DRAPER CITY FIRE DEPARTMENT

TRUCK COMPANY OPERATIONS

2024 Edition

Version 1

FOREWORD

Deputy Chief Steve Pearson

From the new beginning of Draper Fire Department in 2017, we have brought together members from multiple agencies across the state into one location. They were tasked with building our department from the ground up by incorporating policies, procedures, equipment, personnel, and much more. There have been many successes as this heavy task was undertaken by Chief Clint Smith and Deputy Chief Bart Vawdrey along with several other key members.

We have reached a part in the development of Draper Fire Department to create and establish standardization across our firefighting operations. Members of the 2024 training cadre were tasked with the modification of this manual to adapt it in an effort to meet the needs of Draper City residents. This manual will serve as the Standard Operation Guideline (SOG) manual for our department in which each member is responsible to understand and meet. These SOG's will elevate our service to a higher level, and standardize our operations across all platoons.

Firefighters are adaptable to changes that come across our industry and have been for many years. This is a manual that will stand for our Standard Operating Guidelines with the understanding that changes in operations, technology, or training may change the way Draper Fire Department operates. Revisions to this manual will be fully vetted and updated annually. Any new updates will be distributed to department personnel to ensure they have the most current and up to date information.

I look forward to seeing each of you put this information to work and excel at your skill set. You are each amazing individual's and Draper City is lucky to have you as a member of this department. Thank you for being a part of this great agency!

CHIEF'S MESSAGE

Chief Clint Smith

The creation of the engine and truck training manuals will serve as a critical tool in standardizing training across our department, ensuring that all personnel are equipped with the same foundational knowledge and operational procedures. By having clear, detailed manuals, every team member can consistently reference best practices for fire operation, maintenance, and emergency response protocols. This consistency not only minimizes errors but also enhances our ability to respond swiftly and effectively to residents' needs. With standardized training, we can ensure a higher level of preparedness, improving overall efficiency and reducing response times, ultimately leading to better outcomes for the community we serve.

Additionally, the manuals will support individual professional development by providing a structured framework for continuous learning, helping personnel increase their competency in both technical skills and emergency decision-making. This commitment to training aligns with our core values of teamwork, accountability, and community, fostering a culture of growth and ensuring that every team member is prepared to meet the challenges of their role while upholding the highest standards of professionalism.

Thank you to all those that have helped in the development of these manuals for their continued dedication to their craft, our department, and the community we serve. It is an honor to work with you and to be part of this noble profession.

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SECTION 1
Introduction

This manual is dedicated to the men and women of the Draper City Fire Department. This manual should be used as a guideline to direct Truck Company functions on the fireground. Truck functions on the fireground are commonly broken down into 7 tactics. These tactics are **ventilation, search, forcible entry/exit, ladders, utilities, salvage,** and **overhaul.** ****The goal of Truck companies should be to support Engine companies in accomplishing the incident priorities of Life Safety, Incident Stabilization, and Property Conservation (LIP)****. Engine Companies tactics include fire attack, backup/secondary lines, and water supply. Truck companies' priorities are ensuring a rapid search of the building is accomplished and all occupants removed, as well as aiding the Engine companies in rapidly extinguishing the fire and protecting further loss of property.

Incident Commanders (IC's) and Company Officers (CO's) should be utilizing this manual to help guide Truck Companies on various incidents. This manual breaks down truck functions several different ways. The first is by breaking down truck functions by occupancy type. The second is by geographical area. The third is by assignment. IC's and CO's should strive to adhere to these guidelines to ensure trucks are being utilized to their highest potential. These guidelines should be referred to in AAR's (After Action Report's). These guidelines should also be utilized to guide and direct company and multi-company training.

The goal of this manual is to help improve Truck Company, and therefore overall Fireground operations by creating Standard Operating Procedures, (SOP's) that the entire organization strives to adhere to. Regarding standard operating procedures Jocko Willink stated, "STANDARD OPERATING PROCEDURES DON'T MAKE ORGANIZATIONS MORE RESTRICTED OR CONSTRAINED. ACTUALLY, THE OPPOSITE IS TRUE. STANDARD OPERATING PROCEDURES GIVE ORGANIZATIONS ALL KINDS OF FREEDOM, BECAUSE EVERYONE INVOLVED AUTOMATICALLY KNOWS WHAT TO DO, HOW TO DO IT, AND THE TIME NECESSARY FOR COMMUNICATION, EXPLANATION, AND DECONFLICTION IS MINIMIZED. IN THIS MANNER, DISCIPLINE GIVES EVERYONE INVOLVED COMPLETE FREEDOM TO RAPIDLY EXECUTE".

Thanks to the Clark County Fire Department, Clackamas Fire District #1, Orem Fire Department, and the Los Angeles City Fire Department for their contributions to this manual.

SECTION 2

Fireground Priorities and Crew Utilization

1. DCFD Truck Companies

Currently (2024) there is one Truck company in the Draper Fire Department. This Truck is a quint and can be utilized as either an Engine or Truck. Careful consideration should be used by IC's and CO's in determining how it will be used since it is the only apparatus with particular abilities. For both residential and commercial responses, the VTA response stacks should be utilized.

2. Incident Priorities — LIP

1. Life Safety — Civilians, then fire fighters

2. Incident Stabilization

3. Property Conservation

Every decision made on the fire ground should be made with a conscious effort to address these time proven incident priorities in order, with life safety being the most critical.

3. Primary Tactical Objectives (Not in order)

- Fire Attack
- Ventilation
- Search
- Forcible Entry/Egress

Three of the primary tactical primary objectives are traditionally categorized as "Truck Work". These three objectives have a direct impact on the life safety of our firefighters as well as the unprotected civilians we serve. These four objectives must occur as simultaneously as possible at every building fire. Each of these objectives address our incident priorities of providing life safety, stabilizing the incident and protecting property.

For example, ventilation will:

•Life Safety — Make interior conditions more tenable for crews and victims by lifting heat build-up, increasing visibility and removing noxious fire gasses.

•Incident Stabilization — Help control the path of fire.

•Property Conservation — Provide for property conservation by allowing interior crews to access the fire quicker and remove byproducts of combustion.

4. Engine Work and Truck Work

There are two basic types of "work" being performed at a building fire in the offensive strategy; Engine Work (extinguishment) and Truck Work (fireground support). Fire Attack, Backup/Secondary, and Water Supply are the three main tactical and task level assignments which engine companies are traditionally responsible for. The remaining assignments fall under the category of Truck Work or Support Work.

The description of Truck Work does not pertain to the specific apparatus itself, i.e., only truck companies perform ventilation or search (regardless of their time of arrival). This is simply a way to better understand and efficiently organize the fireground. With that being said, priority should be given to ML21, and other arriving trucks to perform truck assignments on the fireground.

Truck Work is any work that supports the engine companies' extinguishment efforts and ensures the fire building has been searched and all fire victims have been extricated from the building as rapidly as possible. "Fire under control" is only a portion of incident stabilization and fireground support must

continue to fully meet the needs of the incident.

Due to the possibility of Trucks being out of service or already on calls, Engines could be utilized in their place. Fireground support operations must be performed swiftly and safely regardless of whether there is a truck on scene or not. All firefighters should have a working knowledge of fireground support functions. There will, however, be many times when trucks and engines are in service and arriving on scene in a manner where the IC can and should obtain multiple benchmarks simultaneously and in a timely manner. This manual can be utilized by all IC's, regardless of the order of arrival, as support operations are necessary. This will have a measurable level of increased safety and efficiency at the scene of fires.

5. Earlier Risk Mitigation

By splitting the truck company and accomplishing multiple support functions (i.e., vent, search, and forcible entry/egress) simultaneously with fire attack, the safety of interior companies and civilians will be maximized.

The seven basic truck functions on a building fire can be organized and prioritized by dividing the fireground into three geographic areas; Topside, Inside, and Outside. By inserting each tactic and task where it belongs geographically and in the order of importance based on LIP, we can begin to have a better understanding of when, where, and how these tasks should be accomplished.

a) TOPSIDE TRUCK WORK — The roof of the structure

- Roof Report — Global size up of roof and C-side view, if possible, including: construction, stability, fire conditions, loads, and victims from windows = life safety.
- Vertical Ventilation — Life safety, incident stabilization, property conservation.

b) INSIDE TRUCK WORK — The interior of the structure

- Search = Life safety, incident stabilization
- Overhaul = life safety, incident stabilization
- Salvage = incident stabilization, property conservation

c) OUTSIDE TRUCK WORK — The exterior of the structure

- Forcible Entry/Egress = Life safety, incident stabilization
- Ladders = Life safety
- Utilities = life safety, incident stabilization, property conservation
- Horizontal Ventilation = life safety, incident stabilization, property conservation

d) The highest prioritized objective or task within each geographic area is as follows:

- Topside = Ventilation
- Inside = Search
- Outside = Structure will determine which comes first but anticipate the need for both "softening the structure" (forcible entry/exiting) and proactive laddering.

SECTION 3
Crew Size and Accountability

All truck functions performed on the Fireground will be attempted to be performed by the Truck crew and its attached units. Fireground priorities can and will change, based on the incident and building type. These Truck functions are also "Split" into geographic areas. These geographic areas include; Topside, Outside, and Inside teams. The priorities and geographic areas will be addressed in Section 4 pertaining to the building type involved. Some typical Truck functions may also be performed by the Engine companies.

To keep crew continuity, every attempt should be made to keep a Truck station's crew attached to their respective Truck. Crew sizes will be based on 3-man companies, with options for a 4th man. In the instance of an inexperienced truck crew, an additional unit may be attached to the truck to complete the tasks.

1. Crew Size and Combinations

Examples:

a) Truck Company crew total of three

* 3 › enables one geographic area to be addressed

* 2, and 1 › enables two geographic areas to be addressed (e.g., a Topside Team and a firefighter addressing outside functions)

b) Truck company crew total of four

* 4 › enables one geographic area to be addressed.

* 2, and 2 › enables two geographic areas to be addressed (e.g., Topside & Inside)

c) Truck company crew total of five (3-man truck, and medic ambulance)

* 5 › enables one geographic area to be addressed.

* 3, and 2 › enables two geographic areas to be addressed.

* 2, 2, and 1 › enables three geographic areas to be addressed, (e.g., a Topside, and Inside team, and firefighter to address Outside functions which have been identified as urgent) (e.g., proactive laddering to 2nd floor windows).

*One firefighter is not an acceptable minimum crew size and should only be permitted to operate on the roof or inside by themselves in very limited capacities. Single firefighter operations should be limited to outside functions outside of the IDLH, in the event outside laddering or softening of the structure is needed immediately. Should the firefighter attempt to rejoin the Inside or Topside team, face-to-face communication will need to be made with those crew members.

d) The expectation is that the truck companies will "Split" whenever possible. However, when neither the fire building nor the truck company's experience permit the "Splitting" of the crew, then a crew of five or four is acceptable.

2. Accountability

The Incident Commander retains overall command and control of the incident. The Truck officer has the option to "split" and accomplish simultaneous assignments based on the following conditions: Building size and layout, fire conditions, and the officers

comfort level with the crew's experience. On arrival, the truck officer will inform the IC of the following three items:

1) Crew size (3 to 5)

2) Ability to split (if able)

3) How many teams the truck is capable of splitting into (two or three)

Having received the above information from the truck officer, the IC will acknowledge and advise the truck officer whether or not to split and which areas or assignments to cover.

> Radio Traffic: *"Command MA21 is on scene with 2." "Command copies." "Command ML21 is on scene with 3 and can split, three and two with MA21 crew." "Command copies ML21 is on scene and can split. ML21 I'm going to assign you Ventilation and search." "ML21 copies we will be sending two Topside for Ventilation and one for search."*

In the above, Command recognizes that MA21 is on scene but waits until ML21's arrival to make assignments. Upon ML21's arrival, they assess whether or not they can split and cover multiple assignments, based on building and fire conditions.

Examples:

Scenario 1: You are the Truck Officer on ML21. MA21 arrived on scene with 2 just prior to your arrival. You arrive at a single-story single-family dwelling with fire showing from an Alpha Bravo window. Engine 22 has arrived on scene prior to you and initiated a Fire Attack. You have a walkable pitch roof with minimal obstacles in the front yard to make access to the roof. You feel as though this roof operation will not take more than 2 to 3 personnel to accomplish. You make the decision to split your crew of 5. You, your Engineer and your Tillerman will go to the roof for Topside Ventilation and you will send your 2 firefighters Inside for Search.

> Radio Traffic: *"Command MA21 is on scene with two." "Command copies." "Command ML21 is on scene with 4 and can split." "Command copies ML21 is on scene and can split. ML21 I'm going to assign you Ventilation and Search." "ML21 copies we will be sending three Topside for Ventilation and two Inside for Search."*

Scenario 2: You are the Truck Officer on ML21. MA21 arrived on scene with 2 just prior to your arrival. You arrive at a two-story single-family dwelling with fire showing from a 2nd story window on the Charlie side. Engine 22 has arrived and initiated a Fire Attack. You are presented with a steep pitch roof with multiple obstacles to where you would like to ladder the roof on the Charlie side. You feel that to make the roof operations quick you will need your entire crew of 4 Topside for Ventilation.

> Radio Traffic: *"Command MA21 is on scene with two." "Command copies." "Command ML21 is on scene with 3." "Command copies ML21 is on scene. ML21 I'm going to assign you Ventilation." "ML21 copies we will be going all Topside for Ventilation with 5."*

In the above example, due to conditions, ML21's Captain does not advise Command that they can split. Command recognizes this and gives ML21 only one assignment. Which shall be the one with highest priority. ML21 advises Command that they are going Topside to accomplish their assignment and that they are taking all five members.

3. Riding Positions

It is critical that each morning the Truck Captain gets with his crew and decides how his Truck Company will be split. In the team that is split without the Captain, the Engineer or Senior Firefighter will be the team leader. The team leader will be responsible for crew

accountability and normal radio traffic.

Riding Positions:

Topside Team:
Captain — Scabbarded Tool, 2nd Hook, Saw, or Tactical Sup. for Roof Team

Engineer — Scabbarded Tool, Lead Saw (responsible for roof operations)

Charlie FF — 2nd Saw Medic

Delta FF — 2nd Hook

Inside Team:
Captain — Personal tool, TIC, 4 gas, Hook if applicable

Engineer — TIC and/or personal TIC, Irons, ladders if needed

Charlie FF — Personal TIC and tool, Can

Delta FF — Personal Tool, Hook if applicable

Outside Team:
Captain — Personal Scabbarded Tool, TIC, Hook if applicable

Engineer — Irons, Rotary Saw, Ladders

Charlie FF — Ladders, Hook, Personal Tic

Delta FF — Irons, Rotary Saw, Ladders

All positions are subject to change based on the fireground priorities and the need to split.

SECTION 4

Truck Operations by Building Type

1. Single Family Dwellings

Single Family Dwellings within the Draper City and surrounding jurisdictions are commonly Type V (wood-frame) construction. Basements are common and should be expected.

The majority of the construction is lightweight, with the roof systems being built out of smaller diameter wood trusses, spaced 24" o.c. (on center) Roof decking will consist of OSB (oriented-strand board), or plywood which is covered with asphalt, or wood shake shingles. Concrete or solar tiles can be found but are uncommon. Outside load-bearing walls should be considered your strong areas to walk. Lightweight construction offers many opportunities for fire spread through voids in walls, soffits, and the attic space. If unchecked, this can lead to fire spread and partial collapse of the areas involved.

There are conventionally constructed homes in older portions of the city which allow for longer burn times and greater structural stability. Conventionally constructed (True dimensional) rafters are usually spaced 16" o.c., with either plywood decking or straight sheathing, (1"x6"). In addition to your outside walls, hips, valleys, and ridges are strong portions of these roofs.

Fireground Priorities for Single Family Dwellings

- Ventilation
- Search
- Forcible Entry/Egress
- Ladders
- Utilities
- Salvage
- Overhaul

Fireground priorities for Truck functions will be split between the Truck, and the attached Ambulance. The first arriving Truck on a single-family dwelling should expect to receive the following assignments; Ventilation and Search in that priority. If the first arriving Truck Captain cannot split his crew due to an assignment need for the full company, or the lack of an ambulance, the remaining assignments should be given to available Engine units on scene. If assigning multiple units to Search, i.e., the Ambulance should be called by their operational division such as Division 1Search, instead of Search (1) Search (2), to better track units.

Geographic Assignments:

Inside Ops	Outside Ops	Topside Ops
Search	Ventilation	Ventilation
Overhaul	VES	Roof Reports
Salvage	Forcible Entry / Egress	
	Ladders	
	Utilities	

Tool Cache: (may include but not limited to)

Inside Ops	Outside Ops	Topside Ops
Irons	Irons	Ventilation
Hook(s)	Rotary Saw(s)	Roof Reports
TIC	Ladders	Drop Bag
Attic Ladder	PPV	Roof Ladder(s)
Salvage Equipment	Can	Scabarded Axes
Can		Attack Line

Truck Functions for Single Family Dwellings

Ventilation:

1. Vertically through roof openings should be top priority

   a) Cut over the fire barring any attic space involvement. With attic space involvement, trade space for time.

   b) Cut over the hallway.

   c) For garage fires, ventilation over the garage is not recommended. Topside teams should stop short of the garage at the firewall separating the home from the garage. From this position, an inspection cut followed by appropriate offensive and/or defensive cuts can occur without having to traverse over the garage.
      - Garage roof systems in older homes are not typically protected with sheetrock and frequently contain heavier fuel loads.

   d) For multiple story homes with fire on lower levels, cut over the stairwell

   e) For multiple story homes with fire on the top floor, cut over the fire barring any attic space involvement. With attic space involvement, trade space for time, followed by cutting over the hallway.

