NATIONAL FIRE PROTECTION ASSOCIATION
The leading information and knowledge resource on fire, electrical and related hazards

Technical Committee on Fundamentals of Fire Control within a Structure Utilizing Fire Dynamics
NFPA 1700 SECOND DRAFT MEETING
New York City, NY – March 19-21, 2019

AGENDA

Adobe Connect Meeting Information:
http://nfpa.adobeconnect.com/rfash/

Connection Information:
Telephone Connection: 1-866-398-2885
Participant Passcode: 237983#

1. Call to order at 8:00am, Eastern
2. Introductions
3. Opening remarks - Chair
4. Review and approval of minutes from previous meeting (March 27-28 , 2018)
5. NFPA Staff Liaison report
6. NFPA 1700 Second Draft
    a. Task Group Reports
    b. Act on Public Inputs
7. New business
8. Old business
9. Other items
10. Next meeting
11. Adjourn

Address List No Phone

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Fundamentals of Fire Control Within a Structure Utilizing Fire

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Technical Committee on Fundamentals of Fire Control within a Structure Utilizing Fire Dynamics
NFPA 1700 FIRST DRAFT MEETING
Savannah, GA – March 27-28, 2018

Meeting Minutes

Attendees:

Andrew Ellison – Acting Chair
Dan Madrzykowski – Acting Chair
John Brunacini
Ed Buchanan
Rusty Dunham
Gerald Fontana
Brad French
Jeff Grote
George Healy
Gavin Horn
Stephen Kerber
Kevin Kuntz
Nicolas Ledin
Peter McBride
Tim Merinar - Remote
Todd Nixon
Ryan O'Donnell
Timm Schabbel
John Schutt
Josh Stefancic
Jens Siegal
Devon Wells
Richard White
Steve White

Vincent Conrad – Guest - ISFSI

Bob Fash – NFPA Staff
Dan Gorham – NFPA Staff

Call to order at 8:00am, Eastern

Introductions

Opening remarks – Acting Chair Ellison

Review and approval of minutes from previous meeting (December 5-6, 2017)

NFPA Staff Liaison report

NFPA 1700 First Draft - Task Group Reports

- Chapter 4 revision was reviewed and approved by consensus. Maintain color photos and graphs for final print version.

- Chapter 10 revision were discussed and approved by consensus, although there was a few dissenting votes.

- Chapter 3 revision (definitions) were reviewed and approved by consensus.

- Chapter 2 revisions (references) were reviewed and approved by consensus.

- Annex B revision was reviewed and approved by consensus.

No new or old business discussed.

2nd draft meeting date and location to be determined.

Meeting adjourned at 2:00 pm.

Technical Committee on Fundamentals of Fire Control within a Structure Utilizing Fire Dynamics
NFPA 1700 FIRST DRAFT CONTINUATION MEETING
Teleconference/Web – May 8, 2018

Meeting Minutes

Attendees:

Joe Jardin – Chair
John Brunacini
Ed Buchanan
Rusty Dunham
Andrew Ellison
Brad French
Jeff Grote
Sherri Hu
Kevin Kuntz
Tim Merinar - Remote

Richard Merrell
Todd Nixon
Ryan O'Donnell
John Schutt
Devon Wells
Richard White

Bob Fash – NFPA Staff

Call to order at 1:00 pm, Eastern

Introductions

Opening remarks – Chair Jardin

NFPA Staff Liaison report. All participants advised that the continuation meeting is subject to all regulations of the standards development process.

NFPA 1700 First Draft

- Chapter 4 final revision were reviewed and approved by consensus.
- Chapter 6 revision were reviewed and approved by consensus.
- Chapter 12 revision were reviewed and approved by consensus.

- Chapter 6 revision was reviewed and approved by consensus. New graphics for illustrating directional flow paths.
- Chapter 12 revision for fire specific tactical considerations was reviewed and approved by consensus.

The committee acted on all public inputs

Recommendation made and accepted to change “fire attack” to “fire control” in most instances where it appears in the draft

Recommendation made and accepted to replace “void space” with “concealed space” where appropriate.

Dan Madrzykowski assumes acting chair capacity from Andrew Ellison after lunch break on second day (February 28, 2018)

Chapter 10 held for continuation meeting to allow for additional work by the chapter task group.

Chapter 3 task group definitions held for final submittal of all chapters.

Annex B held for continuation meeting to allow for continuing refinement.

First draft meeting held in recess until the continuation meeting is scheduled to handle remaining items for the first draft.

First Draft Meeting recessed until continuation meeting can be determined.

Public Comment No. 97-NFPA 1700-2018 [Global Input]

Type your content here ...Metal Roofs have change fires in structures. I belong to a small rural volunteer fire department which has on average a 7 minute in service time and longer response times. By the time of arrival fires generally have escalated and burned through a ceiling and into the attic space. On asphalt roofs the fire would burn though and self-vent. With the increased of metal roofs, what is happening is the fire cannot vent and is traveling the attic space. The metal is causing the fire and heat to impinge on roof supports long with higher heat causing a failure more rapidly. The metal roofs also hamper roof ventilation due to the ability of roof screws having an enormous holding psi. One screw can exhaust a firefighter trying to pull it loose. We have found a screw gun is much quicker.

Statement of Problem and Substantiation for Public Comment

Metal Roofs have change fires in structures. I belong to a small rural volunteer fire department which has on average a 7 minute in service time and longer response times. By the time of arrival fires generally have escalated and burned through a ceiling and into the attic space. On asphalt roofs the fire would burn though and self-vent. With the increased of metal roofs, what is happening is the fire cannot vent and is traveling the attic space. The metal is causing the fire and heat to impinge on roof supports long with higher heat causing a failure more rapidly. The metal roofs also hamper roof ventilation due to the ability of roof screws having an enormous holding psi. One screw can exhaust a firefighter trying to pull it loose. We have found a screw gun is much quicker.

Related Item

- nfpa 1700

Submitter Information Verification

Submitter Full Name: Don McGuire

Organization: Campbell County Rural Fire

Affiliation: President of board of directors

Street Address:

City:

State:

Zip:

Submittal Date: Sun Nov 11 04:46:51 EST 2018

Committee: FCO-AAA

Public Comment No. 19-NFPA 1700-2018 [Section No. 1.1]

1.1 Scope.

This guide addresses structural fire-fighting strategy ~~, tactics,~~ and ~~tasks as~~ tactics as supported by science-based research.

Removed "and tasks"

Statement of Problem and Substantiation for Public Comment

Justification: The remainder of the proposed standard does not break down into task level details. There is a strategy chapter and a tactics chapter but no chapter on tasks. There are thousands of fire ground tasks and they cannot possibly all be put into a standard.

Related Item

- PI?

Submitter Information Verification

Submitter Full Name:	Eric Maurouard
Organization:	Olean Fire
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Thu Sep 20 08:09:57 EDT 2018
Committee:	FCO-AAA

Public Comment No. 20-NFPA 1700-2018 [Sections 1.2, 1.3]

Sections 1.2, 1.3

1.2 Purpose.

The purpose of this document is to provide guidance for the development of policies, procedures, and guidelines including strategies, tactics, and tasks for structural firefighting supported by science-based research.

Removed "and tasks" for same reason as section 1. 1.

_

1. 3 Application.

The intent of this guide is to provide guidance on the application of science-based fire dynamics research supporting fire-fighting practices recognizing that life safety of the public and the first responder is the highest incident priority, followed by incident stabilization and property conervation . _

Statement of Problem and Substantiation for Public Comment

1.2 - Justification is the same as 1.1.

1.3 - Justification: You currently do not mention the 3 incident priorities until section 10.4.2. In my opinion, they should be mentioned earlier in the document.

On a side note: I suggest a title revision to the standard. (There is no place to edit the actual title so I'm doing it here) Section 1.3 reads "The intent of this guide is to provide guidance on the application of science-based fire dynamics research supporting fire-fighting practices..." The title NFPA 1700 should be changed to specifically reflect this. Currently the title is "NFPA 1700: The Guide to Structural Firefighting", but this standard only focuses on "water and air" based on fire dynamic research. It is in fact, in its current capacity, not a complete guide to structural firefighting. A true guide to structural firefighting would cover everything from water supply, search, command and ICS, controlling utilities, laddering the building, RIT, forcible entry, etc... If you only intend to discuss fire dynamic research as it can be applied to fire attack, then you should name the standard accordingly.

Related Item

- PI

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Submittal Date: Thu Sep 20 08:23:25 EDT 2018

Committee: FCO-AAA

Public Comment No. 21-NFPA 1700-2018 [Section No. 3.3.34]

~~**3.3.34** * – Decontamination.~~

~~The process of removing contaminants such as soot, particulate, and fireground chemicals to clean fireground tools and equipment and prevent the spread of contamination to other persons or equipment.~~

~~**3.3.34.1** – Dry Decontamination.~~

~~Utilizing forced airflow or brushing off of personnel, PPE, apparatus, tools, and equipment to reduce contaminants.~~

~~**3.3.34.2** – Gross Decontamination.~~

~~The initial phase of the decontamination process during which the amount of surface contaminant is significantly reduced by removing bulk contaminants and substances from the surface of the equipment or tools using some form of brushing, wetting agent, and/or detergents.~~

~~**3.3.34.3** – Wet Decontamination.~~

~~Utilizing water or a water and soap solution to reduce contaminants on personnel, PPE, apparatus, tools, and equipment.~~

Statement of Problem and Substantiation for Public Comment

Decontamination should be its own standard. Remove decontamination from the definitions and Chapter 11 in its entirety.

Related Item

- PI

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Submittal Date: Thu Sep 20 08:57:14 EDT 2018

Committee: FCO-AAA

Public Comment No. 22-NFPA 1700-2018 [Section No. 3.3.35]

3.3.35 Defensive Strategy.

The plan for the actions or movements ~~of the arriving fire~~ of fire department units to protect exposures and ~~control the~~ contain the main body of fire ~~with the intent~~ to ~~not enter the fire building.~~ the already-affected areas.

Statement of Problem and Substantiation for Public Comment

Remove "the arriving"
Justification: Strategy is not solely an initial plan for "arriving units". Strategy can change late in the incident after all units have arrived. Saying strategy is for arriving units is just confusing.

Remove "control"; replace with "contain"
Justification: In a defensive strategy we often allow the fire to burn uncontrolled so long as it is contained to the area that is already burning. Contain is just a better word to use here. If you don't like "contain" my second preference would be "confine" which is what is used in RECEO-VS.

Remove "with the intent to not enter the fire building"
Defensive strategies are not limited to exterior operations. You can implement a defensive strategy to protect interior exposures. Tactics such as shelter in place or trench cuts (with hose lines on the top floor under the trench cuts) are interior defensive tactics to fulfill a defensive strategy.

Add "contain the main body of fire to the already affected areas"
This is the true essence of what a defensive strategy is. We are writing off buildings or portions of the building that we cannot save and focusing our efforts to protect interior or exterior exposures.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 25-NFPA 1700-2018 [Section No. 3.3.146]	

Related Item

- PI

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Committee:	FCO-AAA

Public Comment No. 66-NFPA 1700-2018 [Section No. 3.3.57]

3.3.57 Exposure.

3.3.57.1. The side of a structural assembly or separate part of the fireground that is directly exposed to the fire to which the fire could spread.

3.3.57.2. The process by which people, animals, the environment, and equipment are subjected to or come in contact with a hazardous material/weapon of mass destruction (WMD).

Statement of Problem and Substantiation for Public Comment

Need to also add a definition for 'exposure' that relates to firefighters being exposed to products of combustion on the fireground. The proposed language was taken from NFPA Glossary of Terms and is included in othe rstandards (e.g. 475, 1072), but may need to be further adapted for this document scope (e.g. remove reference to WMD, focus on fireground contamination)

Related Item

- FR99

Submitter Information Verification

Submitter Full Name: Gavin Horn
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Submittal Date: Wed Oct 24 10:50:49 EDT 2018
Committee: FCO-AAA

Public Comment No. 123-NFPA 1700-2018 [Section No. 3.3.83]

3.3.83 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. [**1410,** 2015]

Revise to: ***Flow path*** is the route followed by smoke, air, heat or flame toward or away from an opening; typically, a window, door or other leakage points. Additionally, add an annex to explain how flow paths are generated such as:

- The flow is caused by pressure differences that result from temperature differences, buoyancy, expansion, wind impact and HVAC systems.
- Flow characteristics include stratification within the boundaries of a compartment or at an opening, the degree of turbulence and its direction, velocity, and shape. These characteristics can often be identified by evaluating the smoke/air track.
- At openings, or within rooms, the smoke/air track flow(s) may be classified as unidirectional, bidirectional or dynamic.
- Multiple flow paths are possible within a structure fire and there may be multiple combinations of inlets and/or outlets.
- Flow paths can be altered by firefighting tactics.

The types of flow within a flow path may be characterized as:

Unidirectional Flow - A flow of smoke or air moving in a single direction.

Bidirectional Flow - A flow of smoke or air moving in opposing directions.

Dynamic Flow - A unidirectional or bidirectional flow of smoke/air that presents irregular stratification and shape or alternates in direction (pulsations).

Statement of Problem and Substantiation for Public Comment

The referenced NFPA 1410 defnition for flow path assumes there is a fire. It is not necessary to have a fire to have a flow path within a structure. Additionally, the definition excludes air which an important factor in the communication of flow path concepts theoretically and practically. The proposed definition is in keeping with the concepts laid out within the definition of Ventilation Profile and Vent Profile (NFPA 1700) that relies on relating the connection between visual observation of conditions (Smoke/Air/Heat/Flame) at an exhaust or intake inlet or other leakage points (i.e. walls/roof spaces/floors etc.). Additionally, the inclusion of an annex to the Flow Path definition develops understanding on how flow paths are generated and characterized.

Related Item

- Pls[1]

Submitter Information Verification

Submitter Full Name: Peter McBride
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Submittal Date: Thu Nov 15 08:33:17 EST 2018
Committee: FCO-AAA

Public Comment No. 23-NFPA 1700-2018 [Section No. 3.3.91]

3.3.91 Fully Developed Stage.

The stage of fire development where heat release rate has reached its peak within a compartment. [**1410,** 2015]

No problems with this definition but would like to see incipient stage, growth stage, and decay stage added to the definition list.

Statement of Problem and Substantiation for Public Comment

Justification: There are four stages of fire development and the current standard only defines one.

Related Item

- pi

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Submittal Date:	Thu Sep 20 09:23:13 EDT 2018
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Public Comment No. 124-NFPA 1700-2018 [Section No. 3.3.96]

3.3.96 Hazard Control Zones.

The physical or conceptual demarcation of an emergency scene according to levels of risk and the associated personal protective equipment (PPE) usage that identifies the exclusion, hot, warm, and cold zones are all zones within the “hazard control zone” classification.

3.3.96.1 Cold Zone.

A hazard-free area where PPE is not required and that is suitable for locating command, rehabilitation, medical functions, and public access.

3.3.96.2 Exclusion Zone.

An area where no personnel may enter due to imminent hazard(s), where issued PPE will not protect against the hazard, or where there is a need to protect potential evidence.

3.3.96.3* Hot Zone.

The primary incident hazard area deemed immediately dangerous to life and health (IDLH) and where personnel wear PPE suitable for the hazards encountered.

3.3.96.4 Warm Zone.

A limited-access area for personnel directly aiding or in support of operations in the hot zone where personnel wear PPE suitable for the hazards present.

Revise order of Zones to reflect order of severity and do not list alphabetically.

Statement of Problem and Substantiation for Public Comment

Hazard Control Zones when listed by order of severity least to most or most to least is a logical progression whereas the alphabetical presentation disconnects the the concepts of hazard controls from a natural sequencing in actual use and for instructional design purposes (e.g. presentation and student recall). The revised order should be: Exclusion, Hot, Warm and Cold Zones.

Related Item

- PIs[1]

Submitter Information Verification

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Submittal Date: Thu Nov 15 09:07:26 EST 2018
Committee: FCO-AAA

Public Comment No. 68-NFPA 1700-2018 [Section No. 3.3.125]

3.3.125* Kilowatt.

A measurement of energy release rate. [**921,** 2017] A watt is defined as one joule per second. A kilowatt is 1000 watts.

