

Fire and Rescue Departments of Northern Virginia

Firefighting and Emergency Operations
Volume II - Fire Operations
Book 2
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Fires in Residential and Commercial Townhouses and Rowhouses

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Cover Photograph

TABLE OF CONTENTS

RESIDENTIAL AND COMMERCIAL TOWNHOUSE FIRES

- 1. Introduction
 - 1.1 Background
 - 1.2 Purpose

- 2. Description
 - 2.1 Definition
 - 2.2 Characteristics

- 3. Construction
 - 3.1 Type
 - 3.2 Roofs
 - 3.3 Attics
 - 3.4 Walls
 - 3.5 Insulation
 - 3.6 Firewalls
 - 3.7 Floors
 - 3.8 Windows
 - 3.9 Doors
 - 3.10 Stairs
 - 3.11 Fire Protection Features
 - 3.12 Chimneys
 - 3.13 Garages

- 4. Hazards
 - 4.1 Life Hazards
 - 4.2 Fire Hazards
 - 4.3 Collapse

- 5. Fire Operations
 - 5.1 Strategic Factors
 - 5.2 Resources For Fires In Townhouses
 - 5.3 Apparatus Positioning For Fires In Townhouses

- 6. Engine Company Tactics
 - 6.1 Water Supply
 - 6.2 On-Scene Report
 - 6.3 Size-Up and Situation Report
 - 6.4 Initial Line
 - 6.5 Back-Up Line
 - 6.6 Line Above The Fire

TABLE OF CONTENTS

Section 6 continued

- 6.7 Basement Fires
- 6.8 Garage Fires
- 6.9 Attic Fires
- 6.10 Large Volume Fires
- 6.11 Exposures

- 7. Truck and Rescue Company Tactics
 - 7.1 Positioning
 - 7.2 Initial Actions
 - 7.3 Forcible Entry
 - 7.4 Rescue and Primary Search
 - 7.5 Ventilation
 - 7.6 Ladder Deployment
 - 7.7 Basement Fires
 - 7.8 Attic Fires
 - 7.9 Large Volume Fires

EMERGENCY OPERATIONS MANUAL

VOLUME II – STRUCTURAL FIREFIGHTING

Residential and Commercial Townhouse Fires

1 INTRODUCTION

1.1 BACKGROUND

1.1.1 Fires in townhouses always present a life safety hazard; life safety is our number one priority.

1.1.2 Townhouse occupancies have attached exposures where fire can spread, whether or not the exposure is separated by a firewall. Decks, storage sheds, trash bins, etc. can also be attached.

1.1.3 In recent years, the advent of lightweight construction techniques has increased the life safety hazard because of the potential for early collapse.

1.1.4 Because of the variety of layouts and floor plans involved, reconnaissance must be performed to determine the location of the fire within the building as well as conditions in the rear and eventually the attached exposures.

1.2 PURPOSE

1.2.1 To describe residential and commercial townhouses and rowhouses, which comprise a large portion of the structures throughout Northern Virginia.

1.2.2 To point out the construction features of such buildings with regard to protecting life and extinguishing fires.

1.2.3 To describe the hazards associated with these types of structures and recommend precautions that should be taken.

1.2.4 To establish standard tactics for fires that occur in such structures.

1.2.5 To establish tactics for operations for engine, truck, and rescue companies for fires that occur in such structures.

1.2.6 To reduce the loss of life and property by establishing a standard method of operation for companies combating fires in townhouses.

2 DESCRIPTION

2.1 DEFINITION

2.1.1 The term “townhouse” is a generic term. It is used to describe various styles of attached dwellings. These can range from old rowhouses, to modern townhouses, duplexes, quads, and piggybacks (see figures 1-5). Each occupancy has a separate address and its own entrance. Regardless of name, the firefighting tactics are basically the same for each style.

2.2 CHARACTERISTICS

2.2.1 A townhouse is a one- to four-story unit normally attached to several other units. These units may or may not be completely separated by substantial firewalls. Normally, utilities are completely separate from one another.

2.2.2 Townhouses may or may not have a garage, which may store one or two vehicles. It may be on the lowest level in the front or it may be detached in the rear off of a common alley.

2.2.3 Townhouses may range from two to four floors in height and may be different in height from front to rear (i.e., two floors on the front and three floors on the rear or vice versa). Refer to the “definition.”

2.2.3.1 A duplex is two dwelling units connected together under one roof.

2.2.3.2 A quad is four dwelling units connected together back-to-back, under one roof, with separate addresses and may have entrances on four different sides.

2.2.3.3 A piggyback is two stacked units (one over the other) with attached units on each side, each with a separate address and entrance. These are typically two-level units over one-level units, but other floor plan variations may be found.

2.2.3.4 Familiarity with the response district will enable the first-in officer to paint an accurate on-scene picture for the remainder of the assignment as to the style and layout.

2.2.3.5 The importance of accurately defining the different styles of attached dwellings is so that all personnel can expect and deal with the additional attached exposures.

- 2.2.4 Townhouses may have unfinished basements that allow a fire originating in that area to quickly spread to and compromise structural components (floor joists, plywood I-beams [“I’s”], plywood floors, etc.).
- 2.2.5 Commercial establishments may occupy townhouses and may not involve the same life safety concerns.
- 2.2.6 Commercial townhouses do not differ greatly from residential townhouses in construction type nor firefighting tactics; however, they are designated such to differentiate the two occupancy types.

3 CONSTRUCTION

3.1 Townhouse construction is typically Type V, Wood Frame.

3.1.1 Platform frame construction is typical. Because of this construction method, there are inherent barriers to the spread of fire through the walls.

3.1.2 Older rowhouses may have balloon-frame construction.

3.2 ROOFS

3.2.1 The roof frames are of two basic types: lightweight or conventional.

3.2.1.1 Lightweight - Triangular trusses that rest on the top floor load-bearing and non-load-bearing walls, or parallel chord trusses or plywood I's forming the peak from the front and rear load-bearing walls to a ridge pole.

3.2.1.2 Conventional - Sawn wood rafters forming the peak from the front and rear load-bearing walls to a ridgepole.

3.2.2 The roof deck:

3.2.2.1 Over the trusses is usually 4 x 8 foot plywood sheathing, but can also be particleboard of the same dimension.

3.2.2.2 Over sawn wood rafters is usually plywood sheathing or may occasionally be 1 x 4 inch or 1 x 6 inch boards nailed perpendicular to the rafters. The covering will usually be asphalt shingles, but occasionally wood shingles.

3.2.3 Many townhouses constructed during the 1980s have FR (fire retardant) plywood sheathing roof deck inside each party wall. Much of this FR plywood was later determined to be defective. Some was replaced, but companies should suspect the presence of FR plywood and use caution during fireground operations. The integrity of an FR roof should be considered to be unsafe even before a fire occurs.