2. Horizontally via a window in the fire room or roll up garage door.

   a) **Arbitrary window breaking or "guessing" at which window to take is unacceptable.**

   b) Size up smoke during 360 and use the TIC to aid in this decision.

   c) Ensure Fire Attack is ready to make entry prior to "taking the glass". This will limit fire spread while providing a horizontal exhaust for the hose team to push steam and fire gasses out of and away from interior companies.

   d) PPV should only be started after fire is declared "under control" or Fire Attack has located the fire and is actively making progress on the attack, and coordinated with interior teams.

Search: WE ASSUME THERE ARE VICTIMS UNTIL PROVEN WRONG

1. Ask escaping occupants or bystanders where victims may most likely be found.

2. Size up the structure and determine location of fire, floor stability, bedrooms, access/egress points, and potential victims.

3. Initiate primary search through the appropriate entrance taking into consideration fire conditions and potential location(s) of victims. If making entry prior to Fire Attack, weigh the benefit of finding the fire location first, and attempting to isolate it prior to initiating search.

4. Conduct searches using oriented man procedures. Rooms should be performed with one "oriented man" maintaining the entrance to the room, isolating, and listening to the radio for changes on the Fireground while the other ventilates and actively searches the room.

5. Consider split search and VES based on fire conditions and comfort.

6. Forcible entry needs could be initially accomplished by the Search team. Strong consideration should be given prior to committing to a search to open the "C" side door, as a secondary means of access/egress.

Forcible Entry/Egress:

1. Confirm the primary entrance/egress is unobstructed for interior crews.

2. Complete 360 and soften secondary egresses while maintaining door control.

3. If the fire is in the garage, consider opening the overhead garage door with an appropriate method for entry/egress points and potential victims.

Ladders:

1. Place ground ladders to any and all upper floor windows/balconies beginning nearest the fire and working away.

2. Recognize potential for ladders to be thrown to taller first floor windows for rapid FF egress.

3. Recognize potential for ladders to be thrown to basement windows where they can fit.

4. Place secondary ladders to the roof for topside egress.

Secondary Search:

1. Coordinate with initial primary search teams.

2. Searches should consider starting near the fire working back.

3. Secondary searches by nature should be more thorough and methodical.

Utilities:

1. Turn off utilities to the structure (gas and power).

2. Water does not generally have to be secured unless requested by Command.

Salvage:

1. When possible, cover and protect items below the ceiling prior to pulling for attic fires.

2. For IC, gain information from occupants that are salvage priorities and locations of those items.

3. Make determinations on what to remove from the structure or to cover in place.

4. Close doors to keep contaminants out of non-affected rooms.

5. Use floor runners where practical.

Overhaul:

1. Identify suspected point(s) of origin and open all areas involved to expose any hidden fire. Be mindful of subfloors, overhead voids, walls, window casements, door frames, cabinets and soffits. *Make mental notes of fire pathways and spread for investigations*
    * Recognize potential for both vertical and lateral fire spread within the structure and expose areas as necessary.

2. Large amounts of personal storage are typical in single-family dwellings and can hide smoldering fires.

3. Remove and sort combustibles that were involved in the fire area to ensure extinguishment.

4. A good rule of thumb is to pull all combustibles away from the wall by a foot in the fire area.

2. Mobile and Manufactured Homes

Mobile homes (also called manufactured housing) are prefabricated off-site and transported in one or more sections for assembly. Mobile homes may be single-wide or double-wide and typically range from 8 feet wide or greater to 40 feet or more in length.

The kitchen and living space are usually on one end with the bedrooms at the other.

There's usually limited access/egress with two-man doors, with only one being used regularly. Expect narrow hallways, relatively small window openings and minimal interior fire stops.

The largest void space is between the floor joists and ground and should be sounded when interior. Firefighters should also be aware of a small truss space that may be present in the overhead. This space on homes with a slight pitch is similar to a common attic, however much smaller.

Fireground Priorities for Mobile Homes

1. Search
2. Forcible Entry / Egress
3. Ventilation
4. Utilities
5. Ladders
6. Overhaul
7. Salvage

Geographic Assignments:

Inside Ops	Outside Ops	Topside Ops
Search	Forcible Entry / Egress	Roof Ops Not Recommended
Overhaul	VES	
Salvage	Ventilation	
	Utilities	
	Ladders	

Tool Cache: (may include but not limited to)

Inside Ops	Outside Ops	Topside Ops
Irons	Irons	Roof Ops Not Recommended
TIC	PPV	
Hook(s)	Rotary Saw(s)	
Salvage Equipment	TIC	

Truck Functions for Mobile and Manufactured Homes

Search:

1. Ask escaping occupants or bystanders where victims may most likely be found.

2. Size up the structure and determine location of fire, floor stability, bedrooms, access/egress points, and potential victims.

3. Initiate search through the appropriate entrance taking into consideration fire conditions and potential location(s) of victims.

4. Consider VES. Consider turning walls and windows into larger openings for rapid search and victim removal.

Forcible Entry and Egress:

1. Confirm primary entrance and egress is unobstructed for interior crews.

2. Complete 360 and soften secondary egresses while maintaining door control.

3. Consider turning walls or windows into large openings for points of rapid egress and larger vent ports.

Ventilation:

Communication with Fire Attack is critical to maintain coordination.

1. Horizontally via a window in the fire room.

a) Arbitrary window breaking or "guessing" at which window to take is unacceptable.

b) Size up smoke during 360 and use the TIC to aid in this decision.

c) Ensure Fire Attack is ready to make entry prior to "taking the glass". This will limit fire growth while providing a horizontal exhaust for the hose team to push steam and fire gasses out of and away from interior companies.

d) Consider turning walls or windows into large openings for points of rapid egress and larger vent ports.

2. Vertical Ventilation is not advised on these types of structures.

Utilities:

1. Turn off utilities to the structure (gas and power).

2. Consider the possibility of power theft and confirm with interior crew(s) that power is secured.

3. Water does not generally have to be secured unless requested by Command.

Ladders:

1. Recognize potential for ladders to be thrown to taller windows for rapid FF egress and/or victim removal.

Manufactured homes may be on a built-up foundation; window sills could be several feet higher than normal.

Overhaul:

1. Identify suspected point(s) of origin and open all areas involved to expose hidden fire. Be mindful of spaces below the floor, above the ceiling, walls, window casements and door frames.

2. Recognize potential for weakened floors and the area below.

    a) Access hatches are common in these structures and can be less destructive in checking for extension.

3. Remove and sort combustibles that were involved in the fire area to ensure extinguishment.

Salvage:

1. Ask occupants which items are salvage priorities and locations of items.

2. Make determination to remove from the structure or cover in place.

3. Close doors to keep contaminants out of non-affected rooms.

4. Use floor runners where practical.

3. Garden Style Apartments

Garden apartments are plentiful throughout the city. They usually range from two to 5-stories. They can be constructed of lightweight or conventional construction with either flat or pitched roofs. Every apartment exits to either a courtyard, landscaped area, or common breezeway. There are no internal stairwells or hallways that access any of the apartments.

Fireground Priorities for Garden Style Apartments

- Ventilation
- Search
- Ladders
- Forcible Entry/Egress
- Utilities
- Overhaul
- Salvage

Geographic Assignments:

Inside Ops	Outside Ops	Topside Ops
Search	Ventilation	Roof Report
Overhaul	VES	Ventilation
Salvage	Ladders	
	Forcible Entry / Egress	
	Utilities	

Tool Cache: (may include but not limited to)

Inside Ops	Outside Ops	Topside Ops
Irons	Irons	Chainsaw(s)
Hook(s)	Ladders	Hook(s)
TIC	Rotary Saw	Drop Bag
Salvage Equipment	PPV	Ladder(s)
		Scabarded Axes
		Hose Line

Truck Functions for Garden Style Apartments

Ventilation:

Communication with Fire Attack is critical to maintain coordination.

1. Vertically through roof openings.

   a) For top floor fires, cut over fire barring any attic space involvement (with attic space involvement, trade space for time).

   b) Prepare for defensive cuts

   c) Consider diagnostic cuts in utility voids to check for fire extension

   d) Even in lower floor fires crews should go to the roof to check for possible extension into the common attic space. Fire spread through utility voids and HVAC systems, and exterior fire spread can quickly spread into the attic.

2. Horizontally via a window in the fire room.

   a) Arbitrary window breaking or "guessing" at which window to take is unacceptable.

   b) Size up smoke during 360 and use the TIC to aid in this decision.

   c) Ensure Fire Attack is ready to make entry prior to "taking the glass". This will limit fire growth while providing a horizontal exhaust for Fire Attack to push steam and fire gasses out of and away from interior companies.

   d) PPV should only be started after fire is declared "under control", and coordinated with interior teams.

Search:

1. Ask escaping occupants or bystanders where victims may most likely be found. (Confirm they reside in the building involved)

2. Size up the structure and determine location of fire, floor stability, bedrooms, access/egress points, and potential victims.

3. Initiate primary search through the appropriate entrance taking into consideration fire conditions and potential location(s) of victims.

4. Search must occur above, adjacent to, and below the fire apartment.

5. Conduct searches using oriented man procedures. Rooms should be performed with one "oriented man" maintaining the entrance to the room, isolating the room, and listening to the radio for changes on the Fireground while the other ventilates and actively searches the room. A water can will be brought with you if you're in front of Fire Attack.

6. Consider split search and VES based on fire conditions and comfort.

Ladders:

1. Ground ladders to any and all upper floor windows/balconies beginning nearest the fire and working away.

2. Ground ladders to exterior walkways if fire conditions have cut off civilians' egress via stairs.

3. Secondary ladders to roof for topside egress.

Forcible Entry/Egress:

1. Gain access to the building.

2. Confirm primary entrance/egress is unobstructed for interior crews.

3. Force entry to adjacent occupancies, working away from the fire, until you find a non-IDLH environment.

4. Consider balcony doors as a secondary egress for the fire unit.

Secondary Search:

1. Coordinate with initial primary search teams.

2. Searches should start near the fire working back.

3. Secondary searches by nature should be more thorough and methodical.

Utilities:

1. Confirm with command via radio if utilities to the entire building need to be secured or if only the affected unit should be secured.
a) Consider total building shutdown when the fire has extended into common utility voids.

2. Once confirmed secure gas and power.

3. Turning off water in these structures is more likely due to a sprinkler activation and may require locating a riser and turning off the supply to the system.

Overhaul:

1. Identify suspected point(s) of origin and open all areas involved to expose any hidden fire. Be mindful of subfloors, overhead voids, walls, window casements, door frames, cabinets and soffits.

a) Recognize the potential for both vertical and lateral fire spread within the structure and expose areas as necessary.

2. Uninhibited fire spread is common in utility chases and into the attic space. Be aware of fire spread through floors and ceilings into these common areas. Expose as necessary.

3. Remove and sort combustibles that were involved in the fire area to ensure extinguishment.

4. A good rule of thumb is to pull all combustibles away from the wall by a foot in the fire area.

Salvage:

1. When possible, cover and protect items below the ceiling prior to pulling for attic fires.

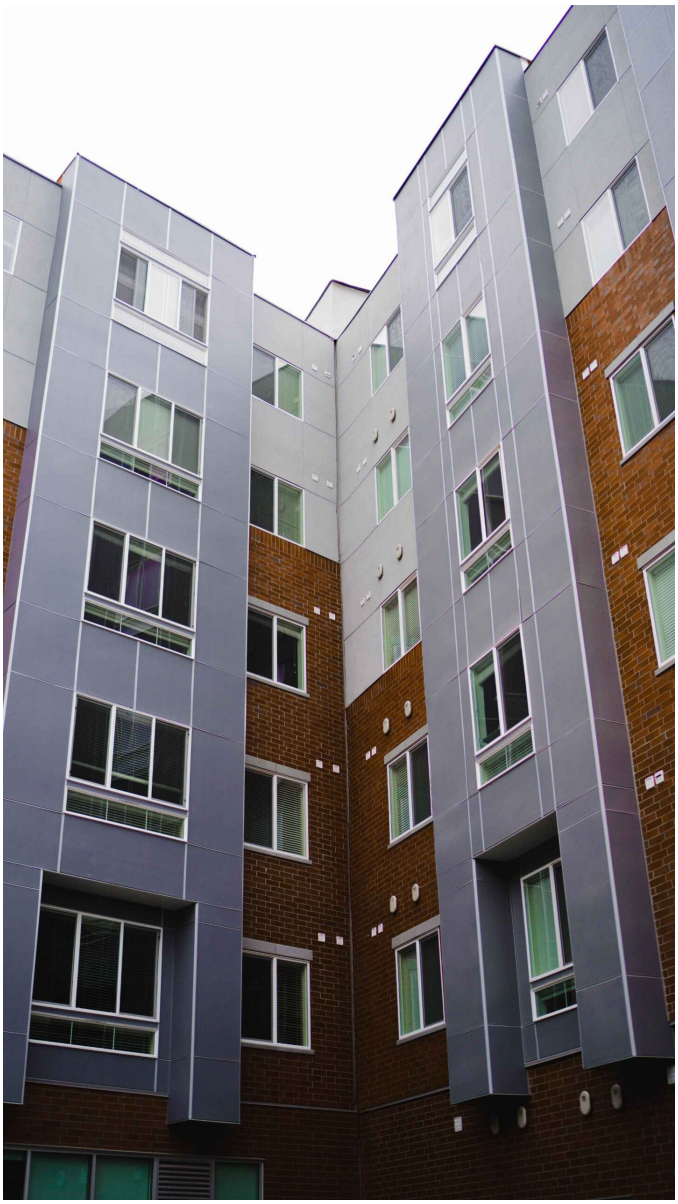
2. If present, make an attempt to stop sprinkler flow.

3. For fires occurring above the ground floor, make an attempt to salvage below the fire with chutes and catchalls.

4. Center-Hallway Apartments

Center-hallway apartments are low to mid-rise structures where all apartments share a common interior hallway for access and egress. Apartments may have a balcony on the exterior: however, there are no exterior stairwells or walkways with access to each apartment from the outside. Interior stairwells may access the roof. The roof may be flat or pitched, and vary in construction and covering.

Center hallway apartments have historically experienced some of the greatest losses of life due to the interior public hallway being overcome with smoke and fire.



Fireground Priorities for Center Hallway Apartments

- Ventilation
- Search
- Ladders
- Forcible Entry/Egress
- Utilities
- Overhaul
- Salvage

Geographic Assignments:

Inside Ops	Outside Ops	Topside Ops
Ventilation • Stairwell • Hallway • Bulkhead Door	Ladders • Roof • Windows and / or Balconies	Ventilation (Top Floor Fire) • Unit of Origin • Hallway • Stairwell (Bulkhead Door) • Defensive (Strip) Ventilation
Search • Stairwell • Fire Floor Hallway • Apartment of Origin • Adjacent Apartment(s) • Floor Above •Top Floor	VES	Ventilation (Lower Floor Fire) • Stairwell (Bulkhead Door) • Hallway
Forcible Entry / Egress	Forcible Entry / Egress • Stairwells	Overhaul
Overhaul	Utilities	
Salvage • Floor(s) Below		

Tool Cache: (may include but not limited to)

Inside Ops	Outside Ops	Topside Ops
Irons	Irons	Chainsaw(s)
Hook(s)	Ladder(s)	Hook(s)
TIC	Rotary Saw(s)	Scabbard Axes
PPV		Drop Bags
Salvage Equipment		Ladder(s)
		Hose Line

Truck Functions for Center Hallway Apartments

Ventilation:

Communication with Fire Attack is critical as the interior stairwell and hallway is the ingress for FFs, and the egress for the unprotected civilians.

1. Vertically through roof openings.

a) Primary ventilation opening (heat hole) over the fire regardless of location.

• If the fire originated in the top floor apartment and hallway conditions are still tenable, the ventilation operation should begin over the fire apartment.

• If the fire originated in the hallway, the ventilation operation should start over the hallway.

• If the fire originated on a lower floor and conditions are untenable on the top floor hallway due to open stairwells or lapping, then ventilation should begin over the stairs and top floor hallway.

• Aggressive ventilation over the stairwells and hallway is paramount in the saving of lives by facilitating the rapid advancement of hose lines.

Note: Communication with interior crews is critical to determine where the fire has taken control of and in turn, where the roof company will begin cutting operations: the residential unit, hallway, or stairwell. Even in modern buildings with protected stairwells be prepared for smoke and heat traveling vertically throughout the building through open doors, voids, and exterior smoke and fire spread.

b) If a bulkhead door or scuttle hatch exists, these need to be forced to provide lift and relief of smoke in the stairwell immediately. This must be coordinated with top floor companies and special attention should be paid to the proximity of the door or hatch in relation to the fire apartment. In the absence of a door or hatch over the stairwell an opening will need to be created. The 2nd Hook should be accomplishing this and should be trained in how to accomplish it.

c) If a common attic exists the roof team will trade space for time and begin preparations for a defensive strip cut after an initial heat hole is placed. Coordination with Fire Attack is critical to ensure the strip cut works as intended.

2. Horizontal

a) Using multiple positive pressure fans, force smoke and heat back down the hallway and out a window or slider within the fire apartment.

b) Second option for smoke removal is to pressurize one stairwell, systematically controlling doors on each floor beginning with the fire floor, followed by the floor directly above and then top floor, and forcing hallway smoke and heat into the opposite stairwell and out of the bulkhead door on the roof. Both operations will require multiple PPV fans.

c) It is important to remember the typical migration and stratification pattern of smoke within these types of structures; the fire floor, the floor directly above the fire floor, and the top floor are areas of great concern. We should generally be checking and ventilating these floors before all others.

