



# LARGE AREA SEARCHES

## Agenda

- Overview of Large Area (Team) Search
- Demonstration of there operation
- Knot tying and search practice
- Search evolutions

## Course Objectives

- The member will understand and be able to use search rope to complete an organized search of open or complex layouts
- The member will be able to act in a team leader, searcher, or control person role

## Large Area (Team) Search

Is the practice of using rope to assure large or complex areas are thoroughly searched.

It is a system that allows for minimal duplication, while allowing for a quick path to the exit when needed.

It reduces disorientation, assists in air management, and potentially speeds up Rapid Intervention efforts.

## When is it used?

- Used when the search operation is beyond the scope of standard search techniques

- Large spaces

- Gyms
- Warehouses



- Complex layouts

- Office cubicles
- Stores



## When is it used?

Would this Incident require the use of a Large Area Search Techniques ?



## When is it used?

### COMPLEX FLOOR AREAS:

- Stores
- School
- Large Offices – open floor plans ( cubicles )
- Industrial Building

Should we know these building require such  
Search techniques – PRIOR TO AN INCIDENT ?

## When is it used?

ANY SITUATION –

Where an effective and/or safe search  
**CAN NOT** be accomplished

Due to:

Building Construction

Or

Heavy Smoke Conditions

( Ex: Basements – where Smoke just wont lift )



## WHY?

Disorientation is a real and often avoidable killer of members at the scene of fires:

### Examples:

- Boston, MA: June 24, 1994
- Worcester, MA: December 3, 1999
- Kansas City, MO: December 18, 1999
- Phoenix, AZ :March 14, 2001
- New York City: August 18, 2007



## Large Area Search Operations –

Are both **Labor & Equipment Intensive**

The Required Manpower & Equipment  
Must be Assembled  
BEFORE searches begin .

This Includes – Full PPE (Personal Protection Equipment)  
“ **Dressed for Success**”

## Our Personal Protective Equipment - Should Include:

- **SCBA** : As large as cylinder as possible – preferably 1 Hr  
( Note: the teams operation time is based off team member with smallest cylinder, so all members of the team SCBA Cylinder should be consistent )
- **PASS DEVICE:**
- **FLASH LIGHT** – ( Yes - EVERY MEMBER )
- **RADIO(S)** – EVERY Member - ( Leader - 2 if possible )  
These teams typically will use a Tactical Channel outside Fire operations and if the case, the Leader should have a 2<sup>nd</sup> radio so they can Monitoring **Both** – the Teams communications and Fire Operations/Conditions – ( Tactical decisions )

## SCBA Cylinder Times:

### RULE of 1/3

- 30 Minute Cylinder  
10 in, 10 out, 10 safety
- 45 Minute Cylinder  
15 in, 15 out, 15 safety
- 60 Minute Cylinder  
20 in, 20 out, 20 safety



## TEAM'S TOOLS - Should Include:

- **Forcible Entry Tools** ( as conditions Require )  
Minimum – Set of Irons: Flat Axe/Halligan
- **6' Steel Hook**
- **Door Chocks**
- **Guide Line** : Minimum 200'  
Sufficient Diameter – ½" recommended ( can be felt w/ Gloves )  
Snap Hook at each end ( Optional but Recommended )  
Carried in a Bag – with rope attached to the bag
- **Personal Rope**: 15' recommended - of smaller diameter  
( Distinction & Manageability )  
Snap hooks at both ends ( with eyelets )  
( maintain contact with the guide line )



## TEAM'S TOOLS - Should Also Include:

- **Marker Lights:**

1 at the entrance

1 at the rope bag



strobe – attention getting best – opposed to just  
standard hand light – different

- **Thermal Imaging Camera – TIC**

For accountability of team member,  
Monitoring area fire conditions  
and as navigational aid



# What about?



- Cables for guide rope
- Markings or pre-tied knots
- Other Gadgets and Gizmos



## TEAM'S TOOLS - Should Also consider:

- **Stoke Basket**

For transporting equipment to staging location  
For Victim Removal

- **Cable or Guide Rope**

Will not burn thru or melt – when conditions require  
Example: Pier & Catwalks  
Note: Much more difficult to work with

- **Charged Hose line Staged**

teams to advance in conditions require



## TEAM'S TOOLS - Should Also Include:

- **TIME KEEPING :**

Uninterrupted time keeping is essential

Watch at scene or Radio Communication – dispatch

Mark entry, Operation, and Exit Times

Again – time related to Cylinder size

All Logged on Tactical Work Sheet

- **BACK UP TEAM** - (RESCUE TEAM = NEXT Team scheduled In)  
Ready to go – before or as team enters



## The TEAM :

- **Team leader**

Equipped with guide rope bag  
Sets pace and direction

- **2 Searchers**

Equipped with irons, hand light and personal ropes

- **1 Control person**

Tracks time and accountability of teams involved  
in search

If this is the Team – What else should we have ready ?

Back Up /Rescue Team:

- **Team leader**

Equipped with guide rope bag/ TIC

Sets pace and direction

- **2 Searchers**

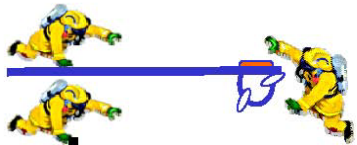
Equipped with irons, hand light and personal ropes

Our Control person can remain constant for entire search operation – replacing as needed

## The Team Leader

- Responsible for the **overall team operation**
- Informs team members of their objectives  
( search for LIFE & Fire )
- Informs team of **special hazards** – told by IC @ briefing
- Responsible for the deployment of the **Guide Line**
- Responsible for **Communications:**
  - With members of the Team
  - With Incident Command
- Responsible for **Search Termination**
- Controls the **Speed & Direction** on the Teams Search

TEAM LEADER



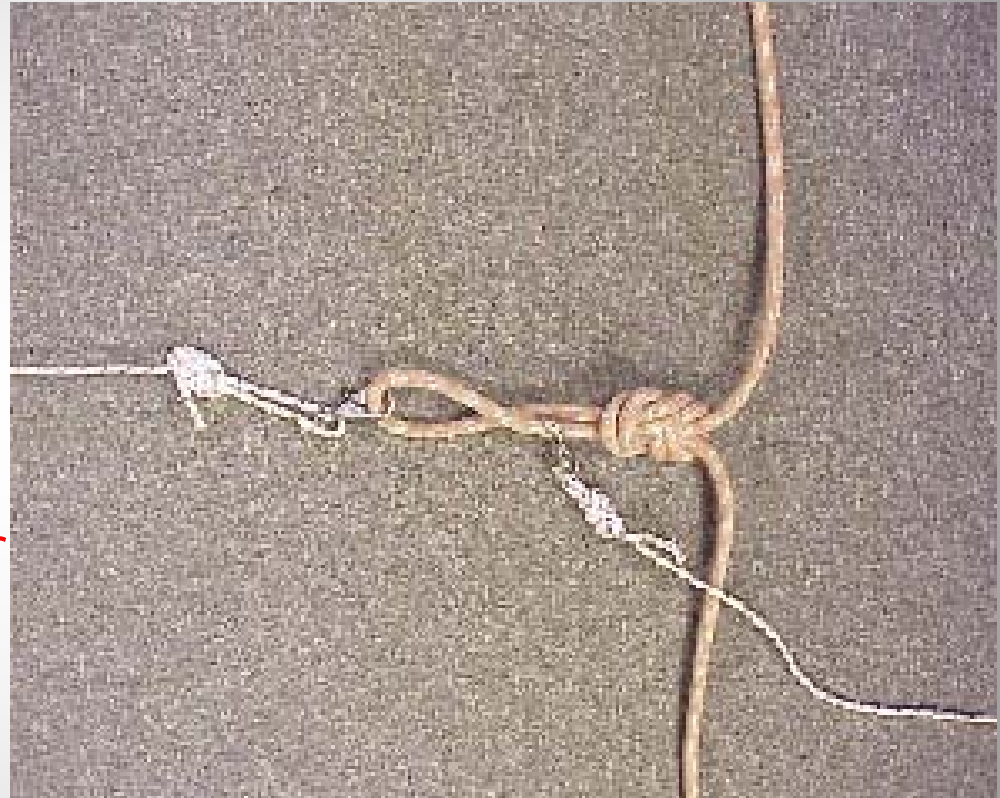
## Knots

- Search knot

Overhand on a bight,  
butterfly,  
in-line eight on a bight

– Tied by the **Team Leader**  
every 20 feet  
(Approx. 4 Arms Length)

