

## **Fire Science programs**

**The following information is being forwarded by the Fire Science program at Dutchess Community college in the interest of facilitating fire departments staying current with the latest testing, information, and suggested procedures.**

In this document please find a ton of valuable information contained within two separate "documents".

- 1) "Firefighter Safety Call to Action: New Research Informs Need for Updated Procedures, Policies" (page 2)
- 2) "Sample Standard Operating Guideline" (page 5)

Note: The electronic versions of this document have some hyperlinks within them that will take you to more information on that topic.

We applaud the tremendous efforts that are being put forth by the IAFC, ISFSI, NIST, and UL to identify current fire "traits" and providing suggested procedures to best deal with these dangerous "fire traits".

"The ISFSI is honored to partner with the IAFC Safety, Health & Survival Section to tackle the tedious process of changing policy in the fire service to accommodate recent research discoveries in fire dynamics and firefighter tactics. This joint effort between the two organizations is a healthy step to ensure each and every firefighter goes home to their families and that our fire instructors have the support they require to teach these firefighters appropriately." ISFSI President Doug Cline 12/23/13

### **Firefighter Safety Call to Action:**

#### **New Research Informs Need for Updated Procedures, Policies**

*A joint effort between the International Association of Fire Chiefs Safety, Health and Survival Section and the International Society of Fire Service Instructors*

**Fairfax, Va., Dec. 23, 2013** - Given the recent proven research by Underwriter Laboratories and the National Institute of Standards and Technology, this call to action is being issued to fire and emergency service officers to take the following immediate actions:

1. Update departmental fireground policies and procedures, deliver training programs and conduct in-service updates to reflect fire dynamic research findings:

- Water doesn't push fire or threaten trapped occupants:
  - Water should be applied to a fire as soon as possible and from the safest location because research has proven it reduces thermal temperatures.
  - Simply put, if you see fire, put water on it immediately. This greatly increases civilian and firefighter survivability as well as property conservation.
- The recently created mnemonic, [S.L.I.C.E.R.S.](#), should replace RECEO VS as a core component of firefighter training programs. (\*\*see page 8 in this document for more on "SLICERS").
- Coordinate ventilation and fire attack. Ventilation continues to be an important tactic that requires significant coordination and control. Adding air to a building without the immediate application of water on today's fires greatly increases fire spread and reduces survivability for victims and firefighters. It isn't possible to make statements about the effectiveness of ventilation without consideration for the timing and application of water. Venting doesn't always lead to cooling; well-timed and coordinated ventilation leads to improved conditions.
- Control the door, control the flow path. Forcing, or opening, a doorway for entry creates an inflow ventilation flow path. Controlling the door to reduce airflow is an important step to improve the survivability of victims and firefighters, control heat release rates and reduce the chance of flashover.
- Closing interior doors to improve compartmentalization is critical to victim and firefighter survivability. What used to be referred to as "Vent-Enter-Search (VES)" is now known as "Vent-Enter-Isolate-Search (VEIS)." When conducting VEIS tactics, closing the door to an entered compartment *prior to* conducting search operations is vital to controlling the flow path.

- Assess exterior and interior collapse potential:
  - Structural stability and potential for collapse must be a priority for consideration during size-up and brief initial reports (BIRs) should identify the presence or potential presence of engineered, lightweight building materials.
  - Sounding the floor for stability is not an exclusive reliable indicator of structural stability and therefore should be combined with other tactics to increase safety.
  - Floor sag is a poor pre-indicator of floor collapse as it may be especially difficult to determine the amount of deflection while moving through a structure.
  - Thermal imagers are not an exclusive, reliable indicator of the presence or absence of fire in a basement and can't assess structural integrity above floor coverings.
  - Water application to a fire in a basement should be applied from an exterior access, penetrating nozzle or via holes cut into the compartment. Conducting an attack on a basement fire from the floor above via interior access is not recommended.
- Conducting a 360° size-up of the fire occupancy should be completed prior to making entry. Wind-driven fires represent an immediate life-threat to firefighters, particularly in light of flow-path research. Attacking the fire from the windward side of the structure may be the most effective way to save lives.
- Discourage or eliminate the widely-used term "nothing showing" from the BIR. As a result of modern fuel loads and energy-efficient building-construction materials, fires in structures can be expected to become ventilation-limited quickly. Smoke or open flame may not be visible from the exterior by arriving fire companies and the term unintentionally but significantly contributes to complacency.

