



**FIREFIGHTING PROCEDURES
VOLUME 1, BOOK 1, ADDENDUM 3
September 4, 2012**

**WIND IMPACTED FIRES IN
FIREPROOF MULTIPLE DWELLINGS**

1. INTRODUCTION

1.1 A wind impacted fire may be one of the most dangerous operations members of the FDNY will encounter. The term “wind impacted” fire shall be used to describe a fire in which the wind has the potential to, or is already causing, a dramatic, sudden and unexpected increase in fire, heat and smoke conditions. Experienced, respected members of this Department who have survived wind impacted fires have all described the following:

- Upon arrival, conditions appeared to be routine.
- Within seconds, fire, heat and smoke conditions changed without warning “from routine to life threatening.”
- An operating 2½” hoseline had little or no effect on the incredible heat being produced.
- Directly attacking these fires with one or two - 2½” hoselines proved ineffective and ultimately led to members incurring serious injuries.

Members of this Department and many civilians have lost their lives or suffered serious injuries when wind has impacted fire conditions causing the conditions to dramatically increase without any warning indications.

1.2 When responding to a reported fire in a Fireproof Multiple Dwelling (FPMD), an overriding consideration concerning size-up must be wind conditions and its potential effect on the fire. The following sections concerning operations in FPMDs are written to provide members with tactical guidance when wind is or may be a factor.

1.3 The FDNY and the National Institute of Standards and Technology (NIST) fire research group, conducted extensive research to determine the causes and effects of wind impacted fires in FPMDs. Live burns recreating wind impacted fires were conducted in vacant apartments on Governor’s Island. Based on data gathered from these burns, and from interviews conducted with officers and firefighters who have operated as the first to arrive units at wind impacted fires, alternate firefighting strategies and tactics were developed, tested and evaluated for effectiveness. This testing has resulted in a revision to firefighting tactics and procedures. In addition, new tools and equipment have been developed for the purpose of extinguishing wind impacted fires.

2. RECOGNIZING WIND IMPACTED FIRE CONDITIONS

- 2.1 The key to successfully operating at wind impacted fires in FPMDs depends on recognizing the wind impacted fire conditions that may change a seemingly routine fire into a blowtorching fire. Blowtorching is the appropriate description of what will occur when fire conditions are impacted by wind conditions.

When wind impacted fire conditions exist in a FPMD, the IC shall notify the Borough dispatcher so this information can be relayed to all responding units. Once the contributing factors are identified, steps can be taken to minimize the hazards to operating members.

- 2.2 The following five conditions must be present for a wind impacted fire to occur:

1. Wind.
2. Fire in an apartment.
3. Failed or opened window in the fire room.
4. Fire apartment door leading to the public hall left open or not fully closed.
5. An area of low pressure such as an opened stairwell door, or an opened apartment door on the opposite side of the public hallway from the fire apartment. This characteristic of air movement is known as the Flow Path.

Note # 1: The term Flow Path describes the movement of fire, heat and smoke from an area of high pressure (the fire area) to an area of low pressure (all areas other than the fire area).

Note # 2: The impact of the wind will be affected by the size of the window opening, the fuel load and the stage of the fire when the window failed.

- 2.2.1 When these five conditions are present, a wind impacted fire condition may occur. The combination of wind feeding the fire and the natural airflow that results from the construction characteristics of all buildings, especially FPMD's, may cause fire to blowtorch from the fire area. In FPMD's, the flow path for these conditions will be towards the public hallway if the fire apartment door is open. The fire is drawn to an area of low air pressure such as an open door on the opposite side of the public hallway or open stairway door. Eliminating this flow path, by keeping these doors closed, is key to preventing a fire in a FPMD from becoming wind impacted. The one factor that cannot be controlled is an occupant in another apartment opening their apartment door, especially on the opposite side of the fire apartment.

Members must be aware and understand that the recognition of any of these factors is the critical first step in evaluating the potential for a wind impacted fire. The IC and company officer must be notified immediately when any of these conditions are observed. **The communication of this critical information to the IC and company officers operating inside the building must be acknowledged.**

3. SIZE-UP

3.1 Size-up begins by observing the wind and weather conditions before the tour starts and knowing forecasted weather changes that will involve wind conditions. This information must be discussed at each roll call. Members must maintain constant situational awareness and accurately size-up conditions when responding to any reported fire in a FPMD. In addition to normal size-up of life, fire and exposures, particular attention must be paid to the following:

3.2 Size-Up: Building Exterior

3.2.1 When responding to a reported fire in a Fireproof Multiple Dwelling (FPMD), an overriding consideration concerning size-up must be wind conditions and its effect on the fire.

