Searching Commercial Structures

BATTALION 3 STRIP MALL FIRE ON NW 7AVE, WITH MULTIPLE STORES INVOLVED.

Introduction

The purpose of this section of the Search and & Rescue Manual is to help the MDFR firefighter assess the commercial structure that has come under attack by fire and determine areas of high probability to conduct targeted searches. No single crew can clear these buildings. The goal is to start the search in the locations where the size-up determines the greatest chance of finding a victim.

Top

The implementation of a large area search in a commercial structure is one of the most difficult tasks in the fire service, in part because of the low frequency occurrence of these fires, and training to search in these conditions is often overlooked and ignored by fire departments. Mainly though, searching larger structures, often with vast open areas and unfamiliar layouts, is difficult, dangerous, and sometimes feels impossible. The IC must carefully consider the risk vs. reward because there are scenarios wherein delaying the start of a search because of the inherent danger of the occupancy will be the correct call.

Logistically, many departments overlook and ignore large area search in their training because they do not have locations where they can realistically train and practice. MDFR is lucky because our Acquired Structures Program, although still in its infancy, has already allowed for hundreds of hours of large area search training. That time and effort has allowed for discoveries and improvements by both the Training Division and the crews who are performing these searches.

Often, when the discussion of large area search comes up, it is usually regarding a downed firefighter. While this is a possibility, and clearly some of the most tragic line-of-duty deaths (LODDs) have occurred in large commercial buildings, methods and tactics for searching for downed firefighters will not be discussed in this section. (See RIC Manual)

History

Prior to the use and reliance on TICs, large area searches were slow, cumbersome, and very dangerous. The idea of feeling your way blindly over every surface in a large commercial building in a time sensitive nature was unrealistic. Often search crews on tethered ropes would use short sections of webbing and rope as an actual search tool, sliding the rope close to the ground in an arc to ‘catch’ a victim with the rope. One can only imagine how difficult that was and all the ‘other’ things that can get caught up in the rope.

Types of Occupancies

Simply put, a large area search can be any occupancy where a search rope is required and where the compartment space cannot be completely searched close to a wall. For the purposes of this manual, the large area searches described in the following pages will be focused on:

- Strip Malls
- Night Clubs
- Big Box Stores
- Restaurants/Bars

Top

- Office Buildings
- Warehouses
- Auto Repair Garages

That said, these techniques or aspects of them can also be used in super- sized homes with large open floor plans or in any other occupancy where the OIC feels the need to deploy a rope to ensure they find their way back to the ingress point.

Large Area Search/Commercial Occupancy Size-Up

The blueprint for conducting a search and rescue size-up of a commercial occupancy is largely the same as a residential structure with a few critical differences.

- Time of day. Is the business open or closed?
- Dispatch. Are there multiple callers? Often at commercial fires, if it's not the alarm that notifies the fire department, it is the security guard. Are there people calling from inside who are trapped?
- Witnesses on scene. Are the employees evacuating? Did the security guard see where the fire was? Can they help determine if anyone is missing?
- Where and how advanced is the fire? This differs from a residential fire because answering this question may involve opening multiple areas of the building before honing in on the location of the fire and choosing an entry point.
- Is this a rapidly spreading fire during normal business hours? If so, early units must first search areas close to egress points in the building. This is not to say there won't be victims in remote parts of the building, but the hope is that people would have had a few moments to try and flee. Previous incidents with a large loss of life have proven this to be the case.
- Type of business. Some businesses have a more predictable layout than others. For example, a cold storage facility might be so dangerous for firefighters that it may warrant only the most cautious type of search that keeps firefighters close to egress points, proceeding interior with extreme caution. Some commercial occupancies might have heavy fire loads and/or hazardous materials situations that require a slow and cautious approach as well.

The location of the fire and whether it occurs during business hours will play a major role in your size-up with one major difference--the search and rescue size-up should focus on an area of probability to start the search.

Top

Area of Probability

All early searches in commercial structures will be directed by an area of probability determined by your size-up. Locating and searching the area of probability should be performed in the same manner as in the perimeter and backbone search which will be discussed later in this section. As previously stated, in the absence of specific information, all egress points will be treated as areas of probability and should be prioritized for searching.

