs and electronic devices should be utilised together. Technical search equipment can be classified into two groups:

- Visual search instruments
- Electronic listening devices

7 Hailing Search Method Procedure

The search team leader signals for silence and all work to stop around the area. Four team members form a _____ pattern, spaced at intervals of approximately 8-16 metres, in safe locations as close as possible around the search area.

Going 'around the clock,' each searcher calls out loudly or with a megaphone, ***"If you can hear me call out for help or knock five times on something."*** Instead of hailing, searchers may also knock something solid (usually metallic) that is a contiguous part of the site debris in order to elicit a response.

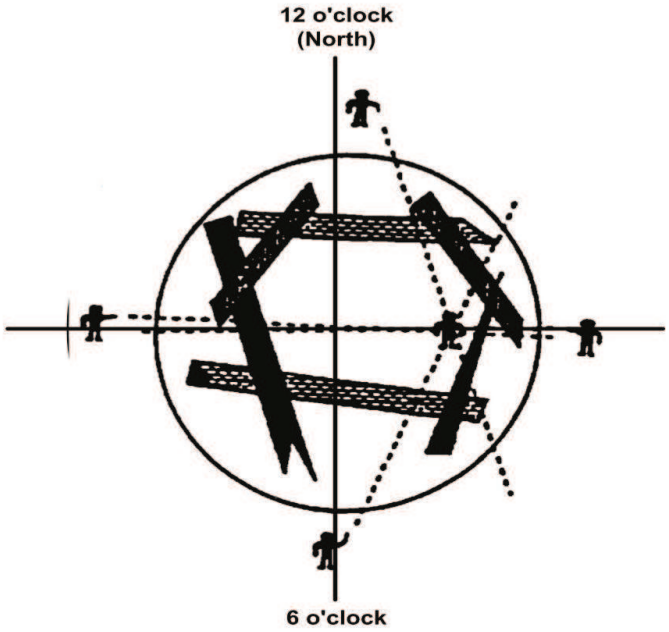


Figure 10 ▸ Setup for the hailing method

All searchers then listen and point in the direction of any potential response to the instructions. If more than one searcher hears the sound, the direction in which they point will triangulate on the source of the sound of the victim. This must be noted on the site sketch or on personal notes, where each rescuer makes a rough sketch of the area and the direction of the source of sound. Use a coordinate grid system and/or the clock system (using North as 12 o'clock).

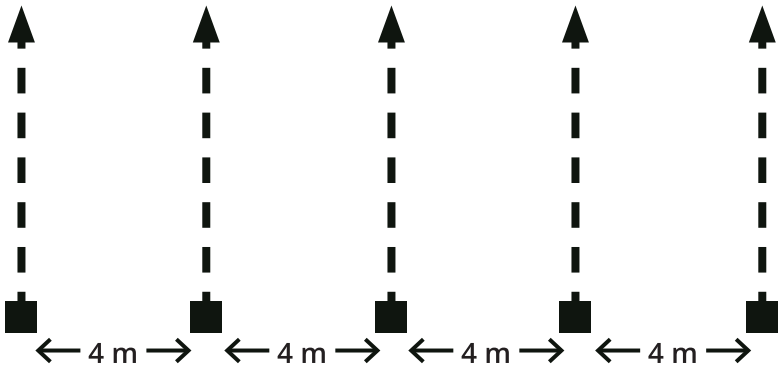
Notes

The collapse pattern, building materials and a multitude of other variables can cause voices to be heard clearer than knocking, and other times vice versa. Use both methods for greater efficiency.

7 Hailing Search Method Procedure (Cont.)

A variation of the hailing method is to set up several searchers in a straight line across the site, or in grid patterns, as when performing the physical/void search. In this scenario, rescuers are also aligned next to, but off, the rubble pile to detect sound the others on the pile may not hear. The rescuers will hail in the order given, listen and then advance as safety permits. This ensures the entire structure is covered in an extensive grid-pattern search.