Statement of Problem and Substantiation for Public Comment

The definition of a kilowatt is kilojoule/sec, so this should be included in the definition, not in the appendix. Also, I would suggest that to be consistent, we should consider adding Watt to the definitions (as joule/sec) then leaving this definition as 1000 watts. In 3.3.124, joule is defined, even though kJ are often utilized in fire service context

Related Item

- FR99

Submitter Information Verification

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Submittal Date: Wed Oct 24 11:05:01 EDT 2018
Committee: FCO-AAA

Public Comment No. 53-NFPA 1700-2018 [Section No. 3.3.131]

3.3.131 Lightweight Construction.

Structures that have ~~framework made out of wood or other lightweight materials.~~ structural members of light weight materials such as wood or metal

(1) light weight wood structural members maybe of engineered type trusses, or laminated beams, osb, or other such products that are attached it's light weight nail plates or glued and pressed in place

(2) light weight metal structural members are of lighter gage metal in the form of light bat trusses, and other such materials.

Statement of Problem and Substantiation for Public Comment

The original wording was unspecific leaving it up to the reader to attempt to understand what light weight construction actually includes.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 51-NFPA 1700-2018 [Section No. 10.5.2.1]	

Related Item

- Fr

Submitter Information Verification

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Committee: FCO-AAA

Public Comment No. 25-NFPA 1700-2018 [Section No. 3.3.146]

3.3.146 Offensive Strategy.

The plan for the actions and movements of ~~arriving~~ fire department units to ~~control~~ contain and extinguish the fire, search for occupants and effect rescues, ~~start searches for occupants, and extinguish the fire with the intent to commence operations inside the fire building~~ and limit property damage .

Statement of Problem and Substantiation for Public Comment

Remove "arriving"
Justification: Strategy is not solely for initial operations. Strategy can change late in the incident. Including the word arriving in the definition is confusing and unneeded.

Rewrite definition
Justification: Offensive fire attack aims to contain and extinguish the fire, search and rescue occupants, and save as much property as possible (as opposed to a defensive strategy where we 1) are not concerned with directly extinguishing the fire, only containing it to the already affected area, 2) are not concerned with searching and removing victims as they are not savable, 3) accept that damage is occurring/will occur to the already affected area)

Again, offensive operations are not limited to interior, nor are defensive operations limited to exterior. Transitional attack in an offensive tactic which begins on the exterior. Conversely, positioning crews interior to protect a wing of a building while letting the rest of the building burn is a defensive tactic. Offensive / defensive is not based on the geographic location of crews.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 22-NFPA 1700-2018 [Section No. 3.3.35]	

Related Item

- pi

Submitter Information Verification

Submitter Full Name: Eric Maurouard
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Submittal Date: Thu Sep 20 10:05:41 EDT 2018
Committee: FCO-AAA

Public Comment No. 26-NFPA 1700-2018 [Section No. 3.3.158]

~~**3.3.158** – Positive Pressure Attack.~~

~~The utilization of powered blowers or fans, prior to fire control, as a means to control and reduce the heat in the intake portion of the flow path and exhaust heat and smoke from the fire area.~~

Statement of Problem and Substantiation for Public Comment

This tactic is dangerous and in most cases unneeded. While there are some departments that still deploy this tactic with some success, the majority of fire departments do not give the fire oxygen prior to water application. There may indeed be some instances where PPA could be useful, but not enough to include it in this standard. Incorrectly deploying this tactic could have catastrophic consequences.

Related Item

- pi

Submitter Information Verification

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Committee: FCO-AAA

Public Comment No. 69-NFPA 1700-2018 [Section No. 3.3.165]

3.3.165 Radiant Heat.

Heat energy carried by electromagnetic waves that are longer than light waves and shorter than radio waves; radiant heat (electromagnetic radiation) increases the ~~sensible~~ temperature of any substance capable of absorbing the radiation, especially solid and opaque objects. [**921,** 2017]

Statement of Problem and Substantiation for Public Comment

Clarifying language to be consistent with other terminology that no longer includes 'sensible'

Related Item

- FR99

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Committee: FCO-AAA

Public Comment No. 126-NFPA 1700-2018 [Section No. 3.3.167]

3.3.167* Rapid Fire Development.

A transient phase in fire behavior accompanied by a rapid increase in heat release rate of the fire and temperature in the environment, sometimes accompanied by the generation of over-pressure.

* revise the annex material to further explain Rapid Fire Development as below.

3.1 Rapid Fire Development

A wide variety of terms have been noted and defined by various sources to define transition situations in which the fire environment rapidly deteriorates. In many cases, there are few quantitative (or even distinct qualitative) distinguishing characteristics between the various terms. In this section, the fire behaviour related to these transient situations is grouped into a category called “Rapid Fire Developments” (RFDs).

Rapid Fire Development: *A transient phase in fire behaviour accompanied by a rapid increase in the heat release rate of the fire and temperature in the environment, sometimes accompanied by the generation of over-pressure.*

RFDs are subdivided into two main categories: flashover and smoke ignition. Smoke ignition is then further subdivided into three separate developments: smoke explosion, backdraft and flash fire (propagating flame fronts including rollovers), as shown in Figure 27.

Figure 27: Rapid Fire Development

Flashover is considered separately as it involves a thermal feedback, which leads to the transition to a fully developed fire, whereas smoke ignitions involve the (auto- or piloted-) ignition of smoke. Smoke ignitions are distinguished by the temperature of the mixture prior to ignition as well as the amount of pressure generated following ignition.These developments will be described according to their potential development, how they may be recognized, and their hazards to firefighters.

3.1.1 Flashover

The most common of the RFDs is flashover, which is identified as a transition stage of fire growth. Flashover is a thermally-driven event stemming from the situation in which a fire generates sufficient heat to overcome the heat lost to the ceiling, walls and floor as well as the energy lost through any openings. This creates an imbalance and an energy feedback loop that results in the HRR increasing to its maximum value for that situation.

The actual temperature and HRR values will depend on many factors, including room size; lining materials; fuel types and loading; and ventilation. The enhanced HRR is accompanied by one or a combination of:

· A sharp (often termed “exponential”) temperature increase in the smoke;

Figure 28: Flashover

· Preheating of adjacent fuel surfaces to the point of piloted ignition;

· Remote (non-piloted) ignition of other surrounding fuels.

The end effect is the transition to a fully developed fire. Flaming combustion may also occur external to the enclosure where there is sufficient oxygen available.

A flashover may also occur following another RFD or as the end result of a change in ventilation conditions in the fire enclosure, such as the breaking of a window or the opening of a door. It is extremely important that firefighters understand that flashovers can occur following a change in the ventilation profile. This can occur, for example, following under-ventilation of a fire; following smoke ignition; or during the normal development of a fire. Whether a fire proceeds to flashover is dependent on whether it releases sufficient heat to initiate this feedback loop, and whether sufficient fuel and air are available to sustain combustion until the tipping point for flashover is reached.

The other RFDs discussed herein are distinct from flashover in that they are not driven by a thermal imbalance in the enclosure. They involve the accumulation of smoke, which mixes with additional air and ignites, and therefore are considered together under the category of smoke ignition.

Observations made during flashover describe the phenomena as fire “exploding” in an enclosure with rapid flame extension across the room and out compartment doors or windows. Exterior windows may break and general burning may also take place at floor level. The rapid change in conditions culminates in full-room involvement.

3.1.2 Smoke Ignition

The smoke ignition category includes a spectrum of possible developments and outcomes related to the accumulation, movement and mixing of smoke with additional air to create a flammable mixture that subsequently ignites and burns. To explain RFDs and discuss how they are related to conditions within the fire environment, it is best to review two concepts previously examined: smoke and flammability.

One of the primary reasons for the wide range of terms and lack of quantitative, or even distinct, qualitative definitions can be understood through a review of the definition of smoke.

Smoke: *The airborne solid and liquid particulates and gases evolved when a material undergoes pyrolysis or combustion, together with a quantity of air that is entrained or otherwise mixed into the mass.* ***[i]***

Smoke is produced during the heating, smouldering, or flaming combustion of solid, liquid or gaseous fuels. The composition of smoke varies widely, depending on the type of fuel; conditions of heating; combustion or pyrolysis reactions; and ambient conditions of the compartment, such as concentration of oxygen, ventilation conditions, and temperature. Due to the tremendous variability in conditions encountered during a fire, it is important to consider all of the products of combustion, pyrolysis and vaporization to be smoke. Of critical importance to the firefighter is the understanding that smoke is fuel . Smoke ignition and the ensuing developments present potential risks due to further fire extension or deterioration of existing fire conditions.

Another concept related to the risk posed by smoke ignition is a fuel's flammable range. For flaming combustion to occur, the mixture of fuel and air must be within the flammability limits for that fuel. As smoke is composed of many different constituents, when we consider it as fuel, its flammability limits are poorly defined. An auto-ignition temperature for a smoke-air mixture will therefore not be a single value. Instead, auto-ignition will occur across a range of temperatures due to the different auto-ignition temperatures of the mixture's components.

Nonetheless, as with any gaseous mixture of fuel and air, there will be a range of concentrations of smoke in air that can sustain propagation of flames (the flammability range). The energy released during combustion will also vary according to how well-mixed the mixture is, and the proximity of the concentration of fuel in the mixture to its ideal concentration in air. The better mixed and the closer the mixture is to ideal, the greater the potential HRRs and temperatures. If ignition occurs in a confined space, when the mixture is close to ideal and well mixed, higher over-pressures may be generated.

These concepts related to smoke and flammability ranges explain why certain RFDs are grouped together under the category of smoke ignition.

Smoke ignition: *The ignition of the products of pyrolysis and incomplete combustion interior or exterior to the fire compartment due to the accumulated smoke layer falling within its flammability range and either auto-igniting or igniting due to an ignition source.*

Events related to smoke ignition usually occur after an enclosure fire has become under-ventilated and a volume of smoke has accumulated. For smoke ignition to occur, the fuel/air mixture in this volume must be within its flammability range, or sufficient mixing must occur between air and a fuel-rich mixture that is initially above the upper flammability limit. If the mixture is within its flammable range and the volume encounters an ignition source of sufficient energy, or is above its auto-ignition temperature, it will ignite. If the initial mixture is above its flammable range, it must first mix with a sufficient quantity of additional air to be within the flammable range. Following this, it too can ignite.

RFDs under the category of smoke ignition are further sub-classified as smoke explosions, backdrafts and flash fires, depending on the sequence of events that culminate in ignition; how the flame propagates through the mixture; and the potential consequences of that event. In general, there are no consistent quantitative definitions for these events. Instead, they relate to a spectrum of different phenomena that are described in the following sections.

3.1.2.1 Smoke Explosion

A smoke explosion can occur either inside or outside the fire compartment when an accumulation of fuel-rich smoke mixes with additional air and falls within its flammable range.

Smoke Explosion: *A rapid fire development that occurs when a smoke-air mixture falls within its flammable range, either external or internal to the room of origin, and is ignited, resulting in a significant pressure front.*

Figure 29: Smoke explosion

One common example occurs when smoke migrates and accumulates in hidden areas such as other rooms or void spaces (including cocklofts, attics or voids within walls). This smoke then mixes with air to fall within its flammable range and encounters an ignition source, resulting in a flame front propagating through the mixture, as shown graphically in Figure 29.

If the ignition occurs in a relatively confined volume, or if obstacles promote turbulence, the flame front may accelerate, leading to an over-pressure situation that may result in structural damage. If the explosion occurs away from the seat of the fire, it poses an additional hazard since firefighters in the vicinity of the explosion may not be wearing full protective equipment.

A smoke explosion can also occur within an enclosure without any change in ventilation, catching firefighters unaware. [ii] In Figure 30, the smoke explosion occurs following the decay of a fire in a closed compartment, as a result of under-ventilation.

Despite a reduction in HRR and temperature, smouldering combustion and/or pyrolysis will continue to generate smoke that accumulates in the enclosure. Small amounts of leakage that naturally occur will introduce fresh air into the compartment, and as this air mixes with the smoke, the mixture may fall within the flammable range. If and when a mixture that is local to an ignition source (such as remaining flames, embers, smouldering combustion or heated surfaces) falls in the flammable range, it will ignite and a flame front will propagate. As this process can take significant time, the resultant mixture may be well mixed when it eventually ignites, and the flame front may propagate quickly. When confined in the compartment, this series of events can lead to the build-up of a significant over-pressure. The resulting smoke explosion can cause significant damage to the structure and/or result in the injury or death of nearby fire fighters.

3.1.2.2 Backdraft

Figure 30: Smoke explosion in a closed compartment

Figure 31: Gravity current

Backdrafts are widely studied and referenced events, caused when the ventilation profile of an under-ventilated fire enclosure is suddenly changed and fresh air enters the enclosure. [iii] Similar to a smoke explosion, backdrafts are accompanied by significant over-pressure.

Backdrafts begin with the fire entering an under-ventilated state, resulting in the accumulation of flammable smoke in the enclosure. During this phase of fire development, a change in ventilation occurs (e.g., a window breaking or a firefighter opening the door to the enclosure). As hot smoke exits above, fresh, cooler air enters below. This air is fed by a gravity current and mixes with the compartment gases, as shown in Figure 31. Ignition can occur along the smoke-air interface through auto-ignition or when a pocket of flammable mixture reaches an ignition source within the enclosure.

Backdraft: *A deflagration resulting from the sudden introduction of air into a confined space containing oxygen-deficient products of incomplete combustion.* ***[iv]***

The resulting flame front will propagate through any regions of flammable mixture, promoting turbulence and additional mixing of smoke and air. The flammability of the mixture that is ignited will depend on many variables. If the ignition source is more remote—allowing more time for the smoke and air to mix—or if more turbulent mixing occurs due to obstructions in the air track, the smoke and air are more likely to be closer to an ideal mixture. This will result in faster flame propagation and higher flame temperatures.

Regardless of the mixture ratio, the ignition pushes unburned fuel-rich gases ahead of the burning smoke-air mixture as it expands. As shown in Figure 32, a large fireball results as the burning flammable smoke-air mixture is forced, under pressure, from the enclosure.

The over-pressures and dramatic fireballs produced during backdraft can result in damage to the structure and extension of the fire beyond the enclosure, and can pose severe risks to firefighters who are in its path. The risk of a backdraft is highest shortly after a change in ventilation conditions.

Figure 32: Progression to backdraft

Despite developing in ways to similar a smoke explosion, there are key characteristics that differentiate backdrafts from smoke explosions:

- A backdraft occurs as a result of a change in the ventilation profile, which produces a gravity current.
- Backdrafts emanate as smoke is pushed ahead of the flame front, resulting in the characteristic fireball emanating from the opening.

Backdraft Indicators

A key indicator witnessed previously in backdraft situations is described as an in-and-out movement of the smoke, giving the impression that the "building is breathing." In addition, the fire may appear to be pulsating. As shown in Figure 33, windows and doors may be closed, yet yellowish-grey smoke will seep out around them under pressure, and then subsequently be drawn back into the building. There may not be visible flames in the room, but doors and windows will be very hot, and the window glass may be discoloured and cracked from the heat. There may also be whistling sounds around doors and windows.

Figure 33: Signs and symptoms of backdraft

If a fire has been burning for a long time in a concealed space, a lot of unburned gases may have accumulated. In a number of past incidents, a pulsating rising and sinking of the hot gas layer has been observed.

Limited ventilation leads to the production of large amounts of unburnt gases. An opening is suddenly introduced and a current of inflowing air mixes with the gases, creating a combustible mixture. The mixture ignites and moves very quickly in the form of a turbulent deflagration; this will be accompanied by a powerful expansion of gases as combustion takes place. The location of ignition source determines the delay in time until a fire ball will "explode" outside an opening. A backdraft may lead to a fully developed fire, or may expel all of the fire gases, leaving only localised combustion in its path.

3.1.2.3 Flash Fires (Propagating Flame Fronts)

Figure 34: Flash fire

This category of smoke ignition comprises a series of RFDs that are characterized by several modes of flame propagation through smoke-air mixtures. In contrast to backdrafts and smoke explosions, the flame propagation in these situations does not result in the generation of any significant over-pressure. Two manifestations of flame propagation that fall into this category are flash fires and rollover.