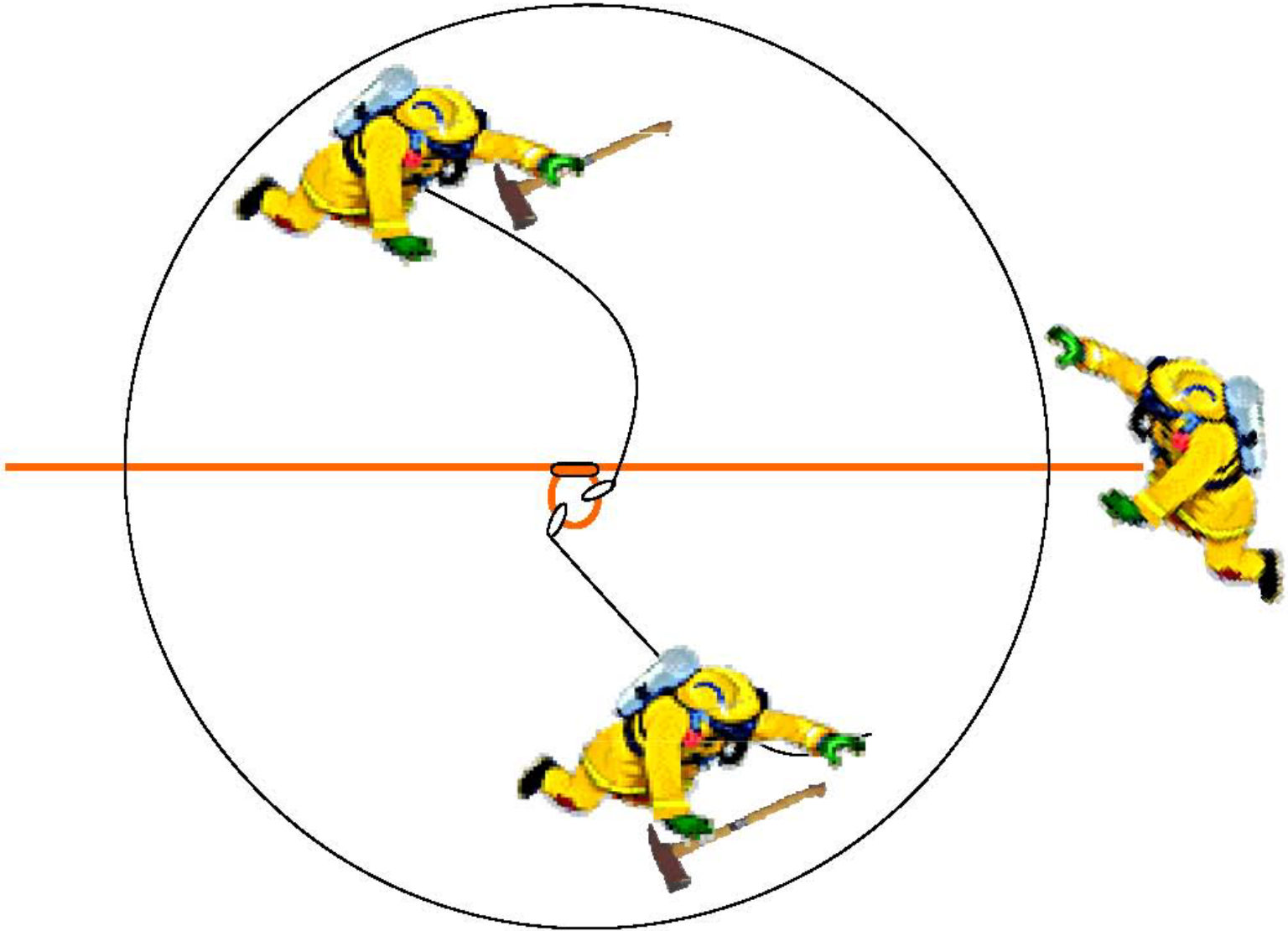
– Searchers clip their personal ropes into knot  
and sweep in half circles



## SEARCH TEAM

- **Two** (2) Person Search team
- Follow Team Leader and search off the guide line with personal rope as directed by Team Leader
- generally each team member will search a **side** of the guide line





## Control Person

- Responsible for outside **monitoring** of the team
- Located in a **safe position** near where the search begins
- Can be **any FD member**
- **Records** Number of **personnel** entering
- Maintain **Radio contact** with TL
- **Records Identity** of search team
- **Records** Entry & Exit **time**
- **Communicates** times & pertinent info from IC



## Rescue Team

- At Minimum – 2 Search members standing by at the control person's location  
( Typically will be next team Scheduled to go in )
- They will be ready to assist in any rescue operations  
( search team member or victim )
- Ready to provide relief for pervious search team
- Should be Radio equipped and monitoring

## Large Area Search OPERATIONS:

Searches will **only begins after:** ( Personal Safety Addressed )

- Team Leader has been briefed by IC
- Teams are assembled ( team & Back ups ) and briefed of their objectives, conditions and hazards
- Positions are assigned
- Required Equipment is assembled – Included:  
Stokes, Spare Mask and Cylinders
- EMS Personal is Equipment are at ready
- Portable lighting at entrance ( Marked )
- PPE – Checked and ready ( SCBA, PASS, RADIO, LIGHT, TOOLS )

## Large Area Search OPERATIONS:

Once Personal Safety is addressed :

Team Leader will ANCHOR THE GUIDE LINE

- Substantial Object outside the area to be searched  
Noting/Anticipating - possible changing conditions
- Between Knee and Waist high – to keep rope off the floor – ( if and when possible )

**At this point**

- Control Person should be ready and in position
- Rescue team should be ready and in position

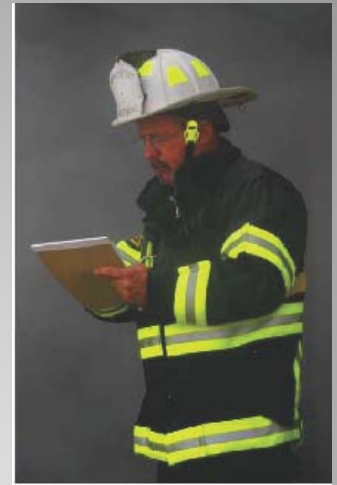
## Guide Line Anchor:



## Large Area Search OPERATIONS:

### Control Person:

- Marks Entrance – On air Time
- Communicates with TL with on air time
- Communicated with TL of any changing conditions



The Safety of the team is the responsibility of the CONTROL MAN

### Team Leader:

- Advance into the Search Area
- Keeps Guide line taut
- Manages the guide line

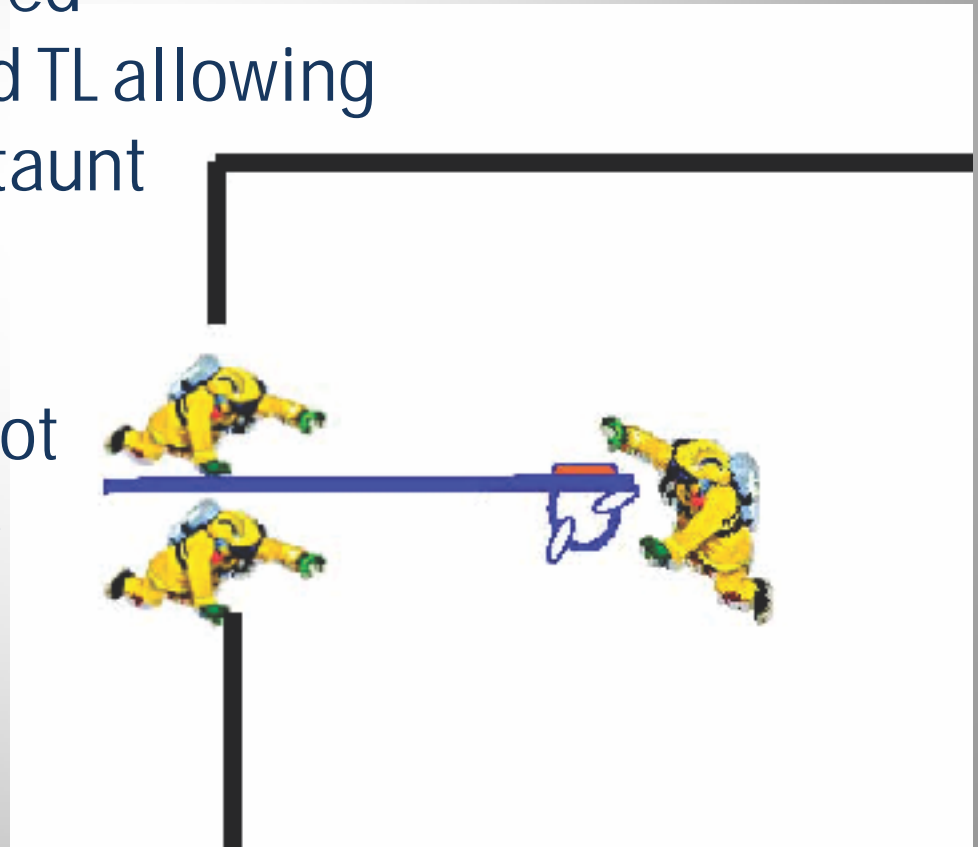




## Large Area Search OPERATIONS:

### Search Team:

- Clip Personal rope onto the guide line
- Keep remaining rope coiled
- Follow several feet behind TL allowing the guide rope to remain taut
- Allow for directional and/or Search Knot
- Advance to the search knot
- Clip in with personal rope and other end affixed to you person





