

Fire Ground Safety SOG

TACTICAL POSITIONING

Positioning of operating companies can severely affect the safety/survival of such companies. Personnel must use caution when placed in the following positions:

- Above the fire (floors/roof)
- Where fire can move in behind them
- Where sector cannot control position/retreat
- When involved with opposing fire streams
- Combining interior and exterior attack
- With limited access--one way in/out
- Operating under involved roof structures
- In areas containing hazardous materials
- Below ground fires (basements, etc.)
- In areas where a backdraft potential exists
- Above/below ground rescue

The safety of firefighting personnel represents the major reason for an effective and well-timed offensive/defensive decision and the associate write-off by Command. THE TWO STRATEGIES ARE BASED ON A STANDARD RISK MANAGEMENT PLAN THAT IS TO BE EMPLOYED AT ALL STRUCTURE FIRES.

WITHIN A STRUCTURED RISK MANAGEMENT PLAN

- 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

When operating in a defensive strategy, operating positions should be as far from the involved area as possible while still remaining effective. Position and operate from behind barriers if available (fences, walls, etc.).

The intent is for personnel to utilize safe positioning where possible/available, in an effort to safeguard against sudden hazardous developments such as backdraft explosion, structural collapse, etc.

When operating in an offensive strategy, be aggressively offensive. An effective, coordinated interior attack operation directed toward knocking down the fire eliminates most eventual safety problems.

Due to the inherent hazards of the fire or incident scene, efforts must be made by Command to limit the number of personnel on the fireground to those assigned to a necessary function. All personnel shall be:

- Positioned in Staging.
- Assigned to a task or operating within a sector.
- Having completed an assignment and no other assignment is available within that sector, crews should be assigned to a Resource, Staging, or Rehabilitation Sector until such time as they can be reassigned to an operating sector or released to in-service status.

The intent of this procedure is to minimize fire ground confusion/congestion and to limit the number of personnel exposed to fire ground hazards to only those necessary to successfully control the operation. Individuals or crews shall be restricted from wandering about the fire ground or congregating in non-functional groups. If personnel have not been assigned to a sector or do not have a necessary staff function to perform, they shall remain outside the fireground perimeter.

When it is necessary to engage personnel in exceptionally hazardous circumstances (i.e., to perform a rescue), Command will limit the number of personnel exposed to an absolute minimum and assure that all feasible safety measures are taken.

In extremely hazardous situations (flammable liquids, LP gas, special operations, etc.) Command will engage only an *absolute minimum number of personnel* within the hazard zone. Unmanned master streams will be utilized wherever possible.

In situations where crews must operate from opposing or conflicting positions, such as front vs. rear attack streams, roof crews vs. interior crews, etc., utilize radio or face-to-face communications to coordinate your actions with those of the opposing crew in an effort to prevent needless injuries. Command should notify Sector Officers or Company Officers of opposing or conflicting operations.

Ground crews must be notified and evacuated from interior positions before ladder pipes go into operation. Do not operate exterior streams, whether hand lines, master streams, ladder pipes, etc., into an area where interior crews are operating. This procedure is intended to prevent injuries to personnel due to stream blast and the driving of fire and/or heavy heat and smoke onto interior crews.

When laddering a roof, the ladder selected shall be one which will extend 2' - 3' above the roof line. This shall be done in an effort to provide personnel operating on the roof with a visible means of egress.

If possible, when laddering buildings under fire conditions, place ladders near building corners or fire walls as these areas are generally more stable in the event of structural failure.

When operating either above or below ground level, establish at least two (2) separate escape routes/means where possible, (such as stairways, ladders, exits, etc.), preferably at opposite ends or diagonal corners of the building or separated by considerable distance.

Hot Zone The Hot Zone will be defined as any area that requires an SCBA, charged hoseline, special protective clothing, or in which firefighting personnel are at risk of becoming lost, trapped, or injured by the environment or structure. The following situations would be included inside the Hot Zone:

- Entering a structure reported to be on fire
- Operating in close proximity to the structure during exterior operations
- Confined Space
- Trench Rescues
- Operating close to crane operations or close to swift water operations
- Building collapse
- Operating close to helicopter operations
- Extrication

ALL FIREFIGHTERS WORKING IN THE HOT ZONE SHALL BE IN CREWS OF A MINIMUM OF TWO PERSONNEL. THE ACCOUNTABILITY SYSTEM WILL BE IN PLACE.

Warm Zone The Warm Zone will be defined as just outside of the Hot Zone where the firefighters start their operations on the fireground. This zone is where the firefighter is not at risk of becoming lost, trapped, or injured by the environment or structure. The following functions could be done in this zone:

- Forward fire apparatus working the incident (i.e.; engines, ladders)
- Laying lines
- HMRT and TRT developing strategies and tactics
- Utility trucks
- Special equipment needs
- Accountability Officer
- FIRE Investigations

If at any time firefighters in the Warm Zone become threatened, this area would become a Hot Zone.

