Spartanburg Public Safety Department
Fire Division

Standard Operating Procedure	No. 102.01
Fire Ground Strategy and Tactics	Page 1 of 8
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I. PURPOSE

The following procedure outlines the fire ground strategy to be employed at structure fires. Fire ground operations will fall in one of two strategies: offensive or defensive. The two strategies are based on a standard incident action plan that is to be employed at all structure fires.

II. INCIDENT ACTION PLAN

The basis of the incident action plan revolves around three ideas:

- We may risk our lives a lot to protect **savable lives**.
- We may risk our lives a little to protect **savable property**.
- We will not risk our lives at all to save **what is already lost**.

Considering the level of risk, the Incident Commander will choose the proper strategy to be used on the fire ground. The strategy can change with conditions or because certain benchmarks (i.e., primary search is clear – no rescue needed) are obtained. The incident action plan will be based on:

- Fire extent and location
- Savable occupants
- The building: type of construction, condition, age, etc.
- Structural integrity of the building: contents vs. structural involvement
- The fire load: what type of fuel is burning and what's left to burn
- The fire and/or smoke conditions: extent, location, etc.
- The rescue profile: savable occupants/survivability profile

The Incident Commander is responsible for determining the appropriate fire ground strategy. Once the appropriate strategy is initiated, it becomes the Incident Commander's job to ensure that all personnel are operating within the strategy. By controlling the fire ground strategy, the Incident Commander is providing overall incident scene safety. **Offensive and defensive strategies should never be employed at the same time in the same fire area.**

Managing fire ground strategy must start with the arrival of the first unit and be constantly monitored and evaluated throughout the entire incident. The initial Incident Commander should include the fire ground strategy in the on-scene report. Once the strategy is announced, all firefighters know whether to operate on the interior or exterior of the building. As command is transferred to later arriving officers, these officers assuming command must evaluate the fire ground strategy based on the incident action plan.

III. OFFENSIVE STRATEGY

The offensive strategy consists of an interior attack and related support directed toward rapidly conducting a search for victims and bringing the fire under control. This offensive attack mode is aggressive and quickly moves in to directly overpower and extinguish the fire from inside. **Offensive operations are our strategic mode of choice, leaving the best chance for rescue.**

Within the framework of the incident action plan, the structure must first be determined to be safe to enter. Once determined safe, fire personnel will initiate offensive operations at the scene of structure fires. The following are guidelines for offensive fire attacks:

- All entry crews must consist of a minimum of two (2) personnel.
- Companies must maintain crew integrity. All company personnel must enter and leave the structure together.
- Personnel should not enter any structure fire without the protection of a hose line.
- Assign a rapid intervention team prior to entry
- Initial attack efforts must be directed toward supporting a primary search (the first attack line must go between the victims and the fire to protect avenues of rescue and escape)
- Determine fire conditions and extent before starting fire operations (as far as possible)
- Offensive fires should be fought from the interior – unburned side
- Personnel must always be aware of the fire conditions on the lowest level of any building.
- Personnel should not operate in a stairwell above a fire. Doing so exposes the firefighters to grave danger of rapid fire and heat spread up the stairwell.
- Avoid exterior application of water during offensive operation
- Personnel operating on a roof must have two (2) exterior means of escaping the roof and be protected by a hose line.
- Ladders should be positioned on at least two (2) sides of the structure and to every floor above ground where firefighters are operating, as secondary escape routes.
- Avoid placing ladders above windows, doors and any other wall openings.

Command must consider the most critical direction, avenues of extension, and speed of the fire and allocate personnel and resources; particularly as they affect:

- Rescue activities
- Level of risk to firefighters
- Confinement efforts
- Exposure protection

Command must consider the seven sides (divisions) of the fire: front, rear, left and right sides, top, bottom, and interior. Fires cannot be considered under control until all seven sides are addressed. Failure to do so frequently results in fire extension.

Where the fire involves concealed spaces (attics, ceiling areas, construction voids, etc.), it becomes paramount that companies open up and operate fire streams into such areas. Early identification and response to concealed space fires will save the building.

Early ventilation (natural or positive pressure) is a major support item that must be addressed during concealed space attacks. This must be initiated early and be well coordinated. Ventilation openings should be made in the fire area. Positive pressure should be injected from the unburned side and exit out of the fire area.