2. Call on standards-setting organizations and publishers to update their programs and products immediately to reflect the latest fire-dynamic research findings.

To learn more about the fire-dynamics research, check out the following resources:

- Organizations:
  - [National Institute of Science and Technology](#)
  - [Underwriters Laboratories](#)
  - [International Society of Fire Service Instructors](#)
  - [IAFC Safety, Health and Survival Section](#)

• ***Watch for It: FSTAR***

- There's a wealth of research underway at leading labs, universities and the private sector on fire behavior in the modern-built environment, but it will have little impact on firefighter tactics unless it reaches fire service leaders. *Firefighter Safety Through Advanced Research (FSTAR)* is a federally-funded online toolkit being created by the IAFC to break down silos between the academic world, laboratory settings and the fireground. Watch for it in the spring of 2014.

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**Provided by the ISFSI**  
**Sample Standard Operating Guideline**  
For Immediate Release: 11/11/2013

<http://www.isfsi.org/Resources/PressReleases/sampleslicrs.aspx>

## **PURPOSE**

The purpose of this guideline is to provide a consistent approach to structural firefighting strategies and tactics. These concepts are written as guidelines to provide fire officers the ability to adjust tactics to a specific emergency. These guidelines are in no way intended to replace one of the most important assets on the fireground, the thinking fire officer. These guidelines are written to provide a standardized vision of strategies that will be used on the fireground. Officers are allowed to deviate from the guidelines when conditions or situations warrant and should immediately notify the Battalion Chief or Incident Commander of their actions.

## **EXPECTATIONS**

All firefighters should be intimately familiar with the tactical guidelines. Company officers should understand all company assignments and how each unit works within the larger fireground picture. All personnel should know the guidelines well enough, so that when they have to deviate from the guidelines, they realize the impact their actions will have on other operating companies, and communicate accordingly.

## **DEFINITIONS & CONCEPTS**

*Accountability Officer* – Assigned Officer responsible for the tracking and verification of personnel on the fireground.

*Defensive Mode* – Command option when the Rescue Mode is not imminent and there are NO life-safety issues. This is also when resources are not available (second or third due engine companies). This Mode is declared when risks outweigh benefits. This Mode identifies an exterior attack for an extended duration-“Risk a Little to Save a Little”

*Door Control* – The process of ensuring the entrance door providing access to the fire area is controlled and closed as much as possible after teams enter the structure. Steps must be taken to prevent the door from locking behind the entering members. By controlling the door, we are controlling the flow path of fire conditions from the high pressure of the fire area towards the low pressure area on the other side of the door. Door control also limits fire development by controlling the flow path of fresh air at the lower level of the open door towards the seat of the fire.

*Driver Pump Operations (DPO)* – A description of the duties and responsibilities that the Drivers (Position “D”) are required to perform on scene.

*Fire Attack Mode*-When a determination of the first arriving officer deems rescue is NOT imminent. This mode may start out with a quick exterior attack and transition to an interior attack. Command will announce as a “Working Fire”

*Fire Department Connection (FDC)* – Water supply connection on Commercial and Multi-Family Buildings, which supplies water to the sprinkler system and/or standpipe system.

*Flashover* - A transition in the development of a compartment fire when surfaces exposed to thermal radiation from fire gases in excess of 1100 °F reach ignition temperature more or less simultaneously. This causes the fire to spread rapidly throughout the space, resulting in fire involvement of the entire compartment or enclosed space.

*Flow Path* - The movement of heat and smoke from the higher pressure within the fire area towards the lower pressure areas accessible via doors, window openings and roof structures. As the heated fire gases are moving towards the low pressure areas, the energy of the fire is pulling in additional oxygen from the low pressure areas. Based on varying building design and the available ventilation openings (doors, windows, etc.), there may be several flow paths within a structure. Any operations conducted in the flow path will place members at significant risk due to the increased flow of fire, heat and smoke toward their position.

