


**Lamorinda**  
Community Emergency Response Team



Light Search & Rescue

Released: 20 April 2026      **Lamorinda CERT**

0

**Community Emergency Response Team**


- 👤 Personal safety is ALWAYS the number one priority
- 👤 Show up prepared
  - Wear appropriate clothing and footwear, have WATER
  - Wear PPE – your personal protective equipment ...gloves, helmet, goggles, mask, boots, etc.
  - Have at least one communications device: cell, radio, etc.
- 👤 Work as a team
- 👤 Size-up - maintain situational awareness
- 👤 The CERT goal is to do the  
**Greatest Good for the Greatest Number**
- 👤 *Hope for the best but plan for the worst!*

Visual SAR.1      **Lamorinda CERT**      74

1

## Unit Objectives

- 🧑‍🚒 Identify size-up requirements for potential search and rescue situations
- 🧑‍🚒 Describe the most common techniques for searching a structure
- 🧑‍🚒 Use safe techniques for debris removal and victim extrication using a lever and cribbing



Visual SAR.2
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2

## Earthquake Possibilities

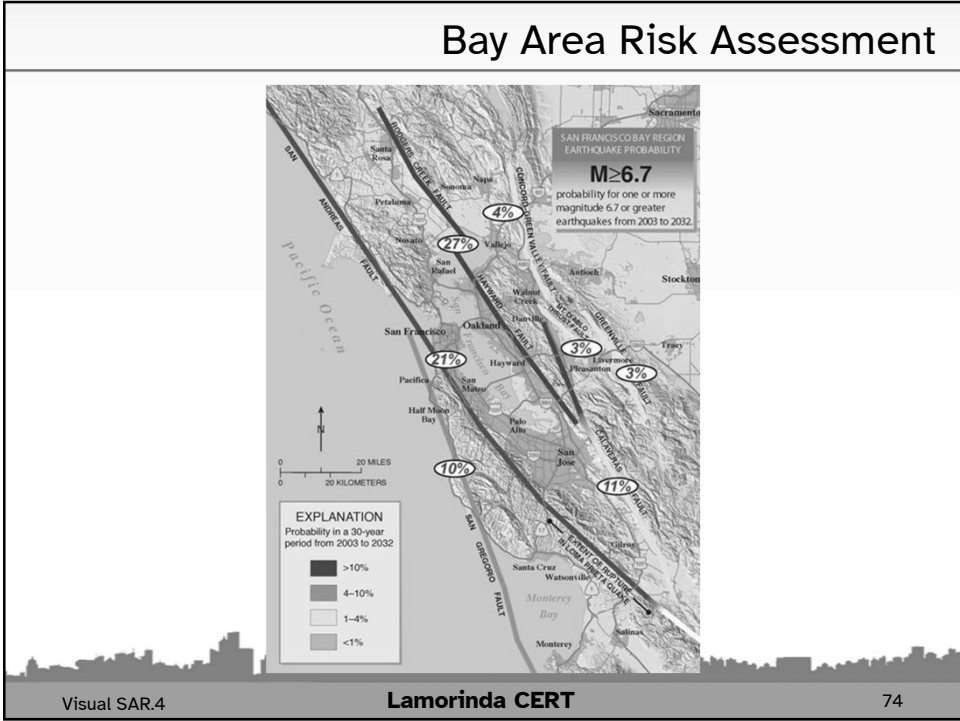
🧑‍🚒 The USGS has estimated a 72 percent chance of a magnitude 6.7 or larger earthquake in the Bay Area by 2043

San Francisco region					
Magnitude (greater than or equal to)	Average repeat time (years)		30-year likelihood of one or more events		Readiness
5	1.3	(0.7)	100%	(1.0)	1.0
6	8.9	(1.0)	98%	(1.0)	1.0
6.7	29	(1.1)	72%	(1.1)	1.1
7	48	(0.9)	51%	(1.3)	1.1
7.5	124	(0.7)	20%	(1.6)	0.9
8	825	(0.7)	4%	(1.9)	1.0