Figure 11 ▸
Hailing method using a line search



Notes

8 Physical Search Patterns for Interior Spaces

Occasionally you will encounter structures that have not totally collapsed and contain large, open areas or a building with many intact rooms, in which live victims, unable to remove themselves or communicate, will be found. An organized approach will yield the best opportunity to locate a victim, and to declare the area searched.

Physical Search Patterns for Interior Spaces (Cont.)

8.1 Multiple Rooms

The basic instruction for searching multiple rooms is **"go right, stay right."**

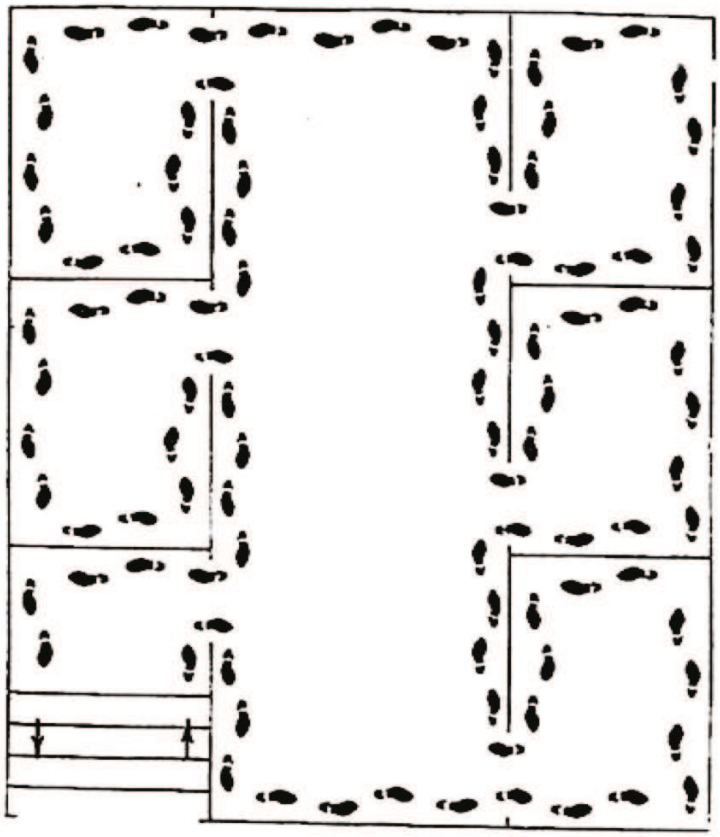


Figure 12 ▸ "Go right, stay right" method for multiple room search

8.1.1 After entering the structure, turn to the right, stay in contact with the right wall, either visually or physically, until the entire accessible area has been searched and the team returns to the starting point.

8.1.2 If the search team needs to exit and cannot remember the direction they entered, simply turn around and stay in contact with the same wall, either physically or visually, keeping it on your left.

Notes

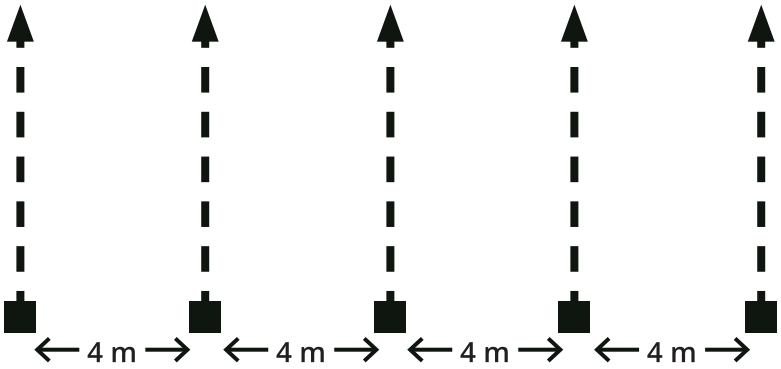
8.2 Large Open Areas (Line Search)

Use the line search method in auditoriums, cafeterias, and offices with multiple partitions.