- The direction and speed at the street level is not a reliable indicator of wind conditions above the street level.
- Wind behavior is not consistent or predictable. Wind impacted fires have occurred on upper and lower floors. Building height, size, shape and location of adjoining or adjacent buildings add to the unpredictability of the effects of wind on fire conditions.
- It does not take high winds to dramatically increase fire conditions inside the building. When the wind subsides or shifts, pressure will equalize allowing the fire and smoke to vent out the window. This condition has also been described as fire and/or smoke pulsing in and out of a failed or opened window. Members operating in the fire area must be aware that when the fire and smoke pulse outward from the window, the condition in the interior will temporarily subside, **giving a false sense that the interior conditions improved**. When the wind gusts back into the window the interior conditions will dramatically deteriorate.

3.2.2 Fire or smoke visible inside the fire apartment that is not venting out of an open or failed window is a potentially dangerous, life threatening condition. This is the classic ventilation profile of a wind impacted fire.

- This indicates the wind is pressurizing the fire area, keeping the fire, heat and smoke from venting out of the window.
- The firefighter performing the outside survey may be the first member to observe this wind impacted fire condition.
- Their observations and size-up are critical to fire operations. These conditions must be immediately transmitted to the company officer and IC. The IC must immediately relay this information to all members on the scene.

Note: The IC must communicate with the officers on the fire floor to determine the interior conditions. The IC must determine if an alternate strategy for extinguishing the fire should be implemented. If so, the IC must communicate this to all officers and receive acknowledgement of the change to the regular SOP's for FPMD's.

3.3 Size-Up: Building Interior

3.3.1 Prior to advancing to the reported fire floor, member must gather information by surveying the floor below or two floors below if scissor stairs are present.

- Determine the location, the number of and letter designation of stairways serving the fire floor. This information is critical if confronted with heavy smoke conditions when arriving on the fire floor or if conditions unexpectedly deteriorate due to fire conditions.
- All members must access the fire floor from the same stairway until the attack stairway has been determined.
- The flow path of any fire will be towards the stairwell, the control of the stairwell door is critical. This door should be maintained closed as much as possible.

3.3.2 When conducting the survey of the floor(s) below, determine the layout, shape and size of the public hallway, especially if there are dead-end hallways. Heightened awareness is required when operating in any hallway that is unusually long, odd shaped, or has dead-ends.

3.3.3 Take note of the location and presence of any fire/smoke stop doors in the public hallway.

3.3.4 Take note of the apartment designations in sandwich type apartments; take note of the apartment layout designation.

3.3.5 The roof firefighter in the apartment above the fire may be able to provide the following information:

- Size and layout of the fire apartment.
- Visible fire or smoke coming from the fire apartment.
- By keeping the apartment door open and opening a window, the roof firefighter will be able to simulate how the wind will flow through the apartment.

4. ALTERNATE STRATEGIES FOR WIND IMPACTED FIRES

4.1 The utilization of alternate strategies to combat wind impacted fires will provide the following benefits:

- Ability to enter the public hallway to close the door to the fire apartment, thereby gaining control of the public hallway and decreasing the flow of smoke and heat from the fire apartment into other areas of the building.
- Rapid deployment of units to search apartment(s), public hallway(s), and stairways.
- Rapid knock down of the fire to quickly improve conditions on the fire floor.
- Reduction of serious injuries to members and civilians.

4.2 Wind Control Devices (WCD) and Exterior Streams

4.2.1 Live fire testing and fireground deployments have shown that the deployment of WCDs (KO Curtains and Fire Blankets) will have the following effects:

- Will cause an immediate reduction in heat and intensity of the fire.
- Possible reduction of visibility in the fire area due to an increase in smoke production.
- Fire may periodically vent around the sides and top of the deployed WCD with the potential for auto-exposure to the floor(s) above. The deployment window must be closed after deployment of the device.
- Advancing a hoseline into the fire apartment after a WCD is deployed, may increase steam and/or heat production. This is due to:
 - WCD allowing members to move closer to the main body of fire.
 - WCD preventing any ventilation of the fire area.
 - Firefighters must have all PPE in place and use the full reach of the stream to maximize cooling of the area ahead of the advancing hoseline.