Flash fires involve a flame moving through a flammable mixture with considerable speed, without developing a significant over-pressure (Figure34). Note that the following definition of flash fire does not specify heat flux or duration, as is specified for the flame-resistant garments. [v]

Flash Fire: *A fire that spreads by means of a flame front rapidly through a diffuse fuel, such as a dust, gas, or the vapours of an ignitable liquid, without the production of damaging pressure.* ***[vi]***

Another process that involves flame propagation through a smoke layer is referred to as rollover. This is where a flame front or pockets of smoke-air mixture ignite and move slowly through a mixture. Rollovers are also considered an early and important indication of impending flashover.

Rollover: *The condition in which unburned fuel (pyrolysate) from the originating fire has accumulated in the ceiling layer to a sufficient concentration (i.e., at or above the lower flammable limit) that it ignites and burns. Rollover can occur without ignition of or prior to the ignition of other fuels separate from the origin.* ***[vii]***

In either case, an under-ventilated or smouldering fire produces fuel-rich smoke, which mixes with air to fall within the flammable range and then is ignited, either by auto-ignition or when exposed to an ignition source. These RFD events can happen within an enclosure (such as during overhaul, when embers or sparks may act as an ignition source) or external to the room of origin in any remote location where a combustible mixture has collected. Depending on the details of the situation, combustion may occur rapidly throughout a volume of diffuse smoke-air mixture (flash fire), along the boundary between the smoke and air layers (rollover) or within the smoke volume in pockets where smoke and air have mixed to within the flammable range. If the combusting mixture is far from its ideal mixture, as would likely be the case for the diffusion flame propagating along a smoke-air interface, the flame temperatures and propagation speeds will be lower than would be the case for more premixed or near ideal mixtures. Independent of the exact nature of flame propagation, if sufficient heat is released in burning regions, these situations can result in significant damage due to thermal radiation; direct flame impingement; or remote ignition of fuels some distance from the fire origin. They can also potentially trip the transition required to initiate flashover.

3.1.3 Distinguishing between Smoke Ignitions

The different types of smoke ignition can be further distinguished in two ways: the amount of over-pressure generated; and the temperature of the initial mixture. Figure 35is a graphical representation of the relationship between these RFDs.

Given the inconsistency in definitions, it is not worthwhile to argue about which term should be used to describe a particular event. Rather, the terms applied describe extremes over a wide variation of possible manifestations of RFDs. While Figure 35only notes four types of RFD, it allows us to understand how different developments may be perceived by firefighters, as well as how they relate to each other in the following ways:

· Flash fires are developments that can evolve from mixtures with a wide variety of starting temperatures, but they generate low over-pressure.

· Smoke explosions can occur in mixtures when they are at lower temperatures; the over-pressure generated tends to be the highest of RFDs.

· Backdrafts are more likely to involve mixtures of smoke and air that are initially at higher temperatures. They evolve from gravity current-induced ventilation of a fire enclosure and produce a characteristic fireball emanating from an opening.

· As the temperature of a mixture increases, rollovers are more likely to occur as the mixture falls within its flammability limits, and less over-pressure will likely be generated when a change in ventilation occurs.

· Rollovers are examples of flash fire developments which typically occur in smoke-air mixtures that are within the flammability limits and above their auto-ignition temperature.

Figure 35: Smoke Ignitions

Most importantly, Figure 35shows that RFDs can occur over a spectrum of initial mixture temperatures and can generate a range of over-pressure situations. While extreme examples might be easily observed and distinguished, a range of developments are also possible between the extremes. These may be described using several of the definitions provided herein. It is important that firefighters understand the underlying fire dynamics (smoke is fuel, ventilation is important, over-pressure can occur) and how to best anticipate rapidly deteriorating conditions. It is also important to realize that any smoke ignition increases the HRR and can therefore initiate a flashover. Through this understanding, firefighters can make an informed assessment of conditions and select appropriate controls and actions to reduce the danger of RFDs.

3.1.4 RFD - Possible Outcomes

Figure 36shows the HRR curves of several RFDs that could occur following a ventilation-controlled period. The rate of HRR can vary. An HRR peak may occur prior to the initiation of a flashover. At the other extreme, the fire may continue to die out, with its HRR decreasing steadily.

Traditionally, fires were represented as shown by the fuel-controlled line as there was usually enough ventilation to allow a compartment to reach flashover. As modern building techniques resulted in tighter building envelopes, the ventilation-controlled curve was popularized as “Modern Fire Behaviour”. The reality is more complicated, as no two fires will be the same, and it is practically impossible to predict whether an RFD will occur, which RFD may occur, or whether the fire will simply decay.

Figure 36: Possible outcomes following an RFD

It is important to appreciate that any of the curves in Figure 36—or in fact any outcome bound by the extreme cases—may occur. It is also important that firefighters understand that a given curve is not necessarily representative of any given smoke ignition.

A useful tool to remind firefighters of the range of possible outcomes is the ***GRAB*** mnemonic. A ventilation-controlled fire can:

- **G** o out;
- **R** esume growth;
- **A** uto- or piloted-ignite; or,
- **B** ackdraft.

A range of RFDs are possible, and firefighters should be aware of their environment to watch for signs of RFD, and to be aware of changes in fire conditions in general. Firefighters should also remember that their actions can have significant impacts on fire development. Modifying the ventilation profile of a compartment might initiate an RFD, or reduce its potential by dissipating accumulated smoke. Application of water—either directly to the fire, or to a heated volume of smoke—will lower the temperature, and inert the mixture, delaying or mitigating an RFD.

[i] (National Fire Protection Association, 2017)3.3.169

[ii] (Fleischmann & Chen, Backdraft and smoke explosions, 2013)

[iii] (Fleischmann, Pagni, & Williamson, 1993)

[iv] (National Fire Protection Association, 2017)3.3.17

[v] (National Fire Protection Association, 2012)

[vi] (National Fire Protection Association, 2017)3.3.87

[vii] (National Fire Protection Association, 2017)3.3.82

Additional Proposed Changes

File Name	Description	Approved
NFPA_1700_Excerpt-_From_Knowledge_To_Practice_Fire_Dynamics_Project_Module_203.docx	NFPA 1700 Excerpt - From Knowledge To Practice Module 203 - Rapid Fire Development	

Statement of Problem and Substantiation for Public Comment

The annex material speaks only to flashover and smoke ignition but fails to explain the differentiation of the phenomena flashover vs. smoke ignition and further fails to identify the phenomena associated with smoke

ignitions (smoke explosion, backdraft, flash fire also known as rollover).
The identified phenomena are listed alphabetically within the existing definitions file and are therefore isolated as phenomena when in fact they are closely related. The disassociation of the phenomena is historic and reflects a dated view of fire dynamics understanding. Revising the Rapid Fire Development annex to reflect the new understanding of the relationships while maintaining the existing alphabetically listed definitions with an annex reference to the Rapid Fire Development annex would serve the purpose of introducing the new concepts while preserving the historical reference until the information becomes more widely understood and adopted.

Related Item

- PIs[1]

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Submittal Date: Thu Nov 15 09:38:51 EST 2018

Committee: FCO-AAA

3.1 Rapid Fire Development

A wide variety of terms have been noted and defined by various sources to define transition situations in which the fire environment rapidly deteriorates. In many cases, there are few quantitative (or even distinct qualitative) distinguishing characteristics between the various terms. In this section, the fire behaviour related to these transient situations is grouped into a category called “Rapid Fire Developments” (RFDs).

> ***Rapid Fire Development:*** *A transient phase in fire behaviour accompanied by a rapid increase in the heat release rate of the fire and temperature in the environment, sometimes accompanied by the generation of over-pressure.*

RFDs are subdivided into two main categories: flashover and smoke ignition. Smoke ignition is then further subdivided into three separate developments: smoke explosion, backdraft and flash fire (propagating flame fronts including rollovers), as shown in Figure 27.

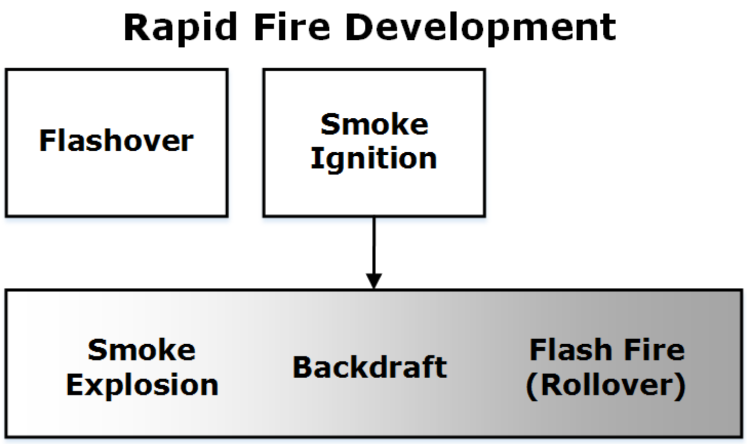


Figure 1: Rapid Fire Development

Flashover is considered separately as it involves a thermal feedback, which leads to the transition to a fully developed fire, whereas smoke ignitions involve the (auto- or piloted-) ignition of smoke. Smoke ignitions are distinguished by the temperature of the mixture prior to ignition as well as the amount of pressure generated following ignition. These developments will be described according to their potential development, how they may be recognized, and their hazards to firefighters.

3.1.1 Flashover

The most common of the RFDs is flashover, which is identified as a transition stage of fire growth. Flashover is a thermally-driven event stemming from the situation in which a fire generates sufficient heat to overcome the heat lost to the ceiling, walls and floor as well as the energy lost through any openings. This creates an imbalance and an energy feedback loop that results in the HRR increasing to its maximum value for that situation.

The actual temperature and HRR values will depend on many factors, including room size; lining materials; fuel types and loading; and ventilation. The enhanced HRR is accompanied by one or a combination of:

- A sharp (often termed "exponential") temperature increase in the smoke;
- Preheating of adjacent fuel surfaces to the point of piloted ignition;
- Remote (non-piloted) ignition of other surrounding fuels.

Figure 2: Flashover

The end effect is the transition to a fully developed fire. Flaming combustion may also occur external to the enclosure where there is sufficient oxygen available.

A flashover may also occur following another RFD or as the end result of a change in ventilation conditions in the fire enclosure, such as the breaking of a window or the opening of a door. It is extremely important that firefighters understand that flashovers can occur following a change in the ventilation profile. This can occur, for example, following under-ventilation of a fire; following smoke ignition; or during the normal development of a fire. Whether a fire proceeds to flashover is dependent on whether it releases sufficient heat to initiate this feedback loop, and whether sufficient fuel and air are available to sustain combustion until the tipping point for flashover is reached.

The other RFDs discussed herein are distinct from flashover in that they are not driven by a thermal imbalance in the enclosure. They involve the accumulation of smoke, which mixes with additional air and ignites, and therefore are considered together under the category of smoke ignition.

Observations made during flashover describe the phenomena as fire "exploding" in an enclosure with rapid flame extension across the room and out compartment doors or windows. Exterior windows may break and general burning may also take place at floor level. The rapid change in conditions culminates in full-room involvement.

3.1.2 Smoke Ignition

The smoke ignition category includes a spectrum of possible developments and outcomes related to the accumulation, movement and mixing of smoke with additional air to create a flammable mixture that subsequently ignites and burns. To explain RFDs and discuss how they are related to conditions within the fire environment, it is best to review two concepts previously examined: smoke and flammability.

One of the primary reasons for the wide range of terms and lack of quantitative, or even distinct, qualitative definitions can be understood through a review of the definition of smoke.

> ***Smoke:*** *The airborne solid and liquid particulates and gases evolved when a material undergoes pyrolysis or combustion, together with a quantity of air that is entrained or otherwise mixed into the mass.*[i]

Smoke is produced during the heating, smouldering, or flaming combustion of solid, liquid or gaseous fuels. The composition of smoke varies widely, depending on the type of fuel; conditions of heating; combustion or pyrolysis reactions; and ambient conditions of the compartment, such as concentration of oxygen, ventilation conditions, and temperature. Due to the tremendous variability in conditions encountered during a fire, it is important to consider all of the products of combustion, pyrolysis and vaporization to be smoke. Of critical importance to the firefighter is the understanding that smoke is fuel. Smoke ignition and the ensuing developments present potential risks due to further fire extension or deterioration of existing fire conditions.

Another concept related to the risk posed by smoke ignition is a fuel's flammable range. For flaming combustion to occur, the mixture of fuel and air must be within the flammability limits for that fuel. As smoke is composed of many different constituents, when we consider it as fuel, its flammability limits are poorly defined. An auto-ignition temperature for a smoke-air mixture will therefore not be a single value. Instead, auto-ignition will occur across a range of temperatures due to the different auto-ignition temperatures of the mixture's components.

Nonetheless, as with any gaseous mixture of fuel and air, there will be a range of concentrations of smoke in air that can sustain propagation of flames (the flammability range). The energy released during combustion will also vary according to how well-mixed the mixture is, and the proximity of the concentration of fuel in the mixture to its ideal concentration in air. The better mixed and the closer the mixture is to ideal, the greater the potential HRRs and temperatures. If ignition occurs in a confined space, when the mixture is close to ideal and well mixed, higher over-pressures may be generated.

These concepts related to smoke and flammability ranges explain why certain RFDs are grouped together under the category of smoke ignition.

> ***Smoke ignition:*** *The ignition of the products of pyrolysis and incomplete combustion interior or exterior to the fire compartment due to the accumulated smoke layer falling within its flammability range and either auto-igniting or igniting due to an ignition source.*

Events related to smoke ignition usually occur after an enclosure fire has become under-ventilated and a volume of smoke has accumulated. For smoke ignition to occur, the fuel/air mixture in this volume must be within its flammability range, or sufficient mixing must occur between air and a fuel-rich mixture that is initially above the upper flammability limit. If the mixture is within its flammable range and the volume encounters an ignition source of sufficient energy, or is above its auto-ignition temperature, it will ignite. If the initial mixture is above its flammable range, it must first mix with a sufficient quantity of additional air to be within the flammable range. Following this, it too can ignite.

RFDs under the category of smoke ignition are further sub-classified as smoke explosions, backdrafts and flash fires, depending on the sequence of events that culminate in ignition; how the flame propagates through the mixture; and the potential consequences of that event. In general, there are no consistent quantitative definitions for these events. Instead, they relate to a spectrum of different phenomena that are described in the following sections.

3.1.2.1 Smoke Explosion

A smoke explosion can occur either inside or outside the fire compartment when an accumulation of fuel-rich smoke mixes with additional air and falls within its flammable range.

> ***Smoke Explosion:*** *A rapid fire development that occurs when a smoke-air mixture falls within its flammable range, either external or internal to the room of origin, and is ignited, resulting in a significant pressure front.*

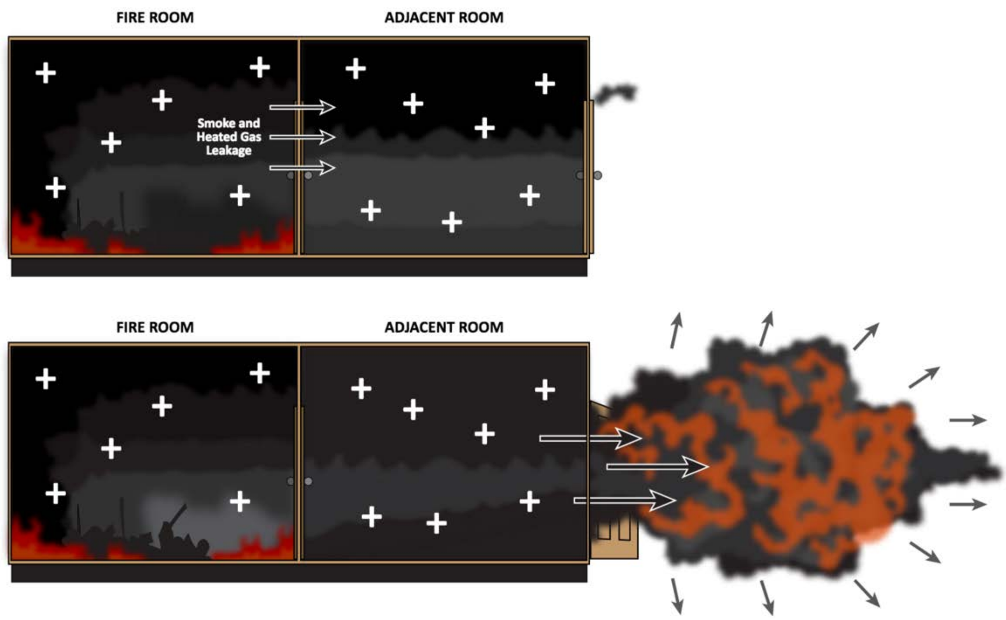


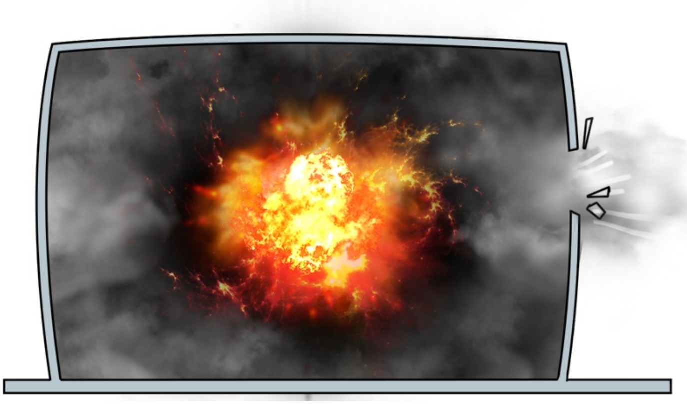
Figure 3: Smoke explosion

One common example occurs when smoke migrates and accumulates in hidden areas such as other rooms or void spaces (including cocklofts, attics or voids within walls). This smoke then mixes with air to fall within its flammable range and encounters an ignition source, resulting in a flame front propagating through the mixture, as shown graphically in Figure 29.