Search:

1. Inside

a) When practical, ask escaping occupants or bystanders where victims may most likely be found.

b) Size up the structure and determine location of fire, floor stability, bedrooms, access/egress points, and potential victims.

c) Initiate primary search in the center hallway if IDLH.

d) Search the apartment of origin. Relay fire location to Fire Attack and attempt to isolate the fire. High consideration should be

placed on bringing a Can interior with the Search team.

e) Conduct searches using oriented man procedures. Rooms should be performed with one "oriented man" maintaining the entrance to the room, isolating, and listening to the radio for changes on the Fireground while the other ventilates and actively searches the room.

f) Search adjacent occupancies, working away from the fire, until you find a non-IDLH environment.

g) If IDLH search the floor above, and the top floor, starting immediately above the fire apartment.

2. Outside

a) Use ground ladders and/or aerial device(s) for rescues from balconies and windows where possible. Do not get caught spending time throwing a ladder to a victim in minimal danger when you should be throwing it to the roof to lift the smoke off the potential many more trapped inside.

b) Start VES rescues closest to the fire apartment and work away (laterally and then vertically).

Ladders:

1. Every Truck arriving on scene should "automatically" be throwing two ladders. One to the roof for topside operations (Aerial), and one as high as you can reach with ground ladders. Secondary ladders should be placed in the following order of priority; roof, drop bags from interior hose teams, and then windows or balconies nearest the fire working away.

Forcible Entry/Egress:

1. Inside

a) Gain access to the building.

b) Confirm primary entrance/ egress is unobstructed for interior crews.

c) Force entry to adjacent occupancies, working away from the fire until you find a non-IDLH environment.

2. Outside

a) Consider balcony doors as a secondary egress for the fire unit.

Utilities:

1. Confirm with Command via radio if utilities to the entire building need to be secured or only a specific unit.

• Consider total building shutdown when the fire has extended into common utility voids.

2. Once confirmed secure utilities (gas and power).

3. Turning off water in these structures is more likely due to a sprinkler activation and may require locating a riser and turning off the supply to the system.

Overhaul:

1. Identify suspected point(s) of origin and open all areas involved to expose hidden fire. Be mindful of subfloors, overhead voids, walls, window casements, door frames, cabinets, and soffits.

• Recognize the potential for both vertical and horizontal fire spread within structures and expose as necessary.

2. Uninhibited fire spread is common in utility chases and into attic space.

Be aware of fire spread through floors and ceilings into these common areas. Expose as necessary.

3. Remove and sort combustibles that were involved in the fire area to ensure extinguishment.

Salvage:

1. When possible, cover and protect items below the ceiling prior to pulling for attic fires.

2. If present, make an attempt to stop sprinkler flow.

3. For fires occurring above the ground floor, make an attempt to salvage below the fire with chutes and catchalls.

4. Ask occupants which items are salvage priorities and locations of items.

5. Make determination to remove from the structure or cover in place.

6. Close doors to keep contaminants out of non-affected rooms.

7. Use floor runners where practical.

5. Commercial Buildings

Commercial buildings throughout the city can vary greatly on shape, size, and occupancy type. Most buildings are made of Type II (non-combustible), or Type III (ordinary) construction. These will be either concrete tilt-up or masonry walls. Type V (wood-frame) buildings are common as well. Roof construction will vary as well from conventional wood or arched roofs on older buildings, to numerous lightweight wood trusses on beams, to metal, or even concrete. These roofs should be pre-planned and understood by Truck Companies prior to an incident happening. The common commercial building is independent of any other building, and should not be confused with a commercial strip mall. Commercial buildings may often have a small office space; however, most of the structure will have large open floor plans and unprotected roof systems leading to uninhibited fire growth. Many of these structures are protected with fire sprinklers and an FDC on the exterior of the building. The interior possibilities are endless, ranging from kitchens, vehicles, fuel and industrial type products down to office products, carpeting, mattresses and more. A large fire load is to be expected and often accompanied by high-density, high-rack storage. Rolling steel or sheet-curtain doors are common and important in access and egress, as well as ventilation.

Fireground Priorities for Commercial Buildings

1. Forcible Entry/Egress
2. Ventilation
3. Utilities
4. Search
5. Ladders
6. Overhaul
7. Salvage

Geographic Assignments:

Inside Ops	Outside Ops	Topside Ops
Search	Forcible Entry / Egress (Ventilation) **	Ventilation
Salvage / Overhaul *	Ventilation	Overhaul ***
	Utilities	
	Ladders	

Tool Cache: (may include but not limited to)

Inside Ops	Outside Ops	Topside Ops
TIC	Irons	Chainsaw(s)
Irons	Sledge Hammer	Folding Ladder / Roof Ladder
Long Handled Hook(s)	Rotary Saw(s)	Trash Hook(s)
Salvage Equipment	Ladders	TIC
	PPV	Rotary Saw(s)
		Drop Bags
		Pick Head Axes (Scabbard)
		Hoseline

* Salvage and Overhaul to be conducted simultaneously by Engine and Truck Companies

** When softening the structure of a warehouse with large exterior openings, keep in mind these openings will create and change the flow path of the fire.

*** Identify, expose, and extinguish roof, mansard, and utility chase fires, which may require a crew to assist with extinguishment.

Truck Functions for Commercial Buildings

Forcible Entry/Egress:

1. Confirm primary entrance/egress is unobstructed for interior crews.

2. Complete 360 and soften secondary egresses while maintaining door control.

3. Coordinate opening large roll-up doors with interior crews.

Ventilation:

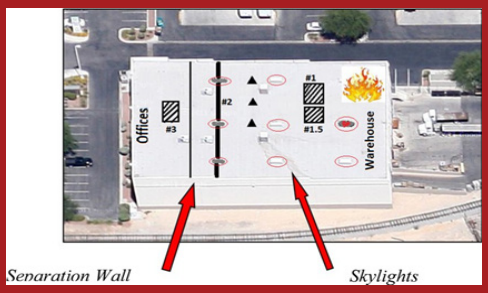
1. Vertically through roof openings

a) Begin cuts as close to the fire as the construction and fire condition in the truss space will allow.

b) Operation should be to ventilate the seat of the fire and then defensive cuts to protect uninvolved areas of the structure.

c) Use smoke indicator holes to determine location of fire and time remaining until fire overruns strip cuts.

d) Use natural openings (skylights) only if they are near the fire. Cuts take preference.



The first cut is a heat hole, followed by expanding the hole if necessary / possible. The second cut is a defensive cut to protect the remainder of the structure. Note: Make holes as necessary over office to facilitate salvage efforts.

2. Horizontally via doors using:

a) Natural currents

b) Positive pressure

Note: Horizontal ventilation will not be as effective due to warehouses' exceedingly tall ceilings. Roll-up doors are the preferred exit ports for horizontal ventilation.

Utilities:

1. Confirm with Command via radio that utilities to the entire building need to be secured or only a specific unit should be secured.

2. Once confirmed, secure utilities (gas and power).

3. Turning off water in these structures is more likely due to a sprinkler activation and may require locating a riser and turning off the supply to the system.

Search:

1. When practical, ask escaping occupants or bystanders where victims may most likely be found.

2. Size up the structure and determine location of fire, access/egress points, and potential victims.

3. Initiate primary search through the appropriate entrance taking into consideration fire conditions and potential location(s) of victims.

4. Consider large area search techniques, preferably after fire control and ventilation have been achieved. Note: During business hours, most occupants will self-evacuate.

Ladders:

1. Ground ladders to any and all upper

floor windows/balconies beginning nearest the fire and working away.

2. Secondary ladders to roof for topside egress.

Overhaul:

1. Identify suspected point(s) of origin and open all areas involved to expose any hidden fire. Be mindful of subfloors, overhead voids, walls, window casements, door frames, utility chases and mansards.

a) Recognize potential for both vertical and lateral fire spread within structure and expose areas as necessary.

b) Be aware of fire spread through mansards. Ensure fire has not spread vertically from the point of origin to these hazard areas.

Salvage:

1. When possible, cover and protect items below the ceiling prior to pulling for attic fires.

2. If present, make an attempt to stop sprinkler flow.

3. For fires occurring above the ground floor, make attempt to salvage below the fire with chutes and catchalls.

4. Ask occupants which items are salvage priorities and locations of items (file cabinets, computer equipment and machinery).

5. Make determination to remove from the structure or cover in place.

6. Close doors to keep contaminants out of non-affected rooms.

7. Use floor runners where practical.

6. Industrial Buildings

For the purposes of this manual Industrial buildings will be defined as any building constructed completely of metal/steel, or concrete tilt-up, that is used in the industrial setting. These buildings are classified as Type II buildings per NFPA or "fire resistive". Structural members will use large, steel I-beams approximately 20' OC and smaller.

C-channel purlins which link up to each large I-beam. This structural frame will be covered by a corrugated metal skin that ranges in thickness from 18 to 22-gauge steel. Per NFPA an all-metal building is a Type II-A. The construction can be disguised by stucco or masonry veneer walls. These would be classified as a Type II-B building.

The most common layout for these buildings is the stand-alone warehouse; however, these truly disposable structures can be designed and configured into most any type of interior layout. If an interior attack is initiated, crews should respect the phenomena of elongation and aggressively cool the overhead structural members.

These Type II structures can have large, open spaces with high rack storage which will allow for uninhibited fire growth and spread. Although some metal-clad buildings will have sprinklers in the overhead, each level of storage rack will not. In the case of concrete tilt-up, reinforced concrete is used for the exterior walls, with an interior metal skeleton.

Fireground Priorities for Commercial Buildings

1. Forcible Entry/Egress
2. Ventilation
3. Utilities
4. Search
5. Ladders
6. Overhaul
7. Salvage

Geographic Assignments:

Inside Ops	Outside Ops	Topside Ops
Search	Forcible Entry / Egress	Ventilation (Roof Ops Not Advised)
Salvage / Overhaul	Ventilation	Overhaul ***
	Utilities	

Tool Cache: (may include but not limited to)

Inside Ops	Outside Ops	Topside Ops
TIC	Irons	
Irons	TIC	
Rope Bag	Rotary Saw(s)	
Hook(s)	PPV	
Salvage Equipment		

Truck Functions for Industrial Buildings

Forcible Entry / Egress:

1. Confirm primary entrance/egress is unobstructed for interior crews.

2. Complete 360 and soften secondary egresses while maintaining door control.

3. Coordinate opening large roll-up doors with interior crews.

Ventilation:

Communication with the hose team is critical to maintain coordination.

1. Horizontally via rotary saws.

   a) Use thermal imaging to locate the hottest point along exterior walls and begin opening with rotary saws.

   b) Open roll-up doors.

   c) Open man-doors.

2. Vertical Ventilation is not advised on these types of structures due to the all-metal roof and early potential collapse. If the building is constructed differently, but still used in the industrial setting then proceed with topside ventilation as appropriate.

Utilities:

1. Confirm with Command via radio that utilities need to be secured.

2. Once confirmed, secure utilities (gas and power).

3. Turning off water in these structures is more likely due to a sprinkler activation and may require locating a riser and turning off the supply to the system.

Search:

1. When practical, ask escaping occupants or bystanders where victims may most likely be found.

2. Size up the structure and determine location of fire, access/egress points, and potential victims.

3. Initiate primary search through the appropriate entrance taking into consideration fire conditions and potential location(s) of victims.

4. Consider large area search techniques. after fire is under control Note: These structures are disposable buildings. Prior to making entry for search operations, personnel should make every attempt to ensure the structure is stable and not in immediate danger of collapse.

Salvage:

1. When possible, cover and protect items below the ceiling prior to pulling for attic fires.

2. If present, make an attempt to stop sprinkler flow.

3. For fires occurring above the ground floor, make an attempt to salvage below the fire with chutes and catchalls.

4. Ask occupants which items are salvage priorities and locations of items, e.g. File cabinets, computer equipment and machinery.

5. Make determination to remove from the structure or cover in place.

6. Close doors to keep contaminants out of non-affected rooms.

7. Use floor runners where practical.

Note: These structures are disposable buildings. Prior to making entry for salvage operations, personnel should make every attempt to ensure the structure is stable and not in immediate danger of collapse.

Overhaul:

1. Identify suspected point(s) of origin and open all areas involved to expose any hidden fire. Be mindful of subfloors, overhead voids, walls, window casements, door frames, utility chases and mansards.

    • Recognize potential for both vertical and lateral fire spread within the structure and expose areas as necessary.

    • Be aware of fire spread through mansards.

2. Large hazards exist in these occupancies and identification of materials stored is necessary.

3. Remove and sort combustibles that were involved in the fire area to ensure extinguishment.

7. Commercial, Retail, and Mercantile Strip-Malls

Commercial, retail and mercantile strip malls can be different by occupancy type, size, and interior layout.

Commercial strip malls are similar to commercial warehouse type structures, but are arranged in a strip mall configuration. Commercial strip malls are typically Type II (non-combustible) or Type III (ordinary) construction. Individual units are arranged with an office portion in the front of the occupancy and a warehouse in the back. Often the office area will have a second floor or mezzanine/loft, while the rest of the unit will only have a main floor. The office side on the A side will have an outward swinging glass door, while the warehouse or C side could have multiple roll up and outward swinging metal doors.

Hazards/Considerations:

- Large fire loads
- Large open floor plans
- Large roof spans with various loads
- Utilities may be high voltage or large diameter gas lines
- Fire walls may separate units and are good areas of refuge and/or access

Retail strip malls are usually smaller ranging from 500 to 4,000sq ft. These are plentiful along State St. These could also be referred to as a shopping plaza, shopping center, or mini-mall. Most have similar dimensions based on construction features from when they were built. These are usually one-story and, in some instances, can be attached to an anchor store. Some of these strip malls can only have an A-side entrance. A-side entrances are commonly glass outward swinging commercial doors. C-side entrances/exits are commonly metal outward swinging doors. Mansards are common, both supported, and un-supported. Common attic or truss lofts should be expected. Exterior walls are typically reinforced masonry or wood-framed with stucco.

Mercantile strip malls are usually found attached to an anchor store on either end or the middle. Mercantile strip malls are usually over 4000sq ft. Front doors are glass outward swinging commercial doors, and rear doors are outward swinging metal commercial doors. Fire ground challenges

will include common attics and mansards, as well as large open areas used for storing merchandise adding to fire loads and large void spaces for fire to travel. These strip-malls will have increased square footage compared to a retail strip mall as a mercantile strip mall allows space for rear storage.Expect good access to the rear in these where utilities and sprinkler hook ups can be found. Reinforced masonry walls are common.

With all strip malls roof construction can vary. Conventional rafter beam construction is common with older retail strip malls. In any strip mall lightweight truss construction can be found with open web wood, open web metal, or i-joists being common. Steel bar joist construction is common as well. Companies must get out and look at what type of construction is in their areas.

Alarm and sprinkler systems vary widely. For all strip mall occupancies, apparatus placement is critical. When possible, Truck companies should take the rear of these structures. The C-side will give the Truck a true read on the height of the building (no mansard or fascia to contend with), as well as direct access to all rear doors for forcible entry/exit.

Fireground Priorities for Strip Malls

1. Ventilation
2. Forcible Entry/Egress
3. Utilities
4. Search
5. Ladders
6. Salvage
7. Overhaul

Geographic Assignments:

Inside Ops	Outside Ops	Topside Ops
Search	Ventilation	Ventilation - Offensive Vent - Defensive Vent
Salvage / Overhaul *	Forcible Entry / Egress (Ventilation) **	Overhaul ***
	Utilities	
	Ladders	

Tool Cache: (may include but not limited to)

Inside Ops	Outside Ops	Topside Ops
TIC	Irons	Chain Saw(s)
Irons	Sledge Hammer	Ladder(s)
Rope Bag(s)	Rotary Saw(s)	Trash Hook(s)
Long Handled Hook(s)	Ladder(s)	TIC
Salvage Equipment	PPV(s)	Rotary Saw(s)
	K-Tool	Rope Bag(s)
		Pickhead(s)
		Hoseline

* Salvage and Overhaul to be conducted simultaneously by Engine and Truck Companies

** When softening the structure of a warehouse with large exterior openings, keep in mind these openings will create and change the flow path of the fire.

*** Identify, expose, and extinguish roof, mansard, and utility chase fires, which may require a crew to assist with extinguishment.

Truck Functions for Strip Mall Buildings

Ventilation:

1. Vertically through roof openings

2. Begin cuts as close to the fire as the construction and fire condition in the truss space will allow.

3. Operation should be to ventilate the seat of the fire and then defensive cuts to protect uninvolved areas of the structure; in the example below the office and then the remaining structure.

4. Use smoke indicator holes to determine location of fire and time remaining until fire overruns strip cuts.

5. Use natural openings (skylights) only if they are near the fire. Roof cuts should be prioritized.

6. Horizontally via doors using:

a) Natural currents.

b) Positive pressure.