*Flow Path Control* - The tactic of controlling or closing ventilation points which will: Limit additional oxygen into the space thereby limiting fire development, heat release rate and smoke production. Control the movement of the heat and smoke conditions out of the fire area to the exterior and to other areas within the building.

*Incident Commander* – Referred to as “Command” of the incident. This is the first or highest ranking Officer or Acting Officer on the incident, who is responsible for the oversight or direction of the incident strategy.

*Initial Rapid Intervention Crew (IRIC)* – Crew of personnel who temporally assembles to provide for the safety and rescue of the firefighting crews. Once additional manpower assemble to meet the required “Two-In, Two-Out” Rule, they assume their primary function on the fireground.

*Investigative Mode* - Command option where the first-in unit investigates and other apparatus stage. This is when there is NO visible or apparent emergency upon arrival. Example: Responding for a fire alarm with nothing showing upon arrival.

*On-Deck* – The movement from one position to another. This is used as a description when personnel move from the Rapid Intervention Crew (RIC) to interior Fire Attack/ Search Crews etc.

*Operations (Forward Ops.)* – Assigned Officer who provides tactical direction to personnel engaged in firefighting and rescue operations. This person can be located close to or in the building where the incident is taking place.

*Manpower Pool* – Group of personnel assembled away from the incident, which are prepared and teamed for incident operations.

*Mayday* – A standard three-word distress call to indicate that a firefighter, emergency medical technician, or team is in immediate danger and requires assistance.

*Medical Rehab Group* – Group of personnel who are assigned to monitoring, documentation and possible care of personnel who have been engaged in firefighting operations.

*Personal Accountability Report (PAR)* – A system utilized by the Incident Commander(IC) via the radio and accountability System, to verify the status of personnel at an incident.

*Primary Hydrant/Water Source* – Hydrant or water source closest to the incident.

*Quick Response Vehicle (QRV)* - ALS provider who responds to emergencies in a car.

*Rapid Intervention Crew (RIC)* – Crew of personnel solely dedicated to the safety and rescue of the firefighting crews.

*Rescue Mode* - Command option where critical life safety situations are present. Command will announce as a “Working Fire”. This mode will be declared when there is entrapment of occupants or firefighters. This should be considered on non-fire related emergencies. (structural collapse, confined space, trench collapse) The Rescue Mode ends when the occupants or firefighters have been removed or the determination for rescue is NOT possible.

*Rural Water Supply* - A water supply system established where a distribution system is not present. Mostly found in the rural parts of the locality where apparatus is required to shuttle water to the incident.

*Safety Officer* – Assigned Officer responsible for the overall safety of the incident operation.

*Secondary Hydrant/Water Source* – Hydrant or water source near the incident, but from another direction that is separate from the primary hydrant or water source.

*S.L.I.C.E.R.S.*– Slice is a Fire Attack Mode tactic used to reduce temperatures inside a building prior to entry by firefighting personnel for extinguishment or rescue.

*Truck Operations* – Support Operations that are assigned to Truck Companies that provide assistance in firefighting and rescue operations.

*VENT-ENTER-ISOLATE-SEARCH (V.E.I.S.)* – is the approved tactic when entering a structure through an opening (door or window) to search an area for the location of the fire or to locate possible victims. The priority upon entering the area via a window is to close the door to that room or area in order to isolate that area being searched from the fire area. When entering a fire area via a doorway entrance, the door needs to be controlled until the fire area is further isolated or a charged hoseline is advancing on the fire. By isolating the area, we are controlling the flow path of the fire, heat and smoke towards the ventilation point as well as controlling the air flow from the ventilation point towards the fire area.