## Large Area Search OPERATIONS:

### Search Team:

- Searched begin off the guide line
- Rope management is important
- Have communications with TL and partner

### Team Leader

- will be ahead of search team
- Place and overhand knot at a point where large area search will begin
- Once search knot completed advance several feet past with rope bag – turn and face rope and hold line tight

## Large Area Search OPERATIONS:



## Large Area Search OPERATIONS:

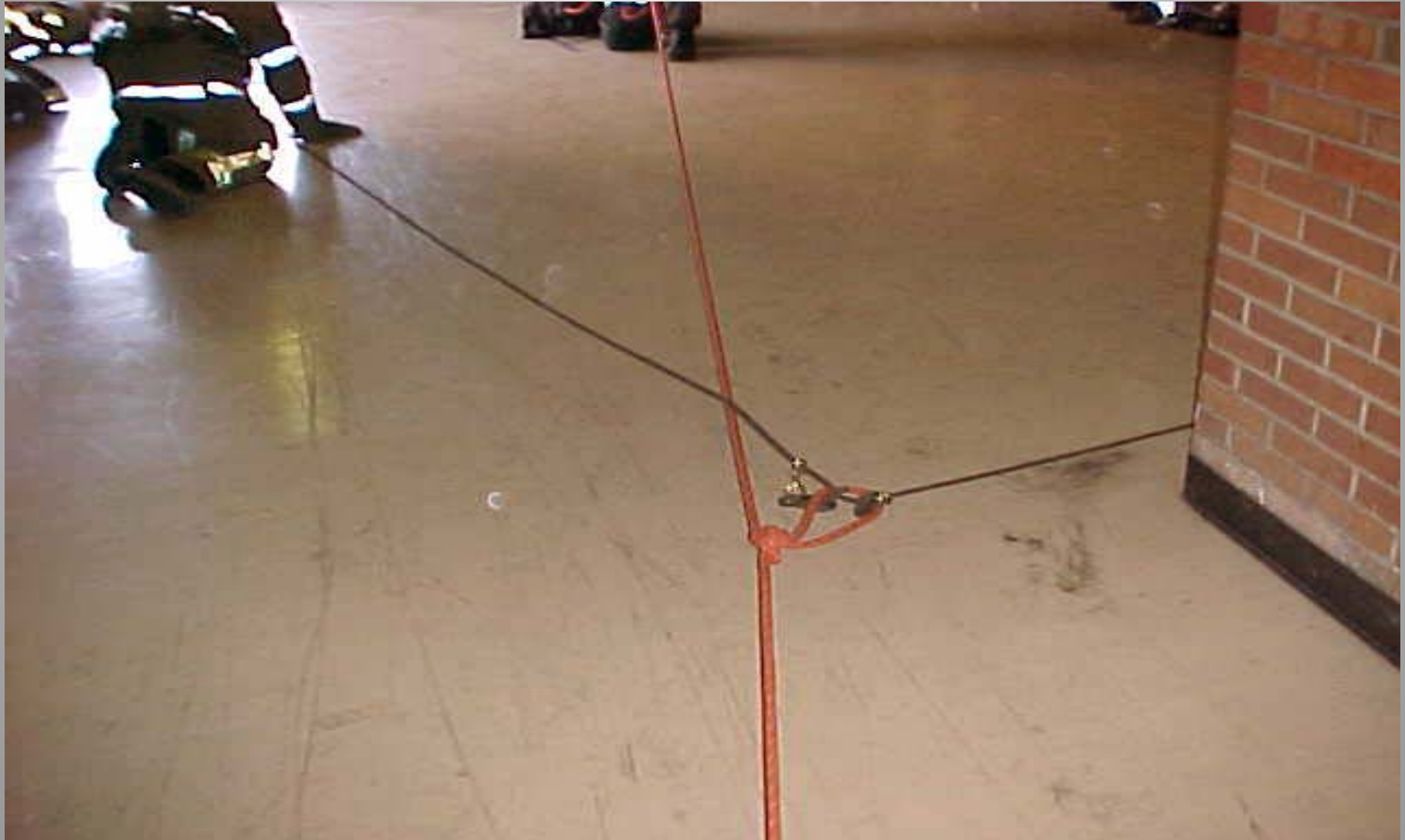
### Search Team:

- Once Team reached the Search Knot, they will clip their personal rope into this knot.
- This will be the position where the Large area search begins from.

### Team Leader:

- Once Search team is attached
- Will advance 20' ahead
- Hold guideline tight
- Monitor team with TIC and Radio Communication

# Large Area Search OPERATIONS:



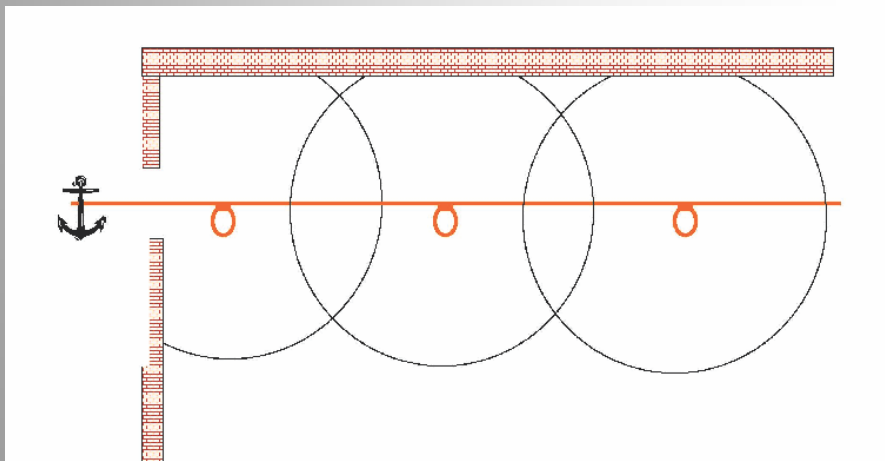
# Large Area Search OPERATIONS:

Team Leader:

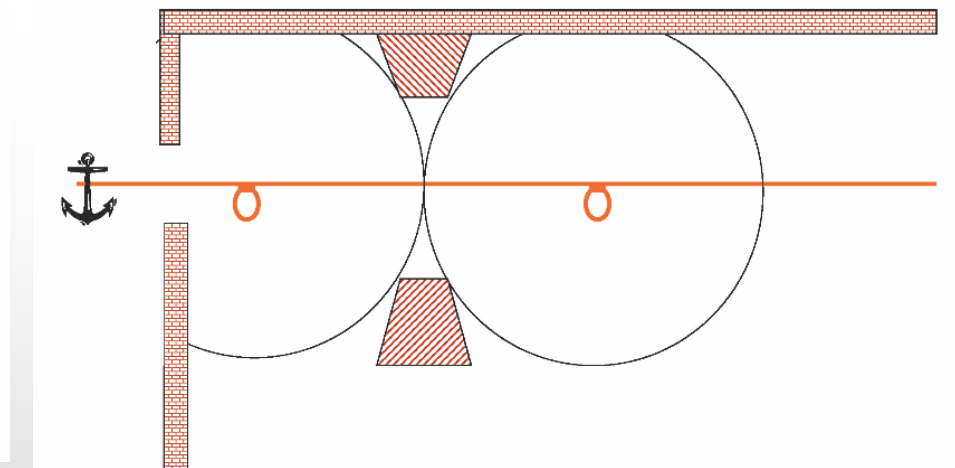
**Spacing of the Search Knot is important**