3.2.4 The roof is typically pitched from the center peak to the front and rear, and occasionally, a perpendicular gable will be found on the front. The roof is usually steep enough to require a roof ladder or aerial device from which to work. The roof style may also be flat or mansard. If possible, firefighters should work supported independently from the roof.

3.2.5 The presence of a dormer does not always indicate a finished attic. The dormer may be false, only attached to the exterior roof surface and not connected to the attic.

3.3 ATTICS

3.3.1 Attics, if present, are usually unfinished and may be used for storage by occupants. Access to this space may be through a scuttle or pull-down stairs located somewhere in the top floor ceiling, including inside a bathroom or a closet. This space may be the location of water heaters and HVAC units.

3.3.2 In lieu of an attic, townhouses may have a top floor vaulted ceiling or a loft.

3.3.3 There may be flooring in the attic that will make application of fire streams from the floor below difficult.

3.3.4 Knee walls will be found in units with lofts and dormers. Knee walls may contain hidden fire, and must be opened to check for fire extension.

3.4 WALLS

3.4.1 Walls will be constructed of dimensional lumber, 2 x 4 inch in size, and may be load-bearing or non-load-bearing. Occasionally, lightweight aluminum studs may be found in non-load-bearing walls.

3.4.2 Exterior walls may be covered with brick veneer, wood, aluminum, or vinyl siding over a thin layer of insulating sheathing. In the case of aluminum or vinyl siding, it can be easily breached.

3.4.3 All interior walls are typically covered with gypsum.

3.4.4 Foundation walls are either masonry block or a poured reinforced concrete monolithic (cast-in-place) wall.

3.5 INSULATION

3.5.1 Insulation can be rolled fiberglass, blown-in rock wool, or blown-in cellulose.

3.5.2 Insulation will be found in attics, exterior walls and, in some structures, the interior walls.

3.6 FIREWALLS

3.6.1 Depending on when the townhouse was constructed and what edition of building code was in effect at the time, firewalls will be:

- Located between each address
- Located between every other address
- Non-existent
- Between the living spaces (occupied floors) only and does not extend into the attics or basements.

3.6.2 Firewalls are constructed of two types:

- Masonry
- 1-inch gypsum layers on both sides of the wall studs

3.6.3 Solid masonry firewalls can often be seen from the exterior if parapets extend through the roof. Masonry firewalls may stop at the underside of the roof deck.

3.6.4 Rooflines (the ridges) may be offset at each address to accomplish separating the attic spaces.

3.6.5 Firewalls might be penetrated to allow the running of utilities.

3.6.6 Familiarity of buildings in each respective response district, especially during construction, will provide knowledge of the type and location of firewalls.

3.7 FLOORS

3.7.1 Floor decking is typically wood (boards) or wood composite (plywood or chipboard). The decking may be covered with carpet and pad, masonry or vinyl tile, or tongue-and-groove decorative wood.

3.7.2 The decking material will be laid on sawn wood joists, parallel chord trusses, or plywood I-beams. These joists, trusses, or beams will be spaced from 16 to 24 inches on center.

3.7.3 Floor joist direction can be side-to-side or front-to-rear. If front-to-rear, an unfinished basement may have an unprotected steel girder and Lally columns supporting the floor above which presents a collapse hazard when exposed to fire. If side-to-side, joists will be supported on the basement load-bearing walls.

3.8 WINDOWS

3.8.1 The most common style of window utilized in townhouses is a double-hung, sliding sash type. The glazing may be of single, double, or triple thickness. Other styles of windows may be found and should be noted during pre-planning and size-up opportunities.

3.8.2 Casement windows create a special hazard. Many of these types of windows are found in construction dating from the late 1940s to the late 1960s. The windows have steel frames set in concrete or masonry. While breaking all the glass in the windows will ventilate the affected area, entrance and exit through the remaining window frame is physically blocked. The window must be opened by lifting a latch and rotating a crank. Removing the frame with force would be very difficult under adverse conditions and would require the use of heavy forcible entry tools. Firefighters should note these windows in their size-up upon arrival at a structure fire. Treat casement windows as if they were barred.

3.9 DOORS

3.9.1 Exterior doors on residential townhouses are solid wood, insulated metal, or wood panel. In addition, you may find sliding glass or French doors in the rear. Commercial townhouses may have a tempered glass door in the front. Exterior doors are inward opening on residential and outward opening on commercial.

3.9.2 Interior doors are commonly hollow-core wood doors. Inward opening doors are typically found leading to bedrooms and bathrooms. Outward opening doors usually lead to closets or basement stairs.

3.9.3 There are three standard locks on exterior doors. These are mortise, rim, and tubular dead bolt. Mortise locks were the most prevalent locks up until the 1970s. Rim and tubular deadbolt locks became more popular during the building boom of the 1970s, 1980s, and early 1990s. Mortise locks were re-introduced as the primary lock in new construction in the late 1990s.

3.10 STAIRS

3.10.1 One of the most notable construction features in residential townhouses is the open stairway. Open stairs allow quick spread of fire and products of combustion to floors above.

- 3.10.2 A door may or may not be found at the top of the basement stairs. If present, this will slow the spread of fire and its products to upper floors.
- 3.10.3 In commercial townhouses, the stairwell will be enclosed.
- 3.10.4 A fire on lower floors severely endangers occupants on upper floors. This is especially present in residential occupancies as bedrooms are typically found on upper floors.
- 3.10.5 Stairs are an important construction feature that require hose line protection to maintain access and egress routes. Members should remember that, in most cases, the stairways are stacked. Stairs are also usually located against a wall.
- 3.10.6 Storage under basement stairs is common. These stairs can be “unfinished” on the underside. A fire originating in this storage area can quickly lead to the collapse of the stairs.
- 3.10.7 Many modern townhouses have steep, narrow, or spiral stairways to upper levels that may inhibit hose line advancement and rescue operations.

3.11 FIRE PROTECTION FEATURES

- 3.11.1 Depending on when the townhouse was constructed, it may or may not be sprinklered, and may or may not have a fire department connection.

3.12 CHIMNEYS

- 3.12.1 Chimneys can be either masonry with a tile flue, or wood-framed with a metal flue.
- 3.12.2 The metal flue, also known as zero clearance or pre-fabricated chimney, is a galvanized metal pipe in a wood-framed chimney with siding on the exterior. The wood-framed chimney can be non-fire stopped and interconnected to adjoining floor/ceiling voids. Chimney fires can create temperatures high enough to cause ignition of the surrounding framing members. Fire spread to attached occupancies is likely where occupancies utilize a common chimney (quadraplexes, piggybacks).