Cold Zone The Cold Zone will be defined as outside of the Warm Zone where no one is at risk because of the incident. The following functions could be done in this area:

- Command
- Level I & Level II staging
- Support and Staff personnel
- Canteen
- Rehab
- Media
- P.D. Liaison
- INTERVIEWING THE RESPONSIBLE PARTY

ALL PERSONNEL ENTERING THE HOT ZONE SHALL:

- **WEAR FULL TURNOUTS**
- **HAVE CREW INTACT**
- **BE ASSIGNED TO A SECTOR**

ALL OTHERS STAY OUTSIDE.

SECTORS

The safety of firefighting personnel represents a major reason for fireground sectorization. Sector commanders must maintain the capability to communicate with forces under their command so that they can control both the *position* and *function* of their companies.

Sector officers and company officers shall be able to account for the whereabouts and welfare of all crews/crew members under their assignment. (See Personnel ACCOUNTABILITY System).

Company officers shall insure that all crew members are operating within their assigned sector only. Crews will not leave their respective sectors unless authorized by the sector officer.

When crews are operating within a sector, company officers shall keep the sector officer informed of changing conditions within the sector area, and particularly those changing conditions which may affect the safety of personnel.

Hazards that will affect only a specific sector area should be dealt with within that sector and need not necessarily affect the entire operation.

REHABILITATION

It is the intent of this Sector to reduce the fatigue and trauma experienced during difficult operations to a reasonable (and recoverable) level and is in no way intended to lessen the individual and collective efforts expected of all members during field operations.

In an effort to regulate the amount of fatigue suffered by fireground personnel during sustained field operations, sector officers should frequently assess the physical condition of their assigned companies. When crew members exhibit signs of serious physical or mental fatigue, the entire crew should be reassigned to a Rehabilitation Sector if possible. Company officers shall request reassignment to Rehabilitation Sector from their sector officer. The company officer's request shall indicate the crew's position/condition, etc., and shall advise as to the need for a replacement crew. Individual crews shall not report to the Rehabilitation Sector unless assigned by the Fireground Commander. Crew members shall report to and remain intact while assigned to Rehab.

It is the on-going responsibility of Command to summon adequate resource to tactical situations to effectively stabilize that situation, and to maintain adequate resource during extended operations to complete all operational phases.

The rotation of companies will be utilized by Command during extended operations to provide an effective on-going level of personnel and their performance. The Dispatch Center will assist in coordinating the rotation of companies during such campaign operations.

SAFETY SECTOR

The recognition of situations which present inordinate hazards to fireground personnel and the proper response to safeguard personnel from those hazards is of critical importance to all fire department operations.

Command has the responsibility to recognize situations involving a high risk to personnel and to initiate appropriate safety measures.

Command shall establish a Safety Sector at incidents involving an inordinate danger to personnel. Command should consider establishing a Safety Sector on any situation where it may be advantageous to the overall safety of operations.

Assigned personnel will respond automatically to multiple alarm incidents to establish a Safety Sector and will report to the Command Post upon arrival. When the need for specialized assistance is noted, Command should confirm the response of the appropriate personnel (Safety Officer/Structural Engineer).

Command may designate any available personnel to establish a Safety Sector when the need is indicated. This should be a high priority assignment.

The establishment of a Safety Sector or the presence of a Safety Officer in no way diminishes the responsibility of all officers for the safety of their assigned personnel. Each and every member shall utilize common (safety) sense and work within the intent of established safety procedures at all times.

STRUCTURAL COLLAPSE

Structural collapse has been a major cause of serious injury and death to fire fighters. The possibility of structural collapse should be a major consideration in the development of any tactical plan.

Structural collapse is always a possibility when a building is subject to intense fire. In fact, if fire is allowed to affect a structure long enough, structural failure is inevitable.

Regardless of the age and exterior appearance of the building, the possibility exists that a principal structural supporting member is being seriously affected by heat and may collapse, inflicting serious injury to firefighters.

Example: A 100' length of unprotected steel will expand 9" when heated to 1100o F.

In the typical fire involved building, the roof is the most likely candidate for failure, however failure of the roof may very likely trigger a collapse of one or more wall sections. This is especially true if the roof is a peak or dome type which may exert outward pressure against both the bearing and non-bearing walls upon collapse. In multi-story buildings or buildings with basements, the floor section above the fire may collapse if supporting members are directly exposed to heat and flames.