Too close and time will be wasted – overlapping searches

Too Far apart areas will be missed



**Too Close and you'll have areas being covered twice wasting time**



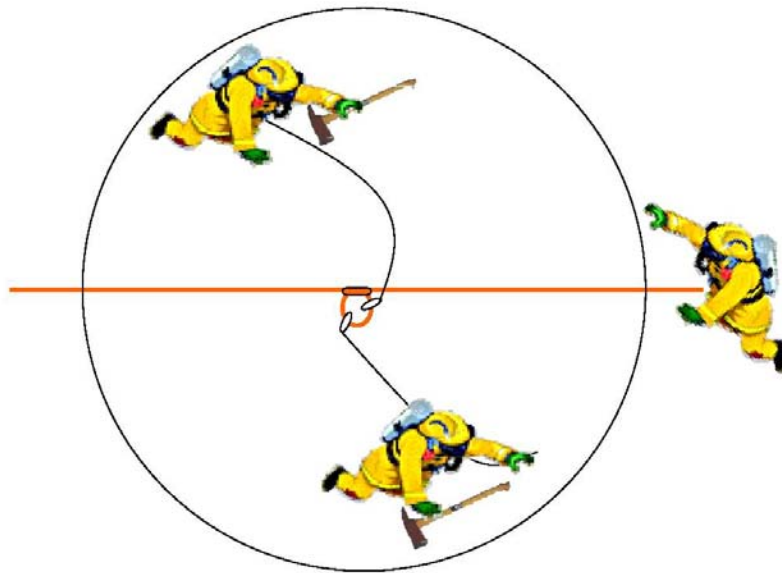
**Too Far Apart: Areas Missed**

## Large Area Search OPERATIONS:

### Search Teams:

- Searching from the Search Knot – Each member will search either side of the guide line
- Will Fan out – searching entire area of the 15' arc from the search knot – combined = 30' radius

Use Tool to  
Extend Reach =  
Area searched



## Large Area Search OPERATIONS:

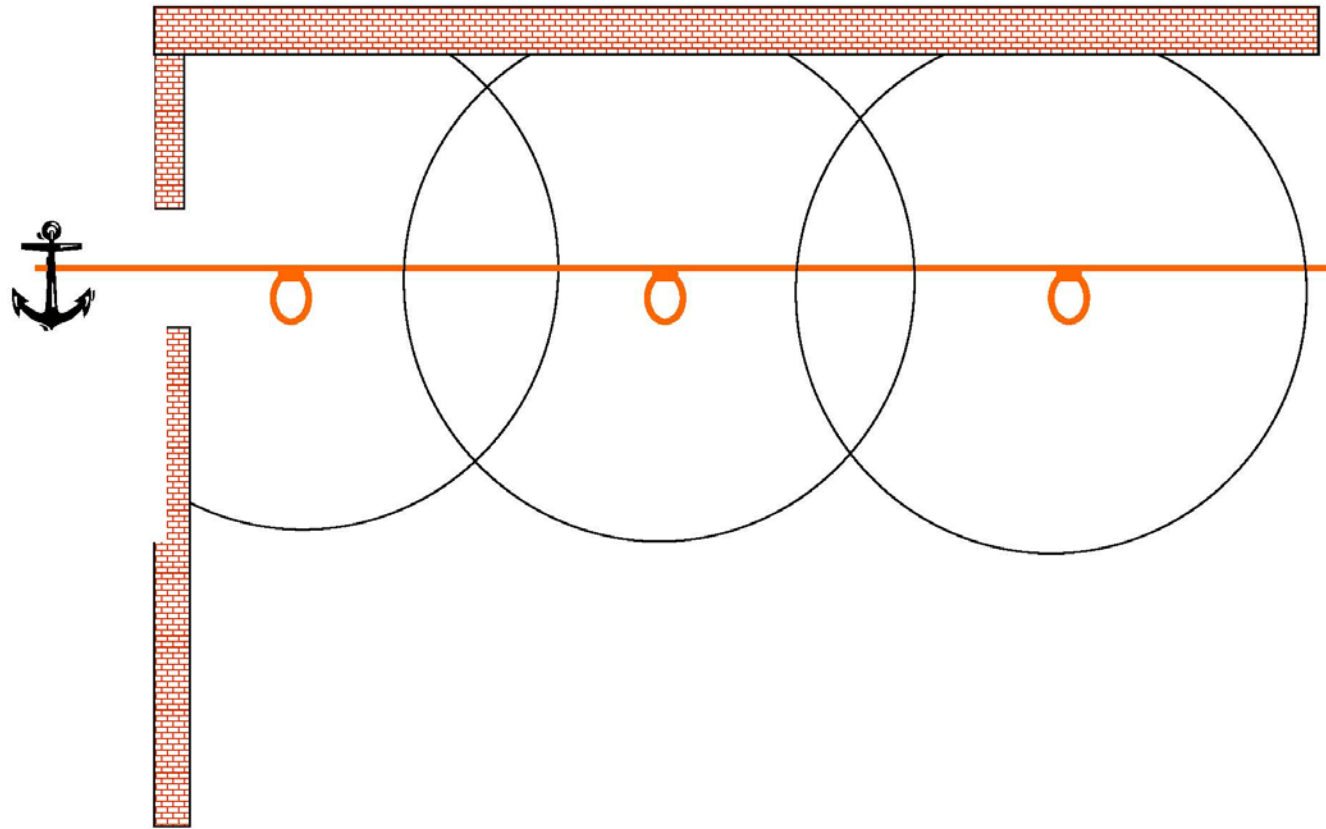
### Search Teams:

- Once search area is complete searched – maximizing members 15' personal rope
- Return to guide line
- Regain composure – waiting for other search team member to complete search
- Once both team members are back at Guide Line Inform TL results and layout found
- Advance to the next search knot and begin search again from this search knot

Note: Search Knots are left in Guide line as references



# Large Area Search OPERATIONS:





## Large Area Search OPERATIONS:

### Search Teams:

This search method will continue until team leader can't extend that line and further and a directional change is required.

At this point – A change of direction is required.

The **team leader** will tie a change of direction knot.