3.13 GARAGES

- 3.13.1 The interior walls of the garage, if attached to the townhouse, will have a minimum of ½-inch drywall. The swinging door from the living area to the garage will be rated at a minimum of 20 minutes. The door, doorframe, and hardware are not required to be a rated assembly. It is typically not self-closing and opens inward from the garage into the living area.
- 3.13.2 The area above the garage is normally finished living space. A vehicle or contents fire in a garage will allow for rapid fire extension to other areas of the structure. The presence of a finished living area over the garage presents a serious life hazard.
- 3.13.3 The overhead entrance door to the garage and its mounting hardware will not be fire-rated. These types of doors are known to collapse when left open and exposed to fire.

4 HAZARDS

- 4.1 Life hazard is our number one priority. Regardless of the time of day, townhouses may have a significant life hazard. Life hazard includes those in attached exposures.
 - 4.1.1 Victims are often found in a normal egress pathway (near windows, in doorways, hallways, etc.)
 - 4.1.2 Victims may also be found in bed. Bedrooms are usually located on the top floor, but may also be located in the basement.
 - 4.1.3 Due to sub-leasing, occupants can be found in both basement living areas and on the top floor.
 - 4.1.4 In commercial townhouse occupancies, transient occupants unfamiliar with the means of egress may create a life safety hazard.
 - 4.1.5 Security measures may also negatively affect life safety by not only blocking exits, but also by impeding entrance by fire companies.

4.2 FIRE HAZARDS

- 4.2.1 The fact that townhouses are generally constructed of wood adds greatly to the fire hazard.
- 4.2.2 The use of combustible interior finishes and the type of furnishings found within these structures, contributes to the fire loading. Generally, these types of occupancies are considered to have a relatively "low" fire loading. Fire flow estimates will be based on a flow rate of 10 gpm per 100 square feet of involved area. Therefore, attack lines should be 1 ¾ inches in size.
- 4.2.3 The presence of highly combustible siding can greatly affect the fire hazard. Vinyl and asphalt siding may contribute to vertical and horizontal fire spread, and creates a severe exposure problem.
- 4.2.4 The presence of interior void spaces may add to fire spread. Vertical and horizontal openings allow smoke and fire to enter and attack the structure itself. Fire that has entered these voids will necessitate the opening of floors, ceilings, and walls. This is especially crucial in balloon-frame construction.

- 4.2.5 The presence of cooking, utility, and mechanical areas creates the potential for fire. It should also be recognized that in the residential setting, the potential for ignition exists from many sources that include space heaters, pilot lights and burners, and smoking materials.
- 4.2.6 The presence of fireplaces and chimneys may create a potential for fire extension to unwanted areas of the structure. Improper installation or time may compromise the integrity of the components, allowing fire or heat to escape and ignite surrounding combustible members.
- 4.2.7 Fire spread to attached exposures is a major concern.
- 4.2.8 Fire can spread horizontally to adjoining townhouses, even though a firewall is present, by passing through penetrations made in the firewall or by spreading over the firewall.
- 4.2.9 Fire can spread over combustible exterior siding and be drawn into the attic vents on the attached occupancy around the firewall.
- 4.2.10 Fire spread from the contents to the structural members can cause weakening of the structural members and thus collapse.
- 4.2.11 The potential exists for flashover to occur in these types of structures. The amount and type of combustible materials, rate of heat release of the burning materials, and an adequate supply of oxygen allow a fire to progress rapidly to the flashover stage.
- 4.3 COLLAPSE
- 4.3.1 In general, most townhouses are constructed of lightweight materials and methods that do not withstand degradation from fire exposure for long periods of time.
- 4.3.2 Collapse of the roof members (trusses) onto the top floor can occur in an attic fire or second floor fire, where fire has extended to the attic.
- 4.3.3 Much of the collapsed roof assembly may be supported by the top floor, non-bearing walls. Some of the roof members will create voids in the top floor rooms.
- 4.3.4 A fire in the kitchen may spread behind cabinets and into the soffit space. It can then spread either to the ceiling or floor above, or vertically to the attic and weaken structural members in all locations in between.

- 4.3.5 Fires in unfinished basements will expose structural members of the floor above. This will rapidly cause weakening of the structural members supporting the floor above. Members should be aware that an attic fire could have begun as a basement fire, spreading to the attic through interior, vertical utility voids.
- 4.3.6 If fire is in the floor void immediately below operating firefighters, and the fire consumes structural members, the floorcovering may be the only thing supporting the weight of personnel. The importance of sounding or testing the stability of the floor cannot be overstated.
- 4.3.7 In commercial occupancies, the installation of suspended ceilings creates a combustible void that can spread fire over the heads of attack crews, and then suddenly drop fire onto or behind them, cutting off their exit.
- 4.3.8 Fire spread through joist spaces of sawn wood joists will be within that space. If the floor and ceiling void are plywood "I" beams or parallel chord trusses, the fire spread will be throughout the entire void space. The discovery of this construction feature shall immediately be communicated to command. In zero visibility, the ceiling should be probed with a hook or other tool.
- 4.3.9 Some commercial townhouses have elevators that can provide a means of vertical extension.
- 4.3.10 A masonry veneer wall can fall outward the distance of the height of the wall.
- 4.3.11 Overhead garage doors, if not chocked open, can close on crews operating on the interior of the garage, trapping them inside.

5 FIRE OPERATIONS

5.1 STRATEGIC FACTORS

- 5.1.1 Life safety is the highest priority at all structure fires. However, the potential for life loss is most prominent in residential occupancies. This objective should be achieved through aggressive interior fire containment and primary search. All operational tactics should be assigned to support this strategic goal.
- 5.1.2 When it has been confirmed that the occupants of the structure are accounted for, self-evacuated, evacuated with assistance, or rescued, the strategic goal should then focus on firefighter safety and fire extinguishment.
- 5.1.3 In most cases, fire extinguishment should be achieved through an offensive interior attack. At times, size-up will indicate otherwise; however, personnel should anticipate an offensive interior attack.
- 5.1.4 The conservation of property should be a strategic goal throughout the entire incident.
- 5.1.5 The rescue problem should be addressed through an aggressive interior primary search for life that focuses on the area near the fire, as well as the bedrooms and means of egress. Ventilation in this type of structure is critical in facilitating a primary search. This may be achieved through the aggressive removal or opening of selected windows where occupants might be located.
- 5.1.6 If the EMS unit is staffed with members trained as firefighters, and there is no need for the treatment of trapped or injured occupants, this unit may be used as the "outside two," or assigned to other duties as determined by the incident commander. If this action is taken, an additional EMS unit should be requested to the incident for the treatment of injured firefighters or occupants.
- 5.1.7 The interior exposure problem should be addressed through rapid containment of the fire. This must include advancement of an interior attack line to protect any occupants within the structure, focusing on the interior stairway if present or other vertical voids. The interior fire will be of two types: fires involving only the contents, or fires that involve the contents as well as structural members. The latter scenario provides the means for fire to extend throughout the structure.