Note: Refer to TB Tools 2, 3 and Evolutions 33, 33A, and 34 for additional information on this equipment.

4.2.2 In FPMDs, water applied to the main body of fire from a high rise nozzle (HRN), exterior stream, or flanking strategy can provide an offensive tactic designed to rapidly knock down the fire. An exterior stream may be a hoseline operated from street level, a setback, an outside terrace, another wing of the building or advanced up an aerial ladder. A tower ladder stream or ladder pipe may also be effective. Any exterior stream must be directed at the ceiling of the main fire area.

The IC shall consider the following:

- Resources available to place the stream into operation.
- Exterior stream such as the HRN is very effective in knocking down a wind impacted fire in a multiple dwelling due to the smaller compartmented areas/rooms.
- Water must be applied to the room where the main body of fire is located to be most effective.
- The stream shall be deflected off the ceiling for best results.
- If fire has extended to multiple rooms the exterior stream may have to be repositioned.
- Any use of an exterior stream requires communications between the IC and Fire Sector Supervisor to ensure that all members on the fire floor are accounted for and in a safe location before the water is applied from the exterior.

Note: Tests done by the Department concluded that the deployment of the HRN to combat a wind impacted fire greatly improves conditions in the public hallway and inside the apartment when the apartment door has been left open. If members are trapped and a wind impacted fire is preventing their removal, the use of a HRN or an exterior stream may protect members and allow for their safe removal. (Refer to TB Tools 7 Data Sheet 17, High Rise Nozzle)

4.2.3 WCDs and HRNs may be difficult or impossible to deploy in windows of buildings with the following construction features:

- Balconies that extend beyond the building face and are in front of a vented fire window.
- Luxury high-rise multiple dwellings having non-operating windows, limited opening type windows or window walls. In these instances, glass removal will be a time-consuming operation requiring specialized equipment. In addition, falling glass will present a hazard.
- Any type of façade or ledge that extends beyond the face of the building may prevent WCDs from being effectively deployed if they are above or below the fire window.

Note: Members must be aware of the obstacles that buildings in their area present. Drills shall be conducted to determine which alternate strategies may be used based on the building characteristics.

4.2.4 A Flanking strategy is the application of water from inside the fire building to control the main body of fire via a non-frontal attack. A small opening is made in the adjoining wall to the fire room as close to the exterior wall as possible, so as not to create a flow path. The hoseline is operated into the opening to extinguish the fire. Initially, the hole in the wall should be only large enough for the main stream tip of the nozzle to be placed into the opening allowing the stream to be directed at the ceiling of the fire room.

A. Flanking attack when the door to the fire apartment has been left open:

- This option is available based on the location of the fire apartment, the location of a stairway closer to the selected apartment, and the interior hallway conditions.
- Enter an adjoining apartment to apply the hose stream to the fire room or fire apartment via a breached wall adjacent to the fire area, if this adjoining area can be accessed and occupied safely.
- Once access is obtained to the adjoining apartment, the door to that apartment must remain closed and the hoseline stretched to this adjoining apartment from the apartment below via an exterior window or balcony using a utility rope.

- B. Flanking attack when the door to the fire apartment is **closed**:
- Enter an adjoining apartment to apply the hose stream to the fire room or fire apartment via a breached wall adjacent to the fire area, if this adjoining area can be accessed and occupied safely.
 - Once access is obtained to the adjoining apartment the hoseline will be stretched via the fire floor public hallway into the adjoining apartment to operate into the fire apartment.

4.5 INCIDENT COMMANDER

Considerations include, but not limited to, the following:

- Life hazard on fire floor and floors above.
- Information gained from the Sector/Group Supervisors and members operating in the fire building concerning fire, heat and smoke conditions in hallways, stairways and apartments.
- Communicate with the Fire Sector Supervisor to determine the conditions and recommended tactics.
- Members performing the outside survey and the Roof firefighter operating on the floor above can provide a description of wind, fire and smoke conditions.
- Resources available to implement the required tactics.
- Experience has shown that conditions at a wind impacted fire will severely tax the resources of the 2nd to arrive ladder company. Firefighters from the 3rd to arrive ladder, rescue or squad company, equipped with forcible entry tools, may be assigned to force entry into the apartment below the fire apartment in order to secure the ropes of the WCD and/or provide access for the HRN engine company.