Forcible Entry/Egress:

1. Confirm primary entrance/egress is unobstructed for interior crews.

2. Complete 360 and soften secondary egresses while maintaining door control.

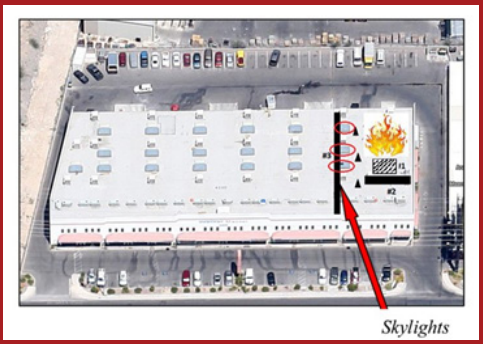
3. Force entry into adjacent occupancies, working away from the fire, until you find a non-IDLH environment.

Utilities:

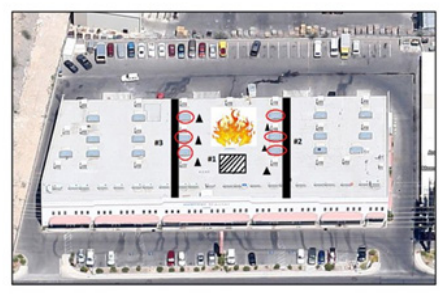
1. Confirm with Command via radio that utilities to the entire strip mall need to be secured or only a specific unit should be secured.

2. Once confirmed, secure utilities (gas and power).

3. Turning off water in these structures is more likely due to a sprinkler



The first cut is a heat hole. The second cut is a defensive cut to protect the offices. The third cut is a defensive cut to protect the remainder of the structure.



The first cut is a heat hole. The second cut is a defensive cut to protect the largest portion of the structure. The third cut is a defensive cut to protect the remainder of the structure.

Note: Smoke indicator holes used to aid in determining location of fire and time remaining before fire overruns strip / trench cuts.

activation and may require locating a riser and turning off the supply to the system.

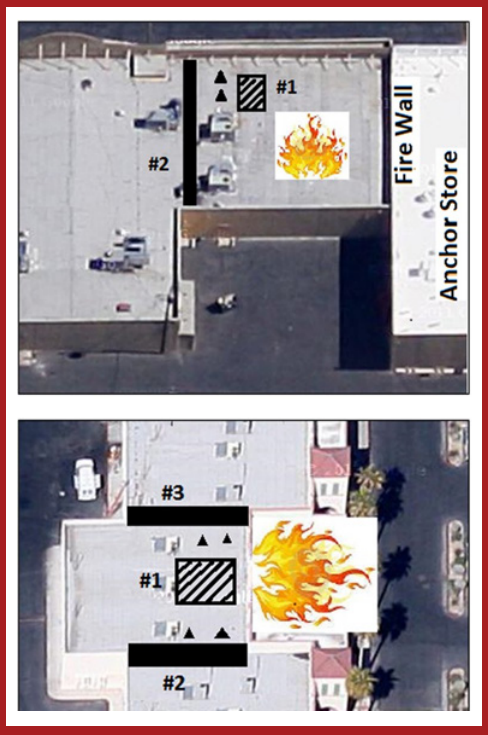
Search:

1. When practical, ask escaping occupants or bystanders where victims may most likely be found.

2. Size up the structure and determine location of fire, access/egress points, and potential victims.

3. Initiate primary search through the appropriate entrance taking into consideration fire conditions and potential location(s) of victims.

4. Consider large area search techniques



The first cut is a heat hole. The second cut is a defensive cut to protect the largest portion of the structure. The third cut is a defensive cut to protect the remainder of the structure, if necessary.

Note: Take advantage of fire walls as a natural fire break.

Note: During business hours, most occupants will self-evacuate.

Ladders:

1. Ground ladders to any and all upper floor windows/balconies beginning nearest the fire and working away.

2. Secondary ladders to roof for topside egress.

Salvage:

1. When possible, cover and protect items below the ceiling prior to pulling for attic fires.

2. If present, make an attempt to stop sprinkler flow.

3. For fires occurring above the ground floor, make an attempt to salvage below the fire with chutes and catchalls.

4. Ask occupants which items are salvage priorities and locations of items (file cabinets, computer equipment and machinery).

Overhaul:

1. Identify suspected point(s) of origin and open all areas involved to expose any hidden fire. Be mindful of subfloors, overhead voids, walls, window casements, door frames, utility chases, and mansards.

- Recognize potential for both vertical and lateral fire spread within the structure and expose areas as necessary.

- Be aware of fire spread through mansards. Ensure fire has not spread vertically from the point of origin to these hazard areas.

2. Large hazards exist in these occupancies and identification of materials stored is necessary.

3. Remove and sort combustibles that were involved in the fire area to ensure extinguishment.

SECTION 5

Truck Operations by Assignment Type

1. Ventilation

Ventilation is a critical Fireground function that is designed as a support function for aggressive interior operations. Its main task is in assisting Fire Attack in quickly locating and extinguishing the fire. The object is to lift the smoke, and lean the fire out. It also aids Search by lifting smoke, and thus increasing visibility enabling a more rapid search of the structure. Ventilation can also be used to change direction of fire spread by pulling fire towards the exhaust opening. Ventilation is working towards improving survivability, tenability, and visibility of the interior space inside of a structure.

When speaking of ventilation, we will categorize ventilation as either vertical, or horizontal. The two methods are separated mainly by where the exhaust opening is being placed. Prior to making a determination on how to ventilate a structure the Truck Captain receiving the assignment will perform a "ventilation profile" to decide how best to accomplish the assignment.

Considerations

- Develop a "ventilation profile"
- Vertical Ventilation
    - Rig to Roof
    - Diagnostic Work
    - Offensive "Heat Holes"
    - Defensive "Strip Cuts"
- Horizontal Ventilation
    - PPV
    - Natural
    - Hydraulic

Tools and Equipment

- Chainsaws
- Rotary Saws
- Roof Hooks
- Scabbard Pick Axes
- Ladders (Aerial and Ground)
- Long Punch
- PPV Fans
- NY Hooks

Developing a Ventilation Profile

When performing a ventilation profile many factors need to be considered in a short time period. For ventilation your options are either Vertical or Horizontal, with vertical being the preference.

The first step in developing a ventilation profile is your building size-up. Having a working knowledge of building construction in both residential and commercial construction will aid in the process, as this will dictate to a large degree what type of operation we can perform. All buildings should be treated as lightweight, but operations will differ based on what type of construction we encounter once we have cut our inspection hole. With residential roofs a 6/12 pitch and below is considered walkable, while anything over a 6/12 will most likely require working off a ladder. Fire location and progression need to be assessed along with the building. This will dictate where our roof operations will begin. Remember, the offensive heat hole needs to be

placed as close as possible to the fire to limit drawing the fire over the interior companies, and achieving the desired effect.

Weather should also be included in the profile. Pitched surfaces, especially metal, ceramic tile, and wood shake shingles can become extremely slippery with rain and snow. With pitched roofs snow usually sticks around longer on the north and east slopes of roofs longer than on the southern and western slopes. Strong winds can hamper horizontal vents especially and should be considered prior to taking glass to prevent an unwanted wind driven fire.

The property itself can create hazards. Trees, drop lines, vehicles, fences, and other yard debris need to be addressed.

The last part of the ventilation profile would be to decide whether or not to "split" your crew. For residential walkable pitches, we will usually split with two going topside for ventilation and two going inside for search. For difficult residential roofs and commercial roofs all four crew members should be going to the roof.

Vertical Ventilation

Vertical ventilation is the preferred method for ventilating a structure. By placing the exhaust hole directly over, or as close as possible to directly over the fire we will get the most lift of smoke out of the structure. As we know fire, heat, and smoke want to travel vertically. This will limit horizontal movement of smoke, and mushrooming. In contrast to a horizontal vent the vertical exhaust opening will always be completely exhausting and is easy to enlarge.

In addition to placing an offensive "heat hole" directly over the fire, consideration should be given to opening holes away from the fire, such as over hallways and stairs. These can sometimes prove more beneficial to interior companies and fleeing occupants.

After opening a large offensive "heat hole" consideration should then be given to opening a defensive "strip cut", to limit fire spread. Sometimes the bigger save needs to be addressed sooner, rather than later to prevent a large loss such as a running attic fire in a strip mall or center hallway apartment building.

Rig to Roof

Generally, the Truck will be assigned ventilation operations. Based on a ventilation profile the Truck officer will determine what type of ventilation operation needs to be performed. When going to the roof initial placement of the Truck will be determined on where we want to access the roof from.

The Engineer on the Truck is responsible for placing the primary ladder. This could be the Aerial, or a ground ladder. Generally, the Aerial should be used on all commercial buildings and should be strongly considered on multi-story single family dwellings, especially those with pitched roofs. The Aerial ladder is the strongest, and safest one-man ladder throw that the fire department has. The primary ladder should be thrown to the off-side corner. This will allow us to trade space for time and give us an opportunity to perform diagnostic work prior to committing over the fire. The one exception to this rule would be for steep pitches. Due to the steepness of the pitch the primary ladder needs to be thrown as close to directly over the fire as possible.

Every Truck going to the roof for ventilation must throw two ladders. A primary, and a secondary. The secondary ladder is thrown halfway between the primary ladder and the fire on the fire side wall. Every member of the roof team should pass the secondary ladder on their way to the fire while traversing the roof. On

a two-man residential roof operation, the other member of the roof team, (other than the Engineer) is responsible for throwing the secondary ladder. On a commercial roof operation, the Tillerman is responsible for throwing the secondary ladder while the captain is assisting the Engineer in stabilizing the Truck. A single member is expected to throw the 28', 24', or 20' straight, but if a 35' is needed the captain should help or the attached unit should be throwing it. If the secondary ladder cannot reach the roof due to height, then the secondary ladder should be thrown to a window, or balcony close to the fire area. If an Engine has done a drop bag, or vertical stretch, this area would take precedence over a window or balcony in proximity to the fire. If neither one of these options is attainable, then attempt to ladder the common hallway.

On large commercial roof operations, a 2nd Truck might be required for ventilation operations. This 2nd Truck should also be throwing its own primary and secondary ladder. The only difference would be in placement. For example, on a smaller rectangular commercial building with a fire in the C/D corner, the first due Truck would throw their primary ladder to the A/B corner. Their secondary ladder would be placed halfway down either the C or D side. The 2nd Truck would then place their primary ladder in the A/D corner with their secondary ladder placed on the fireside wall that the 1st Truck did not ladder.

Roof Team Assignments

It is important that all Truck companies perform ventilation assignments similarly. It is not uncommon to have members from other companies on the Truck for the day, either from being bumped over from another station, or working a trade, or overtime shift. The Truck Captain should be making assignments at the start of the shift, and can be posted on a Task Board in the bay if available. As a 4-person Truck crew going to the roof there should be a team of 2 Hooks and 2 Saw Operators.

Lead Hook

Tillerman or Firefighter position. Brings the "married" Roof Hooks to the roof. Sounds the roof ahead of the lead saw. If there is a firefighter with minimal experience then they should be placed in the lead hook position.

Lead Saw

Engineer. Brings a chainsaw to the roof. Is in charge of the roof operation. Cuts all inspection and smoke indicator holes. Is responsible for path of travel, and opening of the roof.

2nd Hook

Firefighter position. Brings long punch, rotary saw, or haligan to the roof if needed. Follows lead Hook and Saw with the 2nd 6' Hook. Sounds to widen out the path on the way to the heat hole.

2nd Saw

Captain. Brings the 2nd chainsaw to the roof, and keeps it running. Communicates heavy loads and location to Fire Attack. Drop bag for possible hoseline to the roof. L.C.E.S on the roof. Lookout-watches for condition changes globally,

Communication — Handles all radio communications to interior crews and Command, Escape

Routes — Monitors and ensures escape routes from the roof do not become compromised,

Safety Zones — Stays on load bearing wall and ensures those members not involved

in the operation stick to the walls as well.

When the Truck is split on a residential fire there is a possibility of a 2-person team going to the roof. Positioning of Truck Company crew members is ultimately up to the captain in charge, but should be decided upon in the morning at the beginning of the shift to reduce on scene confusion.

Lead Hook

Tillerman or Captain. Places secondary ladder, brings hook to the roof, and sounds out the path of travel for the lead saw. Is responsible for pulling and punching as well as radio communications while the saw operator is working.

Lead Saw

Engineer. Places primary ladder, brings saw to the roof, and is in charge of roof operation. Where is the heat hole being placed and expanding the hole. Is in charge of radio communications while the lead hook is pulling and punching.

Diagnostics

Sounding and Paths of Travel

When operating on a roof the roof team's safety depends on all members having an understanding of safe paths of travel and adequate sounding. Paths of travel should in most cases start from an uninvolved portion of the building. This is why we ladder the offside corner with our primary ladder. All walking should be done as much as possible on load bearing walls and at right angles. The lead saw is in charge of dictating the path of travel to the rest of the crew. The lead hook sounds prior to stepping onto the roof, sounds out a 180 around the ladder, sounding the area where an inspection hole will be cut, and then retreats to the wall waiting for the lead saw.

When working on steep pitch residential roofs it can be beneficial to work from hips and valleys. On the majority of residential roofs, we should be working from the outside load bearing wall. On lightweight commercial roofs outside load bearing walls should be followed until we can find and work off of a large LAM beam. On panelized roofs it is appropriate to follow beams, or purlins.

When exiting the roof, we should be sounding our way off following the same path of travel that we came up. At no time should we be walking where we haven't sounded.

Cross country walking across the roof is extremely dangerous and should not be done at any time.

Inspection Hole

Inspection holes are an absolute on all commercial roofs and can be beneficial on long sloped roofs. Immediately upon making the roof the lead saw should cut a triangle shaped inspection hole at a 45-degree angle to the outside load bearing wall. This should be out of the path of travel of the roof team and at least 3 feet away from the wall. It needs to be big enough to fit a hand into but small enough that it does not act as a ventilation hole. 6" cuts are adequate. After making the cut the saw operator clears the decking with the saw, reaches into the hole and identifies rafter type,

direction, spacing, and on the way out pinches the decking to determine type and thickness. This will determine what type of roof operations we can perform. The lead saw relays this information to the rest of the roof team and then determines the path of travel.

Smoke Indicator Holes

There are mainly two types of smoke indicator holes, a triangle hole and a "kerf" cut. The triangle hole is our go to smoke indicator on commercial buildings. This is a small 3 sided triangle, just big enough to see smoke conditions. This should be cut out of the path of travel. Smoke indicators should be placed every 15-20' and at every change of direction. When passing a heavy load on a roof we should be placing a kerf before and after the load to assess conditions around the load. A kerf is a single plunge cut into the roof. Smoke indicators should continually be reassessed to determine changes in interior conditions.

Offensive "Heat Holes"

There are two general types of vertical ventilation holes. Offensive "heat holes" and Defensive "strip cuts". Heat holes are placed first and should be located as close to over the fire as possible. The goal of the heat hole is to begin to rapidly release heat and smoke from the building. We are also hoping to slow horizontal fire spread by getting the fire to go vertical instead. To have the hole be effective we must exhaust the built-up pressure from inside that is being caused by the fire. If an initial hole is exhausting smoke and/or fire under pressure then it needs to be expanded. After the initial hole is opened the lead saw makes the determination on whether to expand. This can be extended either with or against construction.

In the Draper Fire Department there are two cut sequences used to open all ventilation openings. The primary cut sequence used is the **double center rafter cut**. Because of its versatility this hole can be used on the majority of residential and commercial roofs. It yields an initial 4'x 6' hole which can be expanded easily either with or against construction.

The second cut sequence is the **single center rafter cut**. This cut sequence is reserved for steep pitch roofs where our reach is limited, or where rafter spacing is greater than 24" o.c. This allows for manageable sections of roof to be pulled by the hooks.

Double Center Rafter Cut

The double center rafter cut begins with the head cut. The saw is plunged into the roof and the top of the bar is used to find your outside perimeter rafter closest to the fire. The saw is then reversed, heading back towards your egress rolling two rafters and stopping at your third outside perimeter rafter. Next your outside dice cut is put where you just finished your head cut. Dice cuts should be approximately 1 to 1 1/2 lengths of your saw. A second dice is placed in the middle of your head cut. The third final dice is placed on the

inside of your fire side perimeter rafter. The bottom final cut is a skim cut back towards your egress. This hole can then be expanded either with or against construction, always working back towards your egress. Care should be taken to never place a ventilation hole between you and your egress.

Single Center Rafter Cut

For this cut, locate the perimeter rafter away from the ladder, roll one center rafter and stop at the next perimeter rafter closest to the ladder. Dice alongside the far perimeter rafter, skim-cut the bottom and finish by dicing down along the ladder side perimeter rafter. The cut is easily expanded with construction, down along the length of the roof ladder as needed.

Opening the Roof

After cutting a panel for ventilation the decking will now need to be removed from the rafter it is nailed onto. Decking can be made up of multiple materials. On older conventionally constructed roofs we can find 1x6" straight, diagonal or spaced sheathing. These are commonly covered with plywood for earthquake stability. Plywood and OSB (oriented strand board) are common on newer roofs. Corrugated metal decking will be found on metal roof systems. All decking will be pulled back onto the roof. Louvering is discouraged due to the blocked ventilation opening, and the chance that the material could fall in, either making punching the lid difficult or falling onto interior crews.

Defensive Strip Cuts

A heat hole's purpose is to support offensive fire operations. Strip ventilation's purpose is more defensive in nature. While the focus of a heat hole is to release heat and smoke from the building, strip ventilation is aimed at stopping the lateral spread of fire. When done properly it acts as a sort of fire break. Prior to cutting a strip every effort should be made at opening a heat hole above the fire. At times fire has already self-vented significantly and a heat hole is unobtainable.