In 2004, units from Battalion 3 and Battalion 5 responded to multiple calls from the Metro Ford Car Dealership on 89th St and NW 7th Ave. A customer who was upset with his purchase from the previous day drove his new Ford Escape through the front door of the dealership. He got out of his car, poured gasoline all over it, and lit his new SUV on fire. The car blocked the main entrance of the building and dispatch advised there were multiple calls reporting people trapped in the back of the dealership. A-19 arrived and began attacking the fire, which had spread to two cars, and R-19, led by Lt. Matt Mandell, tied a rope bag off and started their search moving directly to the rear of the dealership (Figure 1). They found employees in the back rooms and used different egress points on the Charlie Side to remove the victims.

(FIGURE 1) ATTACK AND SEARCH CREWS WORK SIMULTANEOUSLY AS THEY GET REPORTS OF PEOPLE TRAPPED IN THE BACK OFFICES. WITH A HIGH RESCUE PROFILE AND FIRE IMPEDING THE MAIN EGRESS, R-19 AGGRESSIVELY REACHED THE DATUM POINT ON A SEARCH ROPE HELPING VICTIMS TO A CHARLIE SIDE EGRESS. [PHOTO BY ERIC GOODMAN]

Top

Using an urgent rescue profile with direct information from dispatch, R-19 moved to an area of probability to affect the rescue. What if the information was not that good and units arriving on scene only have a low rescue profile? Without suggested or direct evidence of victims trapped, a low rescue profile should be employed, and all initial efforts should be focused on locating the fire and using the most advantageous ingress point for extinguishment. In fact, if conditions dictate (such as an incipient, white smoke fire), the IC should consider using the first search crew to search for fire.

Command and Control

The IC on a commercial fire must contend with various unknowns. A good size-up will give an IC an indication of the size of the building, fire conditions, the rescue profile, location of ingress points and hopefully an area of probability if a high or urgent rescue profile is present. This information will give the IC the ability to determine the right search method, when to employ that search method, and the entry point or points. Immediate, aggressive commercial searches in fire conditions should only be performed when there is a high or urgent rescue profile. Otherwise, the search can wait until conditions improve and it's safer to advance into the structure without a hose line close by. In other words, it is often the case that the early moments of a commercial fire provide too many variables and too many possibilities for rapidly deteriorating conditions to commit to an aggressive search away from a hose line without solid and clear intel driving that action forward. In these structures, searching for and locating the fire is the more probable and common situation.

As stated before, the IC should always locate an area of probability before starting a search. Blindly starting a search in a large commercial structure without good intel is dangerous and demoralizing for the crew assigned to the task. Barring a direct report of trapped victims or evidence of possible victims, all efforts should drive towards extinguishment. What the IC needs early in the incident is knowledge of the structure and location of the fire. The first actions of all ICs in a low rescue profile in a commercial structure should focus all of the manpower and efforts on accomplishing these efforts early on in the incident. Search & Rescue efforts at this point are often wasted while more important tasks are still waiting to be completed.

However, when there is a high or urgent rescue profile, it is incumbent upon the IC to send crews to the area of probability to start the search as soon as possible. The next actions by the IC should be to aggressively support the search operations with additional crews to aid in the search and deploy hose lines in support of the immediate area. Because searching in these conditions is manpower intensive, the IC should consider calling for a multiple alarm early in the incident.

Top

Large Area Search Principles

Following are some principles and philosophies that apply to search and rescue in large commercial structures:

- All searches will be conducted with at least one functioning TIC and a search rope anchored to the exterior of the structure.
- Crews must realize their limitations and that they may just be a small part of a larger search and rescue effort.
- Focused and constant air management is a top priority.
- For every crew searching, another should be on deck as a back-up if possible. The back-up crews are there to assist in the removal of victims in case the search team needs to be rescued or to take over when a search can't be completed by the initial crew.
- Have an exit strategy.

Large Area Search Team Tactics and Responsibilities

MDFR is advocating TIC directed, rope guided searches for all commercial and large area searches. Meaning, if you do not have search rope, you cannot start the search and if you do not have a functioning TIC or if your TIC fails while searching, you will stop the search and ensure that a crew with a functioning TIC is replacing you.

At this point, it is important to differentiate and explain the most important tool in each search crews tool set—the rope bag. In the past, the search rope was used as a tool to search in arcs and 'catch' victims in the rope. This does not work effectively. The rope, simply put, is the crew's lifeline to the outside and will be treated as such always. Furthermore, the rope will have one firefighter assigned to it and controlling and maintaining that rope will be their only responsibility.