Actions that may be taken:

- Implement appropriate alternate strategy(s) as necessary.
- The IC must ensure that the Fire Sector Supervisor and/or Units operating in the fire sector acknowledge that an alternate strategy is to be implemented. Alternate strategies differ substantially from the standard direct frontal attack. IC and Fire Sector Supervisor must ensure that all members under their command maintain operational discipline and adjust their actions to the change in tactics.
- Continually evaluate the effectiveness of the alternate strategy(s) implemented.
- The IC may consider implementing a combination of an exterior stream operation, flanking and WCD deployment where exterior reports and interior conditions indicate additional alternate strategies are required.
- Each fire will be different and all members must be familiar with the capabilities and limitations of each alternate strategy.

5. OPERATIONS

5.1 If it is determined that the smoke and heat condition in the hallway is due to a wind impacted fire with the fire apartment door left **open**, operate as follows:

- a. The Ladder Officer shall ensure members exit the public hallway immediately, and notify the IC and Engine officer of conditions. Units on scene shall be notified that a wind impacted fire condition exists.
- b. The IC shall implement the appropriate alternate strategy to gain control of the fire area to allow the forcible entry team to reach and close the fire apartment door. Control of the fire apartment door is critical.
- c. A hoseline shall be stretched and charged in the attack stairwell. This charged hoseline will remain in the stairwell so as not to create a flow path drawing the heat and smoke into the stairwell.
- d. The door to the stairwell must remain closed until the alternate strategy has been implemented, and the IC receives confirmation of the following:

- A KO Curtain or Window Blanket has been deployed over the target window(s) and is secured in place.

And/or

- The stream of a High Rise Nozzle, Exterior Stream, or Flanking Strategy has controlled the fire.

Note: In most circumstances, the KO Curtain would normally be the first tactic used due to its availability and time it takes to deploy.

- e. Once confirmation is received that the alternative strategy has been successfully implemented, the following actions may be taken:
 - Approval to enter the public hallway must be given by the IC, Operations Section Chief or Fire Sector Supervisor.
 - Only the Ladder Officer and one member of the forcible entry team shall enter the public hallway to locate and gain control of the fire apartment door. The Ladder Officer shall utilize the TIC to assist in locating the fire apartment.
 - The other member of the interior team will remain at the attack stairwell door on the hallway side of the door to ensure the stairwell door remains closed limiting the flow path and to act as a beacon in case members need to evacuate the hallway. The Engine officer shall be responsible for control and coordination on the stairwell side of the door.
 - Once the Ladder Officer gains control of the fire apartment door, have the Engine Company advance the charged hoseline to the fire apartment door. The Ladder company member who remained at the stairwell door shall also advance to the fire apartment door.

- The Ladder Company Officer shall evaluate and communicate to the IC and/or Fire Sector Supervisor of the conditions found. The IC and/or Fire Sector Supervisor shall determine if additional alternate strategies are required or whether to enter the fire apartment.
- Once the decision has been made by the IC and/or Fire Sector Supervisor to enter the fire apartment, the Engine Company **must** enter the apartment first followed by the Ladder Company. This is for the protection of operating members due to the extreme conditions and the need to cool the fire apartment immediately. Opening the handline and using the reach and penetration of the stream ahead of the advancing firefighters will cool the fire gases and will help extinguish the fire ahead of the line.
- Prior to entering the fire apartment, to assist the engine company in locating and extinguishing the main body of fire, the Engine Officer shall contact the roof firefighter, or other member operating in the apartment above the fire apartment, and request the following information:
 1. Description of fire apartment (e.g., L-shape, 3 bedroom apartment)
 2. Location of the main body of fire (e.g., kitchen, bedroom, living room)
 3. Most direct route to the fire area (e.g., When you enter the apartment, go in straight 6 feet and make a right down the hallway, the fire room will be the second door on the left approximately 12 feet down.
- Once the hoseline advances towards the interior fire area as directed by the Engine Officer, the fire apartment door shall be chocked open.

- 5.2 When the door to the fire apartment is found **closed** on arrival, window failure has occurred, and reports are received from members operating on the floor above and the exterior that the wind is impacting the fire, operate as follows:
- a. The door to the fire apartment must remain closed.
 - b. The IC shall implement the appropriate alternate strategy to gain control of the fire area.
 - c. The hoseline can be advanced to that location and charged.
 - d. The door to the fire apartment must remain closed until the alternate strategy has been implemented, and the IC receives confirmation of the following:
 - A KO Curtain or Window Blanket has been deployed over the target window(s) and is secured in place.