## INCIDENT SIZE UP

It is critical that the company officer communicate a concise size up of every situation. This information sets the tone for the incident and prompts the dispatcher to ensure the appropriate resources are allocated based on the incident type. The initial radio report should include the following:

- Unit Number
- Conditions (Verify situation or declare a "working incident" and specify the type (See Table 1))
- Building construction type
- Establish Command
- Declare operational mode

Situation Type	Description
High Life Hazard	Any location that poses multiple life threats due to difficulty exiting or lack of mobility of the inhabitants: (Churches, Hospitals, Hotels, Nursing Homes, Schools)
Multi-Family (High Life Hazard)	A building that can or does contain a large number of people. An apartment complex is an example, as long as people can easily exit.
High Rise	A building where total evacuation is not practical, ground based operation is not possible or when resources are stretched beyond the capacity of one jurisdiction.
Commercial Structure	A structure in which the primary purpose is to conduct activities of business, industry, or trade.
Residential Fire	A building occupied by a single family.
Hazmat	An incident involving a gas, liquid or solid that, in any quantity, poses a threat to life, health and property.

(Table 1: Situation Types)

### *Requesting Additional Resources:*

Ensure conditions reported to the dispatcher are accurate so that the correct units can be dispatched.

The incident commander can either request specific units as needed or request a second alarm. A second alarm doubles the resources currently assigned to the appropriate situation type.

Example of an escalating incident:

Engine 1 is dispatched for a *residential fire alarm*

Engine 1 arrives with a working house fire. Engine 1 transmits, “Engine 1 is on the scene of a working residential fire in a 1 story wood frame dwelling. Engine 1 is establishing “Any Street Command” and operating in Fire Attack Mode.

The dispatcher will “reclassify” the call from fire alarm to *working residential fire* and automatically dispatch the appropriate resources for that call type.

## INCIDENT PRIORITIES

The following priorities will guide decision making during the incident:

- Life Safety
- Incident Stabilization
- Property Conservation

When operation at structure fires, the following tactical goals apply:

<p style="text-align: center;"><b>Structural Fire Tactical Goals</b> <b>S.L.I.C.E.R.S.</b></p> <p><b><u>Sequential Actions</u></b></p> <p><b>S</b>ize Up <b>L</b>ocate the Fire <b>I</b>dentify and Control Flow Path <b>C</b>ool the Space from Safest Location <b>E</b>xtinguish the Fire</p> <p style="text-align: right;"><b><u>Actions of Opportunity</u></b></p> <p style="text-align: right;"><b>R</b>escue <b>S</b>alvage</p>
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(Table 2: SLICERS Acronym)

**SEQUENTIAL ACTIONS:** To take place in order:

## Size Up

Size-up must occur at every fire, and as a result of the size-up, the resources available and situational conditions; weather, fire location, size, structure, construction etc. A tactical plan for that fire must be developed, communicated and implemented. First arriving officers/incident commanders are responsible for obtaining a 360 degree view of the structure involved. Where impractical because of building size or obstructions, the incident commander should delegate other arriving units to view parts of the structure unseen by the incident commander.

### *Radio Benchmarks*

- *Initial Radio Report*
- *Declare Operational Mode (Rescue Mode, Fire Attack Mode, Defensive Mode, Investigative Mode)*

## Locate the Fire

The location and extent of the fire in the building must be determined. Officers should use all means available to make this determination. Thermal Imagers should be booted prior to arrival and at the ready for the initial 360 degree lap of the structure. The location of the fire and current conditions will dictate the best location to attack the fire.

## Identify the Flow Path

The incident commander should identify the presence and/or location of the flow path. Effort should be taken to control ventilation and the flow path to protect potential building occupants and limit fire growth. If a flow path is visible, consider closing doors and windows to limit air flow. When closing doors and windows, firefighters should be aware of any potential rescues readily accessible via doors/windows.

## Cool the Space from the Safest Location

Given information obtained during the size up, locating the fire and identifying the flow path, the incident commander will determine if high heat conditions exist inside the structure. When high conditions are present, the incident commander will determine the safest and most direct way to apply water to the superheated space, or directly on the fire when available. The primary goal in this step is to reduce the thermal threat to firefighters and potential occupants as soon as reasonably possible.

### *Radio Benchmarks*

- *Fire has been "Reset" (State location)*
- *Communicate method of continued operations*

## Extinguish the Fire

Once the thermal threats have been controlled, the fire should be extinguished in the most direct manner possible. The incident commander should recognize the potential for the thermal threat to return and should move to extinguish the fire quickly. The incident commander should ensure the proper initial rescue crews (IRIC) are in place for interior fire attack operations.