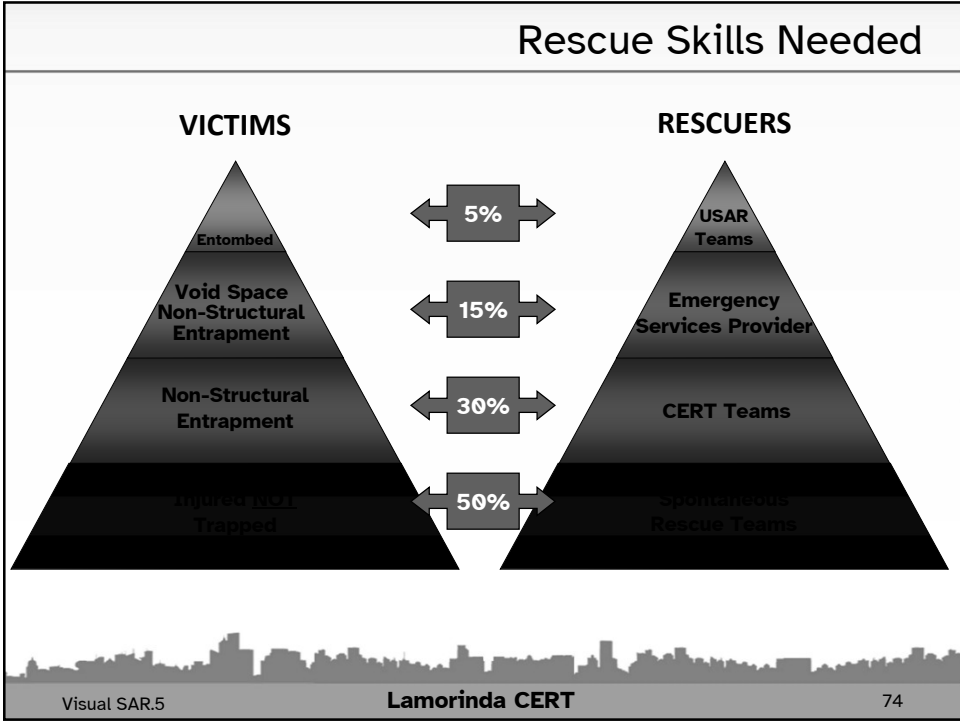
<https://pubs.usgs.gov/fs/2015/3009/pdf/fs2015-3009.pdf>

Visual SAR.3
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3




4




5

## The Golden Day

 **Entrapped Victim Survival Rate**

<i>*ime Until Rescue</i>	<i>Survival Rate</i>
<b>30 Minutes</b>	<b>99.3%</b>
<b>1 Day</b>	<b>81.0%</b>
<b>2 Days</b>	<b>36.7%</b>
<b>3 Days</b>	<b>33.7%</b>
<b>4 Days</b>	<b>19.0%</b>
<b>5 Days</b>	<b>7.4%</b>




*Buck Helm's Car  
Cypress Structure  
Loma Prieta Earthquake  
Photo Courtesy of Ben Ho*

Visual SAR.6
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6

## The Rule of 3's

 **You can survive:**

- **3 minutes** without AIR
- **3 hours** without SHELTER from extreme weather
- **3 days** without WATER
- **3 weeks** without FOOD

Visual SAR.7
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7

## Goals of Light Search and Rescue

- 🛑 Keep rescuers safe
- 🛑 Rescue the greatest number in the shortest amount of time
- 🛑 Get “walking wounded” out first
- 🛑 Rescue lightly trapped victims next



Visual SAR.8

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8

## Light Search and Rescue Operations

- 🛑 **Size-up**
  - Evaluate everything that is going on
- 🛑 **Search**
  - Locate victims
  - Document location
- 🛑 **Rescue**
  - Involve procedures and methods to extricate victims

