

REGIONAL STANDARD OPERATING PROCEDURES

Critical Fireground Factors

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SCOPE & PURPOSE

Virtually every fire incident has a related set of factors that carry consequences ranging from minor to fatal. This is what makes critical factors *critical*. A major function of Incident Command is to identify the factors with the most severe consequences and then concentrate on reducing, stabilizing, eliminating or avoiding the possible outcomes of those critical factors. This requires the IC to develop a standard approach of sorting and prioritizing critical factors. The IC needs a simple system to deal with all basic incident information.

DEFINITIONS & CONCEPTS

The Eight Basic Critical Factor Categories Are:

1. **Building Type**
2. **Occupancy**
3. **Arrangement**
4. **Life safety**
5. **Fire**
6. **Resource**
7. **Action**
8. **Special circumstances**

Critical Factor Category – Building

- Size—area and height
- Interior arrangement/access (lobbies, stairs, halls, elevators)
- Construction type—ability to resist fire effect
- Age
- Condition—faults/weaknesses
- Value
- Interior compartmentation/separation
- Interior arrangement / Basement profile
- Vertical—horizontal openings, shafts, channels

- Outside openings/access—doors and windows/degree of security
- Utility characteristics (hazards/controls)
- Concealed spaces/attack characteristics
- Effect the fire has had on the structure (at this point)
- Time projection on continuing fire effect on building
- How much of the building is left to burn?

Critical Factor Category – Occupancy

- Specific occupancy Type—group (business, mercantile, public assembly, institutional, hazardous, industrial, storage, school)
- Value characteristics associated with occupancy
- Fire load (size, nature)
- Status (open, closed, occupied, vacant, abandoned, under construction)
- Occupancy—associated characteristics/hazards
- Type of contents (based on occupancy)
- Time—as it affects occupancy use
- Property conservation profile/susceptibility of contents to damage/need for salvage

Critical Factor Category – Arrangement

- Access, arrangement, and distance of external exposures
- Combustibility of exposures
- Access, arrangement and nature of internal exposures
- Severity and urgency of exposures (fire effect)
- Value of exposures
- Most dangerous direction—avenue of spread
- Time estimate of fire effect on exposures (internal and external)
- Barriers or obstruction to operations
- Capability/limitations on apparatus movement and use
- Multiple buildings

Critical Factor Category – Life Safety

- Location of occupants (in relation to the fire)
- Number of occupants
- Condition of occupants (by virtue of fire exposure)
- Incapacities of occupants
- Commitment required for search and rescue (firefighters, equipment, and command)
- Fire control required for search and rescue
- EMS needs
- Time estimate of fire effect on victims
- Exposure/control of spectators

- Hazards to fire personnel
- Access rescue forces have to victims
- Characteristics of escape routes/avenues of escape (type, safety, fire conditions, etc.)

Critical Factor Category – Fire

- Size
- Extent (percent of structure involved)
- Location
- Stage (inception to flashover)
- Direction of travel (most dangerous)
- Avenue of travel
- Time of involvement
- Type and amount of material involved—structure/interior/finish/contents/everything
- Product of combustion liberation (smoke, heat, flame, gas, etc.)
- What is perimeter of fire?
- How widespread is the fire area?
- Fire access—ability to operate directly on fire

Critical Factor Category – Resource

- Staffing and equipment on scene
- Staffing and equipment responding
- Staffing and equipment available in reserve
- Estimate of response time for personnel and equipment
- Condition of responders and equipment
- Capability and willingness of personnel
- Ability of responders to fit into an IMS
- Number and location of hydrants
- Supplemental water sources
- Adequacy of water supply
- Built-in private fire protection (sprinkler, standpipe, alarms, protected spaces, smoke removal, etc.)

Critical Factor Category – Action

- Effect current action is having
- Things that need to be done
- Stage of operation (rescue, fire control, property conservation, customer stabilization)
- Effect of the command function—is command established and working?
- Is there an effective organization?
- Has the IC forecasted effectively?

- Is the incident in the proper Strategy with the corresponding IAP?
- Tactical priority questions: Are victims okay? Is fire out? Is loss stopped?
- What is the worst thing that can happen?
- Are operating positions effective?
- Are there enough resources? (Personnel, apparatus/equipment, logistics/support, command, water, SCBA air)
- Are personnel operating safely?
- Is there a safety plan/organization (On-Deck, tactical supervision, etc) in place that can react in case someone gets in to trouble?
- Situation status: from out of, to under control

Critical Factor Category – Special Circumstances

- Time of day/night
- Day of week
- Season
- Special hazards by virtue of holidays and special events
- Weather (wind, rain, snow, heat, cold, humidity, visibility)
- Social unrest (riots, terrorism, etc.)

MANAGING CRITICAL FACTORS

The incident critical factors are the basic items an IC must consider when evaluating tactical situations. They constitute a checklist of major elements associated with size-up, decision-making, initiating operations, and review and revision. It's important for the entire team to agree upon what the critical incident factors are, as well as the standard organizational reaction to those factors.