8.2.1 Spread search team members in a straight line across the open area, _____ metres apart.

8.2.2 Slowly walk through the entire open area to the other side.

Figure 13 ▸ Line search method



_____

_____

_____

8.2.3 Team members on the ends of the line search perimeter rooms using the go right-stay right method.

8.2.4 The procedure may be repeated in the opposite direction.

Notes

9

Victim Management

The following concepts and procedures should be applied the moment the search is initiated until the last victim is found.

Notes

9.1 Precautions during a search

- Never make inappropriate comments the victim should not hear. Keep your comments on a positive note. Always assume someone is _____to you.
- The victim is in the worst possible position and fighting to stay alive, and you can enhance their _____ by being positive about the possibility of finding and extricating them.
- You may be the first person the victim is able to communicate with; therefore it is important to project a sense of confidence and hope.

9.2 Steps for initial contact with a located victim

9.2.1 Identify and overcome language barriers.

9.2.2 Identify yourself as a rescuer, projecting confidence and calm in your voice and choice of words.

9.2.3 Obtain the following information:

- Name
- Adult or child (approximate age)
- Type and _____of_____
- Hydration status
- Warmth
- Degree of _____

9 Victim Management (Cont.)

9.2.4 Provide emergency medical treatment as quickly as possible.

9.2.5 Ask about other potential **victims** and their condition.

9.2.6 Inform the victim of rescue operations.

9.2.7 Inform the victim if you have to leave for short periods.

9.2.8 Provide protection from the environment as much as possible.

9.2.9 Consider direct or indirect intervention of a **relative** or **friend**, etc.

10 Improvised Search Equipment

10.1 Acoustic detection (use to amplify sound through a crack or opening in a building)

- Stethoscope
- Recorder with microphone mounted on a pole

10.2 Visual detection

- Telescopic mirror with illumination
- Common video camera

10.3 Sound transmission

- Loudspeaker mounted on an extension, with microphone
- Portable radios

10.4 Other

Notes

Refer to forms discussed in RM 6-14

COLLAPSED STRUCTURE SEARCH
DATA FORM

Date	CSSR Team Identification
Time	Name or Description of Structure
Date of Collapse	Approximate Occupancy at Time of Collapse
Time of Collapse AM / PM	Location of Structure GPS COORDINATES:

Occupancy Type at Time of Collapse

☐ RESIDENTIAL ☐ COMMERCIAL ☐ INDUSTRIAL

☐ OTHER/DESCRIBE:

Structural Type

☐ LIGHT FRAME ☐ PRE-FAB/TILT-UP CONCRETE

☐ HEAVY WALL ☐ HEAVY FLOOR

FLOORS _____ # OF COLUMNS _____ Blueprint or Photo Available? _____

Structural Engineer Assessment

Name: _____

Identification: _____

Condition Of Structure: _____

Cut off services: ☐ WATER ☐ ELECTRICITY ☐ GAS

Rescue information (see rescue victim identification form)

Rescued: _____ # Live Remaining: _____

Bodies Remaining: _____ # Bodies Recovered: _____

Previous Rescue Team Efforts

Team Name / ID	Leader's Name	Contact Information

STRUCTURE INFORMATION FORM

(Attach this form to the Site Sketch Form)

Potential Dangers Present

Confirmed Dangers

Personnel Available for Searching

Equipment Available

Relatives, Neighbours, Witnesses, Residents or Building Personnel with Possible Information on Trapped Victims

FULL NAME	ASSOCIATION TO STRUCTURE	LOCATION	INFORMATION SUPPLIED

VICTIM IDENTIFICATION FORM

RESCUED VICTIMS

FULL NAME OF VICTIM OR OTHER IDENTIFYING INFORMATION	DATE	TIME	PLACE	RESCUER'S IDENTITY

RECOVERED BODIES

FULL NAME OF VICTIM OR OTHER IDENTIFYING INFORMATION	DATE	TIME	PLACE	RESCUER'S IDENTITY

POST-TEST | LESSON 6

Search and Location Techniques

ID #

1. Complete the following definition for searching and locating:

A set of techniques and procedures whose purpose is to obtain a _____ or indication of the presence of_____ victims in a _____ space within the collapsed structure.