The purpose of the rope is to always have a direct egress path that is not dependent on walls but keeps the search crew oriented to the building by running generally parallel to main walls and using tie-off points. The TIC is the tool MDFR will rely on for clearing large spaces. Instead of sweeping blindly over thousands of square feet with a rope and hands, the crew will use the TIC to cover ground rapidly, eliminating large open areas with the TIC, sweeping and hand searching smaller areas that cannot be cleared by the TIC.

Top

We never actually search with the main rope but deploy it to create an identifiable structure that allows us to complete a systematic search off it and keep searchers oriented to the building. Additionally, the rope is used to keep searchers oriented to each other and their egress. Regardless of what search method is chosen the search team tactics will always be the same. The following are basic components of a rope search:

- **OIC –** The OIC guides or leads the search crew and searches for victims with the TIC. This is a TIC directed search with the rope firefighter as Point/Anchor. The OIC can move away from the rope line to search areas that are not visible but will always stay within voice contact of the Point who is managing the rope. The distance of 'voice contact' is subjective and based on many variables, but 10-15 feet away from the anchor is generally the maximum distance.
- **Point/Rope –** The Point's only responsibility is to manage the rope bag and move as directed by the OIC. The Point will locate tie-off points to maintain the integrity and tautness of the rope.
- **GIB –** The GIB will follow on the rope and will be available to shoot off of the rope with the OIC to search areas that are not visible with the TIC, always maintaining voice contact with the OIC and Point while saving energy for victim removal.
- **Anchor Points –** The first anchor point should be established in an area outside the structure and ideally 10-15 feet from the entrance door. All additional anchors should be established when the search crew must change directions inside the structure or to add tension in a long straight line.
- **Shoot –** To 'shoot' means to move forward and deploy rope from the rope bag into the area of interest. Typically, the Point will shoot no more than 20 feet at a time, equivalent to about 5 to 6 slides. This strategy enables the team to remain within voice distance.

As the search team advances, the principles of the Point, the OIC, and the GIB remain the same: shoot, scan, search off rope to areas of interest clearing at least 15-20 feet on each side of the rope, return to the Point, shoot, and repeat again.

All rope systems and functions rely on this process. Anytime a search rope team advances or changes direction, the principles of Point, shoot, and anchor are repeated, with the GIB and OIC searching as they move up to the Point. The search is happening simultaneously as the rope is being deployed.

Top

Anchor Points

(FIGURE 2) OUTSIDE ANCHORS SHOULD BE EQUIPPED WITH A UNIT INDICATOR AND IN CLEAR SIGHT.

Team members establish an initial anchor point ideally 10-15 feet outside the ingress point on an immovable object. Additional anchor points along the search rope ensure the stability of the rope, eliminate slack in the line, and ensure the safety of the searching firefighters.

- **Outside Anchor -** The first anchor is set to a stationary object. You should not be able to move it or pull it off regardless of how many team members are on the line and the activities they employ. It should be placed within a clear line of sight and should not cross over the entrance, creating a trip hazard, if possible. (Figure 2)
- **Interior Wall Anchor -** This anchor can be set by breaching a hole in a wall with a tool and wrapping the rope through a stud or section of drywall. Alternatively, a carabiner on the drywall can also be used (Figure 3, 4). These methods can be difficult to establish in zero-visibility environments.