- 5.1.8 The exterior exposure problem should be addressed through an aggressive offensive interior attack, an offensive exterior attack, or by protecting the exposures with a defensive attack.
- 5.1.9 The confinement of the fire should be achieved through the rapid advancement of an interior attack line to protect the interior stairway and advance to the seat of the fire. If it cannot be ensured that rapid extinguishment will be achieved, then it is imperative that the hose line(s) is located in such a way as to protect the victims.
- 5.1.10 The extinguishment of the fire should be achieved through the proper selection, placement, and application of the attack line(s). The compartmentation generally found in townhouses and rowhouses, as well as the fire loading, suggests that the 1¾-inch attack line should be effective in extinguishing most content fires. Fires involving structures of this type of occupancy may require the support of several equally effective and mobile lines.
- 5.1.11 The ventilation of this type of structure during a fire should generally be achieved through natural horizontal methods. The reason for venting should be identified and communicated to the assigned units.
- 5.1.12 The need for roof openings typically will only be required when the fire has entered the attic area or has gained access to vertical void spaces. Conventional construction provides the needed support to accomplish rooftop ventilation. Lightweight construction does not provide the support necessary and may result in early collapse. Crews ordered to perform rooftop ventilation in lightweight construction should be independently supported by the use of aerial devices.
- 5.1.13 Fire travel within these types of structures will be affected by the method of construction. Balloon-frame and platform-frame construction methods are common, and each presents a different concern. Balloon-frame construction requires the checking of all levels within the structure. Fire should be suspected of having entered the exterior walls. Platform construction offers some level of fire-stopping, but all affected vertical voids must still be checked for the presence of fire with attention given to the plumbing and heating areas.
- 5.1.14 Reconnaissance is a must to determine the fire's size, extent, and location before deciding on a course of action. When it is impractical for the first officer to personally view side 3, the officer should assign this task to another early arriving unit.

5.1.15 As a general rule, certain situations should cue the officer-in-command to request a second alarm such as:

- Fire in two separate occupancies
- Fire on more than one level of the townhouse
- Known rescues.

5.2 RESOURCES FOR FIRES IN TOWNHOUSES

5.2.1 The minimum resources assigned to incidents of fire in townhouses are:

- 4 engine companies
- 1 truck company
- 1 rescue company or a 2nd truck company
- 1 EMS unit
- 1 battalion chief

5.2.2 The 4th due engine shall assume the role of the Rapid Intervention Team (R.I.T.), unless otherwise assigned by the Incident Commander.

5.2.3 When reports of occupants trapped are received, the assigned resources should be modified to include ALS units, if not already dispatched.

5.2.4 Utility-fueled fires will require the assistance of the involved utility company.

5.2.5 The rehabilitation of companies that have been operating may require additional resources for relief as well as to staff “rehab”.

5.2.6 Units encountering delays in responding should communicate this immediately, along with changes, in arrival order that will affect assignments. The dispatcher should notify the responding chief officer of these changes. The chief officer should be advised of and acknowledge companies becoming available and being added to the incident.

5.2.7 Reserve resources should be available in staging to meet contingencies as they occur until the fire is declared under control.

5.3 APPARATUS POSITIONING FOR FIRES IN TOWNHOUSES

5.3.1 Typical positions and initial actions are listed below:

- First due engine – pull past the involved structure or stop short, allowing room for the truck to have the front; on-scene report, layout, size-up, situation report, initial attack line, search as the line is advanced
- Second due engine – water supply, back up line
- Third due engine – secondary water supply, check for fire extension, visual inspection of side C, and possible exposure line
- Fourth due engine – R I T
- First due truck – position in front of structure; force entry if needed, search, ventilation, ladders
- Rescue or 2nd truck – position away from structure; force entry if needed, search, ventilation, ladders. (See Truck and Rescue Company Tactics for more detail)

5.3.2 After viewing as many sides as possible, the first-due engine company should park in a position to allow for rapid advancement of hose lines into the structure, leaving priority position for the truck company. In most cases this will mean that the first engine pulls at least two addresses past the involved unit. If the truck is entering the block from the opposite direction, it is imperative that the engine stop at least two addresses short of the involved unit. The goal is to have the first arriving ladder truck in front of the fire occupancy with access to its ground ladder bed. As a rule, allow for at least 50 feet of clearance behind the truck's ground ladder bed.

5.3.3 The first-due truck company shall take a position at the most strategic location that will allow for rapid placement of ladders (front and rear) and entry into the structure. Use of the aerial should also be anticipated, and the turntable positioned either directly in front of the involved unit or upwind from the involved area.

5.3.4 The second-due engine shall ensure that a water supply is established.

5.3.5 The third-due engine shall position to allow the crew rapid access to the structure while maintaining access and egress to the incident for additional resources. The engine should take a position to prepare for providing a secondary water supply and to allow for coverage of the rear. If rear access is not available, the third-due engine should position at the end of the row closest to the involved unit. This is to ensure that hose lines can be placed to the rear.

- 5.3.6 The fourth-due engine shall position out of the way, so as to not block access for incoming trucks and assume the position of R I T. If needed, the driver may be assigned to supply water to the 3rd engine.
- 5.3.7 The rescue company should position to allow rapid access to the structure while maintaining access and egress to the incident for additional resources.
- 5.3.8 When an additional truck responds on the alarm, it should position in the rear or in a position to cover the rear. When there is no access to the rear, the additional truck should position on side A in front of the uncovered exposure. Ground ladders and truck operations in the rear will remain a priority.
- 5.3.9 The EMS unit should position in an area that will not block fire apparatus, and allow for unimpeded egress from the scene in the event patient transport is necessary.
- 5.3.10 The chief officer shall position the vehicle without blocking firefighting units, but in a position that will allow effective command of the incident.
- 5.3.11 In general, the only apparatus that should be in front of a townhouse fire should be the first engine and the first truck. This allows room to maneuver special apparatus later in the operation. All remaining apparatus shall position in single file to allow access for later arriving special units (tower ladder, additional trucks).