2. Describe the different functions of the members of a CSSR squad:

Searchers: _____

_____

_____

Safety: _____

_____

_____

Leader: _____

_____

_____

3. From the following list of basic search and rescue equipment, identify those needed for structure marking:

_____ Binoculars
_____ Flags
_____ Flashlight
_____ Periscope
_____ Spray paint
_____ Cones
_____ Hammer
_____ Gloves

4. Number the following steps in proper order for a search and location operation:

___ Conduct an appropriate search pattern and place INSARAG markings where potential victims are detected, both on the structure and on the diagram.

___ Compile and analyse available information.

___ Initial pre-hospital treatment of the victim.

___ Rescue victims with easy access on or near the surface, if this has not already been done.

___ Continually analyse the results and re-evaluate the search plan (make necessary adjustments).

___ Select a search method.

___ Confirm the presence and location of potential victims with the resources and equipment available.

___ Secure the scene.

___ Create a diagram of the structure.

___ Inspect and evaluate the structure.

___ Make INSARAG markings on the structure as needed, if not already done.

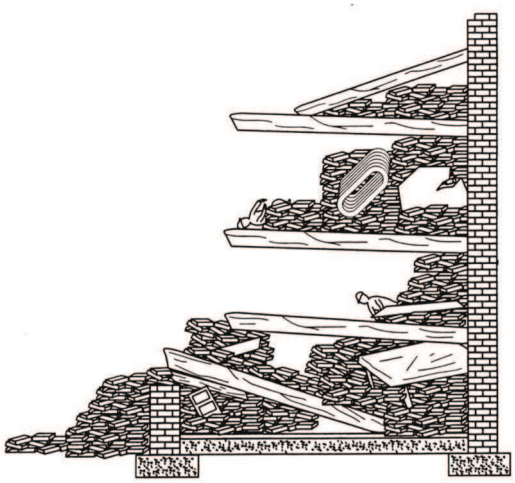
___ Select the area to be searched.

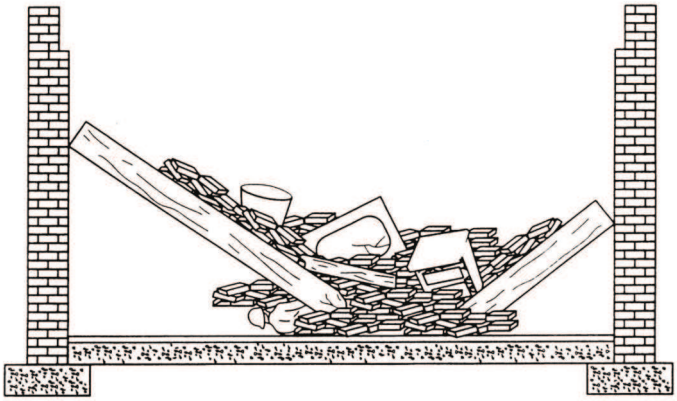
5. Define void space.