If the ignition occurs in a relatively confined volume, or if obstacles promote turbulence, the flame front may accelerate, leading to an over-pressure situation that may result in structural damage. If the explosion occurs away from the seat of the fire, it poses an additional hazard since firefighters in the vicinity of the explosion may not be wearing full protective equipment.

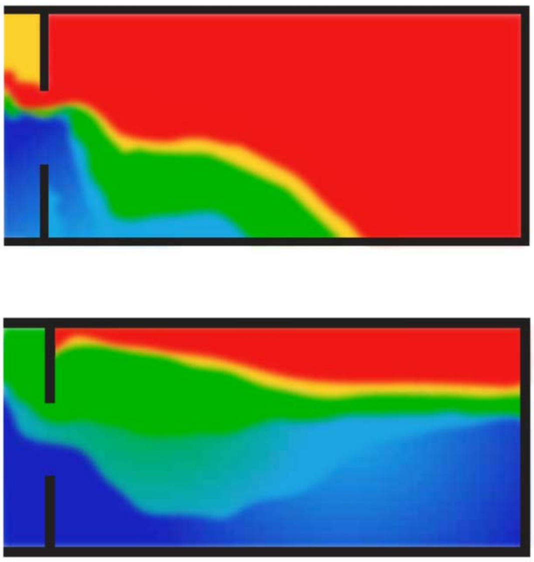
A smoke explosion can also occur within an enclosure without any change in ventilation, catching firefighters unaware.[ii] In Figure 30, the smoke explosion occurs following the decay of a fire in a closed compartment, as a result of under-ventilation.

Despite a reduction in HRR and temperature, smouldering combustion and/or pyrolysis will continue to generate smoke that accumulates in the enclosure. Small amounts of leakage that naturally occur will introduce fresh air into the compartment, and as this air mixes with the smoke, the mixture may fall within the flammable range. If and when a mixture that is local to an ignition source (such as remaining flames, embers, smouldering combustion or heated surfaces) falls in the flammable range, it will ignite and a flame front will propagate. As this process can take significant time, the resultant mixture may be well mixed when it eventually ignites, and the flame front may propagate quickly. When confined in the compartment, this series of events can lead to the build-up of a significant over-pressure. The resulting smoke explosion can cause significant damage to the structure and/or result in the injury or death of nearby fire fighters.



3.1.2.2 Backdraft

Backdrafts are widely studied and referenced events, caused when the ventilation profile of an under-ventilated fire enclosure is suddenly changed and fresh air enters the enclosure.[iii] Similar to a smoke explosion, backdrafts are accompanied by significant over-pressure.



Backdrafts begin with the fire entering an under-ventilated state, resulting in the accumulation of flammable smoke in the enclosure. During this phase of fire development, a change in ventilation occurs (e.g., a window breaking or a firefighter opening the door to the enclosure). As hot smoke exits above, fresh, cooler air enters below. This air is fed by a gravity current and mixes with the compartment gases, as shown in Figure 31. Ignition can occur along the smoke-air interface through auto-ignition or when a pocket of flammable mixture reaches an ignition source within the enclosure.

> ***Backdraft:*** *A deflagration resulting from the sudden introduction of air into a confined space containing oxygen-deficient products of incomplete combustion.*[iv]

The resulting flame front will propagate through any regions of flammable mixture, promoting turbulence and additional mixing of smoke and air. The flammability of the mixture that is ignited will depend on many variables. If the ignition source is more remote—allowing more time for the smoke and air to mix—or if more turbulent mixing occurs due to obstructions in the air track, the smoke and air are more likely to be closer to an ideal mixture. This will result in faster flame propagation and higher flame temperatures.

Regardless of the mixture ratio, the ignition pushes unburned fuel-rich gases ahead of the burning smoke-air mixture as it expands. As shown in Figure 32, a large fireball results as the burning flammable smoke-air mixture is forced, under pressure, from the enclosure.

The over-pressures and dramatic fireballs produced during backdraft can result in damage to the structure and extension of the fire beyond the enclosure, and can pose severe risks to firefighters who are in its path. The risk of a backdraft is highest shortly after a change in ventilation conditions.

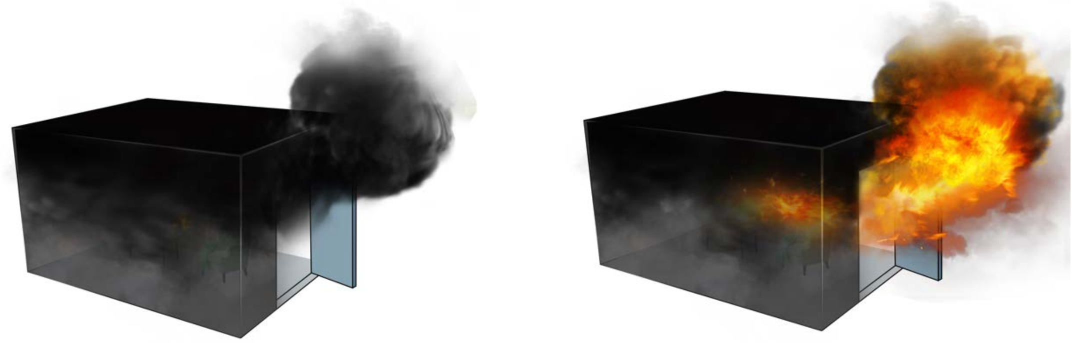


Figure 6: Progression to backdraft

Despite developing in ways to similar a smoke explosion, there are key characteristics that differentiate backdrafts from smoke explosions:

- A backdraft occurs as a result of a change in the ventilation profile, which produces a gravity current.
- Backdrafts emanate as smoke is pushed ahead of the flame front, resulting in the characteristic fireball emanating from the opening.

Backdraft Indicators

A key indicator witnessed previously in backdraft situations is described as an in-and-out movement of the smoke, giving the impression that the "building is breathing." In addition, the fire may appear to be pulsating. As shown in Figure 33, windows and doors may be closed, yet yellowish-grey smoke will seep out around them under pressure, and then subsequently be drawn back into the building. There may not be visible flames in the room, but doors and windows will be very hot, and the window glass may be discoloured and cracked from the heat. There may also be whistling sounds around doors and windows.

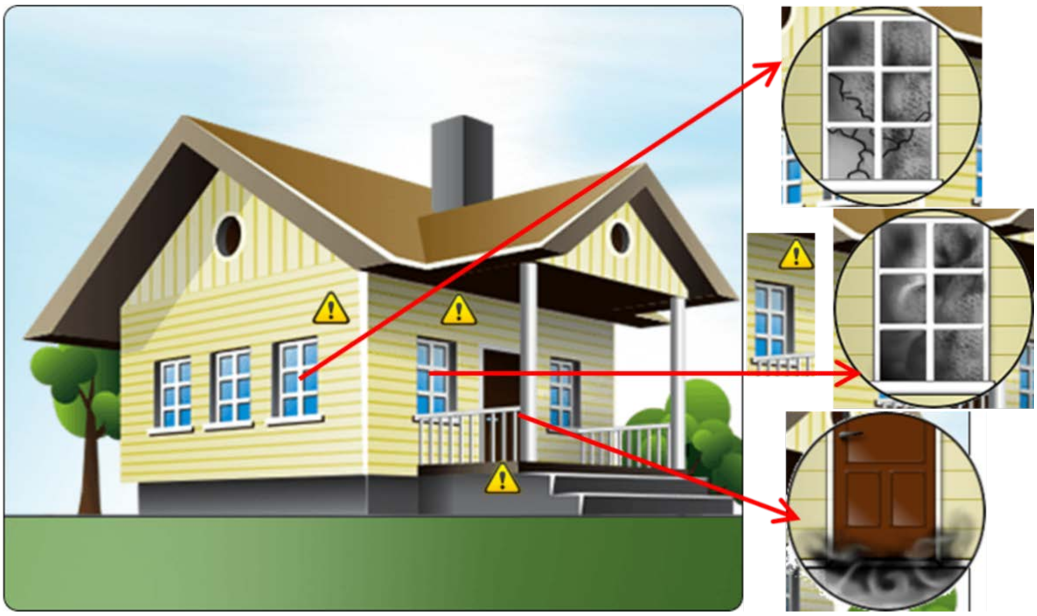


Figure 7: Signs and symptoms of backdraft

If a fire has been burning for a long time in a concealed space, a lot of unburned gases may have accumulated. In a number of past incidents, a pulsating rising and sinking of the hot gas layer has been observed.

Limited ventilation leads to the production of large amounts of unburnt gases. An opening is suddenly introduced and a current of inflowing air mixes with the gases, creating a combustible mixture. The mixture ignites and moves very quickly in the form of a turbulent deflagration; this will be accompanied by a powerful expansion of gases as combustion takes place. The location of ignition source determines the delay in time until a fire ball will "explode" outside an opening. A backdraft may lead to a fully developed fire, or may expel all of the fire gases, leaving only localised combustion in its path.

3.1.2.3 Flash Fires (Propagating Flame Fronts)

This category of smoke ignition comprises a series of RFDs that are characterized by several modes of flame propagation through smoke-air mixtures. In contrast to backdrafts and smoke explosions, the flame propagation in these situations does not result in the generation of any significant over-pressure. Two manifestations of flame propagation that fall into this category are flash fires and rollover.

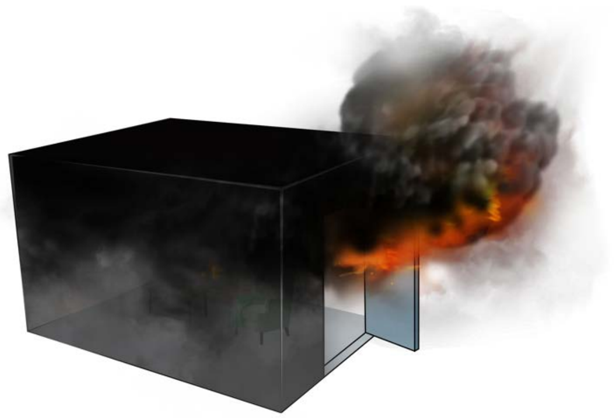


Figure 8: Flash fire

Flash fires involve a flame moving through a flammable mixture with considerable speed, without developing a significant over-pressure (Figure 34). Note that the following definition of flash fire does not specify heat flux or duration, as is specified for the flame-resistant garments.[v]

> ***Flash Fire:*** *A fire that spreads by means of a flame front rapidly through a diffuse fuel, such as a dust, gas, or the vapours of an ignitable liquid, without the production of damaging pressure.*[vi]

Another process that involves flame propagation through a smoke layer is referred to as rollover. This is where a flame front or pockets of smoke-air mixture ignite and move slowly through a mixture. Rollovers are also considered an early and important indication of impending flashover.

> ***Rollover:*** *The condition in which unburned fuel (pyrolysate) from the originating fire has accumulated in the ceiling layer to a sufficient concentration (i.e., at or above the lower flammable limit) that it ignites and burns. Rollover can occur without ignition of or prior to the ignition of other fuels separate from the origin.*[vii]

In either case, an under-ventilated or smouldering fire produces fuel-rich smoke, which mixes with air to fall within the flammable range and then is ignited, either by auto-ignition or when exposed to an ignition source. These RFD events can happen within an enclosure (such as during overhaul, when embers or sparks may act as an ignition source) or external to the room of origin in any remote location where a combustible mixture has collected. Depending on the details of the situation, combustion may occur rapidly throughout a volume of diffuse smoke-air mixture (flash fire), along the boundary between the smoke and air layers (rollover) or within the smoke volume in pockets where smoke and air have mixed to within the flammable range. If the combusting mixture is far from its ideal mixture, as would likely be the case for the diffusion flame propagating along a smoke-air interface, the flame temperatures and propagation speeds will be lower than would be the case for more premixed or near ideal mixtures. Independent of the exact nature of flame propagation, if sufficient heat is released in burning regions, these situations can result in significant damage due to thermal radiation; direct flame impingement; or remote ignition of fuels some distance from the fire origin. They can also potentially trip the transition required to initiate flashover.

3.1.3 Distinguishing between Smoke Ignitions

The different types of smoke ignition can be further distinguished in two ways: the amount of over-pressure generated; and the temperature of the initial mixture. Figure 35 is a graphical representation of the relationship between these RFDs.

Given the inconsistency in definitions, it is not worthwhile to argue about which term should be used to describe a particular event. Rather, the terms applied describe extremes over a wide variation of possible manifestations of RFDs. While Figure 35 only notes four types of RFD, it allows us to understand how different developments may be perceived by firefighters, as well as how they relate to each other in the following ways:

- Flash fires are developments that can evolve from mixtures with a wide variety of starting temperatures, but they generate low over-pressure.
- Smoke explosions can occur in mixtures when they are at lower temperatures; the over-pressure generated tends to be the highest of RFDs.
- Backdrafts are more likely to involve mixtures of smoke and air that are initially at higher temperatures. They evolve from gravity current-induced ventilation of a fire enclosure and produce a characteristic fireball emanating from an opening.
- As the temperature of a mixture increases, rollovers are more likely to occur as the mixture falls within its flammability limits, and less over-pressure will likely be generated when a change in ventilation occurs.
- Rollovers are examples of flash fire developments which typically occur in smoke-air mixtures that are within the flammability limits and above their auto-ignition temperature.