And/or

- The stream of a High Rise Nozzle, Exterior Stream, or Flanking Strategy has controlled the fire.

Note: In most circumstances, the KO Curtain would normally be the first tactic used due to its availability and time it takes to deploy.

- e. The Ladder Company Officer shall evaluate and communicate to the IC and/or Fire Sector Supervisor of the conditions found. The IC and/or Fire Sector Supervisor shall determine if additional alternate strategies are required or whether to enter the fire apartment.
 - f. Once the decision has been made by the IC and/or Fire Sector Supervisor to enter the fire apartment, the Engine Company **must** enter the apartment first followed by the Ladder Company. This is for the protection of operating members due to the extreme conditions and the need to cool the fire apartment immediately. Opening the handline and using the reach and penetration of the stream ahead of the advancing firefighters will cool the fire gases and will help extinguish the fire ahead of the line.
 - g. Prior to entering the fire apartment, to assist the engine company in locating and extinguishing the main body of fire, the Engine Officer shall contact the roof firefighter, or other member operating in the apartment above the fire apartment, and request the following information:
 - 1. Description of fire apartment (e.g., L-shape, 3 bedroom apartment)
 - 2. Location of the main body of fire (e.g., kitchen, bedroom, living room)
 - 3. Most direct route to the fire area (e.g., When you enter the apartment, go in straight 6 feet and make a right down the hallway, the fire room will be the second door on the left approximately 12 feet down.
 - h. Once the hoseline advances towards the interior fire area as directed by the Engine Officer, the fire apartment door shall be chocked open.
- 5.3 When the door to the fire apartment is found **closed** on arrival, window failure has **not** occurred but size-up indicates there is a wind condition; Officers must **still** evaluate the potential for the wind to adversely affect fire conditions. Prior to entry into the fire apartment, the following actions shall be implemented:
- a. The hoseline can be advanced to that location and charged.
 - b. Wind Control Device in position above the fire apartment ready for immediate deployment. As a precautionary tactic, the IC may decide to deploy a Wind Control Device over an intact window of the fire room/area.

Note: Where you are unable to determine the target window from the exterior, the TIC may be of assistance. The IC shall assign a member with a TIC to scan the windows of the fire apartment from street level. Scanning of the fire apartment windows with the TIC can assist in identifying the target window for deploying of the WCD.
 - c. High Rise Nozzle ordered to point of operation upon arrival.
 - d. Prior to opening the door of the fire apartment, the Ladder Officer shall get a report on exterior conditions from members operating outside the building and the Roof firefighter operating on the floor above.

- e. The Ladder Officer and one member of the forcible entry team shall enter the fire apartment to perform a search for the interior fire area location while the other member stays at the fire apartment door inside the apartment making sure the door remains controlled in the closed position, thereby limiting the flow path.
- f. The door to the fire apartment must remain controlled in the closed position until the Ladder Officer requests the charged hoseline be advanced into the fire apartment or requires other assistance. Generally, the charged hoseline should not be advanced into the fire apartment until the main fire area/room has been located and if possible confined by closing a door. Keeping the fire apartment door controlled in the closed position until the fire room/area is confined will significantly reduce the flowpath. Taking steps to reduce the flowpath is a key tactic for member's safety when wind has the potential to adversely affect fire conditions.
- g. Once the hoseline advances towards the interior fire area as directed by the Ladder Officer, the door shall be chocked open.

Note: The goal of the tactics outlined in this situation is to provide a margin of safety to members if window failure should occur. The immediate deployment of these resources will enable members to rapidly exit the fire apartment and control the fire apartment door.

5.4 KNOWN LIFE HAZARD

- 5.4.1 When faced with a known life hazard in either the public hallway or the fire apartment, the following actions shall be taken:
 - a. Notify the IC and all units of the location of the known life hazard.
 - b. Officers must maintain situational awareness and assess conditions while evaluating the risk vs reward. If a decision is made to attempt a rescue, it may be performed while alternate strategies are being implemented. The IC must be notified prior to any rescue attempt. In addition, the IC shall also be notified of the stairway from which operations will take place.
 - c. If the open fire apartment door is found in close proximity to the known life hazard in a public hallway, attempt to close the door. Control of the fire apartment door is critical. Notify the IC if the fire apartment door has been controlled.
 - d. Members operating in the stairwell shall keep the landing clear to allow for victim removal and/or emergency egress.
 - e. Notify the IC when the victim is removed.

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT