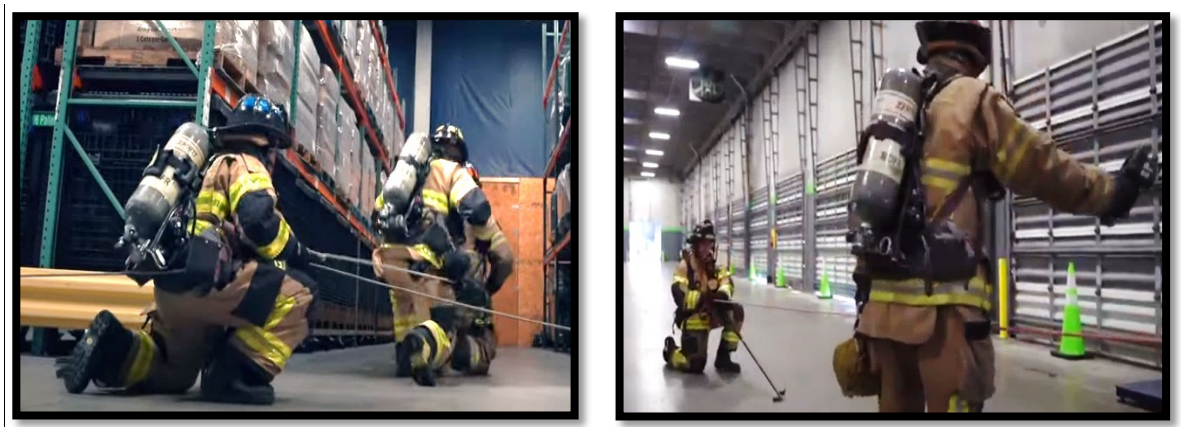
(FIGURE 3, 4) AN ANCHOR AROUND A STUD CAN BE A VERY SECURE ANCHOR, BUT IN THE ABSENCE OF STUDS, A CARABINER ON THE DRYWALL WILL WORK.

Top

- **Fixed Interior Anchor –** This anchor set by wrapping or knotting the search rope around an object of significant size. This could be as small as a heavy desk or as substantial as a column. It can be simply wrapped or girthed around the object (Figure 5, 6, 7).
  Its reliability depends on the object and the amount of time it takes to secure the rope line in near-zero visibility.

(FIGURE 5, 6, 7) WHEN IT COMES TO SECURING AN INTERIOR ANCHOR AROUND A POST, WRAPPING THE POST IS THE SIMPLEST APPROACH. HOWEVER, IF THERE'S LIMITED SPACE FOR THE BAG, A GIRTH HITCH CAN BE A VIABLE ALTERNATIVE.

- **Human Anchor -** A team member holds the search rope, guaranteeing its security. It takes very little time to establish and increases the speed and safety of the search. This is the most reliable of the anchors, but in certain applications it can place a crew member at an unsafe distance, as is the case with a backbone search discussed later in this document. (Figure 8). As an anchor, keeping the rope taut and off the ground allows the crew to easily find the rope as they search around it. (Figure 9)



(FIGURE 8, 9) THE POINT ALWAYS FACES TOWARDS THE CREW, WHILE KEEPING THE SEARCH ROPE TAUT AND ELEVATED OFF THE GROUND. THIS FACILITATES THE CREW'S ABILITY TO LOCATE THE ROPE EFFORTLESSLY UPON THEIR RETURN FROM SEARCHING OFF THE ROPE.

Top

Commercial search options:

1. Perimeter Rope TIC Search
2. Backbone Rope TIC Search

MDFR search crews **will not** enter a commercial structure or commit to any other large area search without a rope and a TIC. The number of variables and the possibility of rapidly changing conditions in these structures necessitate not only orientation, but a direct lifeline to an egress point.

The rope allows for accountability and maintains a tether to safety. In Miami-Dade County, all large area searches with low rescue profiles **will** begin with searching all egresses from the exterior move into a Perimeter Rope Search that may grow to include a Backbone Rope TIC Search.

- **Perimeter Rope TIC Search:** Commits the initial search lines to run roughly parallel to the exterior walls. The goal is to create an interior perimeter. The perimeter rope search effectively cuts down and eliminates a lot of the unknown square footage of a large area. It also directly puts firefighters in the path of where they will most likely find victims that were trying to escape.
- **Backbone Rope TIC Search:** Attaches temporarily to the perimeter rope and extends into unsearched areas that the perimeter cannot see or reach. Often the backbone search will use a temporary human anchor who will place themselves on the perimeter rope and anchor the backbone. When the OIC and the GIB go out into the unsearched area, the point/rope/anchor firefighter will maintain the security of the connection point. When the backbone search is completed, the GIB will gather the rope used and return to the anchor. This will be repeated as many times as required.

The IC should note that unless there is an area of probability the Perimeter Rope TIC Search is always the starting point. Additionally, the Perimeter Rope TIC Search can start from multiple ingress points with multiple crews operating. If so, a Search Group Supervisor should be established.