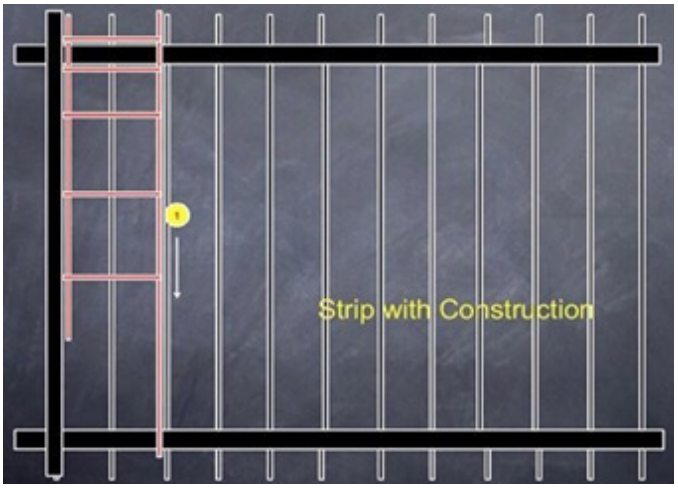
Strip cuts are an example of trading space for time. They are often used when a fire has spread significantly and we are attempting to go for the bigger save by positioning the strip well ahead of the fire. Strip cuts should be highly coordinated with interior crews. Hose lines need to be in place underneath where the strip is being cut. Indicator holes placed on the way to cut the heat hole can be used by roof crews to assess the fires spread towards the strip cut. Strip cuts should be at least 3' wide. We can often use the building's layout to assist us in placing our strip. Our chances of the strip working will increase if we use narrower portions of the building, firewalls, and/or large beams. When utilizing large beams, the strip should be placed on the fire side of the beam. Hose lines should also be brought to the roof to control fire spread across the roof.

Strips can be cut either with or against construction. If the strip is cut parallel to the rafters it is said to be "with" construction. If it is cut perpendicular to the rafters, it is said to be "against" construction. On rare occasions the building's construction will change and the strip will be both with and against construction.

A defensive strip requires a lot of cutting and is best accomplished as a two-saw operation. To complete the following cut sequences all four roof members will be working. Generally, it will be a good idea for the Officer to trade the 2nd saw with the 2nd hook. This way the Officer can retain overall safety but assist the 2nd saw as necessary.

Strip with Construction

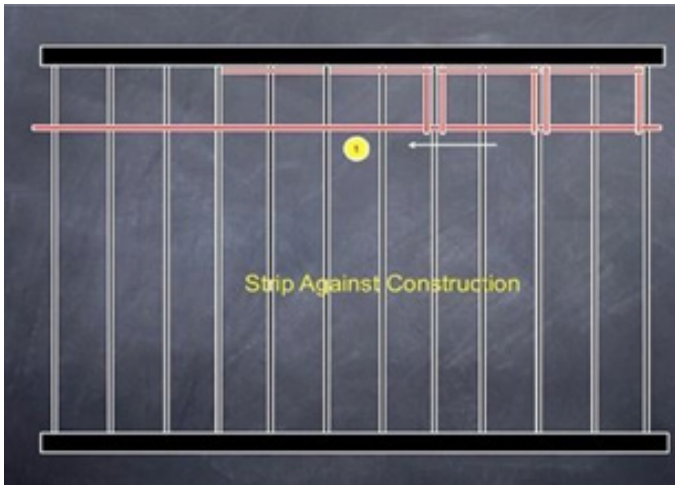
When strip cutting with construction the head cut and bottom cut will be made parallel to the structural members. Cut



sections will have a single center rafter holding the decking the entire length of the cut. When making dice cuts the rafter must be located and rolled each time. Prior to initiating the cuts, the area should be thoroughly sounded and the lead hook should attempt to locate a large beam to begin the operation from. To start the operation the1st saw will reach out off of this beam, roll one rafter and stop at the next going toward the fire. The 1st saw then creates the head cut along the inside of this 2nd rafter, going from one load bearing wall to the other. As soon as the 1st saw is far enough ahead with the head cut the 2nd saw starts making L-shaped cuts to create the removable sections. L cuts are made by extending the bottom cut following the beam (or structural member the crew is working from) then turning the saw 90 degrees and dicing down from the head cut, rolling the center rafter and stopping at the beam. The 2nd saw will continue this repeating pattern of bottom cut, followed by a dice cut, until the 1st saw is freed up to come back and assist. At this point, the 2nd saw will proceed ahead creating only the dice cut at the appropriate spacing from the head cut down to the bottom cut.
The 1st saw will then follow, making the bottom cut and completing the cut sequences. Once all of the cuts have been completed the Officer will coordinate opening the roof with interior crews. The hook crews will then go to work removing the cut sections.

Strip against Construction

When strip cutting against construction the head cut and bottom cut will be perpendicular to structural members. The 1st saw will begin the cut sequence by skim cutting the head cut from one load bearing wall to the other. If possible, the head cut should be on the fire side of a beam or other large structural member, 3 to 4’ in toward the fire. The 2nd saw will start making L cut, beginning with the bottom cut and alternate bottom cut and dice cut. For the bottom cut the 2nd saw will locate each rafter then turn and dice down the center of each rafter bay, between each rafter. This should result in cut panels each supported by a single rafter in the center. With diced cuts place between each rafter, removable sections are determined by the rafter spacing.



Bulkhead Doors

Construction trend

Bulkhead doors generally exist on 3 story or greater center hallway type buildings. We will not generally find them on 2 story and will not always find them on 3 story center halls. But as a general rule they start adding them on 3 & above. Also, some large one-story commercials, especially possessing a mezzanine can have them as well.

Tactical Mindset

Any building with interior, open stairwells from ground floor to the roof should be vented traditionally over stairwells and hallways with power saws and rubbish hooks when no Bulkhead door exists. Very common for no scuttle, hatch, or skylight over top of stairwells on 3 story and lower center halls. Especially on moderns. Cut the stairs/hallway. Remember, stairs lead to hallways.

Top Floor Fire

Addressing the Bulkhead(s), Communicate Roof Conditions

1. Lead sounder and cutter to fire for ventilation operation

2. Second hook sounds over and opens the bulkhead. Radio Coms on conditions...

3. No smoke mask up and descend to the fire floor open door to hallway (ponet door).

4. Return to roof and join Vent Team

5. Be mindful of location of vent operation and direction of wind.

Lower Floor Fire

Communicate Roof Conditions

1. Lead hook and cutter to area on roof above fire.

2. If they have reason to believe fire is in attic space, they use any roof components they can to determine if fire has extended upward into attic space. (Attic hatch, 3-sided cut on sky light punch through drywall/ Sheetrock for horizontal view of attic space or small inspection hole. Do as little damage as possible! This may also just be a visual check.

3. If no fire has extended vertically into attic space join second sounder at bulkhead.

4. Second hook sounds over to bulkhead and forces it open and wedges it open.

5. The roof team then descends the stairs to the fire floor working

to determine upward extension as well as controlling smoke conditions on floors above the fire.

6. This is achieved by closing upper floor hallway doors leading to the stairwell they are in and also opening the hall door on the fire floor thus creating a "Chimney" effect for smoke and heat to escape.

7. They are also tasked with checking for fire extension on the floors above the fire. They should start at the unit directly above the fire. Fire Attack Officer should broadcast unit number over fire tac channel.

<u>*Forcing Entry***</u>**

There can't be enough emphasis put on ensuring the Bulkhead is opened.

<u>"By Any Means Necessary"</u> should be the Standard Operating Procedure of the roof team.

1. Start by trying handle first (try before you pry.)

2. If door is locked, the options are:

a. Pry open with axe and or halligan/ wedge.

b. Attack locking mechanism.

c. Use second chainsaw and make vertical cut 4" in from opening side, from the top of the door to the bottom.

d. If it's a metal door with panic hardware turn 90 away to "B" or "C" side of bulkhead and create a door with the second chainsaw.

e. Other options are making 3 side cut on bulkhead sky light if one exists and flipping it open, and in the case of the top floor fire where opening the bulkhead is going to hinder the team cutting the hole or the opening is facing the windward side, cut a vertical opening on bulkhead then force door.

Remember the door must always be forced! There may be civilians trying to get out.

Heavy Smoke from Bulkhead

1. If top floor fire and heavy smoke emits from opening...Great!!

2. Over radio, let interior companies know bulkhead is open and conditions.

3. If it's top floor fire and opening is going to interfere with the ventilation operation due to proximity/wind, force door open & check for victims.

4. Victim(s) found? Remove to clear area, make radio comms

(company I.D., location, # of victims and their status, as well as resources needed.)

5. If no victims found, partially shut door until cutter is done then open when puller goes to work.

6. Sound your way over to join Vent team.

No Smoke (but obvious working fire)

1. Force door.

2. Radio Coms on door status and conditions.

3. Top floor fire? Mask up, go on air, descend stairwell and open top floor hallway door. Quickly check for victims in immediate area surrounding door.

4. Pay attention to radio and smoke conditions once door is opened! Don't get caught in chimney if engine can't make fire apt!!!

5. Return to roof and join up with Vent team.

Note: The above operation is under the assumption of 3 to the roof. 2 go for roof cut / 1 for bulkhead door.

For a 2-person roof team, focus on opening bulkhead first, then cut roof. For 4-person operation 2 go for roof cut / 2 for bulkhead door.

Horizontal Ventilation

Horizontal ventilation uses fans, hose streams, and natural air currents to move clean air into a building and remove heat and smoke from the building. Of these three methods positive pressure ventilation is the most effective to remove smoke from a building after vertical ventilation has been performed, or when vertical ventilation is not attainable.

Careful consideration must be given to get the most benefit from PPV and not in effect cause a wind driven fire. PPV is always used after the fire has been declared "under control" by Fire Attack. Fans should never be started while there is still active fire burning. Regardless of the method used there are some basic steps that must be adhered to. Horizontal ventilation must be coordinated with

Fire Attack. An exhaust opening needs to be made ahead of the advancing hose line to give the products of combustion and steam a place to escape. Ideally this opening should be made in the fire room. Exhaust openings should never be placed behind the interior companies and thought should be given about outside wind speed/ direction, entry and egress points for interior companies, and the possibility of trapped occupants.

Positive Pressure Ventilation (PPV)

Residual smoke can often be difficult to remove from all parts of a building after the fire has been extinguished. Smoke removal can be greatly aided by the use of positive pressure fans. The tactic is to pressurize the interior of the building, forcing out smoke to the exterior. Rooms should be systematically pressurized, not the entire building at once. Start at the area closest to the inlet and work your way through the structure by opening and closing doors as necessary.

Larger areas will take considerable time to adequately ventilate. Multiple fans should be used, both in series and parallel when attempting to ventilate large open areas.

Hydraulic Ventilation

Hydraulic ventilation is a simple procedure that can be used by interior Engine companies attempting to clear smoke from a room after a fire has been knocked down. The firefighter attempting this procedure will need to clear a window out to place their hose stream through. A straight stream can be used in an "O" pattern, or a fog stream at a 30-degree pattern, and positioned to cover about 2/3 of the exhaust opening.

In summary, ventilation is the best way to augment interior engine companies in their efforts to put out the fire. By lifting smoke and improving visibility hoselines can be rapidly advanced and the fire brought under control quickly. Ventilation also aids in accomplishing a fast search of the structure by improving visibility for search crews, and lifting smoke and heat off of trapped occupants. Truck companies need to train often on ventilation operations to maximize their effectiveness and safety on the Fireground.

Roof Types

Lightweight Roofs

A large portion of both residential and commercial buildings in the city are constructed from lightweight materials. Lightweight roofs on homes are mostly constructed with a pitched roof.

Trusses are made out of 2"x 4" and smaller diameter wood and are spaced out 24" o.c. Trusses are constructed using a top chord in compression, a bottom chord pulling tension, and parallel chords. Pitched trusses are usually held together with gusset plates. The decking consists of plywood or O.S.B. Strong areas of this roof are the outside load bearing walls. There will usually not be a ridge beam. TJI's can be found on long sloped sections of residential roofs.

Commercial roofs can also be constructed from lightweight materials. This section will focus on the majority

of lightweight wood roofs. Both metal and panelized roofs are considered to be lightweight as well, but are discussed in more detail below. The majority of commercial roofs are flat, but a good amount are also pitched. If the roof is pitched, we can assume it is constructed of similar methods as residential lightweight wood roofs. For flat wood roofs a number of different types of trusses can be used.

Open web wood truss. These are built similarly to a wood pitched truss with small dimensional lumber and gusset plates.

These trusses can be spaced anywhere from 16" o.c. to 4' o.c. Wood trusses no matter the type is usually found resting on a load bearing LAM beam. On commercial lightweight roofs with good fire involvement below careful inspection work should be performed, and cutting off of LAM beams is highly advised. Cutting directly over fire is not advised on lightweight roofs. We should be trading space for time if fire is found coming from a smoke indicator hole. Proper identification of the truss type and spacing is paramount before beginning roof operations.

Open web wood truss. The top and bottom chord of these trusses are composed of small dimensional lumber similar to the truss above except the parallel chord is metal tubing.

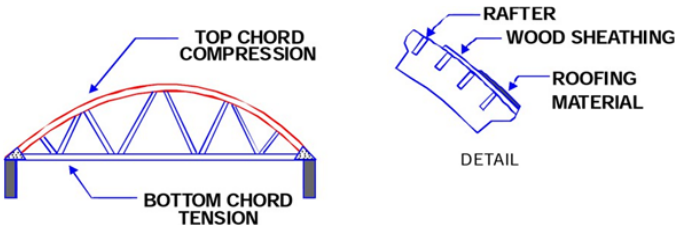
Conventional Roofs

Conventionally constructed roofs use 2"x 6" or larger dimensional lumber placed 16"-24" o.c. The decking is composed of 1"x 6" straight, diagonal,

or spaced sheathing. This sheathing can be replaced or covered with plywood. In Draper City conventional construction can be found in many of the small “strip mall” type of older commercial buildings along State St. Many of the older larger conventionally constructed roofs use arched trusses that are discussed below. Conventional roofs are very strong and can resist fire for large amounts of time. Cutting an Offensive “Heat hole” directly over fire in these types of roofs is encouraged.

Arched Roofs

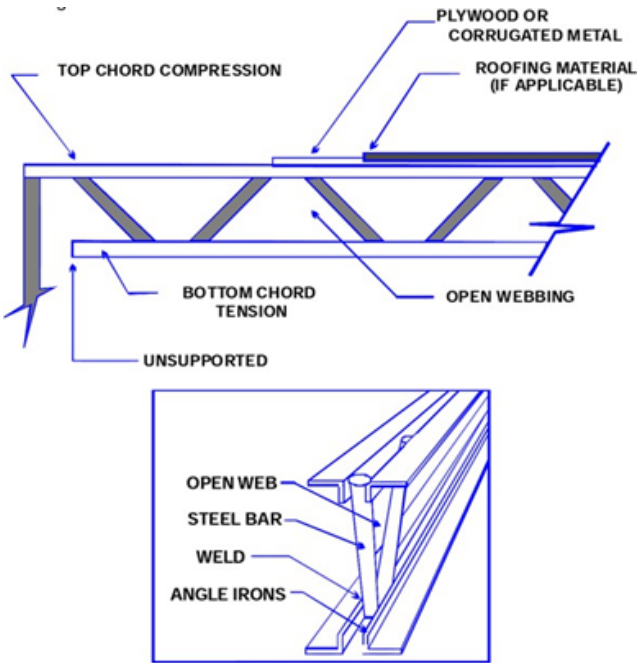
This popular type of roof was constructed during the 1930’s, 1940’s, and 1950’s on both small and large commercial type structures.



Usually a large size (2 x 12 or 2 x 14 inch) of lumber comprises the arch trusses and related members. Some arch trusses have multiple beams forming one truss arch. Some of our arches are made of both metal and wood in the same truss system. Rafters are 2 x 6 inches or larger and covered by 1 x 6 inch sheathing (diagonal or straight) and composition roofing material. Most roofs of this type are well constructed. When exposed to fire, early structural collapse of the arched trusses should not be a primary concern. and 1950’s on both small and large commercial type structures.

Metal Roofs

Open web bar joist construction utilizes a popular building material (metal) in a wide variety of buildings, large and small. Top and bottom chords are usually made from 1/8” steel and web supports are solid 5/8” steel bar. Large buildings may have bar-joists used as girders spaced up to 45 feet. Joists are spaced eight feet apart to accept corrugated metal decking covered by alternating layers of tar and tar



paper. These layers may also include a composition board or other type of material to cover the roof for insulation. Consider the perimeter of the building a strong area. Metal exposed to fire or sufficient heat (steel begins to lose its strength at 1000 degrees F) will expand, twist and possibly fail. Therefore, when the entire roof is composed of metal, the short time necessary for roof collapse should be a major concern when a significant amount of fire is encountered.

Panelized Roofs

Lightweight panelized roof construction is identified by the use of pre-assembled lightweight panels, hence the name panelized roof. The panels are placed over a system of beams and purlins. Beams are typically space from 12-20 feet apart with purlins running perpendicular to the beams spaced 8-10 feet apart. The panels consist of lightweight sheeting reinforced by 2x4s or other lightweight dimensional lumber for rigidity. Panels are put in place between purlins and are either top nailed along the overlapping edges or held in place with various types of metal hangers. The 2x4s may be referred to as “rafters” due to their placement perpendicular to the purlins. It is imperative, however, not to confuse lightweight panelized roof construction with conventional beam/ purlin/ rafter construction. In beam/ purlin/ rafter construction, true rafters (2x6s, 2x8s, 2x10s, TJIs, etc.) are part of the structural load bearing system and are secured to the purlins with joist hangers or other fasteners. These rafters are typically 24” on center but spacing may vary. Sheeting is placed over the beam/purlin/rafter system, typically staggered and nailed to other rafters. Beam/purlin/rafter construction is significantly stronger than lightweight panelized and can support much more weight.