Command deals with these incident factors through a systematic management process that:

1. Includes a rapid overall evaluation
2. Sorts the critical factors in order of priority
3. Seeks more information about each of those factors
4. Focus on the major factors effecting the incident (fire)
5. Quickly and properly react to visual observation and CAN reports

Critical incident factors represent an array of items that remain dynamic throughout the event. Therefore, the relative importance of each factor changes over time. Command must deal continuously with these changes and base decisions on current information relating to the most important factor.

The effective IC does not stick with the initial plan of action after conditions change—for better or for worse. Successful incident operations require the IC to revise the IAP as

needed by constantly reconsidering the incident's major critical factors based on feedback from the information forms.

When IC#1 (Co. Officer) chooses the offensive strategy and the forward command mode, they make their initial size-up from an exterior position. The IC sees the effect the incident problem is having outside the hazard zone. The forward IC then moves to the interior and begins collecting information about how the incident problem is affecting the inside of the structure. These conditions, such as the problem location and the amount of smoke and heat, are utilized in the decision-making process to assign subsequent arriving units.

When an IC is operating in a strategic command position, they usually have a good view of the incident scene. As the IC assigns units to the different operational positions around the inside and outside of the incident scene, they will receive size-up information in the form of progress/CAN reports from these different positions. The IC must consider these reports along with what they are actually seeing. Whatever the IC sees, trumps all other reports.

Consider fixed factors – manage variable factors

Fixed factors pertain to the things that can't be change, such as the way a building sits on a piece of property, the occupancy type or the distance of an exposure. These fixed factors present certain realities that the IC must plug into their incident action plan. If something that normally takes 3 minutes is going to take 20 minutes because of a fixed factor, the IC must react, plan and manage accordingly

Fixed Factors:

- Building
- Occupancy Type
- Arrangement
- Special Circumstances

Variable factors are things the IC can change. If a building is full of smoke, the IC can order ventilation. If the building is heavily secured, a ladder/truck company can force entry. Engine crews manage the fire by applying a sufficient amount of water to extinguishing it. When we don't (or can't) control the variable factors, we should be in safe locations, away from the factors that may harm us.

Variable Factors:

- Life
- Fire
- Resource
- Action

Critical Unknowns

During most critical incident situations, command must develop an initial action plan based only on the critical factors they can see at the beginning of operations. Most of the time, the initial information is very incomplete. The ability to identify the “knowns” and the “unknowns” emerges when the IC uses the standard inventory of the critical factors. The IC must:

- Quickly size up what they know and what they don't know
- Identify and address critical “unknowns” during incident operations
- Some unknowns must be addressed immediately, especially in situations that involve firefighter safety and survival, before the problem can even be engaged (such as basement fires)
- Some forecasted critical unknowns are so critical that they may drive the initial or current Strategy choice.

Quickly Identify & React to Safety “Red Flags”

Red flags are pieces of information that we must address because they can end up injuring or killing us. The IC must always take a pessimistic approach when sizing-up, assuming the worst until determining otherwise.

A red flag will not necessarily change the overall incident strategy or incident action plan, but it must be identified and addressed by the IC and the rest of the hazard zone team. This is a big part of how the IC ensures everyone goes home when the event is over. Some examples of red flags include:

- Fire in the attic space
- Fire in a basement
- Operating above a fire (basements, floor above the fire)
- Zero visibility
- Encountering high heat
- Reports of, “We can't find the fire”, beyond the normal discovery time
- More than one (1) request to back up an attack position
- Reports that state “fire control,” but you can still see active fire conditions from the command post
- Victim(s) located
- Wind-driven fires
- Smoke/fire showing from cracks in walls.

Maintain a Realistic Awareness of the Elapsed Incident Time

One constant for structure fires is that the building will last a very short period of time when exposed to flame. Another severe time constraint is the length of time an SCBA will supply air to its wearer.

In our system, Dispatch provides the IC with elapsed-time reminders. These reminders serve as cues for the IC to re-evaluate conditions, the current strategy and to consider the length of time firefighters have been operating in the hazard zone.

Structure & Time Information around the Tactical Priorities

Tactical priorities provide a job list for incident operations; they are the reason our customers call us. For structural firefighting, these tactical priorities include search/rescue, fire control, property conservation and customer stabilization. Effective incident communications focus on completing the tactical priorities (within the parameters of the critical incident factors and firefighter safety). This approach requires a simple, standard communications game plan (SOP) for the entire organization.

Continually Reconsider Conditions; Stay Current & Stay Connected to Resources

The IC develops their strategy and the IAP based on the initial size-up of the incident's critical factors. These critical factors are very dynamic; they are either getting better, or they are getting worse, but they never stay the same. The current and forecasted incident conditions must drive the strategy, the IAP and our risk-management plan.