Visual SAR.9

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9

## Search and Rescue Safety

- 📢 Always have a whistle!
- 📢 The following “Emergency Alerting System” is to be used in the event of problems at the site:
  - Evacuate – 3 short blasts (1 second each) 3 times
    - Out – Out – Out (*short – short – short*)
    - Drop everything and get out now!
  - Cease Operations – 1 long blast (3 seconds duration)
    - Quiet (*long*)
    - Stop what you’re doing and wait for instructions
  - Resume Operations – 1 long and 1 short blast
    - Oooh – Kay (*long – short*)

This is the FEMA US&R Standard




Visual SAR.10 **Lamorinda CERT** 74

10

## Search and Rescue Safety

- 📢 Earthquake aftershocks
  - Severe after shocks following a major earthquake are common and can create additional injuries and fatalities
  - Unstable structures including bridges, overpasses, high rises, homes and water towers may suffer further collapse as a result of after shocks
  - First responders must be constantly aware that they may be affected by such events and take necessary precautions while conducting their operations.
  - Many injuries and deaths of first responders could be prevented if more precautions against additional shock waves were taken




Visual SAR.11 **Lamorinda CERT** 74

11

## Search and Rescue Safety

- 👤 With the constant threat of terrorist attacks, it is essential that response teams pay special attention to a very new and potentially deadly threat
- 👤 Everyone has to heighten their awareness of their surroundings
- 👤 Secondary explosions are becoming common techniques used to cause serious injury and possibly mass death for response teams
- 👤 There are no second chances when explosions are used for this purpose
- 👤 After an explosion it is safe to assume that a secondary device is involved, unless proven otherwise



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12

## Before You Start





**STOP**  
**Stop**  
**Think**  
**Organize**  
**Plan**




Visual SAR.13 Lamorinda CERT 74

13

## Effective Search and Rescue

-  Effective Size-up
-  Rescuer safety
-  Work in teams
-  Victim safety




Visual SAR.14
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14

## CERT Search and Rescue Size-up

- 1. Gather Facts**
- 2. Assess Damage and Communicate**
- 3. Consider Probabilities**
- 4. Assess Your Situation**
5. Establish Priorities
6. Make Decisions
7. Develop Plan of Action
8. Take Action
9. Evaluate Progress



**REMEMBER:  
ALL CERT  
SIZE-UP IS A  
CONTINUAL  
PROCESS**

Visual SAR.15
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15

## Size-up Step 1: Gather Facts

### Consider:

- Time of event and day of week
- Type of structure and construction type
- Weather
- Hazards
- Occupancy

### Gather facts accurately!






Visual SAR.16

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16

## Size-up Step 2: Assess Damage

-  360° (overview and assessment)
-  Identify entry and egress routes
-  Identify hazards
-  Is it safe to enter?
-  Potential for occupants
  - Interview neighbors
  - Voice 'call out'



Seattle, WA, March 10, 2001 -- Chimney bricks crumbled during the earthquake.

Photo by John Shea/FEMA News Photo

Visual SAR.17


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17

## Assess Damage

- CERT mission changes if:**
  - Damage is light
  - Damage is moderate
  - Damage is heavy
- Consider structure type and age**




**Never enter a structure with heavy damage!**

Visual SAR.18
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18

## Assess Damage

Light Damage




<p><b>Light:</b> Superficial or cosmetic damage, broken windows, fallen plaster; primary damage to contents of structure</p>	<p>Locate, triage, and prioritize removal of victims to designated treatment areas by the medical operation teams</p>
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Visual SAR.19
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19

## Assess Damage

Moderate Damage



**Moderate:**  
Questionable structural stability; fractures, tilting, foundation movement or displacement

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Locate, stabilize, and immediately evacuate victims to a safe area while minimizing the number of rescuers inside the building

Visual SAR.20
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20

## Assess Damage

Heavy Damage




**Heavy:** Obvious structural instability; partial or total wall collapse, ceiling failures

Secure the building perimeter and control access into the structure by untrained but well-intentioned volunteers