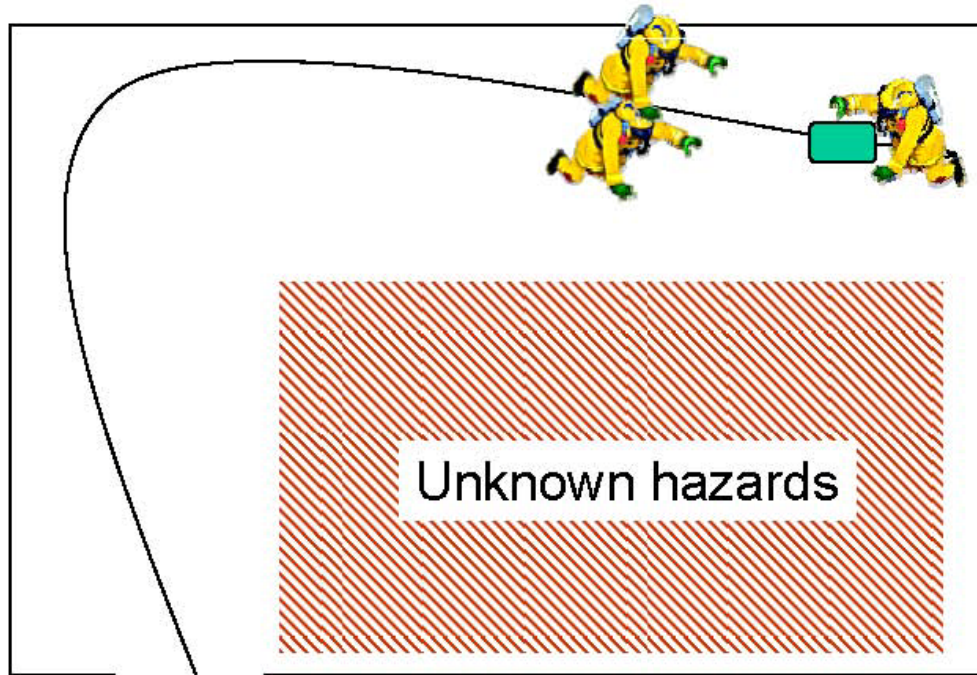
## Directional knots

Overhand, bowline, or several half hitches

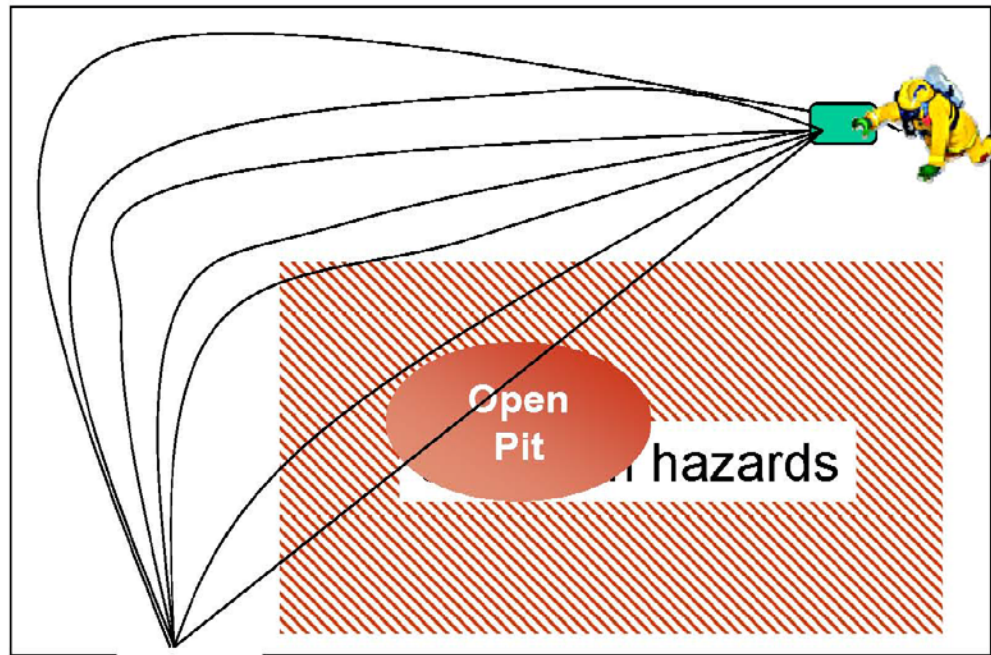
- Tied around columns, door hinges, or wall studs
- Used to keep the rope from “following” the team
- Assures the team the exit path has been searched and is safe



# Hazards of not tying off the rope in turns

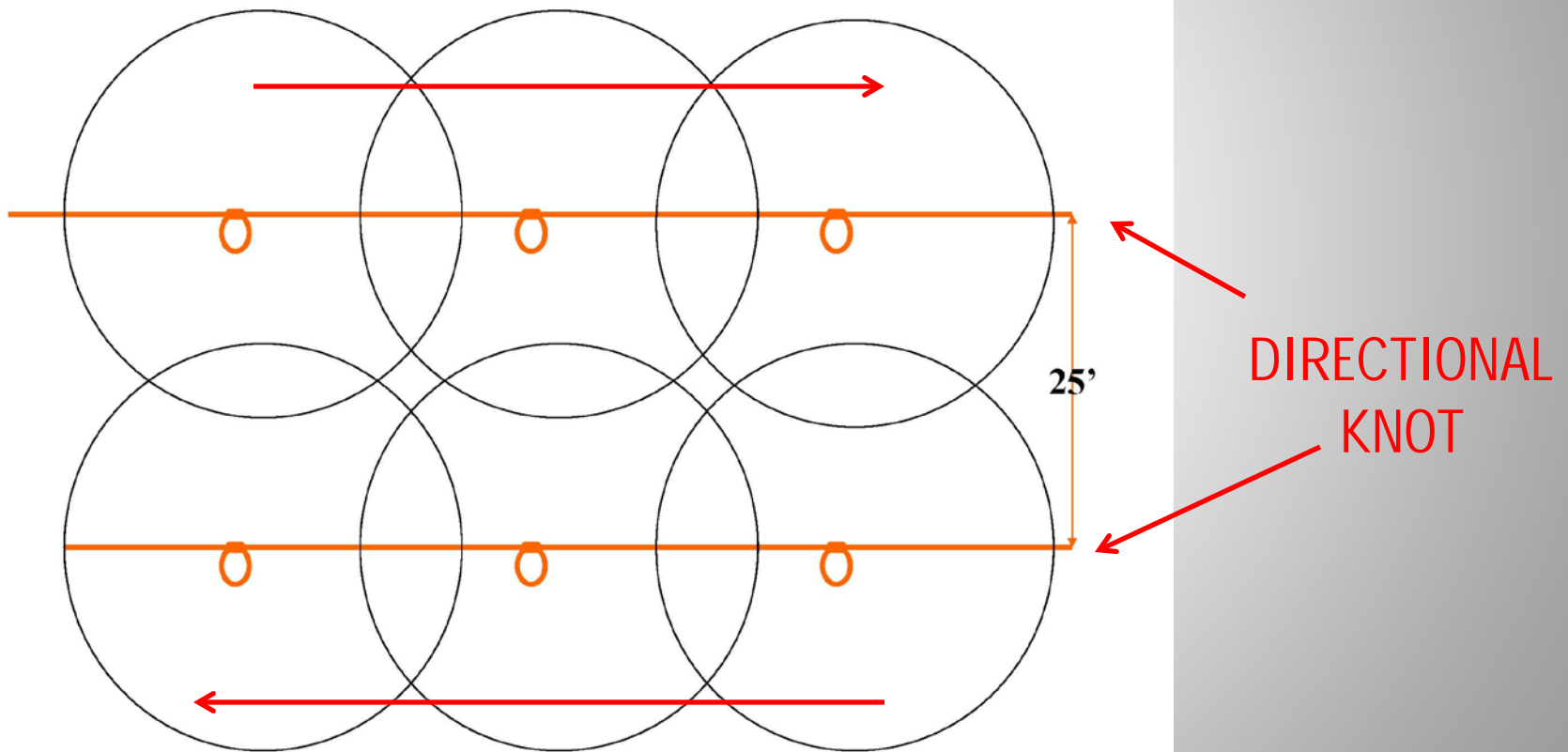


# Searching without securing rope in turns

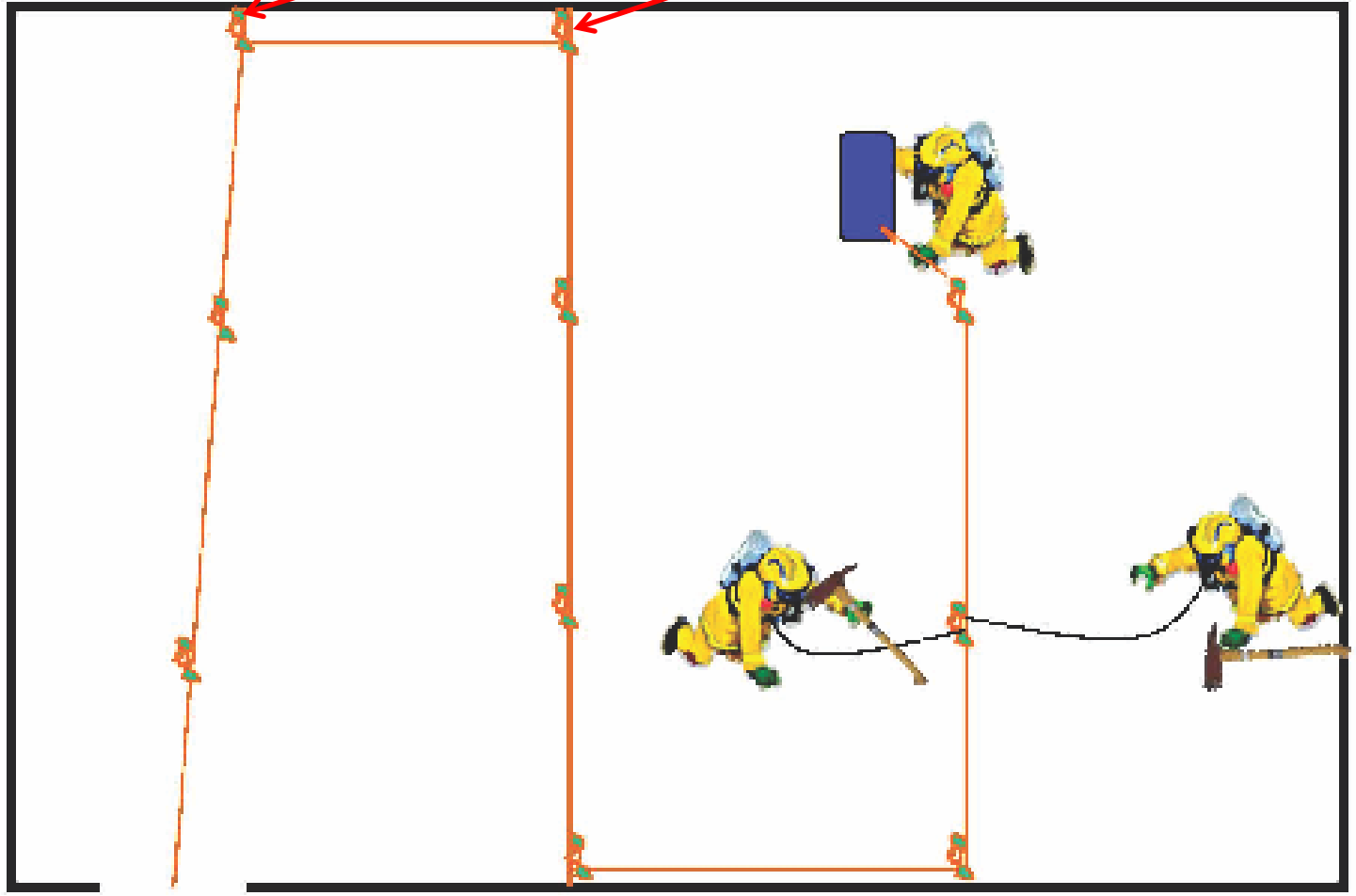


**Regional Bus Garage**

Typically when you come to end of a area –  
Team Leader will need to made 2 Directional Changes  
to continue search in the direction team began.