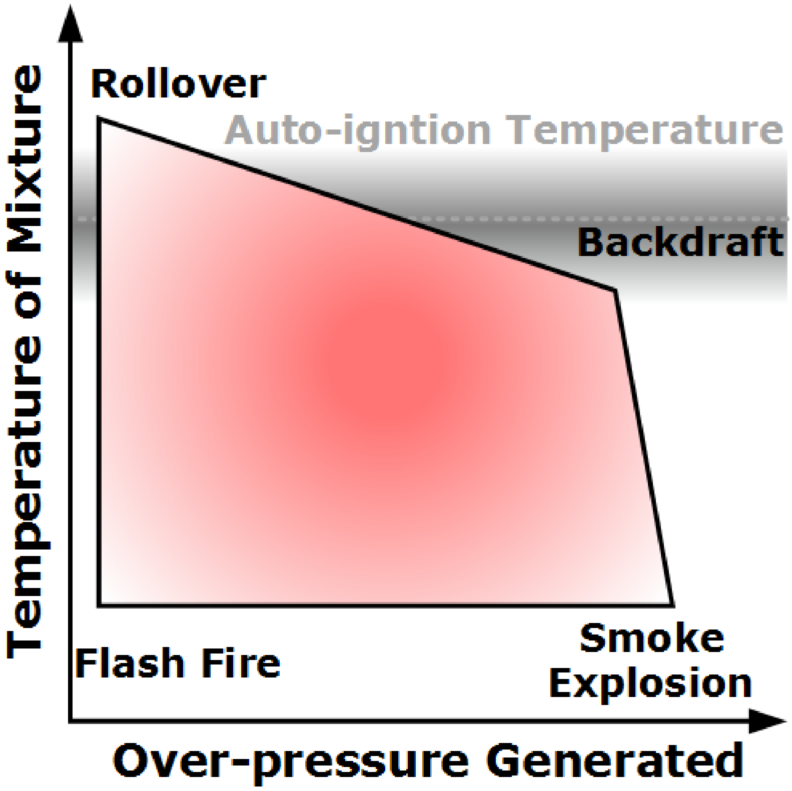


Figure 9: Smoke Ignitions

Most importantly, Figure 35 shows that RFDs can occur over a spectrum of initial mixture temperatures and can generate a range of over-pressure situations. While extreme examples might be easily observed and distinguished, a range of developments are also possible between the extremes. These may be described using several of the definitions provided herein. It is important that firefighters understand the underlying fire dynamics (smoke is fuel, ventilation is important, over-pressure can occur) and how to best anticipate rapidly deteriorating conditions. It is also important to realize that any smoke ignition increases the HRR and can therefore initiate a flashover. Through this understanding, firefighters can make an informed assessment of conditions and select appropriate controls and actions to reduce the danger of RFDs.

3.1.4 RFD - Possible Outcomes

Figure 36 shows the HRR curves of several RFDs that could occur following a ventilation-controlled period. The rate of HRR can vary. An HRR peak may occur prior to the initiation of a flashover. At the other extreme, the fire may continue to die out, with its HRR decreasing steadily.

Traditionally, fires were represented as shown by the fuel-controlled line as there was usually enough ventilation to allow a compartment to reach flashover. As modern building techniques resulted in tighter building envelopes, the ventilation-controlled curve was popularized as “Modern Fire Behaviour”. The reality is more complicated, as no two fires will be the same, and it is practically impossible to predict whether an RFD will occur, which RFD may occur, or whether the fire will simply decay.

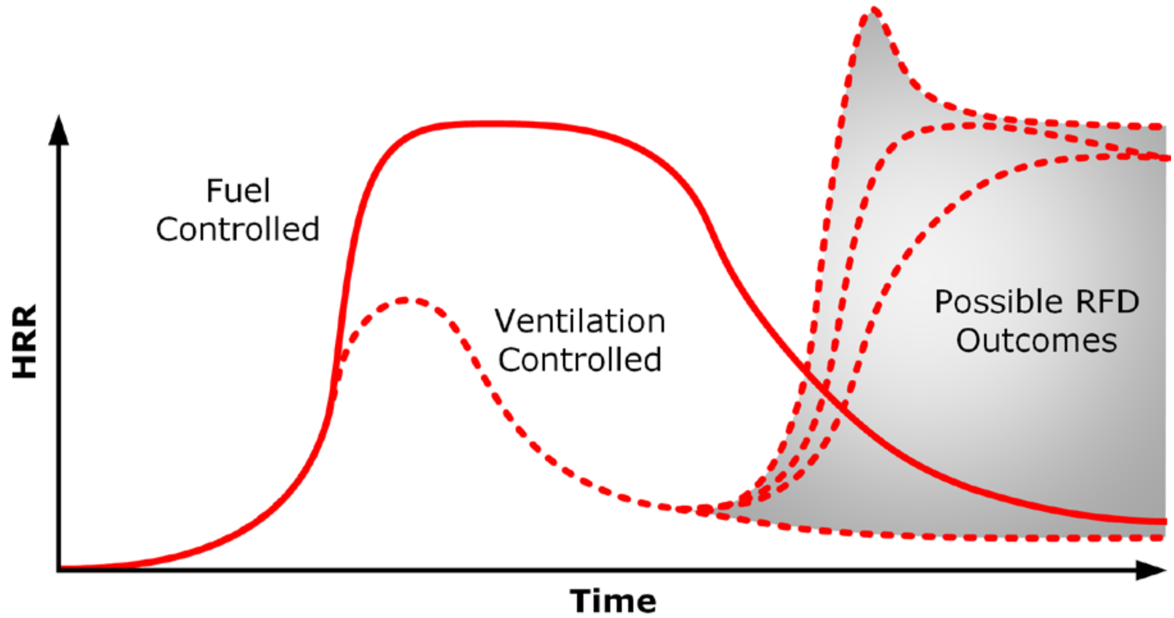


Figure 10: Possible outcomes following an RFD

It is important to appreciate that any of the curves in Figure 36—or in fact any outcome bound by the extreme cases—may occur. It is also important that firefighters understand that a given curve is not necessarily representative of any given smoke ignition.

A useful tool to remind firefighters of the range of possible outcomes is the ***GRAB*** mnemonic. A ventilation-controlled fire can:

- **G**o out;
- **R**esume growth;
- **A**uto- or piloted-ignite; or,
- **B**ackdraft.

A range of RFDs are possible, and firefighters should be aware of their environment to watch for signs of RFD, and to be aware of changes in fire conditions in general. Firefighters should also remember that their actions can have significant impacts on fire development. Modifying the ventilation profile of a compartment might initiate an RFD, or reduce its potential by dissipating accumulated smoke. Application of water—either directly to the fire, or to a heated volume of smoke—will lower the temperature, and inert the mixture, delaying or mitigating an RFD.

---

[i] (National Fire Protection Association, 2017) 3.3.169

[ii] (Fleischmann & Chen, Backdraft and smoke explosions, 2013)

[iii] (Fleischmann, Pagni, & Williamson, 1993)

[iv] (National Fire Protection Association, 2017) 3.3.17

[v] (National Fire Protection Association, 2012)

[vi] (National Fire Protection Association, 2017) 3.3.87

[vii] (National Fire Protection Association, 2017) 3.3.82

Public Comment No. 24-NFPA 1700-2018 [Section No. 3.3.220]

3.3.220 Transitional Attack.

The application of ~~a fire stream from the exterior of a structure to improve~~ a solid or straight fire stream through doors or windows using a hand line positioned at a steep application angle to defelect water off the ceiling in an effort to improve interior conditions prior to an ~~offensive~~ interior fire attack.

Statement of Problem and Substantiation for Public Comment

Transitional attack has been misused to describe numerous exterior water applications methods. To differentiate between blitz attack, defensive exposure protection, and a true transitional attack I think this standard should specifically outline the correct components of transitional attack.

A correct transitional attack:
-Utilizes hand lines <300 GPM (>300+ is a blitz attack)
-Utilizes straight or solid fire streams (if you try this with a fog spray you may inadvertently entrain air and push fire or it's byproducts)
-Utilizes a steep stream angle to deflect water off the ceiling (using a gradual stream angle also has the potential to inadvertently entrain air and does not create the sprinkler effect off the ceiling to cool burning surfaces throughout the room) (Sorry there are no good antonyms to the word "steep"; "gradual" is the best I could come up with)

Remove "offensive"; replace with "interior"
As discussed in my edit to the definition of "defensive strategy" we should not limit defensive strategies to exterior nor offensive strategies to interior. Many consider transitional attack to be a very offensive tactic right from the start of exterior water application.

Related Item

- PI

Submitter Information Verification

Submitter Full Name: Eric Maurouard
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Submittal Date: Thu Sep 20 09:26:29 EDT 2018
Committee: FCO-AAA

Public Comment No. 50-NFPA 1700-2018 [Section No. 3.3.220]

3.3.220 Transitional Attack.

The application of a fire stream from the exterior of a structure to ~~improve interior conditions~~ reset/knockback fire interior prior to an offensive ~~fire~~ interior attack.

Statement of Problem and Substantiation for Public Comment

The original wording was misleading. A transitional attack has not been proven to make interior conditions more survivable for victims without breathing apparatus. They still will be inhaling products of combustion and other deadly gases until they are removed. Victims more often then not die from smoke inhalation then the actual temperatures inside a burning building.

Related Item

- Fr

Submitter Information Verification

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Committee: FCO-AAA

Public Comment No. 127-NFPA 1700-2018 [Section No. 3.3.236]

3.3.236 Ventilation Induced Flashover.

A flashover initiated by the introduction of oxygen into a preheated, fuel-rich (smoke filled), oxygen-deficient area. [**1410,** 2015]

<u>Remove or revise to Operationally Induced Flashover or to Operationally Induced Rapid Fire Development.</u>

Statement of Problem and Substantiation for Public Comment

Flashover is already defined as a thermally driven event i.e. Flashover is a transition phase in the development of a compartment fire in which surfaces exposed to thermal radiation reach ignition temperatures more or less simultaneously and fire spreads rapidly throughout the space, resulting in full room involvement of the compartment or enclosed space.
To then state within the definition file that flashover is ventilation induced is conflicted and not in keeping with the science. Removing the ventilation induced label to better reflect the predominant intent of the definition i.e. the operational practice of breaking glass or a failure to close openings in the enclosure that results in flashover like conditions or Rapid Fire Development better serves the objective of warning fire fighters about random actions or uncoordinated ventilation practices.

Related Item

- Pls[1]

Submitter Information Verification

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Submittal Date: Thu Nov 15 10:36:16 EST 2018
Committee: FCO-AAA

Public Comment No. 27-NFPA 1700-2018 [Section No. 3.3.242]

3.3.242 Vertical Ventilation.

A method of using buoyancy to permit smoke and convected heat to flow upward to be exhausted from the building through vents above the fire while being replaced with intake air through other vents at the same level of the fire or lower.

No problems with this section but a definition for horizontal ventilation should be included in this chapter.

Statement of Problem and Substantiation for Public Comment

Definition of horizontal ventilation is missing.

Related Item

- pi

Submitter Information Verification

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Submittal Date: Thu Sep 20 11:08:05 EDT 2018
Committee: FCO-AAA

Public Comment No. 32-NFPA 1700-2018 [Chapter 4 [Title Only]]

~~General~~ Background

Statement of Problem and Substantiation for Public Comment

This entire chapter as it is currently written talks about the background of the research and this standard. I propose changing the title to "Background" and adding "General" chapter. Under the "General" title should be other information regarding the use of this standard within fire ground operations, along with policy and guideline development.

It is crucially important that fire officers understand where strategies and tactics fit in to the larger picture and how we arrive at our tactical decision making. When I teach strategies and tactics I start at the top and work my way down for the best level of understanding. Please consider adding a paradigm such as the following:

Mission Statement: The written mission of the organization. Most departments include the preservation of life and property within their mission statement. Civilians expect this; firefighters should know it.

Incident Priorities:
1) Life safety: Both civilians and firefighters
2) Incident stabilization: stopping the incident from expanding an escalating
3) Property conservation and environmental protection

Risk Vs. Reward
"Risk a lot, in a calculated manner, to save a savable life"
"Risk some, in a calculated manner, to save savable pets, property, and to stabilize the incident"
"Risk nothing when there is nothing to save"

It is with these three: Mission Statement, Incident Priorities, and a good Risk vs. Reward analysis that we can begin to determine which strategy is appropriate for the incident.

Strategy level:
1) Offensive
2) Defensive
3) Non-intervention
4) Note that strategies may change throughout the incident

Tactic level:
1)Fire attack - interior
 a)direct
 b)indirect
2)Fire attack - exterior
 a)direct
 b)indirect
3)Fire attack - transitional
4)Fire attack - blitz attack
5)Fire attack - exposure protection
6)Fire attack - egress protection
6)Search - primary
7)Search - vES
8)Search - TIC oriented
9)Search - split
10)Vent - horizontal passive
11)Vent - horizontal PPV
12)Vent - hydraulic
13)Vent - vertical

Task level:
Example of different tasks found within the tactic of vertical ventilation: Milwalkee cut or the 7-9-8 coffin cut, sounding the roof, deploying the roof ladder. These are all "tasks" and there are too many of them to list in this

standard but explaining that multiple tasks make up each tactic is important to note.

Also the "General" chapter would be a good place to cite using the ICS system. Using the ICS system should be a very standard aspect of structural firefighting.

In other words, there are some general concepts that could be discussed here rather than just summarizing the background.

Related Item

- pi

Submitter Information Verification

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Submittal Date:	Thu Sep 20 13:00:40 EDT 2018
Committee:	FCO-AAA

Public Comment No. 61-NFPA 1700-2018 [Section No. 4.1.3]

4.1.3

~~The changes to~~ Additional information has been made avaialble to support selection of strategies and tactics that are based on evidence (i.e., knowledge) developed as part of research projects and as a result of line-of-duty death and injury-after-action reports. The overarching objectives of all of these research endeavors was to increase the effectiveness of fire fighters and increase the safety of the public and fire fighters.

Statement of Problem and Substantiation for Public Comment

Strategies and tactics are not necessarily changed. The goal of the document is to support tactics and strategy selection based on evidence.

Related Item

- FR61

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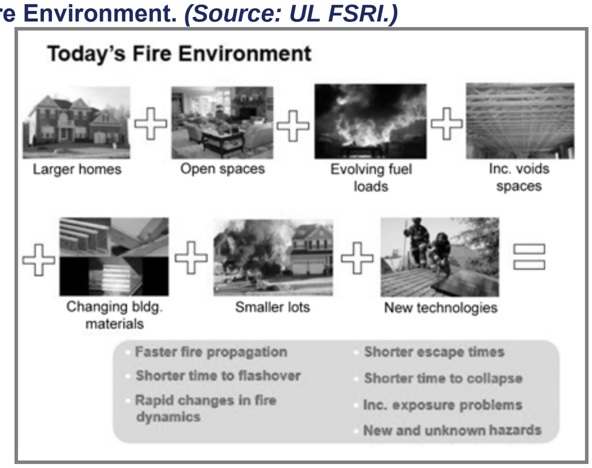
Submittal Date: Wed Oct 24 10:14:28 EDT 2018
Committee: FCO-AAA

Public Comment No. 29-NFPA 1700-2018 [Section No. 4.3.2]

4.3.2 Changes in the Fire Fighters' Work Environment.

Over the past 50 years, changes in construction materials, construction methods, insulation, and furnishings have changed the means and the speed of fire growth within a structure. Both research experiments and line-of-duty death (LODD) and line-of-duty injury (LODI) investigations have demonstrated the importance of understanding how ventilation affects fire behavior. Fires in today's fire environment, fueled predominantly by synthetic materials, commonly become ventilation-limited. How, where, and when a fire receives oxygen greatly impacts the fire dynamics and the resulting thermal environment inside the structure. As outlined in Figure 4.3.2, many factors in the construction methods, building materials, fuel loads, and power technologies have transformed the fire fighters' working environment. The construction techniques and materials used to build a house over the past 50 years have changed. Engineered wood products have enabled long spans and open areas for improved use of living space in houses. Gypsum board interior linings have been reduced en masse by 30 percent in recent years. In order to increase the energy efficiency of houses, insulation has improved, walls are wrapped in plastic to limit incursion of air and water, and multipane, low-emissivity windows are now the norm. The objects and materials inside our homes have changed as well. Some areas have seen more of these changes than others. It is important to note that even though a jurisdiction may have very few newly built homes, many structures are being renovated using new building materials, construction methods, and design features.

Figure 4.3.2 Today's Fire Environment. ***(Source: UL FSRI.)***



Statement of Problem and Substantiation for Public Comment

Add "Some areas have seen more of these changes than others. It is important to note that even though a jurisdiction may have very few newly built homes, many structures are being renovated using new building materials, construction methods, and design features."

Poorer areas such as mine, Western NY, have seen very few new homes built. This is especially true in the municipalities. Its important to note that changes in furnishings and building materials used in renovations still bring these threats to every area.

Related Item

• pi

Submitter Information Verification

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Submittal Date:	Thu Sep 20 11:29:11 EDT 2018
Committee:	FCO-AAA

Public Comment No. 28-NFPA 1700-2018 [Section No. 4.8]

4.8 Summary of Fire-Fighting Research.

Building on the scientific body of knowledge that supports the fire protection engineering discipline, research specific to fire-fighting tactics has been conducted. The results of the studies, referenced here, have been used as a basis of change for fire department standard operating procedures or guides across North America. ~~Experience in the field has shown positive results when tactics such as size-up, door control, coordinated ventilation, and exterior attack, prior to entry, have been used to accomplish the incident priorities of life safety, incident stabilization, and property conservation.~~

Statement of Problem and Substantiation for Public Comment

Remove "Experience in the field has shown positive results when tactics such as size-up, door control, coordinated ventilation, and exterior attack, prior to entry, have been used to accomplish the incident priorities of life safety, incident stabilization, and property conservation."