Visual SAR.21
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21

### Assess Damage

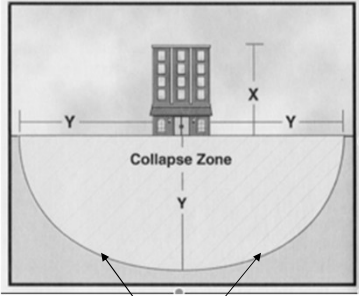


Loma Prieta earthquake damage in San Francisco. The soft first story is due to construction of garages in the first story and resultant reduction in shear strength. Photo from: <http://earthquake.usgs.gov/bytopic/photos.html>

Visual SAR.22 **Lamorinda CERT** 74

22

### Collapse Zone: Stay Out of this Area



Danger tape goes here

- The Collapse Zone is 1.5 times the height of the building (X) in all directions (Y)
  - Example: 40' tall building, collapse zone is 60' out from building
- The additional one-half is to protect you from falling debris that may be projected out during the collapse. Remember: Bricks can weigh 4 to 6 lbs.

Visual SAR.23 **Lamorinda CERT** 74

23

### Light Frame House Collapse

House is supported on cripple walls      Earthquake moves the foundation      House shakes hard, cripple walls give way      House falls, multiple failures occur

Visual SAR.24      **Lamorinda CERT**      74





24


### Light Frame House Collapse

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25

### Above Ground Hazards










-  Fallen fixtures
-  Loose ceiling structure
-  Glass
-  Unsecured furniture




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26

### Ground Level Hazards

-  Unstable buildings
-  Falling debris
-  Energized wires
-  Loose footing
-  Hazmat
-  Emotionally unstable survivors
-  Fire
-  Glass
-  Animals



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27

**Natural Gas: Locate the Shutoff**

Visual SAR.28      **Lamorinda CERT**      74


28

**Water: Locate the Shutoff**

Visual SAR.29      **Lamorinda CERT**      74

29

### Below Ground Hazards




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30

### Size-up Step 3: Consider Probabilities

Consider what probably will happen and what could happen:

- 🧑‍🚒 How stable is the situation?
- 🧑‍🚒 What else could go wrong?
- 🧑‍🚒 What does it all mean for the Search and Rescue?




Visual SAR.31 Lamorinda CERT 74

31

### Size-up Step 4: Assess Your Situation

**Assess:**


- 👤 Whether the situation is safe enough to continue
- 👤 The risks that rescuers will face if they continue
- 👤 What resources you will need to conduct the operation safely
- 👤 What resources are available
  - Personnel
  - Equipment
  - Tools



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32


### Know Your Limitations



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33

### Take A Break



Yoni Brook/for The Washington Post


BE BACK IN 10 MINUTES

Visual SAR.34 Lamorinda CERT 74

34

### CERT Search and Rescue Size-up

1. Gather Facts
2. Assess Damage and Communicate
3. Consider Probabilities
4. Assess Your Situation
- 5. Establish Priorities**
- 6. Make Decisions**
- 7. Develop Plan of Action**
- 8. Take Action**
- 9. Evaluate Progress**



REMEMBER:  
ALL CERT  
SIZE-UP IS A  
CONTINUAL  
PROCESS

Visual SAR.35 Lamorinda CERT 74

35

## Size-up Step 5: Establish Priorities

- 🧑‍🚒 What should be done?
- 🧑‍🚒 In what order?
- 🧑‍🚒 How to safely rescue the greatest number in the shortest amount of time?

Visual SAR.36

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36

## Size-up Step 6: Make Decisions

Keep in mind:

- 🧑‍🚒 Safety of CERT members
- 🧑‍🚒 Life safety of victims and others
- 🧑‍🚒 Protection of the environment
- 🧑‍🚒 Protection of property

Visual SAR.37

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37

### Size-up Step 7: Develop Plan of Action


- 🧑‍🚒 Focus operation on established priorities and decisions
- 🧑‍🚒 Provide for documentation to give to responding agencies or the EOC
- 🧑‍🚒 Provide for documentation to become part of CERT records

Visual SAR.38
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38

### Safety Considerations

- 🧑‍🚒 Make rescuer safety your primary concern
- 🧑‍🚒 Use a buddy system
- 🧑‍🚒 Be alert for hazards
- 🧑‍🚒 Use safety equipment
- 🧑‍🚒 Rotate teams