6 ENGINE COMPANY TACTICS

6.1 WATER SUPPLY

- 6.1.1 When dispatched for a fire in a townhouse, the first arriving engine will lay supply line(s) to establish the water supply for an offensive interior attack. The location and method of the hose lay should be communicated to the second-due engine company.
- 6.1.2 Often, the forward or straight hose lay of a single supply line is sufficient. If the street is wide enough, the officer shall ensure that the line is laid on one side of the street to maintain apparatus access. Often, however, the line must be laid in the center of a narrow street, as is often found in townhouse complexes, so the truck company can straddle it while moving into position.
- 6.1.3 If a large volume of fire or a dead-end street is encountered, two 3-inch supply lines or large diameter hose shall be laid. Consider the size of the structure to include at least the attached exposures.
- 6.1.4 A common problem in townhouse complexes is the water supply engine blocking access to the street when spotting the hydrant. This can prevent the truck or other companies from gaining access to the scene. The officer of the water supply engine shall use common sense and good judgement to prevent this from occurring. Consider the use of two 3-inch supply lines from the 2 ½-inch hydrant connections *or a short section of large diameter hose*. (Illustration 1 shows what happens when the supply engine spots a hydrant improperly.)
- 6.1.5 A hydrant in front of or across the street from the fire unit shall not be used if it will obstruct truck positioning. Again, two 3-inch lines *or a short section of large diameter hose* instead of the soft sleeve can be utilized for the hydrant connection.
- 6.1.6 Officers should avoid using hydrants at the dead-end of streets. The forward lay allows the best positioning for the first engine. When operating on a dead-end street, the attack engine should always position past the involved unit to allow room for the truck.
- 6.1.7 The officer should be aware of the geographic layout of the townhouse complex. The street may be crowded or fire lanes may be blocked in the evenings.

6.1.8 Third- and fourth-due engine officers must be cognizant of the need for a secondary water supply and identify the location of additional hydrants and alternative sources of water.

6.2 ON-SCENE REPORT

6.2.1 The first arriving unit officer's report shall include the following information in the on-scene report:

- Water supply/layout location (if not previously reported)
- Type of structure
- What is evident

6.3 SIZE-UP AND SITUATION REPORT

6.3.1 The first-due engine officer should attempt to view as much of the structure as practical, noting location and extent of smoke and fire, rescues, access points, number of floors (front versus rear), utilities, and exposures.

6.3.2 The information gathered from the size-up will dictate the mode of operation and tactics employed. The size-up results are reported through the situation report, and shall include command statement, initial assignments of on-scene companies, and requests for greater alarms, if needed. Progress reports will follow.

6.3.3 Should interior operations be initiated, the first engine company will begin operations following two-in/two-out guidelines.

6.4 INITIAL LINE

6.4.1 The initial attack line for most fires within this type of structure will be the 1¾-inch pre-connect, allowing for the needed speed, mobility, and fire flow. The first-due engine crew will usually be responsible for deploying this line. An exception might be when the unit arrives alone, and an obvious need for an immediate rescue is indicated.

6.4.2 The advancement of the initial attack line will generally be through the front door of the structure. In most cases, the hose line will be charged prior to entering. The attack should be made from the unburned portion of the structure toward the seat of the fire. This may dictate entrance from a location other than the front door. The first due engine will normally accomplish entry on its own. However, the forcible entry task, when needed, remains the responsibility of the first due truck or rescue.

6.4.3 The purpose of the initial attack line is to protect occupants, the interior stairway, and if possible, advance to the seat of the fire for confinement and extinguishment.

6.4.4 The conditions found upon arrival and the information gained during the size-up, may dictate changes in these tactics.

6.5 BACK-UP LINE

6.5.1 The back-up line for most fires within these types of structures will be the 1¾-inch pre-connect, allowing for the needed speed, mobility, and fire flow. The line should be of sufficient length to reach the location of the initial attack line or to be advanced to the area above the fire, if required.

6.5.2 The second line will generally be stretched from the first arriving engine company apparatus. In most cases, the second arriving engine company will accomplish this task.

6.5.2.1 This line shall be capable of delivering a greater amount of water than the initial line. In the case of a 1¾-inch line, adjustments will have to be made to produce the higher flow. The need for advancement will be determined by the progress of the initial attack line. If the back-up line is not needed to support the attack line, it may be used as the line above the fire. Command must be informed.

6.5.2.2 Before moving to the floor above, this line shall make sure a hose line on the fire floor(s) is in place and making progress. The best way to ensure the safety of the search crew above is with the line at the base of the stairs on the fire floor. From here, the hose crew can observe fire conditions and prevent fire from spreading up those stairs.

6.6 LINE ABOVE THE FIRE

6.6.1 Officers should consider an additional hose line for operations above the fire. There are two purposes of the line above the fire. The first is to protect the company doing the primary search of the floor above and the second is to extinguish vertical extension.

6.6.2 **No more than two hose lines shall be stretched through any one entrance into a building.** The advancement of additional lines should incorporate alternate means of entry.

6.6.3 The line assigned to the floor above the fire in these types of structures will generally be the 1¾-inch pre-connect, allowing for the needed speed, mobility, and fire flow.

6.6.4 This line should be of sufficient length to reach the area above the fire and into the attic, if required. Often the third-due engine company will be responsible for this task. The unit this line is deployed from will be determined by the incident commander, or assigned unit officer.

6.7 BASEMENT FIRES

6.7.1 Size-up at a basement fire is critical to the success of the operation. The location and extent of the fire, building construction, as well as points of access to the basement, must be determined early. If the fire is known to be in the basement, the officer must quickly determine if an exterior access to the basement is present. This exterior door most often will be in the rear.

6.7.2 The objective, when attacking a basement fire, is to keep the fire from extending vertically by containment and extinguishment. This will require two lines. The need for both lines to be coordinated and rapidly get into position is of utmost importance in these types of fires.

6.7.3 The first line should be stretched to the first floor to contain the fire, protect the occupants, and searching firefighters, by closing the basement door or using a fog pattern aimed at the ceiling over the stairway. It is imperative that this fog stream NOT be directed downward into the stairwell. The interior basement stairs are normally located under the stairs to the second floor and face the rear of the structure. The officer of this line must carefully size-up the structural integrity when determining if the line should be positioned at the top of the stairs, or in a position closer to the entrance door.

6.7.4 The second line shall be stretched to the exterior doorway for attack. This stream should be a straight or solid stream to avoid forcing fire, heat, products of combustion, and steam up into the first floor. The exterior attack line shall not begin the attack until it has been confirmed that the first line is in position and ready. The preferred point of attack is the exterior door that leads directly into the basement.

6.7.5 The second line shall be stretched to the rear around the end of the row of townhouses if close, or through an attached exposure if the row of townhouses is long. This may require the use of the leader line or an even longer hand-stretched line. Either task will be time-consuming. The hose crew should anticipate heavy fire upon arrival.