This is where this standard starts to lose credibility. Size up and coordinated ventilation are not the exclusive products of this research. Experience in the field has also shown that interior fire attack is a very effective tactic for certain situations. The UL study on interior / exterior streams also shows the advantages of interior fire attack, but this standard only seems interested in summarizing the benefits of exterior water. To summarize and convey that the very thorough UL studies only support exterior water application prior to entry is disingenuous.

I can show you NUMEROUS videos where transitional attack was not successful for a variety of reasons. One video, titled "Peach street fire" on youtube, shows firefighters using a transitional attack on a well involved apartment fire. The method they were using was consistent with steep angle, tight pattern, stationary - but it had no effect on the fire. A couple minutes later, they made an interior attack and the fire was knocked immediately.

Related Item

- pi

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Submittal Date: Thu Sep 20 11:14:46 EDT 2018
Committee: FCO-AAA

Public Comment No. 70-NFPA 1700-2018 [Section No. 6.4.2.1.1.5]

6.4.2.1.1.5

The outward flow is due to the higher pressure, relative to atmospheric pressure, created by the fire. Subsequently, a region of lower pressure is also created below the outflowing gases where fresh air is drawn into the fire compartment. The rate of air ~~entrapment~~ entrainment to the fire is influenced by the rate of outflowing gases. If outflow increases, air entrainment will also increase. The height at which the flow changes direction is known as the neutral plane.

Statement of Problem and Substantiation for Public Comment

Correcting language

Related Item

- FR63

Submitter Information Verification

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Submittal Date: Wed Oct 24 11:14:35 EDT 2018
Committee: FCO-AAA

Public Comment No. 16-NFPA 1700-2018 [Section No. 6.4.2.1.2.1]

6.4.2.1.2.1

Flashover, which is a rapid transition of a growth phase fire to a fully developed fire, is a dangerous phenomenon and has claimed the lives of countless fire fighters. Time to flashover from ignition was as little as 3 to 5 minutes in modern furnished residential room test fires.

Statement of Problem and Substantiation for Public Comment

Clarify the difference between "legacy" and "modern" furnishing in regards to time to flash over. In the ULFSRI "Comparison of Modern And Legacy Home Furnishing" study, time to flashover in the modern room was 3 minutes 30 seconds, and the legacy room was 29 minutes 30 seconds. Noting this difference in as many places as possible will only help to drive home the fact that the fire environment has changed and fire departments need to adapt appropriately.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 17-NFPA 1700-2018 [Section No. 6.4.2.2.4.1]	

Related Item

- Description of modern fire

Submitter Information Verification

Submitter Full Name: Matthew Woolston
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Submittal Date: Tue Sep 18 09:56:49 EDT 2018
Committee: FCO-AAA

Public Comment No. 17-NFPA 1700-2018 [Section No. 6.4.2.2.4.1]

6.4.2.2.4.1

Flashover, which is a rapid transition of a growth phase fire to a fully developed fire, is a dangerous phenomenon and has claimed the lives of countless fire fighters. Flashover times of 3 to 5 minutes are not unusual in modern furnished residential room fire tests.

Statement of Problem and Substantiation for Public Comment

Clarify the difference in time to flashover between "legacy" and "modern" furnished homes. This is important to not the difference because the modern fire environment has changed, and fire department tactics must adapt to address this change.

https://ulfirefightersafety.org/research-projects/comparison-of-modern-and-legacy-home-furnishings.html

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 16-NFPA 1700-2018 [Section No. 6.4.2.1.2.1]	

Related Item

- Flashover in modern home

Submitter Information Verification

Submitter Full Name: Matthew Woolston
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Submittal Date: Tue Sep 18 10:18:41 EDT 2018
Committee: FCO-AAA

Public Comment No. 71-NFPA 1700-2018 [Section No. 6.4.2.2.4.1]

6.4.2.2.4.1

Flashover ~~, which is a rapid transition of a growth phase fire to a fully developed fire, is a dangerous phenomenon and has claimed the lives of countless fire fighters. Flashover times of~~ times of less than 3 to 5 minutes are not unusual after providing ventilation to vent-limited fires in residential room fire tests.

Statement of Problem and Substantiation for Public Comment

Considering this is the vent limited fire case, times to flashover after provide air to such a compartment has been shown to be faster than the scenario depicted in 6.4.2.1.2.1 (3-5 minutes). Studies have shown that flashover may occur after venting these charged compartments in much shorter timeframes, sometimes less than a minute. This section might refer back to UL materials to further specify this timeframe.

Related Item

- FR63

Submitter Information Verification

Submitter Full Name: Gavin Horn
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Submittal Date: Wed Oct 24 11:20:03 EDT 2018
Committee: FCO-AAA

Public Comment No. 30-NFPA 1700-2018 [Sections 6.14, 6.15]

~~Sections 6.14, 6.15~~

~~**6.14** – Fire Attack Research.~~

~~The technical committee is evaluating the findings of studies related to fire attack and may incorporate suggestions for tactical considerations.~~

~~**6.15** – Other Fire Dynamics Research.~~

~~The technical committee is evaluating the findings of studies related to fire dynamics and may incorporate suggestions for tactical considerations.~~

Statement of Problem and Substantiation for Public Comment

Isn't this what this entire standard is doing - taking the research and determining appropriate tactics? Why do you need to reserve these two sections for this? You have an entire chapter on tactics.

Related Item

- pi

Submitter Information Verification

Submitter Full Name: Eric Maurouard
Organization: Olean Fire
Street Address:
City:
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Submittal Date: Thu Sep 20 12:52:19 EDT 2018
Committee: FCO-AAA

Public Comment No. 2-NFPA 1700-2018 [Section No. 7.5.1.4]

7.5.1.4 Vulnerabilities of Type I Buildings.

Examples of Type I building vulnerabilities include the following:

(1) Elevators to get to fire floor (high-rise)

(2) ~~No ladder~~ Limited ladder truck access (high -rise)

(3) Fire could be remote from building entry

(4) Need controlled evacuation/movement of occupants

(5) Limited entrance and egress to fire floor

(6) Must rely on building fire protection and life safety features (command center, fire pump, sprinkler system, standpipes)

(7) Complex ventilation issues (heat, smoke control, stratification of smoke produced)

(8) Transport of personnel and equipment to upper floors (weight, fatigue)

(9) Delay in response to fire area

(10) Wind-driven

(11) Collapse zone should be considered (larger than other types of construction)

Statement of Problem and Substantiation for Public Comment

Aerial apparatus has its uses even at high rise Type 1 building if the fire is on a lower floor or if the bucket is used to ferry equipment closer to the staging floor if there are elevator issues to conserve members energy

Related Item

- truck

Submitter Information Verification

Submitter Full Name: Shawn Donovan
Organization: Boston Fire Dept
Street Address:
City:
State:
Zip:
Submittal Date: Sun Sep 16 12:35:36 EDT 2018
Committee: FCO-AAA

Public Comment No. 1-NFPA 1700-2018 [Section No. 9.4.1]

9.4.1 Existing Reference Materials.

Materials such as pre-incident plans and maps should be developed ~~per Chapter 4 of NFPA~~ per NFPA 1620, providing information regarding the structure, its contents, and occupancy.

Statement of Problem and Substantiation for Public Comment

The guide should not limit the use of NFPA 1620 to a single chapter, because it sends the message that the rest of the document is not important. The standard should, instead, simply refer them to the entire standard and allow the AHJ to determine what parts of the document are applicable. Should the 1620 TC adjust the chapter numbers or move information around, the reference to the chapter would no longer be applicable.

Related Item

- NA

Submitter Information Verification

Submitter Full Name:	Ryan Wyse
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City:	
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Zip:	
Submittal Date:	Thu Sep 06 15:51:52 EDT 2018
Committee:	FCO-AAA

Public Comment No. 82-NFPA 1700-2018 [Section No. 9.5.1]

9.5.1

The initial fire control strategy should be assessed through evaluation of overall conditions upon arrival. At this point the evaluation of conditions will determine whether you operate in the offensive or defensive strategy.

Statement of Problem and Substantiation for Public Comment

Terminology that is simplified with 2 terms will make the initial strategy a more uniformed concept. Offensive = Inside and Defensive = Outside.

Related Item

- Initial Incident Strategy

Submitter Information Verification

Submitter Full Name: Kyle Trumbly

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City:

State:

Zip:

Submittal Date: Fri Oct 26 11:18:17 EDT 2018

Committee: FCO-AAA

Public Comment No. 57-NFPA 1700-2018 [Section No. 9.6.3]

9.6.3

The use of a 360-degree survey of a structure fire is extremely important to the ~~assessment~~ location of victims, assessment of fire dynamics, ~~crew safety, and the life safety profile within the structure~~ extent of the fire, layout of the structure and direction of the first hose line .

Statement of Problem and Substantiation for Public Comment

The purpose of the 360 is to find where victims are located, a layout of the dwelling, best entry for the initial attack line and the extent of the fire. Victim survivability profiling is not a tactical consideration that should be used, we are here for them and if we write them off before even making an attempt at saving their lives then we should hang up out helmets. There are multiple reports of post flashover conditions and victims surviving inside a room with a closed door. If we start putting us before them then we are loosing the trust of the public.

Related Item

- Size up

Submitter Information Verification

Submitter Full Name: Andrew McIntyre
Organization:
Street Address:
City:
State:
Zip:
Submittal Date: Tue Oct 23 21:36:07 EDT 2018
Committee: FCO-AAA

Public Comment No. 104-NFPA 1700-2018 [Section No. 9.6.5]

9.6.5

Considerations should include the following:

(1) Number of stories A and C sides

(2) Verify basement type (finished or unfinished) and consider the following factors:

 (3) Type of windows

 (4) Likelihood of occupancy

(5) Presence of occupant escape systems

(6) Utilities, including the following:

 (7) Electrical drops

 (8) Fuel gas tanks

 (9) Natural gas service (location of shutoff)

(10) Pre-existing structural hazards

(11) Hazardous grade changes

(12) Roof type and construction

(13) Presence of fire protection features (hydrants, FDC, fire pump, etc.)

(14) As part of the 360 survey, the "A" side door or main exit/entrance should be opened/forced/controlled to check interior conditions. Life, fire, layout.

Statement of Problem and Substantiation for Public Comment

Improve 1700

Related Item

- fr

Submitter Information Verification

Submitter Full Name: Jeff Deetz
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Sun Nov 11 11:40:03 EST 2018
Committee: FCO-AAA

Public Comment No. 128-NFPA 1700-2018 [Section No. 9.7.4]

9.7.4 Assessing Flow Path.

The flow path is the route by which the flow of gases, including air and fire gases, move from high pressure to low pressure. Initial arriving companies need to evaluate all existing openings in the building to develop an accurate ventilation profile for the early stages of the incident prior to determination of strategy. Flow path assessment should include an evaluation of the neutral plane relative to the size and physical position of the opening in relation to the fire location. Another consideration should include the direction of flow within each opening. Opening of doors and windows for the purposes of fire fighter entry can affect the flow path and should be considered. Some things to consider when assess the flow are: unidirectional flow from opening, bi-directional Flow from opening, and position of the neutral plane.

Revise last sentence to: Some things to consider when assessing the flow path is the type of flow (i.e. unidirectional, bidirectional or dynamic) and the characteristics of the flow (i.e. stratification within the boundaries of a compartment or at an opening, the degree of turbulence and its direction, velocity, and shape).

Statement of Problem and Substantiation for Public Comment

The revised sentence reflects the intent of the assessment and is in keeping with the types and characteristics of flow utilized within our definition file.

Related Item

- Pls[1]

Submitter Information Verification

Submitter Full Name: Peter McBride
Organization: Ottawa Fire Service
Street Address:
City:
State:
Zip:
Submittal Date: Thu Nov 15 11:13:23 EST 2018
Committee: FCO-AAA

Public Comment No. 37-NFPA 1700-2018 [Section No. 9.8]

9.8 Risk Management Plan.

Every department should have a risk management plan in writing. Risk management plans are essentially a guide to balancing risk vs. reward. A typical risk management plan may include the following:

"We will take substantial risk, in a calculated manner, to save lives that are savable

We will take some risk, in a calculated manner, to save pet and property that are savable, and to stabililize the incident

We will take no risk when there is nothing to save"

The combined processes of understanding of risk management, incident priorities, pre-arrival factors, and on-scene factors will drive the decision of the initial declaration of strategy by the first arriving unit. The constant evaluation of the incident and all factors could possible change the strategy of the incident depending on the changes. *(See NFPA 1500.)*

Statement of Problem and Substantiation for Public Comment

Although departments may have varied views on risk vs. reward, It seems that if NFPA is intent on writing a standard for strategies and tactics it should also be a guide to risk vs. reward. This example I gave is taken from Phoenix FD and is a good baseline that many departments use. You can't chose a strategy unless you understand risk management and incident priorities.

Related Item

- pi

Submitter Information Verification

Submitter Full Name: Eric Maurouard

Organization: Olean Fire

Street Address:

City:

State:

Zip:

Submittal Date: Fri Sep 21 07:39:58 EDT 2018

Committee: FCO-AAA

Public Comment No. 34-NFPA 1700-2018 [Section No. 9.10.2]

9.10.2

The decision for implementing the offensive strategy is predicated on the ability of the IC to consider the ~~most effective and safe fire control positions for all fire suppression personnel. The following tasks should be performed:~~

- ~~Operate on the intake portion of existing and potential flow paths.~~
- ~~Operate on the upwind side of the structure.~~

~~Operate on the same level or below the fire~~ <u>amount of lives and property savable and the fire conditions in comparison to available resources .</u>

Statement of Problem and Substantiation for Public Comment

Offensive strategy should not hinge on the ability to operate in the intake side of the flow path, the upwind side, and on plane or below the fire. There are plenty of instances where offensive strategies should be employed when these are not possible.

Lets assume a basement fire with no visible flames through the basement windows. Add a handicapped person bed confined on the first floor. Are you saying that because we have to operate above the fire to make access down the interior stairs we shouldn't attempt to employ an offensive strategy to remove the victim and extinguish the fire?

Related Item

- pi

Submitter Information Verification

Submitter Full Name:	Eric Maurouard
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Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Thu Sep 20 15:14:09 EDT 2018
Committee:	FCO-AAA

Public Comment No. 35-NFPA 1700-2018 [Section No. 9.10.3]

9.10.3

The decision for implementing the defensive strategy is predicated on the incident's ~~hazards~~ scope outweighing the ~~ability to safely operate inside the structure.~~ abilities of the availble resources.

9.10.3.1

Life safety is the greatest consideration when determining the overall incident strategy, followed by incident stabilization and property conservation .

9.10.3.2

When the defensive strategy is selected, ~~all control operations should occur in positions outside of the exclusion zone.~~ firefighters should take percautions to limit their risk while attempting to contain the fire to the already affected areas.

Statement of Problem and Substantiation for Public Comment

9.10.3 - No. Strategy is not predicated on the hazard of operating interior. It should be predicated on savable lives and property, and the ability of available resources to cope with the incident.

9.10.3.1 - Strategy is based primarily on life safety but the other incident priorities are important also. Lets assume there is no life safety issues - does that mean we automatically go defensive at every fire? No.

9.10.3.2 - Defensive strategy does not necessarily mean that all personnel will be working in zero hazard zones. A good example is a defensive trench cut. Crews should weigh risk vs. reward and take every precaution to limit the amount of risk they are exposed to.

Related Item

- pi

Submitter Information Verification

Submitter Full Name: Eric Maurouard

Organization: Olean Fire

Street Address:

City:

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Submittal Date: Thu Sep 20 15:24:08 EDT 2018

Committee: FCO-AAA

Public Comment No. 38-NFPA 1700-2018 [New Section after 9.10.3.2]

9.11 Strategy implementation

9.11.1 The incident commander should make the strategy known via verbal or radio communications through the chain of command so that all on-scene personnel are aware.