DIRECTIONAL  
KNOT



DIRECTIONAL  
KNOT

## Large Area Search OPERATIONS:

Searches will Continue Until:

- The Object, Victim or Fire is Located
- Search team's Time runs out – MUST LEAVE  
( Entire Search team Leave Together )
- Search have covered entire area and another approach is required to complete
- Conditions dictate that search be terminated



## Large Area Search OPERATIONS:

When a Victim is found:

- **Search team** will join up at the victim and move victim to the guide line
- **Team Leader** will communicate find – enacting **Rescue team** deployment – They will follow Guide Line to the search team
- Once **Search team** has victim to guide line, they will proceed exiting with the victim following guide line
- At some point – The Search team and Rescue Team will meet up.



## Large Area Search OPERATIONS:

When a Victim is found:

At this point – The **Search team** will:

- Quickly brief Rescue Team
- Pass the Rescue team on the Guide Line and Exit

**The Rescue team** – ( being fresh )

- Continue removing the victim from the area

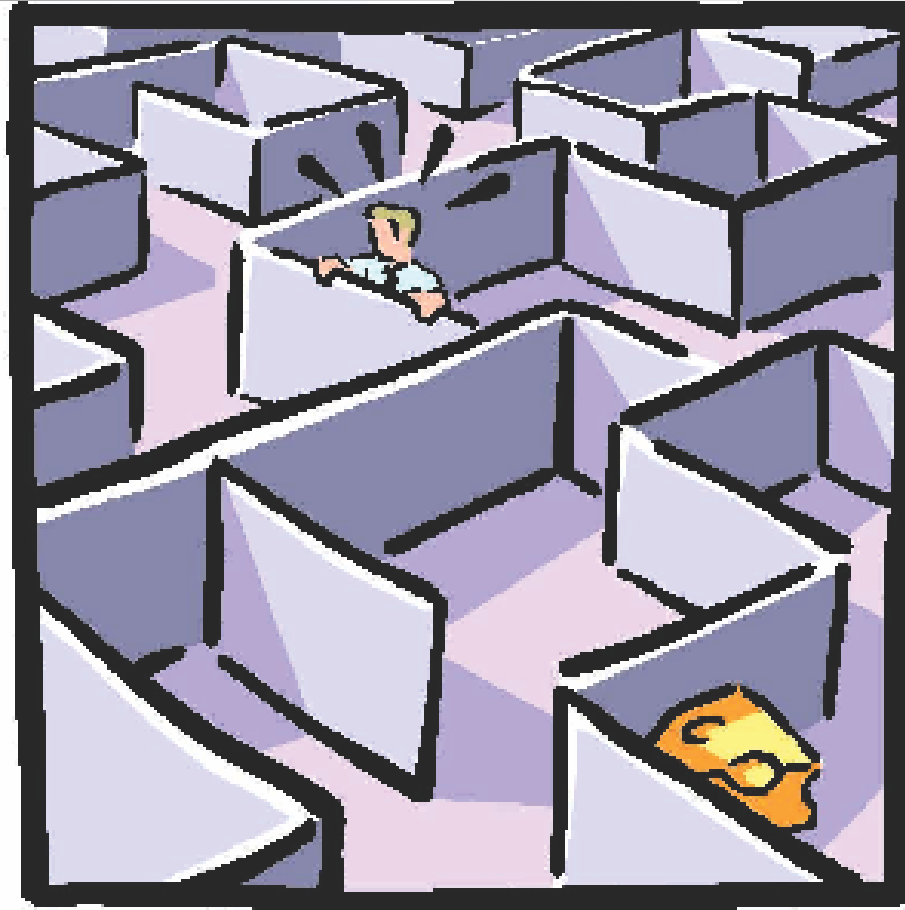
**NO EXCEPTIONS !**

## Large Area Search OPERATIONS:

With any **Other Termination:**

- Guide Line is pulled tight and anchored to a substantial object
- The remaining rope is left in the bag
- The Marked light remain illuminated so easily identifiable by relief or retrieved later  
( This marks is the starting point for next team )
- Search team will exit on right hand on rope –
- Relief team Enters on right hand on rope – (Opposite sides of Rope)
- When meet – a quick briefing of status conducted.