When operating on a lightweight panelized roof system, the roof team is limited to traveling only on beams and purlins, preferably on beams as they are the largest of the roof members. 2x4 “rafters” used in panelized roof systems are not suitable to safely bare the weight of a firefighter. At no time should any member of the roof team step off of a carefully sounded beam or purlin.

The hole placement decision is based on beam and purlin direction and proximity to the fire location. The roof team must “trade space for time” in order to safely create an opening in this type of construction. Trading space for time refers to compromising a position directly over the fire and moving back just far enough to safely perform the operation in an area not subject to heavy flame impingement. In panelized construction, the larger spans of lightweight sheeting and small rafters can quickly fail under fire conditions.

An offensive heat hole must be made using the same principles as in single or double center rafter cut sequences. The cut sequence must be made from an operating position on either a beam or a purlin. The height of the opening is dependent on the reach of the saw operator as they must not step off the structural member.

The cut sequence begins by the saw operator reaching out as far as they can for the head cut. If operating from a purlin, the head cut will be made against construction. Plunge the saw into the roof and locate a structural member perpendicular to the one the saw operator is standing on, either a beam or a rafter.

Next, complete the head cut by cutting away from the fire, at arm's reach. The saw operator will roll 2 rafters and stop at 3. Dice back toward the fire, then skim cut toward the egress along the fire side member the saw operator is standing on. If operating from a beam, the head cut will be made with construction as the rafters run parallel to beams. Reach out and plunge the saw into the roof and locate a purlin, then complete the head cut working back away from the fire. When making the head cut with construction, no rafters will be rolled as they are parallel to the cut. Be sure to reach out far enough to reach over a rafter when making this cut. After the head cut, dice back towards the fire. In this situation, each dice cut will cross over the rafter. Be sure to roll the rafter and not cut through it. Space the dice cuts close enough together to create manageable panels for the hook firefighters to pull. The final cut is the bottom skim cut along the fire side of the member the saw operator is standing on, working back toward the egress.

If the heat hole must be expanded, it is expanded along the structural member the saw operator is operating from. During the process of cutting and opening the roof, the saw operator must anticipate the need for expanding the opening early. When visible fire is seen in the cuts or heavy smoke is coming from the initial cuts, these are indicators for needing a large opening. If these conditions exist, the saw operator must remember that allowing the lead hook to open a cut section of roof could create a condition where fire through the opening would prevent the saw operator from being able to expand the cut. It is imperative the lead hook wait until the saw operator is at least one cut sequence ahead before opening the roof. The roof is opened starting with the cut section closest to the fire, working back toward the egress. Each panel is systematically removed by the hook firefighters, being careful not to step back off of the structural member the crew is working from. When the saw operator and hook firefighters need to pass each other, it must be done at intersections of beams and purlins. At these intersections, the hook firefighters can sound their way out onto the perpendicular member to allow the other team member to pass. When operating on a roof where all members must stay strictly on the structural members, the roof team choreography must be very precise. In order to build proficiency with ventilation practices on panelized roofs, the truck company must devote time to training and practicing the operation described above.

2.Search and Rescue

The three main tactics at every residential structure fire should be centered around rapid water on the fire (Fire Attack), coordinated with ventilation, and a systematic search of the structure. All other tasks are secondary in priority to these being accomplished when pertinent. Ideally these three tactics are handled simultaneously by the first arriving Engine and Truck Company. The following will discuss how a Search team can systematically set up their search for the greatest chance of success and also go over valuable Rescue work when a victim has been located. Statistical sources are pulled from http://www.firefighterrescuesurvey.com/

Considerations

- Time: Ways to reduce our time to a potential victim
- Search: Size up
- Search: Positions
- Search: Types and decisions to make while searching
- Rescue: Having an operation

Tools and Equipment

- Irons (Flat Headed Axe and Halligan)
- Water Can
- Ladders
- Hook
- Thermal Imaging Camera (TIC)
- Flashlight(s), Chest Light, Box Lights
- Search Rope

Operations:

Time is of the essence:

By reducing our time to the interior, we effectively increase our civilian's survival chances.

- **Setup your turnouts for fire after every run.** Setting up our gear, keeps our gear together and gives us order. We can pick up our bunkers and throw them in the cab for an EMS run in seconds. If we stow them in the cab and need them for a fire run, it increases our turnout times in critical moments.

- **Set our radio to VECC 5 with the scan off.** When tapped out to a fire, having our radio on the working OPS channel and not on scan, reduces the chances of missing radio traffic for an assignment when transitioning from the apparatus to the fireground and allows us to get to work.

- **The Draper Fire Department has a goal of a 60 second turnout time to fire with the wheels rolling.** These critical seconds saved can help reduce the size of the fire on our arrival, and increase the survival rate of civilians.

- **Assign Search early and add crews often.** Maximize our efforts for search, to ensure civilians are quickly located & removed.

- **Coordinate our Search efforts with Fire Attack.** Once the line is placed, Fire Attack can peel off and search the adjacent area. Fire Attack will typically search the fire room.

Search Size Up:

True orientation for search during any type

of visibility allows us to search thoroughly and efficiently. While en-route, we start our size-up. What is the occupancy type? On arrival, size-up the layout, era, square footage, conditions and search priority. With our experience, training and PPE can we occupy the space? If yes, then we search it.

Underwriters Laboratory: "Exposure duration is as important of a factor, if not more than dose". This backs the Draper Fire Departments culture of occupying the interior for search and not looking at the conditions from the outside and thinking "no one can survive those conditions".

For more information on "True Orientation", see www.youtube.com ("Search Culture Know Your First Due" & "Search Getting Away from the Anchor")

This manual addresses the primary search size-up for single family, duplex and low-rise multi-family dwellings. Knowing and understanding building layouts and fire behavior is paramount for an effective, efficient and aggressive primary search.

Philosophy & Pre-Arrival Life

Civilian LIFE is the primary reason for our professional existence. It is, and always will be our first priority. Statements on arrival that "everyone is out", "no one is home", "the house is abandoned or vacant" should not dictate when or if a primary search should be performed in the structure. Homeowners stating, "My baby is inside" may be referring to a pet. The reporting party is typically under noteworthy stress and should be expected to only possess a fraction of their typical capacity for observation, reasoning, and communication.

www.FirefighterRescueSurvey.com statistics indicate fires with victims; 5% had reports of "All Out" and 28% had "No Reports" at all. There are many documented cases where the fire department arrived on scene and were told by neighbors, police officers, parents or bystanders that there was "no one inside". These statements proved to be inaccurate for multiple reasons; children's sleep overs, teenagers sneaking out or sneaking in, and crime scene cover-ups. Additionally, homeowners go back inside to assist loved ones, and grab their valued possessions.
Bystanders can be a useful source of information for LIFE, Fire and Layout. This can aid in prioritizing the primary search, but this information should be taken as guidance and not fact. www.FirefighterRescueSurvey.com states that structure fires with victims, with bystanders reporting "people are inside" had a 67% accuracy for location of the victim.

Firefighters should not perform victim survivability profiling (VSP). We decide if it's a go or no go, based on if the space's conditions are tenable for a firefighter in full PPE. We must make every effort possible to occupy the space and search for victims. From the outside, we are unable to know the conditions of each room or area on the inside of the structure. Closed doors provide for isolated survivable space, certainty of this can only be achieved by completing a thorough search.
Underwriters Laboratory states: "TIME is as important of a factor, if not MORE than dose" "Survivability is a very complex thing" (Robin Zevotek)

"A search size-up is intended to locate searchable space, not chances of survivability."

The Residential Search Size-Up takes place in three phases; pre-arrival/pre-planning, exterior, and interior. The Pre-arrival size-up includes factors such as Occupancy Type, Time of Day and knowing your first due. The Exterior size-up will include smoke/fire conditions, a 360, building construction and era and residential building styles. The Interior size-up includes human behavior, smoke/fire conditions, and construction features such as doors, windows, and floor coverings.

Occupancy Type

The occupancy type may indicate the number and demographics of victims, floor layout, types of rooms, priority entrances, and also influence tool selection.

Number of Victims: There is an increased

potential number of victims in elderly care homes, care facilities and hotels. This is due to large occupancy loads and the characteristics of the occupants themselves. Geriatric residents travel at a slower pace and have difficulty hearing, which may cause a delay in awareness of a fire. The sick and disabled may be physically unable to evacuate. Hotel guests lack the familiarization of the floor plan and the nearest egress. In emergencies humans typically flee the building the same way they entered. Upper floor egress may lead to inoperable elevators, resulting in incapacitated victims in the hallway. Knowing the potential for increased number of rescues and/or decreased ability to self-rescue, increases the manpower required for primary search, need for shelter in-place options, and aggressive fire attack with coordinated ventilation.

Demographic of Victims: Knowing who the potential victims are will help us understand; their ability to self-rescue, the manpower needed, and where they may be located within the structure. Infants may be in cribs and cannot self-rescue, children hiding in their “safe” places such as; bedrooms, beds, under beds and in closets.

Priority Entrances:

The occupancy type can indicate how familiar with the structure the occupants are and how they may evacuate, which can influence search access.

A behavioral evacuation study of 300 personnel of varied gender, age and mobility was conducted, (Behavioral research performance, www.iafss.org). The study indicates that 95% of the occupants in an elderly care home were evacuated by the main staircase during unannounced fire drills. The other three emergency staircases were not used at all. This information may dictate the entrance and staircase search and/or evacuation crews make entry.

Tool Selection: Each occupancy type in a common geographical area has a “typical” need for security and fire protection. This will influence the appropriate tool selection for the job. Single family dwellings have differing forcible entry and egress needs than a hotel. Being aware of the occupancy type can lead to bringing the appropriate tools to the interior. A set of irons may be beneficial for structures with doors that have double keyed locks (such as a bank), which will produce an interior egress forcing need if the structure has not been softened. Long hooks may be necessary for structures with anticipated high ceilings that may need breached. The “typical” single family residence may only require a light, halligan, TIC and water can (a can is situation dependent).

Time of Day

Is time of the day as critical for primary search prioritization as we once thought? NFIRS reporting indicates 46% of civilian fatalities occur between midnight and 7a.m (http://nfirs.fema.gov). According to FirefighterRescueSurvey.com, 40% of our victims are located in bedrooms, more than any other single location within a residential structure. The survey website also reports victims being located in bedrooms, 17 of the 24-hour day cycle. This can be attributed to varying sleep cycles, as bedrooms are not just used for naps and sleep but also play time, watching television, folding clothes and other activities.

Your First Due

By running EMS calls and paying attention to how homes are built in certain neighborhoods we can learn a lot about our first due area. By knowing how the homes are built and oriented in our area it can assist in rapid victim location, identify search priorities, help in developing a rescue plan, and locate access and egress routes, and increase firefighter safety and orientation.

THE EXTERIOR

A 360 will assist in locating civilians presenting from decks and windows that may need immediate rescue. It will reveal yard, building, smoke and fire conditions, possible fire location, and gives the ability to size-up the building itself.

Yard, Porch & Deck: The condition of

the exterior is a good indicator of likely conditions of the interior. If you encounter hoarder conditions in the yard, or neglected building maintenance, you can expect the interior to have hoarder conditions and poor building maintenance as well. Hoarder conditions may include beds in the front room, high piles of storage, garbage throughout the house, and no working smoke detectors.

With the likely hoarding conditions on the interior, the conventional search access, patterns and techniques may decrease efficiency. Access through multiple doors and windows (VES) to target high probability areas should be considered. When performing VES in these conditions, be aware that doors may be missing or hoarding conditions may not allow for the door to be closed, making the room difficult to isolate. Hoarding behavior should also heighten the crew's awareness of window and door locations for emergency egress.

An outside ramp to a door can indicate if a disabled or bariatric occupant is trapped inside. Raised front steps or small light windows in the foundation can be signs of a basement.

Smoke & Fire: Reading smoke and understanding fire behavior is paramount for an effective, efficient and aggressive primary search. Being able to read interior and exterior smoke characteristics will assist in locating the seat of the fire, increase the crew's safety, aid in prioritizing the primary search by predicting fire progression and the most hazardous areas for potential victims. (Read David Dodson's: Art of Reading Smoke)

The Building

Sizing up the building itself is beneficial to every assignment on the fireground. Be knowledgeable of building codes and construction in your area. Read the building's construction type, era, number of floors and footprint. Observe the roof, exterior walls, exterior doors, windows, and indicators of interior stairwell location. Having this knowledge prior to committing to the interior will assist your crew in performing an efficient and effective search, finding egress and staying oriented.

Number of Floors and Footprint: The structure assists in understanding the building layout, deciding a search pattern, how or if the crew will split, search priority, and can indicate the structures' fire walls, fire doors and stairwell locations. The greater the footprint and number of floors, the greater the manpower needed for primary search. Firefighters staying oriented during search is dependent on understanding the layout of the structure you are searching.

Roof: If pitched it can easily be seen from the ground and indicate room location and layout of a structure by locating plumbing vents, chimney, skylights and/or dormers.

Plumbing Vents: 1 1/2" - 2 1/2" diameter black pipe coming from the roof will indicate bathroom and kitchen locations.

Chimney: A house with only one chimney will indicate where the family or living room is and a one-story house with dual/tri flues can indicate a basement, confirm with a 360.

Skylights: Skylights can be found in most types of rooms to increase natural light and are not common in bedrooms due to the need for controllable light for sleeping.

Roof Pitch: A steep pitched roof along with gable windows or dormers can indicate living space above, accessing by way of a ladder can decrease the time for victim location.

Exterior Walls: Determine the number of units, building layout and room locations by indicators from the exterior wall. Locating and counting the mail boxes, electrical/ gas meters and address or room numbers are indicators of the number of units in the structure. A dryer vent indicates laundry or utility rooms.

Garage Location: The garage in ranch style homes are typically located on the opposite side of the structure than the bedrooms.

Exterior Doors: Front doors typically swing towards the bedrooms and enter into a foyer. The main entrance typically leads

to the stairs, the family room, kitchen or a hallway which leads to the bedrooms. Garage man doors open into kitchens, utility, laundry, and family rooms. Slider doors open into either kitchens, family or master bedrooms.

Windows: They can be one of the prime indicators of building layout, room location, and access/egress. Noting security bars on windows and doors prior to your search can determine rescue and emergency egress locations. When windows are on corners, look on the adjoining wall for another window in the same room, which can help confirm room type and layout.

Window Accessories: Windows with either blackout blinds or air conditioning units which both comfort people during sleep, can be evidence of bedrooms. Seeing hair products, kid's toys, or dish soap in the window sill can also be an indicator of the room type.

Bathrooms: Bathroom windows are typically smaller, have a higher window sill and are fogged for privacy, they are not governed by code for an egress window. A single-family multi-story home with evidence of two or more bathrooms on the first floor can indicate a master being on the main.

Window Egress Code from the Exterior Perspective: Building codes in response areas can differentiate. Window codes can be of significant information to search crews for various reasons. They assist in room type size-ups, to target high probability VES. The size and floor the window is on, can indicate window sill to interior floor height prior to head first window entry during VES.

Vent Enter Search (VES):

Windows aid in sizing up rooms that are isolatable (having a door - bedrooms and bathrooms). The ability to isolate the room can be crucial, for the civilians, firefighters on the interior, and the flow path. A non-operable window on floor two that is in line with the front door can be a warning that it is a vaulted entry and attempting a VES can negatively affect the entire fireground.

Prior to VES, be efficient and size-up for interior door location. In bedrooms, doors are in or within a few feet of the corners. Bedrooms that are on outside corners of the structure will typically have interior doors on the inside corner. Midspan or non-corner bedrooms will have interior doors that are typically placed on the far side of a wall from the living areas. This knowledge can decrease the time for room isolation.

Prior to performing VES on a McMansion, understand that the bedrooms are typically large and may have two sets of double doors. One set is the main entry to the room and the other to the master bathroom. Master bathrooms in these large homes can have multiple doors themselves, his and her closets, toilet, single or double to the bedroom itself and possibly a powder room.

Residential Styles

Split-level (tri-level):

These homes will have two sets of stairs parallel with each other oriented from bravo to delta sides, one going to floor two and one set going to the basement. The stairs are typically to the left or the right within a few feet of the front door (dependent on door orientation to the two-story section). The typical tri-level will have the garage that leads into the kitchen, dining and living room on the main. The daylight downstairs will have a family room, bedroom, laundry and a bathroom. The upstairs will typically have a large landing with three bedrooms and a bathroom.

Split-entry (bi-level):

This type of home will also have two sets of stairs that are parallel, these are usually oriented from the alpha to Charlie sides. The front door leads to a smaller foyer while one set (typically the side towards the garage) leads downstairs while the other set leads to the main living area on floor two. The downstairs will typically have the garage with a short hallway, a laundry room, a bathroom and possibly a bedroom,

office or family room. The upstairs typically has a living room, kitchen (on one side of the structure) and three bedrooms and a full bathroom (on the opposite side of the structure.)

We just covered the importance of a search 360 and how it can decrease time to locate presenting victims. We also discussed how yard and building, smoke and fire conditions may influence our search. Sizing-Up the building itself and the importance of paying attention to the details. Knowing specific building styles in your area can lead to a successful search. The next part will focus on the interior. Specifically, it will go over Victims; LIFE, human behavior and victims body orientation. Sizing-up interior conditions, construction and floor plans.