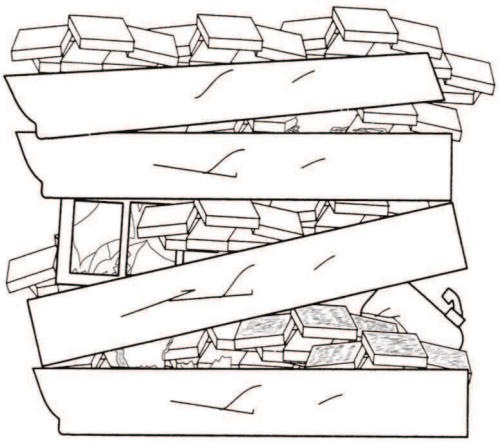
6. List and describe the characteristics of the two search modalities:

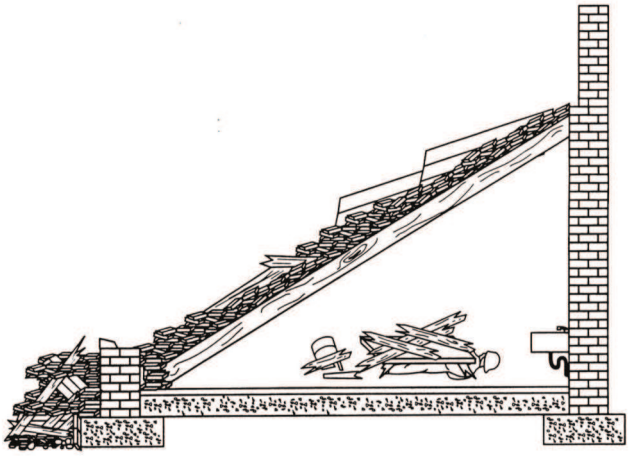
Hasty Search	Extensive/Grid Search

7. Identify the void spaces in the following four drawings, using arrows to indicate their locations:









CSSR LESSON 6 EVALUATION

Course Location: _____ **Dates:** _____

Do not write your name on this form. Please complete a copy of this form at the end of every lesson. Your evaluations are very valuable towards improving the course. Please use the ratings below.

1 VERY POOR	2 POOR	3 AVERAGE	4 GOOD	5 EXCELLENT

Please fill in the required information.	**Lesson Number :**	**Lesson Name :**	
	Instructor's Name		
Use a scale from 1 to 5 as described above to rate the various lesson components.	**Lesson Rating (rate 1 to 5)**		
	Content	Instructor	Method
	Workbook	Interaction	
Mark your selection with an "**X**"	**Instruction Level**		
	☐ Too basic	☐ Appropriate	☐ Too advanced
	Duration		
	☐ Too short	☐ Appropriate	☐ Too long
	Usefulness Was this lesson useful to you?		
		☐ Yes	☐ No
Rate from 1 to 5	**Overall Lesson Rating** Taking all the above into consideration, I rate this lesson: _____		
If you need additional space, please use the back of the sheet.	**Comments and Observations**		

Thank you for your help. Your input is valuable.
Please turn in this completed form to the instructor.

EXERCISE EVALUATION
LESSON 6

Course Location: _____ **Dates:** _____

Do not write your name on this form. Please complete a copy of this form at the end of every lesson. Your evaluations are very valuable towards improving the course. Please use the ratings below.

1 VERY POOR	2 POOR	3 AVERAGE	4 GOOD	5 EXCELLENT

Lesson 6 **Search and Location Techniques**	**Station 1**	**Station Name: Cross Pattern Search**
	Instructor:	
Use a scale from 1 to 5 as described above to rate the various lesson components.	**Station Rating (rate 1 to 5)** Instructor ____ Materials ____ Method ____ Location ____	
Mark your selection with an "**X**"	**Instruction Level** ☐ Too basic ☐ Appropriate ☐ Too advanced	
	Duration ☐ Too short ☐ Appropriate ☐ Too long	
	Comments and Observations	
	Station 2	**Station Name: Line Search**
	Instructor:	
Use a scale from 1 to 5 as described above to rate the various lesson components.	**Station Rating (rate 1 to 5)** Instructor ____ Materials ____ Method ____ Location ____	
Mark your selection with an "**X**"	**Instruction Level** ☐ Too basic ☐ Appropriate ☐ Too advanced	
	Duration ☐ Too short ☐ Appropriate ☐ Too long	
	Comments and Observations	

Thank you for your help. Your input is valuable.
Please turn in this completed form to the instructor.