## What About Large – Complex Layouts ?



These don't only present a problem  
With there Large Areas

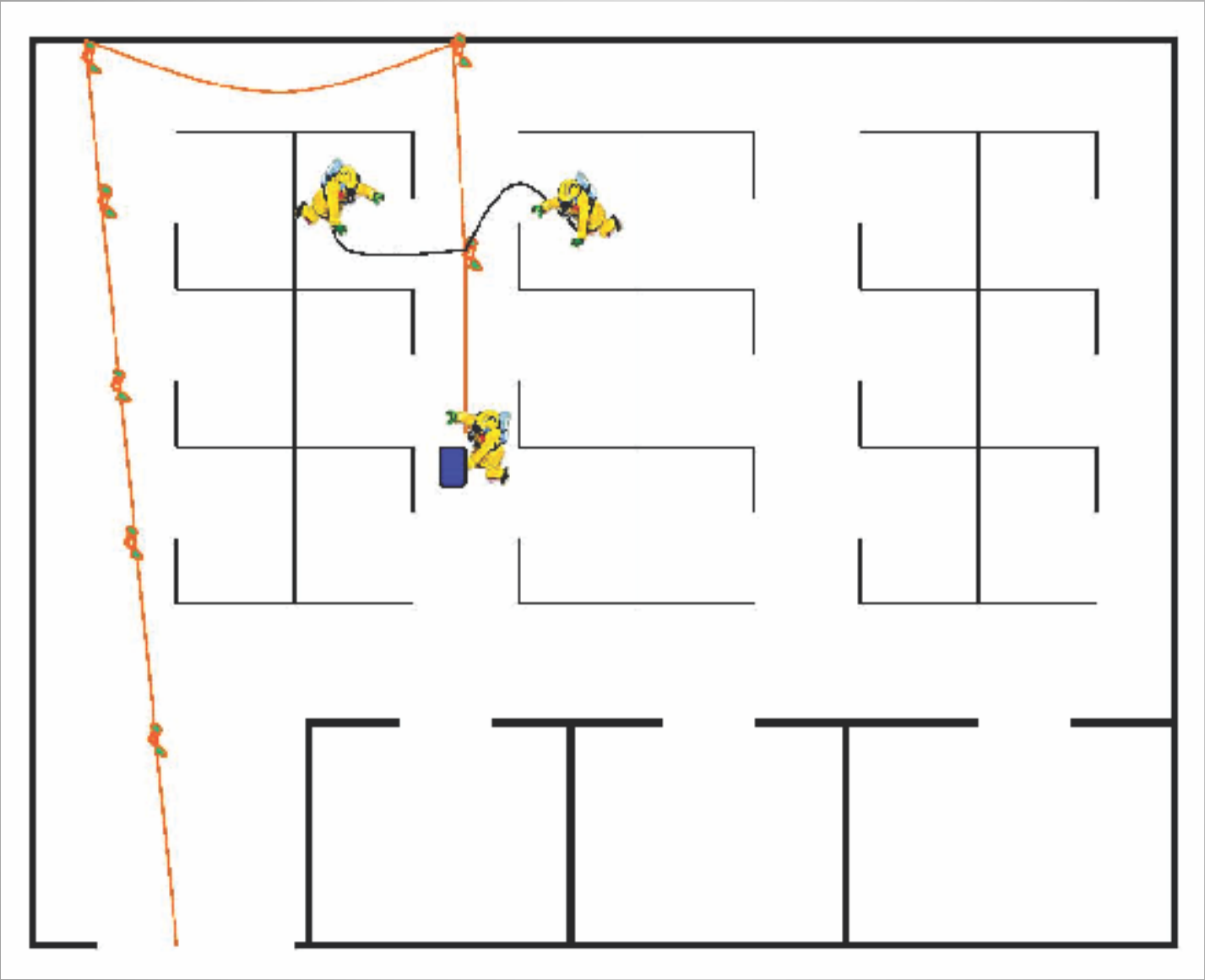
BUT ALSO

From the Complex – MAZE LIKE  
Conditions

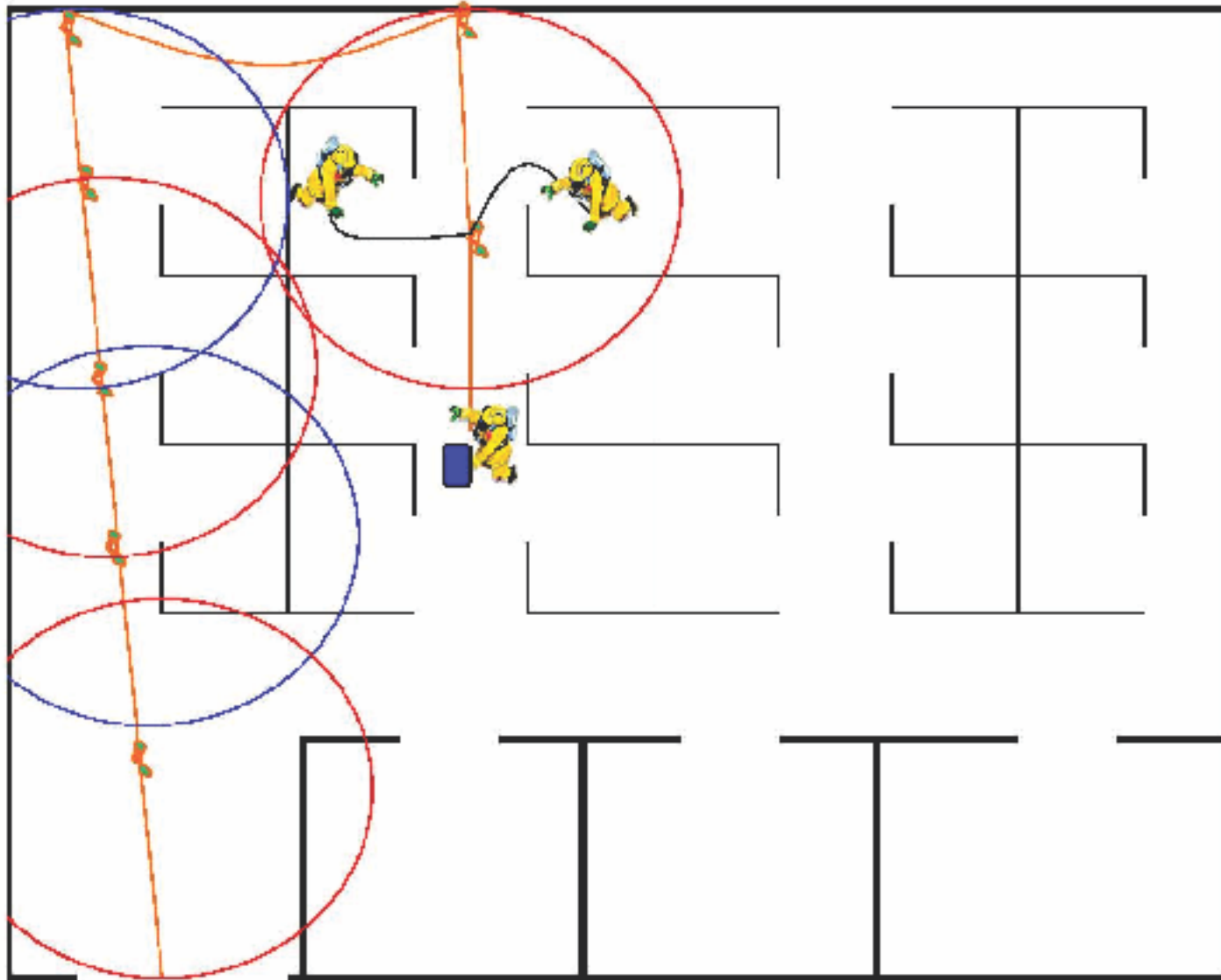
We'll use a Guide Line:

- To assure coverage
- To assure we find our exit

# What About Large – Complex Layouts ?



# What About Large – Complex Layouts ?

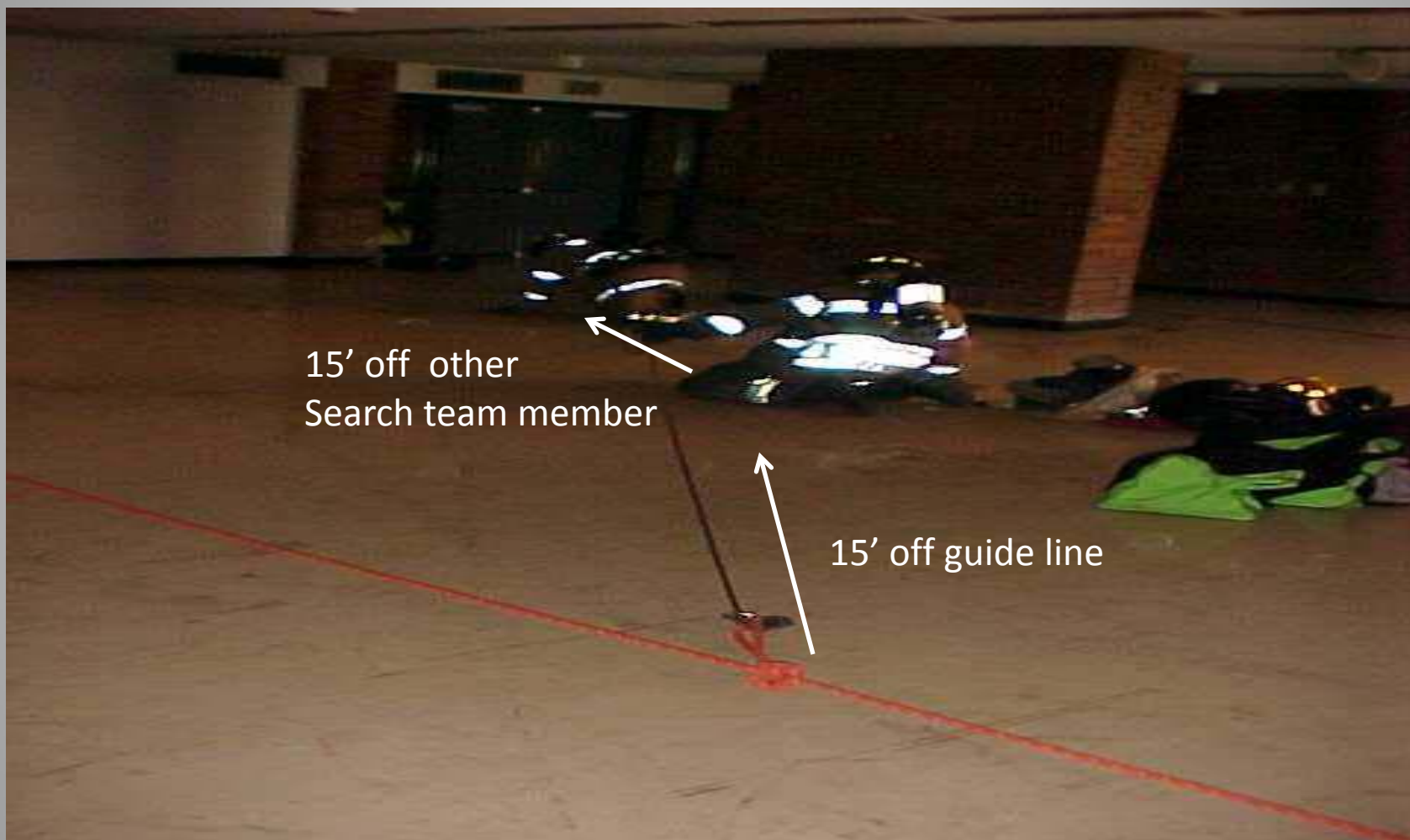


## What About Large – Complex Layouts ?

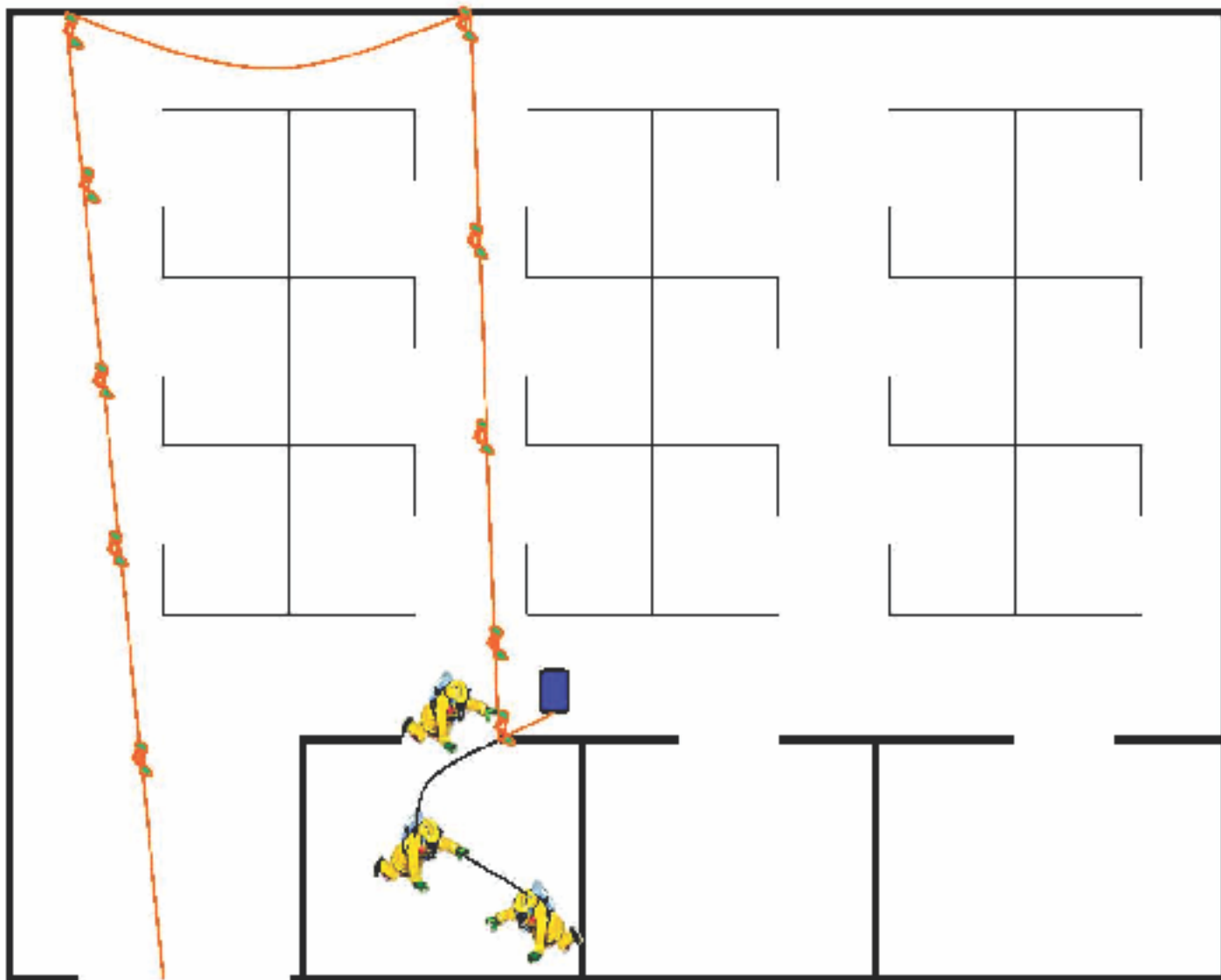
Be a Pig...Take More Space – When Conditions Require

- Piggy backing 2 searchers allows for 30' of coverage when needed.
- Good for exploring wide open space
- Covering rooms too small for search knots but too large for right/left search
- First searcher stretches their rope fully and becomes the anchor for the second searcher TEAM

## What About Large – Complex Layouts ?



# What About Large – Complex Layouts ?





# SAFETY CONSIDERATIONS

## Air Management

Team Search helps with air management, **but**

- Members must know and understand what their ( Heads up Display ) HUD is telling them
- In large/complex areas, don't wait for blinking red
- Take opportunities to check your air levels during the operation

Note: Not every member of the team will have the same air consumption.

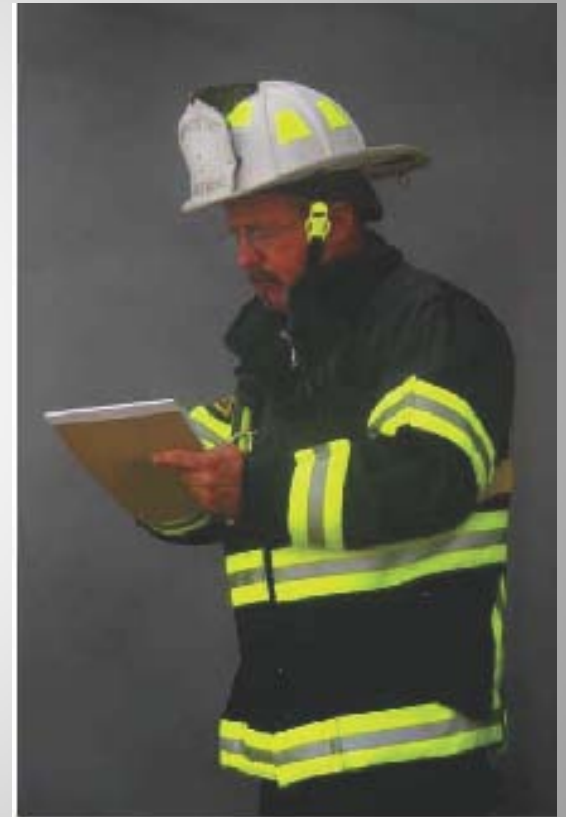


# SAFETY CONSIDERATIONS

## Air Management

### Timing Is Everything

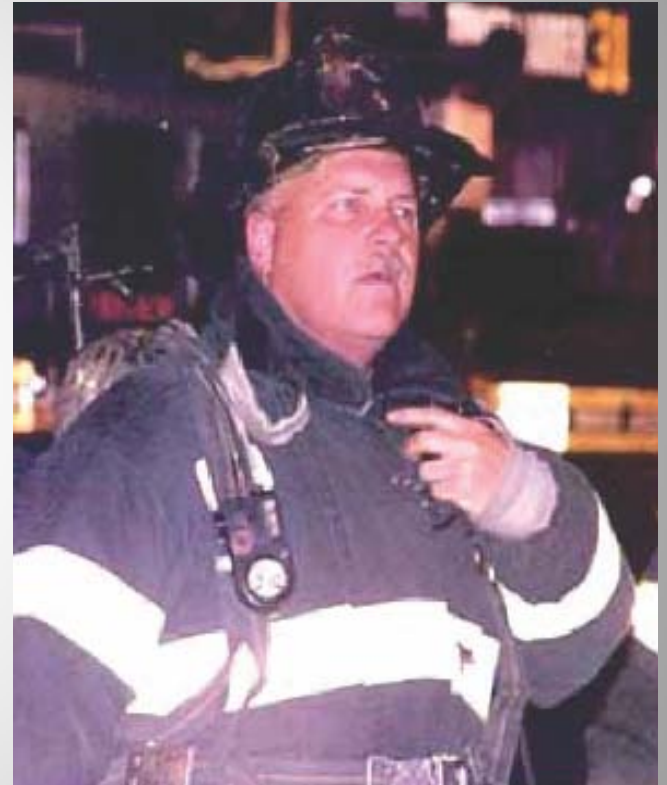
- The rule of 1/3
  - Cylinder size  $\div$  3 = Operational time
  - E.g. 30 minute cylinder =
    - 10 minutes operational time
    - 10 minutes exit
    - 10 minutes safety
- Time kept by control person



# SAFETY CONSIDERATIONS

## Communication

- Control person communicates with team leader
  - Every 5 minutes
  - With 2 minutes left
  - Time to exit
  - Anytime the operation or information changes significantly
- Team leader should update on Conditions, Actions, and Needs  
aka : **CAN Report**



## SAFETY CONSIDERATIONS

# SAFETY

- **Under no circumstances** should team members leave the guideline or personal rope.
- Follow the direction of the team leader and control person always.
- Secure line before and after hazards.
- Remain aware of changing conditions and your air supply.

# SAFETY CONSIDERATIONS

Conclusions -

Large Areas Searches:

- Is a disciplined activity
- Requires thinking firefighters
- Requires rope management skills
- Needs to be practiced
- Is adaptable
- Is another tool in the toolbox