A knowledge of various types of building construction can be invaluable to the Fire Officer from a safety standpoint as certain types of construction can be expected to fail sooner than others. For example: light weight truss and bar joist roof construction can be expected to fail after minimal fire exposure.

Structures have been known to collapse without warning but usually there are indications which may tip off an alert fire officer. Action shall be taken to avert any imminent hazard.

Signs of building collapse may include:

- Cracks in exterior walls.
- Bulges in exterior walls.
- Sounds of structural movement--creaking, groaning, snapping, etc.
- Smoke or water leaking through walls.
- Flexible movement of any floor or roof where firefighters walk.
- Interior or exterior bearing walls or columns--leaning, twisting or flexing.
- Sagging or otherwise distorted rooflines.
- Time of fire involvement.
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The following construction features or conditions have been known to fail prematurely or to contribute to early structural failure when affected by fire.

Contributing Factors:

- Parapet walls.
- Large open (unsupported) areas--supermarkets, warehouses, etc.
- Large signs or marquees--which may pull away from weakened walls.
- Cantilevered canopies--which usually depend on the roof for support and may collapse as the roof fails.
- Ornamental or secondary front or sidewalls--which may pull away and collapse.
- Buildings with light weight truss, bar joist, or bow string truss, roofs.
- Buildings supported by unprotected metal--beams, columns, etc.
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Buildings containing one or more of the above features must be constantly evaluated for collapse potential. These evaluations should be a major consideration in determining the strategy, i.e. offensive/defensive.

It is a principal Command responsibility to continually evaluate and determine if the fire building is tenable for interior operations. This on-going evaluation of structural/fire conditions requires the input of company officers advising their sectors and of sectors advising Command of the conditions in their area of operation.

Most structures are not designed to withstand the effects of fire, and can be expected to fail if exposed to heavy fire involvement. If after 10-15 minutes of interior operations heavy fire conditions still exist, Command should initiate a careful evaluation of structural conditions, and should be fully prepared to withdraw interior crews and change to a defensive strategy.

If structural failure of a building or section of a building appears likely, a perimeter must be established a safe distance from the area which may collapse. All personnel must remain outside this perimeter.

EVACUATION

Interior firefighting operations should be abandoned when the extent of the fire prohibits control or the structure becomes unsafe to operate within. When such conditions make the building untenable, evacuate, account for personnel, regroup, recommunicate, and redeploy.

Our primary concern, when a hazard which may affect the safety of fire personnel becomes apparent, is the welfare of those personnel. In an effort to protect personnel who may suffer the adverse effects of hazards such as structural collapse, explosion, backdraft, etc., a structured method of area evacuation must be utilized, one which will provide

for the rapid/effective notification of those personnel involved, and one which will be able to accurately account for those personnel.

The method of evacuation selected will vary depending on the following circumstances:

- Imminence of the hazard
- Type and extent of hazard
- Perception of the area affected by the hazard

The emergency traffic announcement is designed to provide immediate notification for all fireground personnel. The use of "Emergency Traffic" should be initiated only when the hazard appears to be imminent or has just occurred.

Any member has the authority to utilize the "Emergency Traffic" announcement when it is felt that a notable danger to personnel is apparent; however, considerable discretion should be applied to its use - emergency traffic announcements become ineffective if overused.

When an imminent hazard has been realized, the emergency traffic process should be initiated. Usually a company or sector officer will be the initiator. The initiator should describe the apparent hazard and order a positive response, usually to evacuate a particular area or section, according to the scope of the hazard.

If possible, the sector officers of those areas to be evacuated should request an acknowledgment of the emergency traffic dispatch from those crews to be evacuated.

Upon receipt of the emergency traffic evacuation order, company officers shall assemble their crews and promptly exit to a safe location, where the company officer will report a PAR for all crew members. Shortly after the evacuation order, sector officers shall begin the process of accounting for all evacuated crews. When all affected crews and crew members are accounted for, the Sector officer will report a PAR for that Sector. At this time a more specific determination as to the reality/extent of the hazard can be made and efforts initiated to redeploy/redirect attack forces.

Building evacuation generally involves a shift from an offensive to a defensive strategy. In such cases, Command must develop a corresponding operational plan and must communicate that plan to all operating companies. It is extremely important that everyone gets the word that a shift in strategy has been made. This transition can be time consuming based on companies interior positions.

Hazards of a less than imminent nature should usually be handled by a consultation of Command, sector officers and/or the Safety Officer, Fire Protection Engineer, company officers or outside agency authorities. These officers or specialists should make a determination of the nature and possible effect of the suspected hazard, and advise Command so that a more knowledgeable decision as to the proper course of action can be made.