Both searches are creating rope systems in the same fashion as explained above but are placed in different areas of the structure. The search can start as a Perimeter Rope Search and transition into a Backbone Rope Search if the crew deems it necessary and the layout allows. In situations where the search might exceed 100 feet, Command should deploy multiple search teams from different entry points. **No crew should advance any further than 200 feet or two rope bags, without permission from the IC.**

Top

Perimeter Rope TIC Search

Barring an urgent or high rescue profile, the Perimeter Rope Search is the default search for all large area searches. The goal is to create an interior perimeter that generally runs parallel to exterior walls. That is, of course, if the interior layout allows for it. This inner perimeter can be built by multiple crews.

CREWS PRACTICING THE PERIMETER ROPE TIC SEARCH AT AN ACQUIRED STRUCTURE. [PHOTO BY RICARDO STEPHENS]

When to Perform a Perimeter Rope TIC search:

1. Usually, to search for fire or to search for victims after the fire has been confined or controlled in a low rescue profile.
2. When the IC suspects that victims in a high or urgent rescue profile will be found along the perimeter and near egress points.
3. Other than quickly locating and searching an area of probability, all searches will start with a Perimeter and evolve to add a Backbone Search.

Tool Package Considerations – Perimeter Rope TIC Search:

The tools and equipment used must enhance the search's effectiveness and ensure the safety of the personnel. Tool choice should consider mobility and forcible exit if necessary. The members conducting a large area search should have the following pieces of equipment:

- One rope bag per member
- At least one functioning TIC
- A set of Irons
- 6' metal hook
- Door storm (if required)
- Personal webbing and hand lights

Crew Responsibilities – Perimeter Rope TIC Search:

1. OIC

a. Perform a good size-up and determine the entry point.

Top

b. Will advance approximately 10 feet into the structure, thoroughly scan the immediate area for victims and perform a 3-level scan prior to advancing.
c. Determine which method and in what direction to start the search.
d. Show the crew the TIC and direct the Point to shoot 20' ahead and wait.
e. As the crew moves ahead of the OIC 20 feet at a time, the OIC scans the space in all directions for victims. When the OIC clears the area, they will advance up to the next space and repeat this process.
f. Guide the crew with the TIC while staying oriented to the overall layout of the building. It is ideal to guide from the back or just behind the Point while in open space and from the front while in tighter spaces (hallways, rooms, etc.). Leading from the front in smaller spaces avoids deploying rope into a dead end.
g. Makes verbal and mental notes of important structural layouts and calls them out to the crew as they move. This not only includes windows and doors, but also when a new room is discovered and more important, when they encounter a potential hazard (overhead storage, confusing layouts, working sprinklers, fall hazards, etc.)
h. Constantly communicate with the crew and ensure that the crew closes the communication loop with every callout. It is imperative that both members of the crew repeat everything that is spoken by the OIC. This ensures accountability and message delivery.
i. Search for victims, staying within voice distance. The OIC should roam around within voice distance, searching with the TIC in and around objects. The OIC must switch from guiding with the TIC to searching with the TIC.
j. Search smaller spaces (hallways, rooms, cubicles, etc.) utilizing the TIC directed search or oriented search with the help of the GIB while the Point stays at the entry point with the rope. If another space is found beyond voice distance, the OIC will then move the Point up to the next entry point, always trying to avoid advancing rope into a dead end.
k. Upon finding a victim, will plan and coordinate egress procedures by positioning themselves ahead of the crew and leading them to a safe environment. This might require the OIC to pick up the rope and follow it back to the egress.
l. Radio to the IC that 'we have a victim' and where the crew plans to take the victim. "We are taking the victim to a door on the Charlie Side."
m. Maintain air supply.
n. Maintain radio communications with Command. Announce to the IC or Division that you have a par when exiting the building.
o. Maintain situational awareness of their surroundings.
p. Monitor fire conditions.

Top

2. Point

a. Apply an outside anchor.
b. Apply additional interior anchors to maintain the integrity and tautness of the rope.
c. Manage the main rope.
d. Only shoot in 20 feet increments or as directed by the OIC.
e. Relay and repeat all information from the OIC.
f. When a crew finds an egress, they will advise the IC the location of the egress, quickly exercise the door, chock the door in the closed position, and anchor the main rope as nearby as possible.
g. Keep the rope taut and off the ground but especially when the crew is tethered off it.
h. Prior to exiting, anchor the rope at the farthest navigable point where you left off and exit at the closest egress.