### *Radio Benchmarks*

- *"Water on the Fire," when water is applied to seat of fire*

## **ACTIONS OF OPPORTUNITY: May occur at any time**

### **Rescue**

The incident commander should consider the potential for rescues at all times. Firefighters should be prepared to remove occupants. It should be reinforced that often the best action the fire department can take is to suppress the fire. The incident commander and fireground officers must make a rapid and informed choice on the priority and sequence of suppression activities versus occupant removal. As life safety is the highest tactical priority, rescue shall always take precedence. The incident commander must determine the best course of action to ensure the best outcome for occupants based on the conditions at that time.

### **Salvage**

Firefighters should use compartmentalization to control fire spread and smoke whenever possible.

*Special Note on Ventilation:* Fire departments should manage, and control the openings to the structure to limit fire growth and spread and to control the flow path of inlet air and fire gases during tactical operations. All ventilation must be coordinated with suppression activities. Uncontrolled ventilation allows additional oxygen into the structure which may result in a rapid increase in the size and hazard of the fire due to increased heat release rates. Residential Assignment

### **Dispatch Assignment**

(3) Engines, (1) Truck, (1) Heavy Squad, (1) Medic Unit/Ambulance, (1) QRV, (1) Battalion Chief and Air Utility

### **First Engine**

- Position Engine past structure or stop short to leave room for 1st Truck.
- Establish command, give initial size up, identify and initiate water supply (Rural Water Shuttle if necessary) and state operational mode.
- Complete lap around building.
- Responsibilities: Rescue Mode-Rescue of occupants. Fire Attack Mode-Initiate SLICERS. DPO operations. Pull 2 attack lines. Defensive Mode-No entry.

### **Second Engine**

- Position apparatus at primary hydrant (when available) and secure water. In rural water settings, pick up the 1st Engine's supply line and prepare for rural water operations.
- Ensure continuous water to 1st Engine. If 1st engine can get its own water, support the FDC.
- Responsibilities: Establish Initial Rapid Intervention Crew (IRIC) when no rescue is evident. In rescue and fire attack mode, initiate 2nd attack line and support initial attack. DPO/Water Supply Operations. If no Truck Company, prepare for Initial Search.

### **Third Engine**

- Position apparatus at secondary hydrant (At or near front), when available to establish secondary water source.
- Lay-in and supply water for 1st Truck Operations.
- If rural water, deliver water to 2nd engine and drop crew. Apparatus to help setup dump site for rural water operation.
- Responsibilities: Establish On-Deck Rapids Intervention Crew, Initiate a handline dedicated for RIC use only. DPO/Water Supply Operations.

### **First Truck**

- Position apparatus at or near front.
- Ladder roof unless advised otherwise by command.
- Prepare for immediate V.E.I.S. when appropriate
- Responsibilities: Prepare for forcible entry, search, salvage and overhaul.
- Coordinate with command for access for compartment cooling, place ground ladders for escape, control utilities.

### **Heavy Squad**

- If arriving before Truck with necessary staffing, assume primary Truck Operations duties. Otherwise, position apparatus away from scene.
- Responsibilities: Serve in role appropriate for arrival.

### **Medic/Ambulance**

- Qualified Medic Units should serve as initial IRIC until relieved.
- Establish Medical/Rehab Group.

### **Battalion Chief**

1st BC: Position command vehicle to serve the command function. Obtain progress reports and assume Command as necessary. Establish an Accountability Officer (QRV, Staff) and Safety Officer (Staff). Maintain dedicated Medic Unit for incident, not involved in firefighting operation.

- 2nd BC: Operations (Forward Ops.)

### **QRV**

- Report to Command
- Establish Accountability Officer

### **Tanker Box**

- 1st - Report to Dump Site to Deliver Water.
- 2nd Tanker - Report to Dump Site to Deliver Water.
- Engine - Report to Fill Site to Set-Up Fill Operation

**Visit the ISFSI LMS to participate in the course related to this information, [learn.isfsi.org](http://learn.isfsi.org).  
Enter the enrolment key SFDDFT for the course Single Family Detached Dwelling Fire  
Tactics**