- 6.7.6 Basement fires sometimes need to be attacked with the first line going down the interior stairs. This may be necessary because an exterior entrance into the basement is not accessible, or there may be no entrance at all. Under these circumstances, the officer will need to determine if it is safe to attempt going down the basement stairs for a direct attack on the fire. The officer must carefully evaluate the structural stability, life hazard, and the fire and heat conditions at the top of the stairs. Good judgment must be exercised in deciding if it is safe to proceed down the stairs. In this case, the second line shall back up the first line.
- 6.7.7 If **only one line is available**, or fire or structural conditions do not permit the first line to go to the first floor, then the first line should be stretched to the exterior doorway for attack. After the fire has been knocked down from the exterior entrance to the basement and the first floor is deemed safe for entry, the second line shall be brought to the first floor to extinguish any vertical extension on the floors above. The officer of this line must carefully size-up the structural integrity in determining where or if the line should be positioned on the floor above the fire. This line has two objectives, extinguish any fire that has extended upward, and to protect searching firefighters.
- 6.7.8 Occasionally, heavy fire conditions are encountered that prevent an attack from the first floor and there is no exterior entrance to the basement. An option that officers can exercise is that of knocking the fire down from outside the basement. This can be accomplished by applying a fire stream into the basement through a window opening. In most cases, this stream should be a straight or solid stream to avoid forcing fire, heat, products of combustion, and steam up into the first floor. Another option would be to cut a hole in the floor above and operate a fog or distributor nozzle. In either case, officers must ensure that no firefighters have entered the basement and that the application of the stream is simply to knock the fire down so that entry can be made.
- 6.7.9 Should a basement fire occur in a balloon-frame structure, early attention should be given to checking for extension through the stud spaces in the exterior walls. Fire should be expected to extend to all floors and the attic.
- 6.7.10 The advancement of lines for an interior attack of a basement fire must be coordinated with aggressive ventilation of the basement and floors above.

- 6.7.11 When a fire in the basement is suspected and, if the rear is inaccessible, consider positioning an engine at the end of the row of townhouses, but on the end closest to the fire unit. This will facilitate stretching a line to the rear of the row to attack the basement fire. In many cases, this facilitates stretching hose lines to the front and rear of the row of townhouses.
- 6.7.12 Units should expect forcible entry problems, not only through the exterior basement entrance, but also through a locked rear courtyard gate.

6.8 GARAGE FIRES

- 6.8.1 The objective when attacking fires that originate in an attached garage is to confine and extinguish the fire from the unburned area of the structure, secure the overhead door in the open position, and prevent extension of the fire to the living area.
- 6.8.2 The need for quick assessment of extension into the living area and attic is imperative. The attached garage fire is known for its ability to extend to upper floors and the attic. The need for companies to check these areas and have charged lines to support them is crucial.
- 6.8.3 The garage may be located under a living area. This area must be quickly checked for smoke and fire spread. Companies operating in this area should be cautious, as the fire below them has direct access to the floor members supporting them.
- 6.8.4 The fact that a garage may have two means of access offers two alternatives that may be utilized to proceed to the seat of the fire.
- 6.8.5 When the initial line is advanced through the overhead door, the status of the door leading to the living area must be known. This door must be closed and protected to prevent the spread of fire and/or smoke to the interior of the house. A hose line must also be advanced through the house to the garage door to prevent extension. The fire attack must utilize a straight or solid stream to prevent the fire and products of combustion from being driven into the main portion of the house.
- 6.8.6 If the decision is made to advance the initial line through the living area of the structure for the attack, the engine company must be ready to operate the line when the door is opened. If this door was left open at the time of the fire, the advancing engine company should anticipate encountering fire in the living area near that door. A second line should be advanced to back up the first or to proceed to the upper floors.

6.8.7 Many times the fire will have originated in a vehicle parked within the garage. Standard precautions associated with all vehicle fires, such as exploding bumper cylinders or ruptured fuel tanks, should be observed. An option may be to breach an exterior wall to accomplish initial knockdown.

6.8.8 Breaching the overhead door in the center about three-quarters of the way up from the bottom can at times provide access to the overhead door manual release. If the manual pull cord is still intact, it may be within reach of the opening made in the door. Pull the cord to disengage the door from the motor; allowing the door to then be raised.

6.9 ATTIC FIRES

6.9.1 Fires in the attic of townhouses are a result of fire originating in one of several areas. These areas or situations include:

- The living area or basement that has extended into the structural components and enters the attic via void spaces
- Interior fire that has vented through a window and exposes the vented soffit area
- Fire that has originated on the exterior of the dwelling, has involved the siding, and exposes the soffit area
- Fire that has originated in the attic itself by natural occurrences such as lightning strikes, electrical, or mechanical malfunction

6.9.2 Well-involved attic fires in townhouses require a change in the assignment of hoselines. The attached exposures become a high priority in this situation. The most severely threatened exposure should be covered by the second hoseline. The third line should then go to the opposite exposure. Additional resources will be required to support these lines and for subsequent assignments.

6.9.3 Tactics involving fire in the attic will vary to some extent based on the location of the seat of the fire. In the case where fire has originated in the living space or basement, the fire will have to be controlled based on an aggressive interior attack on the seat of the fire, followed by hooking voids and ceilings to expose hidden fire in voids, and fire in the attic. These fires may be controlled by one line in the area of fire origin, or normally will require extensive hooking and multiple lines to extinguish, depending on the amount of extension and spread.

- 6.9.4 In some situations, fire exposes the soffit area under the eaves which is vented into the attic. This can be caused from fire blowing out windows, a doorway below, or from a fire that originated on the exterior of the structure. In these cases, the first task is to conduct a quick sweep of the soffit and eave line with a hose stream. This quick sweep is intended to knock down fire extending into the attic through the soffit vents. The steam conversion drawn into the attic area can help deter fire advancement to this area before an attack on the seat of the fire is commenced.
- 6.9.5 When encountering fire in the attic only, with no involvement of the living space, unit officers must consider the following as operations commence.
- 6.9.5.1 At this time, the occupant's personal belongings in the living space are not involved in the fire.
- 6.9.5.2 Conditions may be very tenable in the living area, even when there is extensive fire above.
- 6.9.5.3 At this point there is high heat and fire in an unoccupied, relatively confined area. A hose stream utilizing a fog pattern is indicated in this instance. Crews will want to use an attic scuttle if readily available, or poke a small hole for placement of the nozzle. Flow the fog pattern for several seconds. The fire should darken down due to the steam conversion and expansion. Avoid flowing the nozzle too long, or the ceiling may become saturated and collapse into the living area.
- 6.9.5.4 The intent of this approach to attic fires is to rapidly knock down the bulk of fire in the attic area until primary search, vertical ventilation, and salvage operations are completed. Extensive ceiling removal may still be required to check for extension, expose pockets of fire, or for the removal of blown-in insulation. However, this tactic can "buy" crews the time to search the occupancy and deploy salvage covers without pulling the fire down into to the living space
- 6.9.5.5 If the attic area has a floor, the nozzle stream will normally not be able to penetrate the attic. In these instances, the officer should look for a pull-down or constructed stairway. If no stairway is found, consider opening the ceiling within approximately 2 feet of the exterior wall where the pitched roof eaves terminate. This area is often not floored due to its inaccessibility and lack of storage space.