Crews retreating from interior operations often require hoseline protection. The protection afforded to firefighting personnel in such situations represents a major function of back-up lines.

SEARCH AND RESCUE

Search and rescue should be performed according to an efficient, well planned procedure which includes the safety of search crew personnel.

The object of the search effort is to locate possible victims, not create additional ones by neglecting the safety of the search crew.

Prior to entering the search area, all search team members should be familiar with a specific search plan including the overall objective, a designation of the search area, individual assignments, etc. This may require a brief conference among crew members before entering the search area to develop and communicate the plan.

Individual search activities should be conducted by two or more members when possible.

Company officers must maintain an awareness of the location and function of all members within their crew during search operations.

A brief look around the floor below the fire may provide good reference for the search team, as floors in multi-story occupancies usually have a similar layout.

Whenever a search is conducted that exposes search crews to fire conditions (particularly above the fire floor) the search team should be protected with a charged hoseline, in order to insure a safe escape route.

If search personnel are operating without a hose line, life lines should be used when encountering conditions of severely limited visibility.

HIGH-RISE SAFETY

Fire personnel conducting operations in high-rise buildings are faced with many non-typical hazards due to the design, elevation, limited access/egress, etc., inherent in these buildings. High-rise buildings containing a working fire are considered a high hazard area.

STAIRWAYS/ELEVATORS

If a working fire is suspected in a high-rise building, the following procedures shall be adhered to:

- Utilize stairways to go aloft.
- Elevators may be used to go aloft provided the following measures have been taken.
 - A. The elevator shaft must be checked to insure that heat/fire have not damaged the hoist mechanism, etc. This can be done by checking the space between the door frame and the elevator car and shining a light up the shaft. If smoke or fire are visible in the shaft, **DO NOT USE THE ELEVATOR**.
 - B. Before using an elevator, the nearest enclosed stairway should be identified. Should the elevator stop at a floor with heavy SMOKE or intense heat, firefighters can then head directly for the stairs without losing time searching for them.
 - C. You must verify that the floor you are going is uninvolved. This can be done by utilizing the following measures.

Elevators With Firefighter Service Feature

- Engage the Emergency Operations.
- Take elevator to the floor two floors below the suspected fire floor.
- Be prepared to close the elevator door immediately, usually by removing your finger from the door control button, if fire or smoke are visible on the floor.

Elevators without the Emergency Operations shall not be used if a working fire is indicated.

If elevators are used to transport personnel and equipment, beware of exceeding the maximum load capacity of the elevator.

When operating around a highrise building where the potential hazards of falling glass and debris exist, a fireground perimeter shall be established 200' from the building and shall be observed by all fire personnel as a high hazard area.

Other perimeters will be at the discretion of Command, based on need.

Pumpers supplying water shall utilize hydrants outside the perimeter when possible.

Command and staff support personnel shall remain outside the perimeter unless entering the area to assist with interior operations.

Risk Mangement

Operating at Emergency Incidents poses an inherent risk of injury – or worse, death. The purpose of this procedure is to describe the Regional Operating policy regarding risk assessment and safety management of emergency incidents.

We are committed to providing the safest possible work environment for our members. It is important that all members operating at incidents operate in a safe manner. Each must practice as a “Safe Person” for their own safety, as well as to minimize risk to others. Towards that goal, all members are expected to operate under the following risk management profiles.

- We Will risk our lives a lot, in a calculated manner, to save SAVABLE lives.
- We Will risk our lives a Little, in a calculated manner, to save SAVABLE property.
- We Will Not risk our lives at all for lives or property that are already Lost.

This risk management profile will be applied to all emergency incidents and will be continuously re-assessed throughout the incident operation.

When considering the SURVIVAL profile of any victims, members must consider the conditions present in the “compartment” or area of fire conditions or other conditions affecting survival. A fire in a rear bedroom of a house, with smoke throughout the house may allow a survivable environment if a search and rescue effort is initiated quickly. We may extend risk, in a calculated manner, with these conditions.

A significant fire in a residence with dense smoke under pressure to floor level throughout the building likely means victims could not survive. A very cautious, calculated rescue and fire control operation would be warranted. A well-involved building would likely represent a zero survivability profile. Similar conditions in an abandoned building would indicate little survivability and little property to be saved and members should avoid an offensive fire fight.

Victims buried by a trench collapse or under water for 10 minutes or more, would be unlikely to survive therefore an extremely cautious and a well-planned, safe, recovery operation is required.

Rescuers should consider notification time, dispatch processing time, response time, and time on-scene as part of the calculation.

Actions in a calculated manner requires:

1. Incident Command established (where applicable)
2. Proper personal protective equipment
3. Accountability system established.
4. Safety procedures in place.
5. Continuous risk assessment by all members