THE INTERIOR

HUMANS, INTERIOR CONDITIONS AND CONSTRUCTION

Civilians and Victims

Being able to size-up human life, behavior and body positions decreases our time to locate victim(s) on the fireground and increases the civilian survival rate.

LIFE

Victim's survivability is dependent on search priorities, techniques and actions. www.FirefighterRescueSurvey.com reports that 40% of structural fire victims are found in the bedrooms and 17% are in major arteries including stairs and hallways. NFIRS reports that 3% are trying to rescue, 3% are trying to extinguish, and 36% are trying to escape (usa.fema.gov).

Human Behavior

Civilians tend to head directly towards the main routes of egress during general or emergency egress. Victims that are not aware of the fire or trying to self-evacuate can be overcome by smoke, this leaves them slumped over in chairs, lying in bed or on the floor near windows, doors or in the main pathways to egress.

Children tend to go to their "favorite" spots; bedrooms (own, siblings or parents where it's safe), specifically under or in their own bed or closets. If they cannot retreat to their room, they tend to stay at ground level and hide in other familiar spots; in low large cabinets, in blankets or clothing piles and typically places they play and spend most of their day.

Arriving to a building in your area that has had multiple false fire alarms, should increase the crew's awareness of the potential of increased victims, due to resident complacency to fire alarms.

Victim Body Orientation

When the search company finds an adult occupant, observe the body position which may indicate direction of travel. A victim that has become incapacitated and was heading away from the main entry or egress, was potentially heading to rescue loved ones.

Interior Conditions

Conditions need to be continually sized-up to include Fire, Heat and Smoke. The search position height is dictated by heat, but the position is chosen. The position is chosen for its ability to amplify sound, maximize visibility and remain efficient. Getting below the neutral plane can allow the search crew to see; LIFE, FIRE, LAYOUT.

Construction

Knowledge of interior building construction (i.e., doors, windows, and floor coverings) can assist firefighters in search prioritization, orientation inside the fire building and locating areas of refuge or egress.

Interior Doors

Characteristics of interior doors can indicate the type of room you are about to enter. Knowing what type of room, you are about to enter, is relative to how you will search and if it has a potential egress window or door.

Doors that swing towards the main interior of the structure typically lead to stairs,

closets, pantries, a garage or the outside. If it also has a deadbolt or lock it is likely opening to the outside or a garage. These can warn the crew of an elevation change on the other side of the door threshold. Basement doors can swing inward or outward.

Doors that swing away from the main interior and into the room, are usually bedrooms and bathrooms. This can indicate rooms with windows for a place of refuge or egress.

McMansion (5,000 square feet or larger home)

A set of double swinging interior doors down a hallway or on an upper floor can indicate a master bedroom. A master bedroom that could be 600+ square feet including a master bath and closet, the large square footage may lead to the decision to do an oriented search or to have two firefighters search the room.

Windows from the interior perspective

Operable residential windows with greater than 72 inch outside grade to sill height, have a code minimum interior floor to window sill height of 24 inches (IRC)/ 36 inches (IBC). Building code knowledge can assist in estimating outside sill to ground height, in case of victim rescue or emergency egress.

In low visibility conditions finding a floor HVAC register can indicate a window above. When in front of a sliding glass door the register is placed on the non-operable side. Being aware of windows and doors assists in crew orientation, rescues and egress.

Floor Coverings

Understanding typical room flooring can assist search crews in staying oriented. Being aware that you are entering another room and the type of room you are entering, will assist in staying oriented and how you search the room. Feeling a floor covering change will give you a heads up that you're transitioning into another room.

A concrete floor or subfloor in a residence can indicate you're on floor one (typically the subfloor), in a garage or basement. Sizing up the structure before entry and knowing your area's building construction norm, will assist in knowing if there is a slab foundation or a basement. Bedrooms, living and family rooms are typically carpeted. Foyers, kitchens, laundry and bathrooms are expected to be wood, tile or linoleum.

Floor Plans

Building layouts are comparable with one another for region, occupancy, and era. If you're going to above grade floors in multifamily structures, observe the floors below to get an idea of the layout. This will assist in search efficiency and orientation.

Multifamily dwellings typically have common walls between units, this leaves minimal outside wall real estate for each unit. Per window egress code requirements, every bedroom is required to have an egress window. This pushes bedrooms to the outside walls, leaving little to no outside wall space for other rooms to have windows. Multifamily dwellings that do have more outside wall space, family or great rooms will then be the next most common room to get a window or slider door. This knowledge will assist search crews to identify high probability VES entry points and the floor plan of each unit.

Stairs

When in low visibility and you come upon a "coat" closet, reach up and feel (tool or hand). A sloped ceiling can indicate stairwell location.

Rooms

Finding objects in a room such as small furniture or toys can indicate that children may be present or you're in a child's playroom or bedroom. This information can assist in where you may look or be more diligent in sweeping, such as under beds and in closets.

Furniture

Bunk Beds typically have a bottom twin (38

inch wide) or full size (53 inch wide) mattress with a twin-size mattress on top. When you come upon a twin- or full-size mattress, reach up and in for bunk beds.

RESIDENTIAL SEARCH SIZE-UP SUMMARY

The purpose of this discussion on search size-up is to convey the diversity, on what a systematic and complete residential search size-up may include. The information in this manual should assist our crews, to search based on educated decisions, resulting in rapid victim location and removal. We should have the knowledge to perform a continuous size-up, identify search priorities, locate access and egress, and increase our crew's orientation within a structure fire.

Making Entry for Search

Typically, on the first arriving Truck on Single Family Dwelling fires the Medic Ambulance and/or Squad will "split" from the Truck and be assigned Search. Prior to making entry the "A" side door should be forced for Fire Attack, and strong consideration should be made for opening the "C" side door. This can be accomplished by splitting the Medic Ambulance. One member goes to the front door with a halligan and axe to force the "A" door and conducts a LIFE- FIRE- LAYOUT. The second member should go to the "C" side door with a halligan, axe, and rotary saw. The rotary saw is for when a glass slider is encountered instead of a man door, or security doors are encountered. The "C" side door is opened and this firefighter performs a LIFE-FIRE-LAYOUT. When making entry, do an interior size-up. Sweep wall to jamb (touch the jamb behind the door, this will ensure a complete sweep) body length deep and conduct a LIFE-FIRE-LAYOUT. This sweep and size-up starts our search. If the door is obstructed from opening all the way, reach around it with a hand to determine if there is a victim behind the door. After forcing both doors the Medic Ambulance or Squad meets up and determines where to start their search.

- LIFE

  a) Call out "Fire Department, anyone in here" and hold your breath & listen
  b) Scan for victims with your eyes

  c) Sweep for victims with your hands

- FIRE

  a) Look for the glow, which way is the smoke going? Listen for the crackling of fire

- LAYOUT

  a) Look for signs of the layout; stairs, hallway, furniture, etc.

  b) When making entry ahead of the hoseline, the search team will make entry and control the door.

Search Priority

- 42% of victims are located in a bedroom

- 11.5% of victims are located in a hallway

- 10% of victims are located within 6' of an exterior door.

Our search priorities are the bedrooms and searching egress as we move in.
Victims higher in the elements have a lower chance of survival, such as victims on beds vs floors. We search top bunks first, down to the bed and lastly under the bed. Victims behind a closed door have a greater chance of survival. If we are working down a hall and come upon two rooms, one with an open door and one with a closed door, we prioritize the open-door room.

The fire apartment or room is the priority, with fire attack typically searching the immediate fire area. Adjacent apartments and rooms are the next priority, with another crew (possibly from the second due Truck) searching the floor above in the same pattern.

Consider how the heat, smoke and fire will extend within the building. Occupant egress from the building (interior stairs) can

be quickly impacted by the fire conditions, negating their use and endangering occupants. Gaining access to the fire area, or area to be searched, will usually be through the main door that the occupants use. The "Close before you doze" campaign is asking citizens to "shelter in place". This may increase the odds of bedroom rescues and increase the need to prioritize bedrooms and VES.

COMMERCIAL SEARCH SIZE-UP SUMMARY

Commercial buildings can be very disorienting due to unknown layouts and large open spaces. Truck crews should be utilized initially to assist in ventilation and forcible entry efforts to open the building up. Once we have lift, the building is open, and Fire Attack is getting water on the fire, consideration can be given to putting crews interior to Search. Strong consideration should be given on bringing multiple TIC's interior. This should be our default in large area searches.

"All in for Search" with a 4 Person Crew

When "All in for search", which is generally reserved for known victims or in incidents where vertical ventilation is not feasible, the crew typically splits into two teams. The split could be the Truck and Medic Ambulance working separately, or the captain splitting with one Firefighter, while the Engineer splits with the other Firefighter. This is up to the captain's discretion and experience of the crew. The two crews must formulate a plan to coordinate their search efforts, to reduce the possibility of redundancy or missed areas.

When searching ahead of the hoseline. The "inside" crew searches for the fire, isolates and communicates location to fire attack (Locates - Isolates - Communicates). In unison, the "outside" crew performs a targeted search.

When searching behind the hoseline. The "inside" crew makes their way to fire attack, typically communicating that fire attack has the fire area for search and then searches back. In unison, the "outside" crew performs a targeted search.

Search Positions

Search Position is imperative to an efficient and thorough search. If you can identify all objects in an approximate 10' area around you, then walking upright is typically performed. Walking during moderate, low or zero visibility is jeopardizing civilian lives. In these situations, we need to get below the smoke and most likely down on the ground to search with our hands. While searching, we strive to get our eyes and ears below the smoke. The lower we are, the thinner the smoke and the easier it will be to see and hear our victims, along with communicating with our crew. This also prevents saturating our gear unnecessarily...

Our civilian's survivability is dependent on time, in which time is determined by us. To be both efficient and effective, the search must be hasty yet thorough. Exploit the known characteristics of fire behavior, and occupy the space below the neutral plane to size-up LIFE, Fire and Layout. Your body position should place the ears where sound is farthest traveled, the eyes where it is most visible and place the hands where the victims are. Get on the ground! "Inches of visibility are worth miles of work" - Brian Olson.

We do not maintain physical contact with another firefighter, wall or search line to stay oriented. Knowledge of building construction and layouts along with practical training, can prepare a firefighter to stay oriented, efficient and off the wall in adverse conditions.

Body Positioning Matters

The search position height is dictated by heat, but the position is chosen. The position is chosen for its ability to amplify sound, maximize visibility and remain efficient. The denser the smoke the eyes and ears are occupying, the more suppressed the senses become. This decreases the ability to locate an egress, the crew's ability to communicate and the ability to see, locate or hear victims and downed firefighters.

Down On All Fours (Crawling)

This technique has traditionally been the "norm" and what the textbooks and our recruit academies taught and engrained in us. So why did they teach us this? Because, it's an efficient way to stay low and move throughout a low visibility, high heat structure. It's just not always the most efficient and effective way to search.

The number one priority on the fireground is LIFE. Even though crawling is an efficient way to stay low and move, this position forces the eyes down and is counterproductive to the assignment. You are unable to monitor conditions above, causing the searcher to stop and sit upright to visualize overhead. To make the primary search a success, we need to move with haste and be thorough.

Crawling is dependent on all four appendages to continually hold up and balance the body. When one is crawling and lifts a hand to sweep, the balance must be adjusted or the body will tend to follow. Opt to not sweep, and the ground covered in one pass becomes inefficient. If you come upon below-grade stairs or a compromised floor while on all fours, the center of gravity can lead you into the hazard. Crawling tends to open up the palms for burns and trauma, which we need for ourselves and THEM. There may be times we crawl, typically in more cluttered homes, small spaces or over beds.

Upright On Two Feet (Walking)

When the conditions allow, this can be a quick, sturdy and effective position to use. Ever heard, "If you can see your feet, then walk". It isn't my feet that I am worried about, it's what is beneath them that matters.

The distance of vision in a standing position is greatest when looking straight down towards your feet, and decreases as the eyesight rises. Being able to see 5 feet down to your boots, does not equate to the same visibility as 5 feet in front of you. In low to zero visibility, firefighters that are standing are slow and use their hands to navigate walls and furniture and concentrate on not tripping on objects, which hinders them to be able to effectively search for victims.

The Tripod-Position

A firefighter that trains with this technique can be efficient and search a structure with nearly the same speed yet is more effective than one can be on their feet.

The tripod position keeps the center of gravity low and to the rear, which creates a stable and balanced stance. The position leads with a foot and a tool (typically a halligan) which increases the stability and situational awareness. The foot and halligan head (adz & pike) can give warning and increase time to react, to compromised floors and step downs such as below grade stairs.

The tripod position can cover more square footage per pass and increases efficiency. The position allows the use of both hands to search. If the conditions warrant, transitioning from the tripod to a body sweep can be fluid and maintains an efficient search. Visibility is maximized for the environment by getting low and naturally keeping the eyes up. This technique keeps eyes up, to scan for victims, egress and monitor the conditions.

Body Length Sweep/Search

Can be used to sweep the entry and egress and in low to zero visibility, high heat searches. This will increase the probability of finding the 42% of victims that collapsed, during re-entry for fire control, returned for a rescue attempt or attempting egress (NFIRS Data - Fatalities Only). www.FirefighterRescueSurvey.com reports that 10% of all structural fire victims are within 6 feet of a door.

Upon forcing access or egress, complete the assignment and perform a full body length sweep and Size-Up; LIFE, FIRE, LAYOUT.

Observe the floor plan of your own home and all the homes you have been through. What are the chances of being able to perform a full-length body and arm sweep in the bedroom, bathroom, kitchen or laundry

room, and not hit anything? The probability is low, within that space is a bed, nightstand, dresser drawers, a clothing pile, tables, chairs, couches, another wall and most likely more.

If rooms are typically crowded with furniture and debris and can be reached with a body length search, why sweep with a tool that has no feeling? What if there is something soft or hard struck with your tool, what then? Be efficient, stay oriented, come off the wall and use both hands to feel for victims.

Extending The Reach with A Tool

Swinging a tool to search for humans is not acceptable. When you strike an object, you still need to go investigate with your hands. The more sweeping performed with a tool, the quicker and greater the shoulder fatigues, which results in less control. To be proficient, you must have realistic training, it is not typical to strike civilians with tools in low visibility training scenarios. Every firefighter knows what a human feel like with gloved hands, second nature matters when seconds count. We will not sweep tools for victims, search with our hands.

Search: Types and decisions to make while searching:

Search

An orderly and systematic examination of a building or area for the purpose of locating persons, or locating fire and extension of fire.

Searchable Space

Any space within a structure that we can occupy with our training, experience and PPE.

Primary Search

Immediate and rapid, yet thorough and systematic search through all affected areas, to locate victims or verify the removal and/or safety of possible occupants.

Secondary Search

A thorough and painstakingly complete search for life, of all areas that required a primary search, the outside perimeter of the building, all shafts, elevators, roofs, etc.

Targeted Search

Starting a search at a place within the structure that has the highest potential for civilians, which are typically bedrooms, egress and within 6’ of an exterior door.

All Clear

A benchmark made by command, when a primary and secondary search has been completed on the entire structure. The Draper Fire Department always strives to conduct an immediate primary search, followed by a painstakingly complete secondary search. Every building has the potential to be occupied, at any time. Search may be performed in front of or without an operating hoseline on the fireground.

Members shall be constantly aware of the environment, including the status, location and operation of hose-lines or lack thereof.

On Scene Reports will be repeated if and only if the report is “positive”. Positive reports are suggestive of a civilian inside. Examples: “My baby is inside”, “They are home”, etc. Try to get any information that can aid in our search: How many people? Where might they be? Age? Do not take much time with them, get the info you need and get inside.

On the contrary, if there are any negative reports such as: “no one is home”, “everyone is out”, “the building is abandoned or vacant”, we can acknowledge this input to the reporting party. We will not repeat this information to anyone, nor over the radio.

On scene reports hold the same validity no matter who the source is: police officer, home owner, son, neighbor, mom, etc., they are under stress. They most likely have never had their house catch fire, let alone even seen a structure fire. They will most likely not be able to recall recent events, such as

their in-laws are in town or their children had friends spend the night. Even if they look calm, everyone acts different under stress. Negative reports are never repeated, they may cause a loss of life. If we repeat the information, we may be responsible.

- 5% of structure fire victims, were reported “Everyone is Out” (Firefighter Rescue Survey)
- 28% of structure fire victims, were not reported at all (Firefighter Rescue Survey)
- 75 civilian fatalities & 200 injuries inside “Vacant” structures every year (Source: USFA)

The Draper Fire Department will not use cars in the driveway or a lack of vehicles, to guide our search priority. Civilians may bike, bus, park in the garage or take other types of transportation, making this “clue” not relevant. 1/3 of the American workforce work the graveyard schedule. 6.1% of Americans are under 5 years old (the napping age). 18 of 24 hours in the day, bedrooms are the number one type of room that our structure fire victims are located in (Firefighter Rescue Survey). Bedrooms are always a high probability for victims, not just at night.

Tools taken to the interior will typically be minimal, to allow us to search with our hands.

Personal Flashlight

A flashlight may cause reduced or improved vision, depending on smoke conditions. Start with having your chest light on and if you are getting back-splatter (bright lights on in fog), turn your chest light off for improved vision. Keep your helmet light off, it can increase your ability to locate the glow of the fire. Consider bringing a box light in with you.

Flat Headed Axe

Residential: Typically left at the front door after forcing entry if used. Generally, the pick head axe that is on every Truck Firefighters scabbard is sufficient for residential forcible entry needs.