- 6.9.5.6 Pull-down attic stairs shall not be used where fire has been present. These stairs are typically rated to only 250 pounds. Their integrity due to exposure to fire is questionable. A FD attic ladder may be needed, however in most situations the nozzle can be advanced through the opening in the 8-foot ceiling without ladders.
- 6.9.5.7 Attacking the fire through an exterior gable vent should be considered when access to the attic area from the interior would be too time consuming due to the presence of flooring in the attic. Breaching the siding for nozzle access is also an option when interior access is not possible. A piercing nozzle, which typically delivers over 100 gpm, is also an option, but the reach of its stream is very limited.
- 6.9.5.8 Aggressive salvage operations and primary search should be ordered as the hose line is being deployed.
- 6.9.6 The interior officer should request a report from the command officer on the exterior to convey their observations as the fog stream is being deployed. For example, a report of heavy steam production would indicate that the stream is effective.
- 6.9.7 A roof collapse hazard is present in townhouses. This is a particular concern with the presence of furnaces and hot water heaters in the unfinished attic areas.
- 6.10 LARGE VOLUME FIRES (Volume of fire is such that fire spread to adjoining exposures is a major concern.)
 - 6.10.1 It may be necessary for the first engine to perform a holding action or a quick knockdown on the townhouse of origin by using the deluge set or 2 ½-inch line.
 - 6.10.2 The next line shall be stretched into the most severely threatened exposure, most likely, downwind.
 - 6.10.3 The third line goes to the rear or the opposite exposure as determined by Command.
 - 6.10.4 The third engine is still responsible for rear coverage.
 - 6.10.5 In the situation where a heavy volume of fire is encountered in the townhouse of origin, it may be appropriate for the first arriving officer to address the attached exposures first.

- 6.10.6 This situation may require an elevated stream for extinguishment. Officers shall keep this in mind while positioning apparatus and establishing water supply. If a tower ladder is not on the assignment, consideration should be given for special calling one. Remaining companies shall preserve access to the scene for truck companies.
- 6.11 EXPOSURES
- 6.11.1 The purpose of the exposure line(s) is to prevent or extinguish fire spread into any attached exposure. It may also be used to prevent exterior spread or auto-exposure.
- 6.11.2 Areas to be checked are the attic, basement, and intervening floors. In the case of piggybacks with fire on the lowest level, checks may need to be made into two or four attached exposures above. Basically, any separate unit that is attached to the occupancy of fire origin must be checked. If evidence of fire spread is found, call for a hose line.
- 6.11.3 The 1 $\frac{3}{4}$ -inch hand line is normally sufficient for this task because of its flow and mobility. The company officer shall ensure that it will be of sufficient length.
- 6.11.4 In the case of the rear exterior exposure, stretch the line via the shortest route. However, if wind is a factor, consider stretching the line through the upwind, attached exposure, or around the upwind end of the row. This adds protection for operating personnel with the wind being at their backs.

7 TRUCK and Rescue COMPANY TACTICS

NOTE: The rescue and truck company's functional duties on a fire call closely parallel one another. Tasks assigned such as a search for victims and location of the fire, forcible entry, ventilation, and control of utilities, may be carried out by either of these units. Assignments specific to the truck would **normally** involve laddering, whereas the rescue might be called to use extrication and cutting tools or specialized equipment carried on the apparatus. The truck and rescue companies perform vital functions on the fire ground. Success in preserving life and property hinge on the proficiency of the members performing these duties. When a second truck is dispatched to a townhouse fire in lieu of a rescue, the **second truck** will assume duties assigned to the **rescue** as described in this section.

7.1 POSITIONING

7.1.1 There are three general locations for turntable placement at townhouse fires. These are determined by degree of fire extension and location.

7.1.1.1 If it is a contents fire with an aggressive interior attack, place the turntable in front of the involved unit. This will facilitate the best placement of the aerial to windows, if needed. The aerial will be able to be raised to the roof of the involved unit or to either exposure easily from this position.

7.1.1.2 If there is an attic fire, place the turntable in front of the upwind exposure.

7.1.1.3 For a heavily involved situation that may require the use of elevated streams, the turntable of the first truck should be in front of the most threatened exposure. A second truck should be in front of the next most severely exposed unit unless otherwise directed by Command. If possible, both turntables should be able to rotate back to the original fire occupancy to assist with the completion of extinguishing the main body of fire.

7.1.2 The turntable should be far enough away to allow the ladder to be rotated in front of side one at low angles.

7.1.3 If elevated streams become necessary, a tower ladder is the most effective unit to accomplish the task and should be requested by Command. An attempt to maintain access for later arriving trucks should always be an objective of all companies.

7.1.4 It is considered good practice to have trucks positioned in both front and rear on row structures. This is seldom possible in townhouse complexes. Even though the apparatus cannot get to the rear, rear coverage is necessary for ventilation, ladder placement, etc. Officers shall survey the scene to determine the best fireground position to accomplish the initial assignment of rear coverage. When access to the rear is limited, additional alarm trucks shall stop at the closest corner while approaching the front of the row. This will allow the truck to easily reposition to the front if needed, and facilitate operations at the rear.

7.2 INITIAL ACTIONS

7.2.1 The initial actions of the first arriving truck or rescue will be determined by the plan of action developed from the size-up. After ensuring entry, these initial actions will generally be tactics focusing simultaneously on primary search and ventilation. Ventilation must be done to support the search as well as the advance of the attack.

7.2.2 The initial actions of the truck and rescue company will depend on their arrival sequence. Should the rescue company arrive at the same time as the truck, the rescue company will generally be assigned the task of entry and primary search, and the truck is responsible for laddering and outside ventilation.

7.2.3 When only the truck or the rescue is on the scene, the officer may have to split the crew. The tasks of search and ventilation must be accomplished simultaneously requiring the crew to split with a member venting from the exterior while the officer and other member conduct the primary search inside.

7.2.4 Upon arrival of the other unit, this officer is responsible for ensuring laddering and outside ventilation is accomplished.

7.2.5 Certain size-up factors (untenable conditions, signs of backdraft, or smoldering stage, etc.) may indicate the need for ventilation prior to entry into the structure. When these conditions are observed, the fire shall be vented prior to entrance into the structure. Before venting, the initial charged line must be in place and ready. In most cases, ventilation should occur from the top down using the removal of windows as the avenue for hot gases to escape. If ladders are used to remove upper-story windows, consideration should be given to leaving one or more in place. This allows the interior crews the advantage of seeing the ladder placement prior to entrance into the structure. Paths of ingress should also be forced, but not opened.