9.11.2 Whenever there is a change of strategy, the incident commander should make the new strategy known via verbal or radio communications through the chain of command so that all on-scene personnel are aware.

9.11.3 Whenever a change of strategy involves all personnel being withdrawn from interior locations, a Personnel Accountabiliy Report PAR should be conducted.

Statement of Problem and Substantiation for Public Comment

Letting everyone on scene know the strategy seems like a pretty common practice so that everyone else may also effectively and correctly use risk vs. reward.

Related Item

- pi

Submitter Information Verification

Submitter Full Name: Eric Maurouard
Organization: Olean Fire
Street Address:
City:
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Zip:
Submittal Date: Fri Sep 21 07:50:26 EDT 2018
Committee: FCO-AAA

Public Comment No. 105-NFPA 1700-2018 [Section No. 10.4.1]

10.4.1

The primary mission on the fireground is life safety; therefore, attack, along with search, and ventilation/nonventilation become primary tactical objectives. How, where, and with how many fire fighters each department operates on the fireground should be based on an ongoing (exterior and interior) size-up. ~~Since the fireground is not black and white, there is no single tactic that is ideal for all fires. The goal of fireground operations is to make sure that all of our actions are coordinated~~ The rescue/fire control-extension/exposure problem is solved in the majority of cases by fast, strong, well-placed water application that puts water on the fire as quickly and as safely as possible. The IC should coordinate all activities on the fireground towards fire control .

Statement of Problem and Substantiation for Public Comment

The non-coordination of a coordinated attack has led to several FF maydays and LODDs. The rescue/fire control-extension/exposure problem is solved in the majority of cases by fast, strong, well-placed water application that puts water on the fire as quickly and as safely as possible. A practice that has become lost in the fire service with other fireground activities.

Related Item

• Primary Mission • Coordinating Fireground Activities

Submitter Information Verification

Submitter Full Name:	Mark Smith
Organization:	Vandenberg Fire Department
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Mon Nov 12 15:08:52 EST 2018
Committee:	FCO-AAA

Public Comment No. 129-NFPA 1700-2018 [Section No. 10.4.1]

10.4.1

The primary mission on the fireground is life safety; therefore, attack, along with search, and ventilation/nonventilation become primary tactical objectives. How, where, and with how many fire fighters each department operates on the fireground should be based on an ongoing (exterior and interior) size-up. Since the fireground is not black and white, there is no single tactic that is ideal for all fires. The goal of fireground operations is to make sure that all of our actions are coordinated.

Water on the fire (fire control) should be the primary tactical priority. Once the fire is under control, ventilation should be utilized to assist with search and rescue.   Utilizing ventilation to early can put firefighters at risk due to flow paths created from vertical and horizontal ventilation.

Statement of Problem and Substantiation for Public Comment

The non-coordination of a coordinated attack has led to several FF maydays and LODDs. These terms should be eliminated.

Related Item

• coordinated attack

Submitter Information Verification

Submitter Full Name:	Sean Glaser
Organization:	DOD Vandenberg AFB Fire Dept
Affiliation:	Assistant Chief of Operations Vandenberg Fire Dept
Street Address:	
City:	
State:	
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Submittal Date:	Thu Nov 15 19:54:16 EST 2018
Committee:	FCO-AAA

Public Comment No. 72-NFPA 1700-2018 [Section No. 10.4.1]

10.4.1

The primary mission on the fireground is life safety; therefore, ~~attack~~ fire control , along with search, and ventilation/nonventilation become primary tactical objectives. How, where, and with how many fire fighters each department operates on the fireground should be based on an ongoing (exterior and interior) size-up. Since the fireground is not black and white, there is no single tactic that is ideal for all fires. The goal of fireground operations is to make sure that all of our actions are coordinated.

Statement of Problem and Substantiation for Public Comment

Current language throughout this chapter uses “fire attack”, which has been changed to “fire control” in the remainder of the document. Update throughout for consistent terminology.

Related Item

- FR100

Submitter Information Verification

Submitter Full Name: Gavin Horn

Organization: University of Illinois Fire Service Institute

Street Address:

City:

State:

Zip:

Submittal Date: Wed Oct 24 11:57:59 EDT 2018

Committee: FCO-AAA

Public Comment No. 87-NFPA 1700-2018 [Section No. 10.4.1]

10.4.1

The primary mission on the fireground is life safety; therefore, attack, along with search, and ventilation/nonventilation become primary tactical objectives. How, where, and with how many fire fighters each department operates on the fireground should be based on an ongoing (exterior and interior) size-up. Since the fireground is not black and white, there is no single tactic that is ideal for all fires._ The ~~goal of fireground operations is to make sure that all of our actions are coordinated.~~ non-coordination of a "coordinated" attack has directly attributed to FF maydays and LODDS. When something is on fire, the IC should coordinate all activities towards fire control. In most cases, the rescue, fire extension, and exposure problems of an incident are solved by fast, strong, well-placed water application that puts water on the fire as quickly and safety as possible. The fastest water on the fire almost always results in making the rest of the incident priorities easier and safer for responders and victims alike.

Statement of Problem and Substantiation for Public Comment

The problem is that the non-coordination or the poorly-timed coordination of a coordinated fire attack can and has put firefighters and civilians at increased risk. Removing the term "coordinated attack" would help eliminate the confusion and misconceptions caused by the term. When a building is on fire, the IC should coordinate all activities towards fire control to help stabilize the incident.

Related Item

- Coordinated Attack

Submitter Information Verification

Submitter Full Name: Daniel Bramble
Organization: Payson Fire Department
Street Address:
City:
State:
Zip:
Submittal Date: Sat Oct 27 10:32:49 EDT 2018
Committee: FCO-AAA

Public Comment No. 90-NFPA 1700-2018 [Section No. 10.4.1]

10.4.1

The primary mission on the fireground is life safety; therefore, attack, along with search, and ventilation/nonventilation become primary tactical objectives. How, where, and with how many fire fighters each department operates on the fireground should be based on an ongoing (exterior and interior) size-up. Since the fireground is not black and white, there is no single tactic that is ideal for all fires ~~. The goal of fireground operations is to make sure that all of our actions are coordinated~~ but it should be understood that when fighting fires in smaller structures (residences especially) all efforts should be focused on rapid extinguishment where possible as this will improve interior conditions for all involved. Rescue should always remain flexible in priority and care should be taken to not try to coordinate too many tactics at once unless they are absolutely necessary prior to extinguishment .

Statement of Problem and Substantiation for Public Comment

It has been my experience that the more "coordinating" we try to accomplish the less we actually achieve. With the recently-proven advantages of transitional attacks via NIST and other research, improving interior conditions as quickly as possible is preferable over trying to remove a victim in an atmosphere that is certainly untenable. The size of the structure, location of the fire and percentage involved are critical size-up factors in determining what sequential priority search/rescue should be given.

Related Item

- Coordinating tactics

Submitter Information Verification

Submitter Full Name: Jason Kofoed
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City:
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Submittal Date: Mon Oct 29 18:50:58 EDT 2018
Committee: FCO-AAA

Public Comment No. 73-NFPA 1700-2018 [Section No. 10.4.2]

10.4.2

On the fireground, coordination means that all of the crews operating on the fireground are working together. It means that timing is precise, movements are well choreographed, and communications are clear and concise. Specifically, fire attack, search ~~(~~ and ~~obviously~~ rescue~~)~~ , and ventilation/nonventilation crews should all operate as one. Coordinated fireground operations enhance life safety, incident stabilization, and property conservation.

Statement of Problem and Substantiation for Public Comment

Remove unnecessary language

Related Item

- FR100

Submitter Information Verification

Submitter Full Name:	Gavin Horn
Organization:	University of Illinois Fire Service Institute
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Wed Oct 24 12:00:38 EDT 2018
Committee:	FCO-AAA

Public Comment No. 76-NFPA 1700-2018 [Section No. 10.4.2]

10.4.2

On the fireground, coordination means that all of the crews operating on the fireground are working together. It means that timing is precise, movements are well choreographed, and communications are clear and concise. Specifically, fire attack, search (and obviously rescue), and ventilation/nonventilation crews should all operate as one. Coordinated fireground operations enhance life safety, incident stabilization, and property conservation.

Currently, the terms "coordinated ventilation" or "coordinated attack" are not include in Chapter 3 (in any edition). The non-coordination of a coordinated attack has lead to several FF maydays and LODDs. I believe theses terms should not be used in the document. When something is burning (on fire) the IC should coordinate all activities towards fire control. The rescue/fire control-extension/exposure problem is solved in the majority of cases by fast, strong, well-placed water application that puts water on the fire as quickly and as safely as possible.

Statement of Problem and Substantiation for Public Comment

The document "implies" that tactical activities have to be coordinated in order to impliment water on the fire. No matter how many people show up on the scene, the main activity that should be performed is water on the fire until fire control is achieved. Again, "coordination" implies doing a lot of things at once. These activities slow down fire extinguishment, they distract the IC, and cause FF injuries. Unless people are hanging out of windows or you have credible info that somebody is trapped in the fire building, the only thing that should be coordinated is an overwhelming force of water into the fire compartment.

Related Item

- Coordinated Attack

Submitter Information Verification

Submitter Full Name: John Brunacini
Organization: Blue Card
Affiliation: Vice President
Street Address:
City:
State:
Zip:

Submittal Date: Wed Oct 24 16:56:04 EDT 2018
Committee: FCO-AAA

Public Comment No. 106-NFPA 1700-2018 [Section No. 10.4.3]

10.4.3

Conditions, staffing, and resources should drive fireground tactics and tasks. ~~While the majority of this chapter focuses on fire attack and ventilation (water and air), that is not because search and rescue is being minimized, it is only because this document is driven by empirical data, and the fire service has yet to truly dissect the tactic and tasks of search and rescue. Search and rescue is, and always will be, of utmost importance to the fire service and to unprotected occupants. Although we don't yet have empirical data on search, the fire service does have data points on occupant survivability. We now know that, apart from fire department operations, three things impact the survivability of a given space in the structure: the proximity to the fire, the elevation in the space, and whether or not the room/volume is isolated from the fire~~ Firefighters conducting search and rescue operations should not open closed doors that are connected to an uncontrolled fire (working ahead of water) until the fire is controlled and the space has been ventilated. 60 seconds after opening, the space becomes one (temperatures and O2 levels) with the fire compartment .

Statement of Problem and Substantiation for Public Comment

We shouldn't show up and open any doors exposed to the fire compartment until the fire is controlled and the space has been ventilated. UL research clearly indicates that less than 60 seconds after opening, the space becomes one (temperatures and O2 levels) with the fire compartment.

Related Item

- Search and Rescue

Submitter Information Verification

Submitter Full Name: Mark Smith
Organization: Vandenberg Fire Department
Street Address:
City:
State:
Zip:
Submittal Date: Mon Nov 12 15:58:28 EST 2018
Committee: FCO-AAA

Public Comment No. 115-NFPA 1700-2018 [Section No. 10.4.3]

10.4.3

Conditions, staffing, and resources should drive fireground tactics and tasks. While the majority of this chapter focuses on fire attack and ventilation (water and air), that is not because search and rescue is being minimized, it is only because this document is driven by empirical data, and the fire service has yet to truly dissect the tactic and tasks of search and rescue. Search and rescue is, and always will be, of utmost importance to the fire service and to unprotected occupants. Although we don't yet have empirical data on search, the fire service does have data points on occupant survivability. We now know that, apart from fire department operations, three things impact the survivability of a given space in the structure: the proximity to the fire, the elevation in the space, and whether or not the room/volume is isolated from the fire.

All sections in chater 10 relating to life safety (10.4.3 thru 10.4.6) do not present the concept of putting the fire out and changing the atmosphere to where it is survivalable for both the unprotected occupants and the firefighters. The term "either remove the occupant from the atmosphere or remove the atmoshpere from the occupant" is never used, along with "protect in place" (plenty of empirical data), secondary searches, etc. One of the main focuses of the tactical chapter should be how to manage life safety in conjunction with fire control and completing the other tactical priorities. In my last public input, I submitted Blue Card SOP's addressing the life safety tactical priority that addressed these issues (time did not permit their review).

Statement of Problem and Substantiation for Public Comment

The problem solved is not having firefighters open closed doors that are connected to an uncontrolled fire and working ahead of water application. Putting the fire out makes the compartment much more survivable.

Related Item

- Life safety

Submitter Information Verification

Submitter Full Name: John Brunacini

Organization: Blue Card

Affiliation: CEO

Street Address:

City:

State:

Zip:

Submittal Date: Wed Nov 14 13:37:43 EST 2018

Committee: FCO-AAA

Public Comment No. 133-NFPA 1700-2018 [Section No. 10.4.3]

10.4.3

Conditions, staffing, and resources should drive fireground tactics and tasks. While the majority of this chapter focuses on fire attack and ventilation (water and air), that is not because search and rescue is being minimized, it is only because this document is driven by empirical data, and the fire service has yet to truly dissect the tactic and tasks of search and rescue. Search and rescue is, and always will be, of utmost importance to the fire service and to unprotected occupants. Although we don't yet have empirical data on search, the fire service does have data points on occupant survivability. We now know that, apart from fire department operations, three things impact the survivability of a given space in the structure: the proximity to the fire, the elevation in the space, and whether or not the room/volume is isolated from the fire.

Firefighters should not open closed bedroom doors that are connected to an uncontrolled fire. UL has launched a great campaign to teach "close before you doze".

Firefighters shouldn't open any door exposed to the fire compartment until the fire is controlled and the space has been ventilated.

UL research shows rise in temperatures and decrease in oxegen levels. Keeping the doors closed until the fire is extinguished and ventilated will save lives.

..

Statement of Problem and Substantiation for Public Comment

Keeping bedroom doors closed will save lives.....close before you doze (UL Campaign)

Related Item

• Search and rescue

Submitter Information Verification

Submitter Full Name: Sean Glaser
Organization: DOD Vandenberg AFB Fire Dept
Affiliation: Assistant Chief of Operations Vandenberg Fire Dept
Street Address:
City:
State:
Zip:
Submittal Date: Thu Nov 15 20:26:59 EST 2018
Committee: FCO-AAA

Public Comment No. 74-NFPA 1700-2018 [Section No. 10.4.5]

10.4.5

~~Data states that removing~~ Removing any potential victim from the hazardous atmosphere as soon as possible after arrival is essential to minimizing ~~the fractional effective dose~~ their exposure , therefore increasing their chance of survival. As the ~~fractional effective~~ exposure dose is a function of the time ~~a victim~~ an individual is exposed to the hazard (i.e., thermal exposure and/or toxic gases), the earlier into an incident the ~~victim~~ occupant is removed from the atmosphere, the ~~less fractional effective~~ lower dose they are likley to have been exposed to and the greater their chances for survival. Finding them is the first step to removing them, and therefore searches need to start as soon as possible.

Statement of Problem and Substantiation for Public Comment

"Fractional effective dose" terminology is unnecessary for this audience and the same message can be conveyed without this language.

Related Item

- FR100

Submitter Information Verification

Submitter Full Name: Gavin Horn
Organization: University of Illinois Fire Service Institute
Street Address:
City:
State:
Zip:
Submittal Date: Wed Oct 24 12:02:36 EDT 2018
Committee: FCO-AAA

Public Comment No. 116-NFPA 1700-2018 [Section No. 10.4.6]

10.4.6

While this chapter doesn't focus on search, it is still essential to our operations and therefore is defined and mentioned here. Primary search is the fast, yet thorough, search for life and fire. At residential fires, fire attack and ventilation are there to support the primary search. ~~This doesn't mean that at every fire search should be the first task, but it means that it should still be an option.~~ A primary search needs to be conducted in all involved and exposed buildings that can be entered. ~~Depending on the fire size and location, building layout, the location of hose lines, and so forth, the search group (through the IC) will decide what search tactic(s) is/are most appropriate (e.g., oriented search, VEIS, split search).~~ As more research is conducted, and more data made available to the fire service, this chapter will continue to evolve to help improve efficiency and effectiveness on the fireground.

VEIS, search groups, and the other tactics mentioned should be eliminated unless there is a dedicated "life safety" tactical area where these activities are defined and presented on throughly.

Statement of Problem and Substantiation for Public Comment

The specific tactics of VEIS, search groups, and split crews should not be mentioned unless the document defines them, expands on their application, and lays out all of the tactical considerations that apply to each of the tactics mentioned.