Command must get ahead of the fire. Command must make critical decisions that relate to cutoff points and develop a pessimistic fire control strategy. Command must consider where the fire will be when attack efforts are ready to actually go into operation. If misjudged, the fire may burn past the attack/cutoff position before resources and personnel are in position. Don't play "catch up;" project your set-up time, write off property, and get ahead of the fire. Set up adequately ahead of the fire, and then overpower it.

IV. DEFENSIVE STRATEGY

The decision to operate in a defensive strategy indicates that the offensive attack strategy, or the potential for one, has been abandoned for reasons of personnel safety, and the involved structure has been conceded as lost. The defensive strategy consists of an exterior attack directed to first reduce fire extension and then bring the fire under control.

When changing an offensive strategy to a defensive strategy, the Incident Commander will make an announcement as emergency traffic and drivers should initiate a continuous blast of all apparatus air horns. Personnel will withdraw from the structure and maintain a safe distance from the building. Fire officers will account for their crews and advise Incident Command on the status of their crew. A PAR (personnel accountability report) shall be obtained after any switch from offensive to defensive strategy.

Interior lines will be withdrawn and repositioned when changing to a defensive strategy. Crews should retreat with their hose lines if safe to do so. If retreat is being delayed because of hose lines, and it's unsafe to stay in the building, hose lines should be abandoned.

All exposures, both immediate and anticipated, must be identified and protected. The first priority in defensive operations is personnel safety; the second is exposure protection; the third is fire extinguishment.

V. MARGINAL SITUATIONS

Many times offensive/defensive conditions are clear cut and command can quickly determine the appropriate strategy. In other cases, the situation is marginal, and command must initiate an offensive interior attack, while setting up defensive positions on the exterior.

THE ONLY REASON TO OPERATE IN MARGINAL SITUATIONS IS RESCUE.

The effect of the interior attack must be constantly evaluated, and the attack abandoned if necessary. Strategy changes can develop almost instantly or can take considerable time. Command must match the strategy with the conditions. The Incident Commander controls overall incident scene safety by determining the proper strategy to be used.

Command needs to constantly evaluate conditions while operating in marginal situations. This requires frequent and detailed reports from fire officers. Command should abandon marginal attacks and move to a defensive approach when:

- A primary search "all clear" is obtained and the situation is still marginal
- The roof is unsafe or untenable (especially working fires in large unsupported or lightweight trussed attic spaces)
- Interior forces encounter heavy heat and cannot locate the fire or cannot make any progress on the fire
- Heavy smoke is being forced from the building under pressure and is increasing

VI. ONE AND TWO FAMILY DWELLING STRATEGY AND TACTICIS

The confinement of fires in one and two family dwellings is often achieved through the rapid advancement of an interior attack line to protect any occupants within the structure, focusing on the interior stairway if present or other vertical voids, and advancing to the seat of the fire.

Exterior exposure problems should be addressed through an aggressive offensive interior attack, an exterior attack on the bulk of the fire, or by protecting the exposures with a defensive attack.

The ventilation of this type of structure during a fire should generally be achieved through natural horizontal methods. 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. As with all roof ventilation operations, ventilation crews should be protected by a hose line, and provided with two separate escape routes from the roof.

The initial attack line should be backed-up with a second hose line that is capable of delivering an equal amount or greater amount of water than the initial attack line.

Consideration should be given to advancing an additional hose line for operations above the fire. There are two purposes of the line above the fire. The first is to protect a company doing the primary search of the floor above the fire, and the second reason is to extinguish vertical extension.

Good fire ground practice dictates that no more than two hose lines be stretched through any one entrance into a building. The advancement of additional lines should incorporate alternate means of entry. Caution, however, should be exercised to assure that opposing hose lines are not placed into operation.

Basement Fires

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 first line should be stretched to the first floor to contain the fire and 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. Extreme caution must be exercised when operating above the fire in this manner. Spongy floors or any other indication of structure damage to the floor must lead to the rapid evacuation of the first floor.

Companies must also exercise extreme caution when working above fires in the area of the kitchen. The concentrated load of a refrigerator and other heavy kitchen appliances has been known to lead to rapid collapse of the floor.

The second line should 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. CREWS OPERATING

ON THE FIRST FLOOR MUST STAY CLEAR OF THE INTERIOR BASEMENT STAIRWELL AND OTHER PATHS OF HEAT, SMOKE AND FIRE TRAVEL. THE STAIRWELL OFTEN ACTS AS A CHIMNEY.

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. In this case, the second line must back up the first line.

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.

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.

Attic Fires

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 ceiling to expose hidden fire in voids and the 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.