Commercial: Can be taken to the interior when anticipating forcible entry

Halligan

Each member having a halligan gives them the ability to split search and still be able to force doors, take glass or force exit. Place your halligan in walls or at thresholds during a room search, so you can use your hands to search. If the conditions warrant you to take the glass, bring the halligan into the room.

Thermal Imaging Camera (TIC)

The Can

When entering ahead or without a line, remember a 2 1/2-gallon extinguisher can knock down fire; more importantly it can hold fire till you are able to pass or close a door or remove a baby! (Mike Lombardo) The can will spray 50’ for 50 seconds.

Hook
Can be brought to the interior and buried into the wall of a main throughway, to be easily accessed when needed. On residential structures, bury the hook in a main throughway for a later use. The 6’ hook hinders the search.

<u>Rescue: Having an operation:</u>

Definition: The act of intervening and/or removing a person from danger.

When We Locate a Victim

When we locate a victim and have the air to continue searching, hand off the victim to another crew when possible. It is easier to hand off a victim, then to try and communicate what has or has not been searched.

We do not perform an EMS assessment. They are either obviously dead and we are leaving them or we are pulling them out. Can or do we need to isolate and/or vent the area we are in? Make contact with our team and let them know by calling out “Victim,

Victim, Victim". Can our team make the rescue ourselves? Do not delay the rescue by waiting for radio time, get them moving. If we need the assistance of ladders, a window conversion, a hose line or additional personnel, then request it from command. Keep radio traffic to a minimum "Command, Ladder 21 bringing victim out Alpha side".

Critical victims are ours, until we hand them off to another crew or medical. When deciding to take a victim out a window or back through the structure, consider time to make the rescue and the conditions.

Grips

Focused on some grip techniques for victim drags and carries that are traditionally used for grappling. Two of those types of grips are the Gable Grip and the Kimura Grip. Both are 'thumb less' grips where the thumb is on the outside of the grip going the same direction as the fingers not trying to wrap around in the opposite direction as we would normally use when we pick up everyday objects.

A general rule is that whichever arm wraps the body part, the opposite hand is the top grip. The goal is to think of our hands as big hooks rather than a hand with independent fingers. The Gable and Kimura grips are not only stronger than a traditional grip but they are also easily performed with structure gloves on and in zero visibility. Whether we are grabbing a victim's legs for a double leg drag, their torso or an arm we should squeeze them close to our body and utilize one of these grips to give us our best shot at keeping a grip on our victim which we all know is a difficult task in the fire environment.

Drags

Carrying a victim out is typically used for light weight victims, such as a child. When carrying children, keep them low in the elements. If waiting with a baby at a window for rescue, hold them in the cleaner air.

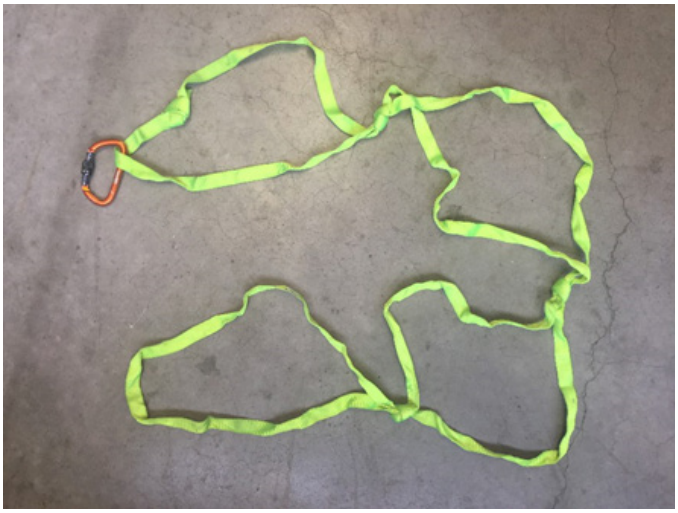
The purpose of drags are to Grab and Go. The weight of an adult victim will take time and energy. Adults will typically take a crew to complete the rescue. Quick simple drags will keep the victim moving. Head first drags can be done by one or two firefighters performing a "wrist lock" or a "Single Arm Lock". Head first drags elongate the victim rescuer combo more than feet first.

Feet first drags are the preferred drag, it keeps the victims head low in the elements and keeps the victim and rescuers overall body length shorter than head first. Feet first drags can be performed by crossing the victim's legs, putting the victim's feet in each armpit or by two firefighters. Brace your arms in the victim's knee pits for an improved hold.

Victims can be spun around by crossing their ankles, lifting their feet in the air and spun on their back. When pulling victims down stairs, to protect their head we will try to drag head first.

Using webbing is a last resort. It can be complicated and time consuming. Webbing is considered with very large victims or with victims that need to be brought up stairs (typically from a basement).

The strap of choice is a 22' webbing tied in a loop (water knot) and then knotted three times at equal distances, this will create four holes. The two middle holes for the legs and the two outer holes for the arms. (See picture below)



A 7' looped prusik can be girthed around a victim's appendages. This type of webbing drag will elongate the victim and increase the difficulty when navigating in small spaces and turns.

Victims that are found on a bed, can be rolled up on the sheet they are lying on. If a victim is on the ground, we can grab a blanket and wrap them in it as well.

Rescuing Victims Through Windows

Our preferred way of window rescue is to drag victims, on their backs to the window, legs first. Legs go up in the air towards the window sill with their butt against the wall. The victim's hands are crossed and handed

to the outside firefighter. The victim is then pulled head out by the outside firefighter, and assisted from the inside by the inside firefighters.

LADDERS

Throwing Ladders for Access, Egress & Rescues

Rescue, access and egress ladders that are thrown to windows, will have the tip at the window sill. Ladders thrown to a balcony will extend 2-4 rungs above the railing on the wall, to provide a good handle for victims and firefighters. Angle will vary when throwing ladders for rescue. Ladders should land between 60 and 75 degrees but other angles will work.

Ground Ladder Rescues

When civilians are hanging out windows, two firefighters can carry the ladder flat and throw the tip below the victim and raise it up and under the victim.

When a window rescue is being made, a second ladder is recommended, “parallel ladders”. It creates a wider base and the ability for more firefighters to assist in the rescue.We prefer to take victims out of the window head first. As the victim’s torso is being brought to the ladder, place your arm under their armpit and grasp the back of the beam. Guide legs to one side of the ladder, place arm between the victim’s legs and grasp the back of the ladder beam. Slide hands along beams during rescue.

Ground Ladder Assists

Victims presenting at windows. A second ladder allows for us to pass other firefighters and civilians coming down. If able, climb up and make entry to assist the victim onto the ladder, while another firefighter is on the ladder assisting them from below. Putting a firefighter inside will allow us to possibly isolate the room and search the room, after assisting the civilian on the ladder.

Aerial Ladder Assists

Escorting conscious victims down aerials will take time, civilians have never been on an aerial ladder. The amount the aerial is extended and the degree of the angle will affect the speed of them being able to descend.

Convert a Window to a Door for Rescue

After locating a victim, a decision is made on how we are going to rescue the victim. When the option is chosen to remove a victim by way of a window, a window-to-door conversion should be considered.

Large victims, short staffed crews, firefighter rescues and access/egress in hoarder homes are some of the reasons we should consider a window-to-door conversion.
One of the most difficult parts of a civilian rescue by window, is getting them from the floor to the window sill.

3. Elevator rescue operations

INTRODUCTION

Draper Fire Department is often called upon to provide rescue assistance to passengers trapped in an inoperable elevator car; usually due to electrical power failure, malfunction of control components, or activation of safety devices. An understanding of the basic mechanical principles of elevators, as well as the components of the machine room, hoistway and elevator car is recommended for safe operations. In the event of an emergency, time may be of the essence of evacuating passengers. To ensure that a rescue is performed safely, the rescue team must be organized, trained and equipped with the proper tools.

RESPONSE

Initial resources should respond code 1 (non-emergent) unless a life safety or medical issue warrants a code 3 (emergent response).

The initial units responding include both the Heavy apparatus (Engine or Truck) and the Medic ambulance. Additional units are dispatched as per the request of the first arriving officer.

TOOLS ASSIGNMENTS

Each crew member will be assigned equipment according to riding assignment.

- Captain- Key ring, elevator keys, flashlight, and radio.
- Engineer- Lock-Out Tag-out kit, water can, flashlight, and radio.
- Tailboard FF- Flashlight and radio. Captain's discretion.
- Medic Driver- Poling tool, Elevator kit, flashlight and radio.
- Medic Passenger- Irons, flashlight, and radio.

FIRST ARRIVING IC

The IC should:

- Radio an Initial Arrival Report
- Contact an RP, evaluate the situation and decide the safest and most expedient means of rescue.
- Decide if the appropriate resources are en route. An elevator service technician is an important resource and should be considered during this assessment.
- Make verbal contact with the occupants to advise them of fire department arrival and to keep them informed of what actions are being taken and to determine if any medical issues exist.

SCENE SIZE-UP

Upon arrival the IC should investigate and determine the following:

- The type of elevator and location of the stalled car.
- How many occupants are in the elevator.
- Is there a fire or other structural hazard present.
- Verify location of correct power shut-off switch.
- Determine type and level of rescue required.

Strategic Considerations

- Determine if there is a life-threatening issue that is affecting the occupants such as a serious medical condition or fire.
- Determine if the elevator car is positioned between floors.
- Ensure properly trained individuals and resources are on scene to handle the situation.
- Ensure all safety procedures are in place for the removal of the passenger(s).

TACTICAL CONSIDERATIONS

First arriving crew members will be given an assignment for the rescue operation by their riding position. The following is how the rescue team can be assigned.

Changes can be made per Captain's discretion.

- Captain - Respond to elevator

lobby, usually located at the ground level of the building. Locate the Fire Department service key. Look for what floor the car might be stalled on by car position indicator.

• Engineer - Locate and gain access to the machine room.

• Tailboard FF - Captain's discretion.

• Medic Driver - Make contact with the passenger(s).

• Medic Passenger - Make contact with passenger(s).

If the elevator is stalled in between floors at least one firefighter should proceed to the floor above and at least one firefighter should remain on the floor below. Once members are in place, an Elevator Recall Sequence should be initiated:

EMERGENCY RECALL SEQUENCE

• Verify with the passengers that the emergency stop button in the car is not engaged.

• Ensure the hoistway door is fully closed.

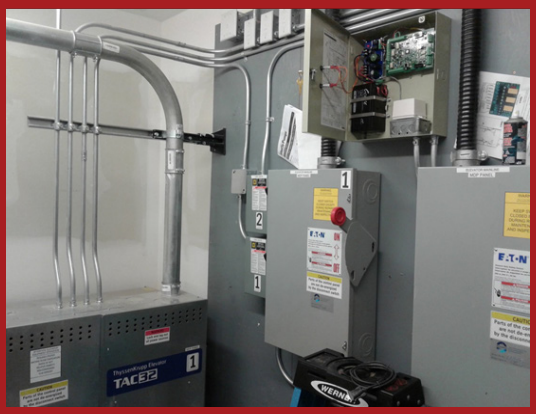
• Press the floor call button.

• Attempt a Phase 1 recall (firefighter emergency recall) operation to return the car to the lobby.

• Reboot the System - Shut the power off to the elevator at the mainline disconnect. Leave the power off for 15-30 seconds, cycle the mainline disconnect back on (re-energizing), and then attempt normal operation of the elevator again to see if it reset.

If the recall sequence fails to return the elevator to normal operation, or if there is a need for immediate rescue, initiate the Elevator Rescue Sequence.

Firefighter recall panel



Mainline disconnect in elevator mechanical room

ELEVATOR RESCUE SEQUENCE

- Mainline disconnect shall be switched to the off position.
- Perform lockout/tagout on the mainline disconnect.
- Open hoistway door utilizing elevator keys or Picking tools.
- Open the elevator car door.
- Guard any open hoistway.
- Remove passenger(s).
- Remove lockout/tagout and leave mainline disconnect OFF until service technician arrives.

If the passengers are unable to be removed utilizing the Rescue Sequence, determine which type of rescue procedure will be required.

- Lowering of firefighters for emergency hatch rescue.
- Drifting (manual lowering of the car).

EMERGENCY HATCH RESCUE

- Ensure rescue personnel are trained and familiar with this procedure.
- Always double check that the mainline disconnect is OFF and secured by Lockout/Tagout for all elevators that operate within the same hoistway as the stalled elevator.
- Use the correct hoistway door key or Pick/Pole the door above the stalled car.
- Ensure proper fall protection for Rescue personnel AND entrapped civilians.
- Place a ladder from the lobby landing to the top of the elevator car.
- Ensure the Emergency stop button/switch is activated to prevent the elevator car from moving.
- Access car top hatch and place a ladder inside.
- Assist passengers out of the top hatch and up the ladders to the lobby floor.
- If the elevator car is unstable and requires it to be shored/rigged to prevent further movement, then proper placement of safety rigging equipment should be done by trained personnel.

DRIFTING (MANUAL LOWERING)

- Shut down mainline disconnect and secured by Lockout/Tagout.
- Determine the location of the stalled car.
- Use the correct hoistway door key or Pick/Pole the door at the lobby location where the elevator car will be drifted down to.
- Elevator car door should remain closed.
- Explain to occupants that the car will be moving down to the next

floor.

• Constant communication between the Firefighters at the lobby location and at the mechanical room hydraulic valve.

• Lower the car slowly until it is level with the lobby floor.

• Open the elevator car door and assist passengers out.

Entering a hoistway or drifting an elevator car is complex. These techniques should be attempted under the supervision of an elevator service technician if possible.

TASK CONSIDERATIONS

• Use the appropriate elevator key to open the hoistway door and block it in the open position. Then slide open the inner elevator door and block it open. Forcible entry should be used as a last resort because elevator components can be easily damaged and are very expensive.

• If the car lodges between two levels and is greater than 3' (creating a fall hazard into the elevator shaft) from the floor level, removal of the occupants to the upper level should be considered.

SAFETY CONSIDERATIONS

• A lock out/tag out system should be used. If the car top emergency stop switch can safely be reached, it should be set in the stop position. Shutting off the car emergency stop switch may be done in addition to the main power shut off.

• Ensure an open hoistway is protected at all times.

TERMINATION

Upon removal of the occupants, shut the elevator doors, leave mainline disconnect OFF, ensure an elevator maintenance technician is enroute, and notify the RP of the out-of-service elevator.

SECTION 6
Apparatus Positioning

Positioning or “spotting” your aerial apparatus requires skill and practice. The trucks should make every effort to spot for use of the aerial device and truck company operations on the Fireground. If arriving first and the Truck Company Officer decides to initiate Fire Attack then the apparatus should be positioned as an Engine.

Often the term is thrown around that the Truck takes the numbers. Hose can be extended, but ladders can’t. While there is some truth to this statement more should be considered as a poorly positioned Truck can delay an arriving Engine from quickly laying to the fire and providing extinguishment. Positioning an aerial apparatus can be broken down into 4 basic considerations.

1. Uninvolved to Involved

Spot the ladder to create distance between where the fire is and where it will be going. If going to the roof for ventilation crews will need time to assess the roof and perform ventilation operations. We will also be setup to protect uninvolved portions of the building if anticipating using aerial master streams.

2. Corners

The “offside” corner is where we aim to place our aerial ladder when going to the roof. By placing the ladder just a few feet off the corner this would allow for two ways on and off the ladder. This can come in handy if crews need to exit the roof in a hurry. The tip of the ladder should “kiss” the roof with both beams. This takes the bounce out of the ladder and is much safer to maneuver up and down with tools. Stay away from placing the egress section on the roof and opt to place the beams on instead.

3. Inside vs. Outside

By taking an inside spot we would be needing our aerial for a longer throw. This could be because of the height of a building or a long setback. An outside spot allows Engine companies to position closer to the building underneath the Trucks ladder. This allows the waterway to get out of the way and produces a better climbing angle for crews going to the roof. By securing an outside spot this also sets us up for aerial master stream operations should the need arise.

4. Pull Past or Stop Short

Pulling past a structure could allow us to place our aerial ladder where needed. This also allows ground ladders to be pulled out right in front of the structure in a quick manner, whether for primary or secondary access/egress. Pulling past also allows the Engine the option of aligning their transverse bed up with their objective. Stopping short might be needed for placement of the aerial ladder.

Other considerations

Commercial Buildings

All commercial buildings should be laddered with the aerial ladder as the primary ladder when roof operations are being performed. While it may seem easy to ladder a one-story commercial with a ground ladder it will not be easy to get that crew off the roof in a timely manner should the need arise. In addition, the angle of the aerial ladder will be much easier to ascend and descend with tools.

Steep Pitched Roofs

When going to the roof of a steep

residential or possibly a commercial aim placing the aerial ladder to the bottom of a valley in the area where roof operations are going to be performed. This allows a stable platform to work from and two different sections of roof to open up. Roof ladders can also be deployed from this position. By placing the ladder low in the valley this also places us in a stronger area of the roof and allows more roof to work.

Second Due Trucks

Second arriving Trucks should be placing their ladders to the roof if the first arriving Truck is performing roof operations. This would apply as long as there isn't an imminent need for a Rescue with the second due Trucks aerial ladder. Second due Trucks should attempt to place their ladder on the opposite "offside" corner. Secondary ladders should be placed on their side of the building. While not covering every possible scenario the above guidelines should set Truck companies up for success on the fireground by starting off their operations in a good position. Truck companies should be routinely spotting their apparatus on buildings throughout the city in attempts to hone their skills.