3. GIB

a. Stay behind the Point on the main rope.
b. Can accompany the OIC to search areas off rope.
c. If assigned to search a small room, will expand their effort to search the whole room as direct by the OIC.
d. Relay and repeat all information from the OIC.
e. With a TIC the GIB can assist the OIC with the searching.
f. If a victim is found, the GIB will be responsible first for victim removal as the GIB should have the most energy.

Step by Step – Perimeter Rope TIC Search:

1. Anchor the rope clearly around an immovable object and place it high enough to be seen by other units.
2. The OIC will enter the space first (approx. 10 feet in) to scan for victims in the immediate area and conduct a 3-level scan of the interior with the TIC. The OIC should note the temperature at the ceiling as well as the type of roof they are operating under.
3. Based on the size-up, the OIC will determine which direction the search will proceed. If multiple search teams have been deployed the OIC will let the IC know the direction they are moving (i.e., R-3 has initiated a left-sided search from the main entrance along the Bravo side).
4. The OIC will show the TIC to the Point and advise them to shoot 20 feet of rope in the direction that they set forth. The GIB will follow on the rope, and the OIC searches with TIC as they move up the rope to Point's position.

Top

5. After arriving at the 20 feet stop, the OIC will conduct another scan, looking for victims and conditions ahead. At each stop, the OIC will scan in all directions, including behind them, not only for safety but also to change the viewing angle.
6. At any time, the OIC may move off rope to view and search objects that are close by and to change their viewing angle as long as they stay within voice distance. The OIC can take the GIB to assist. This process will be repeated as the crew moves deeper into the structure.
7. In more confined or compartmentalized spaces, such as office buildings or large residences, it is advisable for the OIC to lead from the front (Figure 10). This approach prevents from leading the Point into dead-end areas, where retrieving the rope could pose difficulties. Possible dead ends, rooms, and even a room within room should be searched by the OIC and the GIB, while the point stays anchored on the original path (Figure 11). The key is not to stray too far from the Anchor and always stay in voice distance. In these situations, keeping the Point anchored to one path is important to stay oriented and efficient.

(FIGURE 10) R58 DRILLING AT THE TRAINING CENTER IN THE CLASSROOM AREA. THE OIC IS LEADING FROM THE FRONT IN THE CONFINED HALLWAY AND THE POINT IS DIRECTLY BEHIND HIM WITH THE ROPE. **(FIGURE 11)** THE OIC LEAVES THE POINT/ROPE AT THE DOOR AS HE SEARCHES THE ROOM. COMMITTING THE ROPE INTO ROOMS OR DEAD ENDS HAVE PROVEN TO BE INEFFICIENT. [PHOTOS BY ROBERT HERNANDEZ]

8. In certain commercial occupancies, the OIC may need to alternate between the two options, guide from the back and lead from the front, based on the specific conditions encountered during the search.
9. When the search is complete or the crew has reached their terminal distance (200 feet), the rope will be anchored and left behind for future if needed. The crew will exit, following their rope line back to the origin. Gathering large amounts of rope is time consuming, problematic and can be dangerous.

Top

10. While it seems that the GIB is not doing much during this search, please remember that he or she should have tools and should be conserving their energy for victim removal—a situation in which they will be expending vast amounts of energy.

RED LINES = ROPE PERIMETER HIGHLIGHTED AREA = SEARCHED PERIMETER AREA WITH THE TIC

THE PERIMETER ROPE TIC SEARCH STARTS WITH ONE OR MULTIPLE SEARCH CREWS DEPLOYING SEARCH ROPES CLOSE TO THE EXTERIOR WALLS CREATING A FIXED ROPE PERIMETER THAT CAN BE USED LATER INTO THE ASSIGNMENT FOR MORE SEARCHING. CREWS CAN ENTER THROUGH THE SAME OR DIFFERENT ENTRY POINTS AND WILL SEARCH AS THEY DEPLOY THE ROPE.