Rapid fire development has been known to occur when exposing hidden attic fires. A charged hose line must be in place before beginning to hook the ceiling to expose hidden attic fires.

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.

VII. GARDEN APARTMENT STRATEGY AND TACTICS

The presence of combustible siding can greatly affect the fire hazard. Vinyl and wood siding may contribute to vertical and horizontal fire spread and creates a severe exterior exposure problem. Fire can spread over combustible exterior siding and be drawn into the attic vents.

Interior vertical fire extension to the attic, cockloft or apartments above is common in this type occupancy. Vertical voids such as pipe chases in kitchens and baths are one of the primary means by which fire extends in garden apartments. Fire that has entered these voids will necessitate the opening of floors, ceilings, and walls. Fire in the void space will frequently extend to the attic regardless of the floor of origin.

Newer light wood frame construction is subject to early failure and has two distinct factors with regard to potential for collapse: the presence of lightweight trusses, and fire entering the void spaces degrading the structural members.

Caution must be exercised with masonry veneer walls. A masonry veneer wall can fall outward the distance of the height of the wall. When establishing the collapse zone, a factor of 1½ times the height of the wall should be considered.

VIII. STRIP CENTERS AND BIG BOX STORES

Roofs

SAFETY DURING ROOF OPERATIONS IS OF PARAMOUNT IMPORTANCE! PERSONNEL MUST IDENTIFY ROOFS USING TRUSS CONSTRUCTION. OFFICERS MUST ENSURE THAT ONCE FIRE HAS ENTERED THE VOID OR COCKLOFT SPACE OF A BUILDING WITH TRUSS ROOF CONSTRUCTION, THE ROOF OVER THAT AREA MUST BE EVACUATED AS WELL AS THE SECTION OF THE BUILDING THAT IS BELOW THE INVOLVED AREA!

Thermal imaging cameras must be used to determine if fire has developed in a cockloft before committing personnel to operate inside the building or on the roof.

If bowstring trusses were used, they are most often identified by a curved roofline. Bowstring trusses were commonly used over bowling alleys, lumber yards, and auto repair shops, but certainly not limited to those occupancies. Renovations are common to these older centers and false mansard roof fronts can hide these curved roofs. Members must assume that trusses are present when the arched roofline is encountered and extreme caution must be exercised when roof operations are being considered.

The roofs on noncombustible construction can be expected to be supported by steel bar joists with a metal deck roof above. The metal deck roof assembly presents a problem in and of itself. Fires burning below heat up the oil-based materials above the metal deck.

As this occurs, combustible gases are released. Since the roof is watertight, the gases are forced downward and out between the weld joints on the metal deck. These gases can then be ignited and the fire then perpetuates itself, even if the fire in the contents below is extinguished. The metal deck roof fire must be extinguished from underneath by applying streams to cool the underside of the metal deck. Steel bar joists, also referred to as steel, open web joists, have no fire resistance. These joists depend upon membrane fire protection in most cases in strip shopping centers. The "membrane" is the typical drop ceiling using metal "T" supports with drop-in tile panels.

Personnel must consider the possibility of roof collapse after only 5 or 10 minutes of burn time particularly when steel joists are exposed to flame or high heat.

Tactical Considerations

Exposure protection must be ordered and carried out early. Fire spread from store-to-store, once a serious fire has gained control of the store of origin, can be difficult to stop if not flanked early. It may be necessary to place attack lines in exposures located two stores down to get ahead of and cut off lateral fire spread.

Given the use of trusses in strip shopping center construction, partial collapse of the roof should be anticipated.

Ventilation, forcible entry, and fire attack must be coordinated. If the building is tightly closed and a significant amount of smoke is pushing, the top must be opened first to control possible backdraft and flashover situations. If heavy smoke is showing, but backdraft or flashover conditions are not indicated, venting of the large storefront windows will greatly improve conditions for units entering to locate and attack the fire. These windows should be taken out before attack crews enter the building.

Venting as well as forcing entry into the occupancy should not occur until water is ready at the nozzle or appliance.

Aggressive ventilation is crucial. If venting is needed, it must be done early. Integrity of the roof may be lost preventing topside venting if it is delayed. Ventilation can assist members operating inside and can help slow down the lateral spread of fire through the cockloft area.

Heavy caliber streams should be given consideration for attacking fires under roofs of truss construction. This is particularly true for metal deck roof fires. Directing water upward not only extinguishes the running fire, but cools the steel and significantly reduces the chance of collapse.

Crews entering occupancies must check the ceiling above the door BEFORE moving in.