**Teamwork = Success**

Visual SAR.39
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39

## Search Methodology



An effective search methodology:

- 🧑‍🚒 Is systematic and thorough
- 🧑‍🚒 Avoids unnecessary duplication of effort
- 🧑‍🚒 Provides for documentation of search results

Visual SAR.40 **Lamorinda CERT** 74

40

## Search Methods

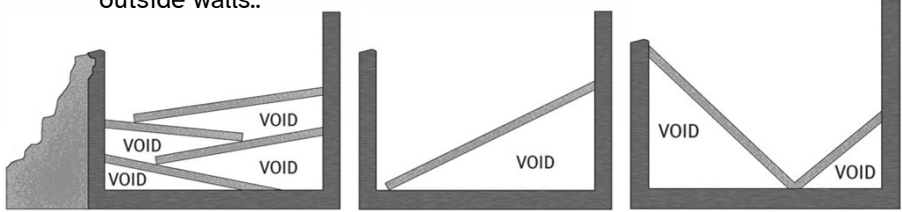
- 🧑‍🚒 Call out to victims
- 🧑‍🚒 Stop frequently to listen
  - Victims may not be able to call out or make much noise
  - Be very quiet after calling so you can hear a response
- 🧑‍🚒 Use systematic search pattern
- 🧑‍🚒 Mark searched areas to document what you found
- 🧑‍🚒 Report what you found

Visual SAR.41 **Lamorinda CERT** 74

41

### Search Operations

- 👤 **Pancake Voids:** Pancake voids (most common in pre-1933 buildings) are small voids throughout a structure that are created by weakening or destruction of load-bearing walls and the resulting collapse of floors onto each other.
- 👤 **Lean-To Voids:** Lean-to voids are created when a collapsed wall or floor is resting against an outside wall, creating a pocket of space.
- 👤 **“V” Voids:** These voids are created by a “V” collapse of a floor or wall: the middle collapses and the ends lean against the outside walls..




Visual SAR.42
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42

### Search Operations

- 👤 **Individual Voids:** Individual voids are spaces large enough for an individual, frequently a child, to crawl into for cover.




Visual SAR.43
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43

### Search Operations

👤 Be thorough in your search!




Visual SAR.44 **Lamorinda CERT** 74

44

### Decision to Attempt Rescue

- 👤 Enough rescuers to form teams of 2 or 3?
  - One team in, one team out for safety
- 👤 Risk to the rescuers?
- 👤 Greatest good for the greatest number



Visual SAR.45 **Lamorinda CERT** 74

45

## Size-up Step 8: Take Action

### Start the Search:

- 👤 Identify alternate exits
- 👤 Stay together & along the walls
- 👤 Start search from top down
- 👤 Right or left handed pattern
- 👤 Continue to call out and listen
- 👤 Move slowly, testing the floor
- 👤 Mark each individual unit
- 👤 Complete "X" after leaving

Visual SAR.46

Lamorinda CERT

74

46

## While Searching

- 👤 Always know the closest way out
- 👤 Knock, shout and listen
  - Call out to victims
  - "If anyone can hear my voice, come here or call out"
  - Ask any found victims for information about the building and others who might be trapped
- 👤 Search under and around debris
- 👤 Check elevators
- 👤 Victims might be in shock or confused

Always be alert for aftershocks,  
fires and the smell of gas

Visual SAR.47

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47

### Conducting Search Operations

#### Be Systematic

Visual SAR.48 Lamorinda CERT 74

48

### Conducting Search Operations

#### Be Systematic

Visual SAR.49 Lamorinda CERT 74

49

### Conducting Search Operations

Triangulate

The diagram illustrates the triangulation technique. A central square represents the search area. Three flashlights are positioned around it, each with its beam directed towards the center. Lines connect the flashlights to the word 'Triangulate' above them. The entire diagram is set against a background of a city skyline silhouette.