Top

Key Points – Perimeter Rope TIC Search:

- Crew members must always maintain voice contact.
- All crew members must make verbal and mental notes of important structural layouts and call them out to the crew as they move. They must also announce when an area has been cleared, when a door has been closed, when they come in/out of a room, when they on a new wall, when they anchor to change directions and when they find a victim. Closed loop communications are the key to success.
- There should be at least two tools amongst the crew. Remember, these tools are not 'search aids' and shouldn't be used for sweeping. They are mainly meant for self-rescue or egress if the need arises.
- Keeping the rope taut and off the ground if possible is very important.
- When a crew finds an egress point, they will advise the IC the location of the egress, quickly exercise the door, then keep the door in the closed position but unlock and anchor the main rope as close as possible to the door.
- The Point must move in a straight line and anchor on any change of direction.
- Depending on the size of the building, the IC may send multiple search teams from multiple entry points. If the IC sends teams from different entry points, both may search in the same direction. If they go in from the same entry point, they will search in different directions, one left and one right.
- In rooms and hallways, where there might be intersections and multiple options to advance, the OIC will guide from the front. Guiding from the front keeps the rope from advancing into dead ends and avoids having to back up and gather rope. Keep the Point as an anchor at the door as well as in hallways and intersections, while the OIC checks ahead for the right path.
- The OIC should not be limited to being attached to the rope. The OIC may roam close by but must be disciplined and stay within voice distance. The OIC can clear space from different angles and look over and around small obstacles that are close by.
- If the TIC malfunctions at any point, the crew must immediately stop their search, anchor their rope, and retreat to the first egress. They should leave all rope lines in place and complete an exchange with the crew that is replacing them so they can pick up where they left off.
- When an on-deck crew is deployed for any reason, the IC must replace them with a new crew if possible.
- Key points of communication that must occur with the IC or Division Supervisor:
    - When a crew enters and when they exit with par.
    - Anytime a crew reaches the end of a rope bag. (200 feet max depth without IC approval). The crew must advise the IC of their location, conditions, and air.

Top

- The light smoke should not lure team members into complacency or a false sense of security. In some cases, as the members move farther into the structure, conditions will worsen.
- While the OIC will always direct the search with the TIC, all available TICs for the unit should be deployed.
- Finally, the search rope used in the perimeter search will not be gathered up. If a crew has reached their limit or completed their search, they will tie off at the farthest point, and then follow the rope out to the ingress point. It is unsafe and unrealistic to try to gather large amounts of deployed search rope in zero visibility during a firefight.

Backbone Rope TIC Search

A backbone search supplements the perimeter search by allowing searchers to use the perimeter rope as a launching point deeper into the structure and away from the perimeter walls. The Backbone Search leaves the Point at the junction of the two ropes, the Perimeter, and the new search rope that is attached to the Perimeter. The OIC and GIB can advance with their rope into the new space. The main difference between the two searches is that after the search into the new area, the crew will return to the anchor and gather their rope for redeployment into a different space.

When to perform a Backbone Rope TIC Search:

1. The Backbone Search is ideal for large, open warehouses with long aisles (big box stores, etc.) (Figure 12).
2. Can be utilized for 'cold smoke' fires where a small smoldering fire exists in a large warehouse and search crews can search to find it.

(FIGURE 12) STATION 30 ENGAGED IN DRILLING ACTIVITIES AT THE USAR WAREHOUSE WHILE CONDUCTING A BACKBONE SEARCH.

Crew Responsibilities Backbone Rope TIC Search:

Crew Responsibilities in this search are basically the same as in the Perimeter Rope TIC search with all differences explained in the following step-by-step section.

Top

Step by Step – Perimeter Rope TIC Search:

1. Assigned to complete a 'Backbone Search' by the IC or Division Supervisor.
2. When the crew first enters a space the OIC will penetrate approximately 10 feet, scan the immediate area for victims and perform a 3-level scan prior to advancing.
3. Start the search on a deployed Perimeter Rope and look for 'areas of opportunity' to shoot the backbone rope (max 100 feet) off the perimeter rope.
4. Will direct the Point to anchor the junction between the backbone and perimeter rope and wait for their return. This is the only time the crew may be further than voice distance, but they are still tethered by rope and thus maintaining accountability.
5. The OIC and GIB will advance into the space with their rope bag and search for victims. After clearing the area, they will gather the rope, return to the anchor/Point, and move down the perimeter rope looking for the next area of opportunity.
6. The Point will leave their hand light on as a beacon for the crew to return.
7. The Point will maintain orientation with the perimeter rope and walls.
8. If the Point has a TIC, they will use it to monitor the progress of their crew while they maintain the backbone anchor and if the GIB has a TIC, they will use it to assist in searching for victims, but neither will use it to guide the search.

RED LINES = PERIMETER ROPE = BACKBONE ROPE HIGHLIGHTED AREA = BACKBONE SEARCHED AREA

THE BACKBONE ROPE TIC SEARCH STARTS WITH ONE OR MULTIPLE SEARCH CREWS DEPLOYING SEARCH ROPES OFF THE FIXED ROPE PERIMETER TO SEARCH AREAS OF INTEREST, DEEPER INTO THE MIDDLE OF THE STRUCTURE. CREWS SHOULD DEPLOY ROPE OFF THE MAIN PERIMETER ROPE AND GATHER IT BACK UP TO REPEAT THIS SEQUENCE AS MANY TIMES AS REQUIRED.

Top

IN THIS INSTRUCTIONAL VIDEO, THE FIREFIGHTERS SHOWCASE THE EFFECTIVE AND SECURE METHODS FOR CONDUCTING A LARGE AREA SEARCH. BY EMPLOYING BOTH THE PERIMETER ROPE TIC SEARCH AND THE BACKBONE ROPE TIC SEARCH, THIS DEMONSTRATION ILLUSTRATES TECHNIQUES AND TACTICS THAT ENSURE A SAFE AND EFFICIENT SEARCH PROCESS. VIEWERS WILL WITNESS THE REMARKABLE EFFICIENCY ACHIEVED THROUGH THE UTILIZATION OF THE TIC, ENABLING THE SWIFT CLEARANCE OF EXTENSIVE AREAS. [VIDEO BY ROBERT HERNANDEZ]

Key Points – Backbone Rope TIC Search:

- Crew members must maintain voice contact and contact with the rope. This is how you maintain constant accountability.
- There should be at least two tools among the crew. Remember, these tools are not ‘search aids’ and shouldn’t be used for sweeping. They are meant mainly for self-rescue and or egress if the need occurs.
- The initial crew can help the IC determine how many extra crews will be required to search off the perimeter line and where they should go.
- Keeping the rope taut and not allowing any extra rope to be taken from the bag is imperative.
- The Point must move in a straight line and look for a place to create an anchor when there is a change in direction.
- The OIC is not limited to being attached to the rope, but they must be disciplined and stay within voice distance of the crew. They may clear nearby objects with the TIC as long as they are within voice distance.
- If the TIC malfunctions at any time, the crew must find the closest place to anchor if possible, retrieve back to nearest egress, and advise the IC who will replace them with a crew who has a functioning TIC.

Top

- When an on-deck crew is deployed for any reason, the IC must replace them with a new crew if possible.
- Communication is vital among the crew and with the IC. Here are some key communication moments:

(FIGURE 13) LT. MAYORGA AT AN ACQUIRED STRUCTURE, COMMUNICATING WITH THE IC WHILE PERFORMING A LARGE AREA SEARCH DRILL. [PHOTO BY RICARDO STEPHENS]

  - With the IC on Ingress and egress with a par. (Figure 13)
  - Type of search and direction with your crew and the IC.
  - When a crew reaches the end of any rope bag at 100 feet and at 200 feet. The crew must advise the IC of their location and air supply.
  - Advise the IC when a section of the backbone or perimeter has been completed.
  - When transferring to the on-deck crew, the search crew should advise where they left off and how they anchored the rope.
  - Other reports to the IC that are always required are deteriorating conditions, additional egresses found, fire location, identified hazards and victims found.
- Closed-loop communication must be constant.
- The 3-level scan allows us to check conditions, floor plans and layouts, locate victims, roof construction, overhead storage and any other hazards.
- Know the limitations of the TIC and use it appropriately. The TIC can be slow to react, it cannot see through objects, and requires a temperature differential for good visibility. Only use the TIC as a tool while in a stationary position during a scan stop, and don't rely on it while you travel.
- If the picture is unclear or if you're uncomfortable with the TIC, let the IC know the issue and exit the structure.
- Light smoke should not lure team members into complacency or a false sense of security. As crews move farther into the structure, conditions may worsen.
- Monitoring air consumption is imperative and not only the OICs responsibility.
- Team members should adhere to their training and techniques, relying on the principles of rope deployment involving anchor, point, and shoot when making changes in direction.
- Ideally all crew members should have a TIC.

Top