7.3 FORCIBLE ENTRY

- 7.3.1 The purpose of entry will be to initiate a primary search and allow access for the advancing engine company.
- 7.3.2 The task of gaining entry into townhouses will generally be easily achieved using basic conventional methods.
- 7.3.3 The access point for the engine company will almost always be the front door. This location may be altered due to the location of the fire, in an effort to attack from the unburned part of the structure. In situations where the front door is not the primary access point, it should still be opened for safety purposes.
- 7.3.4 Attached exposures will need to be accessed. These may require forcible entry as well.

7.4 RESCUE AND PRIMARY SEARCH

- 7.4.1 The area close to the fire on the fire floor and the area directly above the fire, are considered to be the two most *dangerous* areas. Means of egress and sleeping areas are generally considered to be the most *critical* areas to search. The objective in a primary search will be to check these areas first. Various means may be used to arrive at these locations. Support for the primary search should include ladders to upper-story bedroom windows and hose lines engaged on the fire.
- 7.4.2 The task of executing the primary search should be accomplished quickly due to relatively small areas within most townhouses. As the area to be searched increases in relation to size of the structure, there must be an equal increase in the resources to accomplish the task. This need must be identified early, and requested immediately.
- 7.4.3 When accessing the fire floor, crews should begin the search while making their way to the fire area. Crews going to the floor above the fire must also begin searching immediately, but with the objective of quickly getting to the area over the fire first, and then searching outward from that point.
- 7.4.4 Should the tactic of vent, enter and search (V.E.S.) be used to search the bedrooms, the incident commander must be notified to avoid duplication of effort and possible injury.
- 7.4.5 The outcome of the primary search must be reported to the incident commander because this is the primary strategic focus of the operation.

7.5 VENTILATION

- 7.5.1 Ventilation is performed either to support a search, “venting for life” or support the fire attack, “venting for fire”. This strategic decision will determine the method, location and timing of ventilation.
- 7.5.2 “Venting for life” will be accomplished through the aggressive removal of windows where appropriate. The areas of reported or suspected occupants should be addressed first. This must be immediately followed by a search of that particular area.
- 7.5.3 In most cases, ventilation is accomplished simultaneously with search and is sometimes required PRIOR to the commencement of the search. Therefore, ventilation must be coordinated with the search. Ventilation coordinated with an aggressive primary search can improve the survivability of victims because it:
- Reduces heat and smoke on the interior
 - Reduces potential for flashover
 - Allows firefighters to search faster and more effectively
 - Allows for locating the fire more rapidly
- 7.5.4 “Venting for fire” will be accomplished through the coordinated and limited removal or opening of windows in the fire area. The areas where fire can be seen or are showing the highest concentration of smoke should be opened when the attack line is in position to confine the fire.
- 7.5.5 The need for rooftop ventilation in a townhouse will depend on the extent and location of the fire. Generally, the roof will not need to be ventilated unless the fire has entered the attic area, extended into the structure walls, or has considerable hold of the top floor.
- 7.5.6 Vertical, rooftop ventilation should be accomplished through common methods, when ordered by command. The discovery of a lightweight, trussed roof should be made known and reacted to appropriately. Members MUST be independently supported when operating on lightweight construction. A viable and safer option is to vent the ends of a gable roof.
- 7.5.7 Mechanical and positive pressure ventilation (PPV) works well for smoke removal in these types of structures. PPV shall NOT be used in balloon-frame construction.

7.6 LADDER DEPLOYMENT

7.6.1 The purpose of ladder deployment is to provide access into the townhouse and an escape route for firefighters operating within.

7.6.2 Laddering at a fire in a townhouse should be done to the front and rear of all floors above ground level with attention given to the bedroom windows. This can generally be accomplished with ladders of less than 35 feet that are found on most apparatus on the incident scene. Remember the 24-foot extension ladder from the engine may be suitable for some third floor levels.

7.6.3 The need to ladder the roof at a fire in a townhouse will depend on the extent and location of the fire. Generally, the roof will not need to be laddered unless the fire has entered the attic area or has considerable hold of the top floor. Ladders should also be placed to the roof of exposures for access if there is fire in the attic.

7.7 BASEMENT FIRES

7.7.1 The interior crew will provide support for the initial line regardless of where attack begins. If the initial line is to enter from the front, this crew will force entry, locate the basement stairs, and assess severity of fire. The truck shall carry out the tasks of venting and search in support of the attack. The crew must monitor radio traffic to ensure they are aware of the direction of the attack and any information transmitted regarding fire extension and structural stability.

7.7.2 Priority should be given to the sleeping areas and **consideration for V.E.S. must be given** if fire has possession of the stairs or the first floor is untenable.

7.8 ATTIC FIRES

7.8.1 If rooftop ventilation is needed, a trussed roof should be suspected. The majority of townhouse roofs in Northern Virginia are of truss construction. Take appropriate safety precautions.

7.8.2 If the volume of fire in the attic requires vertical ventilation, the crew cutting the vent hole shall work from the safety of the aerial device or operate from the roof of the upwind, attached exposure.

- 7.8.3 Turntable placement is critical. If possible, the turntable shall be spotted far enough away so that the angle of the aerial will be parallel to the pitch of the roof. In this situation the driver shall remain on the turntable while the crew makes the cut. If conditions change for the worse and the crew cannot quickly retreat down the aerial, the driver can rotate the aerial away from the hazard.
- 7.8.4 If wind is noticeable, the aerial shall be positioned to the windward side of the location of the vent hole.
- 7.8.5 The interior crew should be working with hooks opening the ceiling as needed by the attack crew. Salvage covers should be taken in at the time of this operation to cover contents. The top floor should be searched prior to pulling down the ceiling.
- 7.8.6 Crews will also need to check the attics of attached exposures.

7.9 LARGE VOLUME FIRES

- 7.9.1 In large volume fires, the effort shall be to defend the firewalls of the involved unit with the elevated stream.
- 7.9.2 Defending the firewalls means to apply heavy caliber streams to the fire side of the firewall to aid in preventing horizontal spread of fire to the attached exposure.
- 7.9.3 If a tower ladder is on the first alarm assignment, it shall be given the most advantageous position for fire attack. Consideration should also be given for other apparatus with pre-piped elevated streams. The turntable of the aerial device should be positioned in front of the involved unit.
- 7.9.4 If access to the rear is available, a later arriving truck shall position there. Command shall designate which firewall each truck will defend.

REFERENCES

The following sources were utilized in the development of this book in addition to the personal contributions of the committee members.

Brannigan, Francis L. Building Construction for the Fire Service, third ed., National Fire Protection Association, Quincy, MA. 1993.

Fire Department of the City of New York, Row Frame and Brownstone Building Fires.

Gaines, Glenn A. Firefighting Operations in Garden Apartments and Townhouses, Robert J. Brady Company, Bowie, MD. 1978.

Figure 1



Figure 2



Figure 3



Figure 4



Figure 5



Illustration 1