Visual SAR.50
Lamorinda CERT
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50

### Search Marking System

- 🧑‍🚒 Indicates rescuer location
- 🧑‍🚒 Prevents duplication of effort
- 🧑‍🚒 Search Marking is a **Perishable Skill** and must be practiced regularly

**SEARCH MARKINGS**

<p>WHEN YOU ENTER</p> <p>SINGLE SLASH STRUCTURE OR ROOM</p>	<p>WHEN YOU EXIT</p> <p>SECOND SLASH STRUCTURE OR ROOM (Identify Victims &amp; Hazards)</p>
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Visual SAR.51
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51

### Search Marking System

## MAIN ENTRANCE SEARCH MARKING

SEARCH TEAM NAME AND DATE / TIME ENTERED STRUCTURE

**CERT-A**  
**4-15-09**  
**14:30**

USE TRIAGE COLORS  
B = BLACK, DEAD  
R = RED, IMMEDIATE  
Y = YELLOW, DELAYED  
G = GREEN, MINOR

**4-15-09**  
**14:45**

**2 - B**  
**1 - R**  
**2 - Y**  
**1 - DOG Y**  
**1 - CAT G**

DATE AND TIME SEARCH TEAM LEFT STRUCTURE

HAZARDS

★✦○✱✱✱▲  
★□✦✱▼□  
○✱✱✱

TOTAL VICTIMS STILL INSIDE STRUCTURE

X or 0 = NO VICTIMS

Do not place on door, or where door swings to cover!

Visual SAR.52
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52

### Marking Placard

- 📍 Placards are printed on fluorescent orange label paper
- 📍 Use a bold black felt tip pen, if available

**FEMA US&R Directive 2013-014** (which superseded all earlier marking guidelines).

Visual SAR.53
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53

### Premature Exit Marking

5-5-02  
1430 hrs

5-5-02  
CATF-4  
1230 hrs  
1-Victim  
REMOVED

HM-Chems

3 & 4 SEARCHED

- ☝ Filled in when all activities cease prematurely **WITHOUT** completing the search
- ☝ Remainder of the information is documented:
  - ☝ Solid circle
  - ☝ Time team left the building
  - ☝ Hazards found, i.e., HM-Chems
  - ☝ Victim information
- ☝ Notes in BOX

Visual SAR.54
Lamorinda CERT
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54

### No Entry Marking

5-5-02  
CATF-4  
1230 hrs

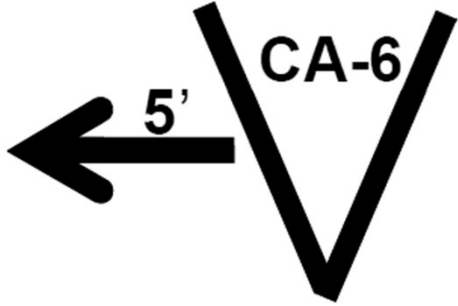
NO ENTRY

- ☝ Filled in when all activities cease prematurely **WITHOUT** entering the building:  
**NO ENTRY** or **NE**
- ☝ No Exit line, fill circle

Visual SAR.55
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55

### Search Victim Marking System




Make a large "V" (2' x 2') with marker or Orange Paint near the known or potential victim. Add team ID and arrow with distance to the victim.

Visual SAR.56 Lamorinda CERT 74

56

### Search Victim Marking System




Make a circle around the "V" when a potential victim has been **confirmed to be alive**. If more than one confirmed live victim, mark total number under the "V".

Visual SAR.57 Lamorinda CERT 74

57

Search Victim Marking System




Make a horizontal line through the “V” when a potential victim has been **confirmed to be dead**.  
If a combination of live and deceased victims are found, make two “V”s.

Visual SAR.58      Lamorinda CERT      74

58

Search Victim Marking System






When all victims have been removed, make an “X” over the symbol.

Visual SAR.59      Lamorinda CERT      74

59

## Building Marking System

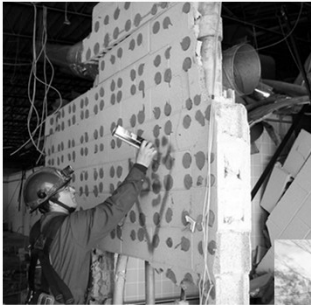

	<p><u>Low Risk</u> for US&amp;R Operations, with low probability of further collapse. Victims could be trapped by contents, or building could be completely pancaked or soft 1<sup>st</sup> story</p>
	<p><u>Moderate Risk</u> for US&amp;R Ops, and structure is significantly damaged. May need shoring, bracing, removal, and/or monitoring of hazards. The structure may be partly collapsed.</p>
	<p><u>High Risk</u> for US&amp;R Ops, and may be subject to sudden collapse. Remote search operations may proceed at significant risk. If rescue operations are undertaken, significant and time-consuming mitigation should be done.</p>


Buildings are marked by Structural Engineers only!

Visual SAR.60
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60

## Search Marking Examples







Visual SAR.61
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61

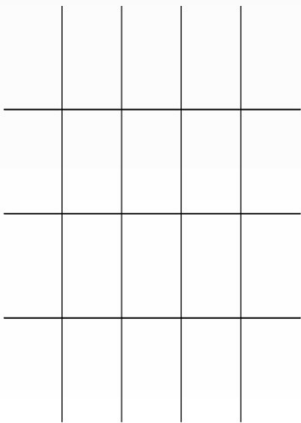
### Building Marking Example



Visual SAR.62 **Lamorinda CERT** 74

62

### Exterior Search



- 👤 Set up a grid search
- 👤 Set distance between searchers according to visibility and debris
- 👤 Overlap patterns for full coverage
- 👤 Search in as straight a line as possible
- 👤 Mark areas that have been searched

Visual SAR.63 **Lamorinda CERT** 74

63

## Conducting Rescue Operations



Visual SAR.64

Lamorinda CERT

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64

## Conducting Rescue Operations

- 🧑‍🚒 Maintain rescuer safety
- 🧑‍🚒 Create a safe rescue environment
  - Move debris and objects out of the way
  - Use tools, not your back, to move objects
- 🧑‍🚒 Triage and stabilize victims in lightly and moderately damaged structures
- 🧑‍🚒 Evacuate victims quickly but safely


Visual SAR.65


Lamorinda CERT





74

65

### Proper Lifting Method










-  Back straight
-  Knees bent
-  Keep load close to body
-  Push up with legs

Visual SAR.66
Lamorinda CERT
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66

### Extrication Method

Depends upon:

-  General stability of immediate environment
-  Number of rescuers available
-  Tools and equipment available
-  Strength and ability of rescuers
-  Condition of victim

Visual SAR.67
Lamorinda CERT
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67

## Removing Victims

Types of victim removal include:

- 🧑 Self-removal or assist
- 🧑 Lifts and drags

**Allow victims to extricate themselves when possible**





Visual SAR.68 Lamorinda CERT 74

68

## Single Rescuer Carries

🧑 If safety and time permit, you should **not** use carries and drags to remove victims when closed-head or spinal injury is suspected

☆ □ ▼  
◇ □ □ ❄

★ ■ ❄ ☆ ❄ □ ▲ □ ■ ☆ ❄ ❄ ❄ ❄ ▼ □ ❄ □ ❄ ❄ ❄ ❄
★ ■ ❄ ☆ ❄ □ ▲ □ ■ ☆ ❄ □ ❄ ❄ ❄ ❄ ❄


Visual SAR.69 Lamorinda CERT 74

69



### Transporting Victims

Bad  
Twisted





Good


Watch your backs!

Visual SAR.72Lamorinda CERT74

72

### Size-up Step 9: Evaluate Progress

-  Most critical step
-  Monitor plan's effectiveness and safety




**REMEMBER:  
ALL CERT  
SIZE-UP IS A  
CONTINUAL  
PROCESS**

Visual SAR.73Lamorinda CERT74

73

**Unit Summary**

- 🧑‍🚒 CERT size-up for potential search and rescue situations
- 🧑‍🚒 Search techniques
- 🧑‍🚒 Lifts and drags



Visual SAR.74 **Lamorinda CERT** 74