Related Item

- Life Safety

Submitter Information Verification

Submitter Full Name: John Brunacini
Organization: Blue Card
Affiliation: CEO
Street Address:
City:
State:
Zip:
Submittal Date: Wed Nov 14 13:57:57 EST 2018
Committee: FCO-AAA

Public Comment No. 41-NFPA 1700-2018 [Section No. 10.4.8]

10.4.8

Tactical options provided herein only address those tactics associated with water and air. They are intended as templates for action(s) to be ordered and organized when positioning and moving fire fighters in response to life safety, fire control, or property conservation priorities.

Statement of Problem and Substantiation for Public Comment

This section is fine but it does solidify my global comment that the name of 1700 needs to be changed to reflect the very specific scope and intent of the document.

Related Item

- pi

Submitter Information Verification

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Submittal Date:	Fri Sep 21 09:02:17 EDT 2018
Committee:	FCO-AAA

Public Comment No. 43-NFPA 1700-2018 [Section No. 10.4.13]

10.4.13

More people are saved by a well-placed and advanced hose line than by any other tactic. Controlling the fire ~~removes the hazard from the victim, which is much more efficient than trying to locate and remove the victim from the hazard.~~ halts the progress of a fire hazard from the victim. In the absence of confirmed viable occupants, it is vital to find, control, attack, and extinguish the fire as quickly as possible.

Statement of Problem and Substantiation for Public Comment

If you extinguish the fire, you are not removing the hazard from our civilians (This is a false statement). How many victims are burned to death inside structure fires? The by product of burning material is what typically kills civilians. Then stating that is it much more efficient than locating and removing victims. Much is a very objective word. And stating that it is more efficient is a false statement, this is completely dependent on the circumstances. You still need to locate and rescue everyone inside and the clock is ticking, UL states "Time is as important if not MORE than dose".

Related Item

- 1st draft report

Submitter Information Verification

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Submittal Date:	Fri Sep 21 15:50:55 EDT 2018
Committee:	FCO-AAA

Public Comment No. 75-NFPA 1700-2018 [Section No. 10.4.14]

10.4.14

When high-priority tasks can be accomplished *simultaneously*, it is important to support and protect the rescue or search operations using hose line(s) and flow path management. Ignoring the fire during search and/or rescue operations is a recipe for disaster. If the fire is extinguished early enough, there will be less smoke, heat, flame, and potential for rapid fire development and its associated dangers. Regardless of the assigned priorities of on-scene crews, a fire attack crew should ~~never ignore a victim~~ not overlook the needs of a trapped occupant , and a rescue or search crew should ~~never ignore a~~ not disregard the risks presented by active fire.

Statement of Problem and Substantiation for Public Comment

The word "never" is utilized. While the message being conveyed makes sense, is this definitive language appropriate for a guide?

Related Item

- FR100

Submitter Information Verification

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Submittal Date:	Wed Oct 24 12:10:22 EDT 2018
Committee:	FCO-AAA

Public Comment No. 51-NFPA 1700-2018 [Section No. 10.5.2.1]

10.5.2.1 Tactical Objective.

The main objective is to control fire extension and ~~limit fire growth to the building of origin~~ extinguish the fire .

Statement of Problem and Substantiation for Public Comment

The original wording does not reflect the end goal in fire suppression. "Limiting growth or extension" . In fact the goal is confine and extinguish.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 53-NFPA 1700-2018 [Section No. 3.3.131]	

Related Item

-

Submitter Information Verification

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Submittal Date:	Wed Sep 26 01:17:37 EDT 2018
Committee:	FCO-AAA

Public Comment No. 117-NFPA 1700-2018 [Section No. 10.5.3]

10.5.3 ~~Exterior Control — Transitional.~~ Transitiona Attack

10.5.3.1 Tactical Objective.

The objective is to improve occupant tenability and interior conditions for fire attack.

10.5.3.2 How It Works.

The following are examples of successful outcomes of exterior control-transitional fire control:

(1) Compartment linings and burning fuel surfaces are cooled, interfering with pyrolysis, which halts flaming combustion and in turn reduces the heat release rate.

(2) Reducing surface temperature of unignited fuels stops pyrolysis.

(3) The flame is displaced from the surface of burning fuels.

(4) Steam production absorbs energy from the environment to cool smoke.

10.5.3.3 Tactical Considerations.

The following are tactical considerations:

(1) Coordinated to support other fire operations (e.g., fire attack/rescue)

(2) Performed from an exterior position

(3) Optimal through a ventilation opening to the fire room

(4) Flow path not disrupted

(5) Flow rate appropriate with heat release rate and area of involvement; balanced to avoid excessive water damage

(6) Rapid interior attack following/concurrent with exterior control crucial to limit regrowth and maintain tenability

(7) Limited on-scene resources, large fire volume, delayed entry time/access for direct fire attack may require multiple or longer applications; more time equals more water

10.5.3.4 Preferred Technique.

The preferred technique is a *stationary* straight or solid stream hand line through the bottom third of an opening, at a steep angle, deflected off the ceiling in the fire room, with care taken to not disrupt the flow path.

10.5.3.5 Alternative Technique.

The following are alternative techniques:

(1) Master stream devices/appliances

(2) Water application to eaves for attic attack

(3) Floor below nozzle or rotary nozzle from above for high-rise structures

10.5.3.6 Safety Considerations.

The following are safety considerations:

(1) Improper nozzle application may disrupt flow path and can injure or kill occupants and/or interior fire fighters.

(2) Change of flow path may also result in rapid fire growth to other uninvolved areas.

Statement of Problem and Substantiation for Public Comment

The committee previously voted on, and accepted the term "Transitional Attack" to describe this tactic. Funny how PM's "exterior" ended up in the final draft. If it's up for debate again, I vote to call it a "quick hit".

Related Item

• Transitional Attack

Submitter Information Verification

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Submittal Date:	Wed Nov 14 14:06:36 EST 2018
Committee:	FCO-AAA

Public Comment No. 45-NFPA 1700-2018 [Section No. 10.5.3]

~~**10.5.3** Exterior Control — Transitional.~~

~~**10.5.3.1** Tactical Objective.~~

~~The objective is to improve occupant tenability and interior conditions for fire attack.~~

~~**10.5.3.2** How It Works.~~

~~The following are examples of successful outcomes of exterior control-transitional fire control:~~

(1) ~~Compartment linings and burning fuel surfaces are cooled, interfering with pyrolysis, which halts flaming combustion and in turn reduces the heat release rate.~~

(2) ~~Reducing surface temperature of unignited fuels stops pyrolysis.~~

(3) ~~The flame is displaced from the surface of burning fuels.~~

(4) ~~Steam production absorbs energy from the environment to cool smoke.~~

~~**10.5.3.3** Tactical Considerations.~~

~~The following are tactical considerations:~~

(1) ~~Coordinated to support other fire operations (e.g., fire attack/rescue)~~

(2) ~~Performed from an exterior position~~

(3) ~~Optimal through a ventilation opening to the fire room~~

(4) ~~Flow path not disrupted~~

(5) ~~Flow rate appropriate with heat release rate and area of involvement; balanced to avoid excessive water damage~~

(6) ~~Rapid interior attack following/concurrent with exterior control crucial to limit regrowth and maintain tenability~~

(7) ~~Limited on-scene resources, large fire volume, delayed entry time/access for direct fire attack may require multiple or longer applications; more time equals more water~~

~~**10.5.3.4** Preferred Technique.~~

~~The preferred technique is a *stationary* straight or solid stream hand line through the bottom third of an opening, at a steep angle, deflected off the ceiling in the fire room, with care taken to not disrupt the flow path.~~

~~**10.5.3.5** Alternative Technique.~~

~~The following are alternative techniques:~~

(1) ~~Master stream devices/appliances~~

(2) ~~Water application to eaves for attic attack~~

(3) ~~Floor below nozzle or rotary nozzle from above for high-rise structures~~

~~**10.5.3.6** Safety Considerations.~~

~~The following are safety considerations:~~

(1) ~~Improper nozzle application may disrupt flow path and can injure or kill occupants and/or interior fire fighters.~~

(2) ~~Change of flow path may also result in rapid fire growth to other uninvolved areas.~~

Statement of Problem and Substantiation for Public Comment

Transitional Attack should not be used for this standard. Offensive or Defensive attacks should be the only terms discussed. If water must be flowed from the outside prior to making entry that should be considered an Offensive Attack because you are offensively progressing into the structure. Flowing the water from the outside into a structure is not the best technique and by being stationary you are making possible victims wait longer inside the IDLH atmosphere. Most victims are found by the primary attack line at fires. With them standing in a stationary position on the exterior of the structure they are wasting time that they could be progressing into the structure.

Related Item

- PI

Submitter Information Verification

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Submittal Date: Sat Sep 22 15:32:27 EDT 2018
Committee: FCO-AAA

Public Comment No. 52-NFPA 1700-2018 [Section No. 10.5.3]

10.5.3 Exterior Control — Transitional ~~.~~ attack

10.5.3.1 Tactical Objective.

The objective is to ~~improve occupant tenability and interior conditions for fire attack.~~ reset or knock back the fire to by time for an interior attack to get in place to complete extinguishment

10.5.3.2 How It Works.

The following are examples of successful outcomes of exterior control-transitional fire control:

(1) Compartment linings and burning fuel surfaces are cooled, interfering with pyrolysis, which halts flaming combustion and in turn reduces the heat release rate.

(2) Reducing surface temperature of unignited fuels stops pyrolysis.

(3) The flame is displaced from the surface of burning fuels.

(4) Steam production absorbs energy from the environment to cool smoke.

10.5.3.3 Tactical Considerations.

The following are tactical considerations:

(1) ~~Coordinated to support other fire operations (e.g., fire attack/rescue)~~

(2) Performed from an exterior position

(3) Optimal through a ventilation opening to the fire room

(4) Flow path not disrupted

(5) Flow rate appropriate with heat release rate and area of involvement; balanced to avoid excessive water damage

(6) Rapid interior attack following/concurrent with exterior control crucial to limit regrowth and maintain tenability

(7) Limited on-scene resources, large fire volume, delayed entry time/access for direct fire attack may require multiple or longer applications; more time equals more water

10.5.3.4 Preferred Technique.

The preferred technique is a *stationary* straight or solid stream hand line through the bottom third of an opening, at a steep angle, deflected off the ceiling in the fire room, with care taken to not disrupt the flow path.

10.5.3.5 Alternative Technique.

The following are alternative techniques:

(1) Master stream devices/appliances

(2) Water application to eaves for attic attack

(3) Floor below nozzle or rotary nozzle from above for high-rise structures

10.5.3.6 Safety Considerations.

The following are safety considerations:

(1) Improper nozzle application may disrupt flow path and can injure or kill occupants and/or interior fire fighters.

(2) Change of flow path may also result in rapid fire growth to other uninvolved areas.

Statement of Problem and Substantiation for Public Comment

There is no proof that transitional attack makes the interior more tenable or safer for trapped occupants. An exterior applied stream does not remove or slow the effects on victims breathing in the products of combustion. Smoke inhalation is what kills most occupants. The only sure fire action is rapid search and removal of the occupants from the environment.

Related Item

•

Submitter Information Verification

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Submittal Date:	Wed Sep 26 01:21:53 EDT 2018
Committee:	FCO-AAA

Public Comment No. 44-NFPA 1700-2018 [Section No. 10.5.3.4]

10.5.3.4 Preferred Technique.

The preferred technique is a *stationary* straight or solid stream hand line through the bottom third of an opening, at a steep angle, deflected off the ceiling in the fire room, with care taken to not disrupt the flow path.

Statement of Problem and Substantiation for Public Comment

No problems at all with this section. This section really needs to be worked in to the definition of transitional attack in the definitions chapter.

Related Item

- pi

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Submittal Date:	Sat Sep 22 09:03:23 EDT 2018
Committee:	FCO-AAA

Public Comment No. 114-NFPA 1700-2018 [New Section after 10.5.4]

The Surface Cooling and Smoke Cooling sections have the same Tactical Objective. These two sections and water application techniques are too intimately related to be broken up and will likely be very confusing to the reader. Sections should be combined with further explanation.

Statement of Problem and Substantiation for Public Comment

Problem: Too confusing for the reader. This section should be combined with Smoke Cooling with additional clarification.

Related Item

- NA

Submitter Information Verification

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Submittal Date: Wed Nov 14 02:16:02 EST 2018
Committee: FCO-AAA

Public Comment No. 99-NFPA 1700-2018 [Section No. 10.5.4.4]

10.5.4.4 Preferred Technique.

A ~~narrow fog or~~ straight stream "flow and move" technique is most effective for fires in one- and two- story family dwellings with a known fire location. If a "shut down and move" technique is utilized, reapplication of water every 10 to 15 seconds to control heat rebound of fire is necessary. The following are preferred techniques to consider:

(1) Utilize a reach and penetration of the stream to wet all surfaces forward of the operating position.

(2) Utilize a rapid, consistent O, T, Z, or N pattern with the hose stream to maximize air movement if the intent is to move smoke ahead of the operating position.

(3) Water application should quickly transition to an attack on the source fire.

(4) Apply reach and penetration of the stream to provide a standoff distance from the effects of fire.

Statement of Problem and Substantiation for Public Comment

Any fog pattern should not be used during interior fire attack operations, if there are no vent openings or vent openings are to small, there will be very adverse and negative effects, it is not worth the risk to use any pattern except straight for interior fire attack. Post fire knock down a broken stream or fog pattern may be useful for limited ventilation of the fire area.

Related Item

• fr

Submitter Information Verification

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Submittal Date: Sun Nov 11 10:55:05 EST 2018
Committee: FCO-AAA

Public Comment No. 98-NFPA 1700-2018 [Section No. 10.5.5]

10.5.5 – Interior Advancement — Smoke Cooling.

10.5.5.1 – Tactical Objective.

The primary tactical objective is to reduce and control smoke flammability, radiation, and HRR during interior advancement as a safer means of progression until effective water is applied to the source fire.

10.5.5.2 – How it Works.

The following are examples of successful outcomes of interior advancement — surface cooling fire control:

(1) Smoke is cooled through energy transfer to injected water droplets converting to steam within the treated smoke volume.

(2) Steam conversion reduces temperature causing contraction and dilution of smoke, resulting in a reduction flammability, radiation, and of the HRR.

10.5.5.3 – Tactical Considerations.

The following are not considered extinguishment techniques but a means of safer interior progression to the seat of the fire:

(1) Factors that affect these techniques include fire intensity, room size and configuration, location, and distance to the source fire.

(2) Effectiveness of water application technique and reapplication should be continuously assessed while advancing.

(3) Water must be applied to the source fire as soon as possible with consideration given to safe positioning.

(4) Ventilation must be limited until water is applied to the main body of the fire.

(5) Firefighters should avoid advancing under a superheated thermal layer without cooling as they advance.

10.5.5.4 – Preferred Technique.

The following are examples of preferred techniques of interior advancement — surface cooling fire control:

(1) Water mist or fog stream is directed into the smoke track in short or long pulses (with a sweeping motion).

(2) Nozzle, cone angle, pulse duration, and flow rate are important in achieving an optimal droplet size of 0.12 in. (0.3 mm); this, ensures effective cooling and contraction of the smoke and lessens the disruption of the thermal balance.

(3) Avoid contact with hot surfaces to prevent excess wet steam and disruption of thermal balance.

(4) Reapplication is necessary during advance.

(5) Combine the smoke cooling as soon as possible with a direct or indirect attack on the source fire.

10.5.5.5 – Alternative Technique.

An alternative technique to interior advancement — smoke cooling might be to provide careful application of a standard fog nozzle or fog- or mist-producing piercing applicator for a surface cooling.

~~**10.5.5.6** – Safety Considerations.~~

~~The following are safety considerations:~~

(1) ~~The door/vent control should be maintained with an unknown fire location.~~

(2) ~~Maintain door/vent control until effective water is on the source fire.~~

(3) ~~Continuous monitoring of cooling effectiveness against fire conditions with a thermal imager should be maintained while advancing to source fire.~~

(4) ~~PPE can be quickly compromised during interior advancement within a convective flow.~~

Statement of Problem and Substantiation for Public Comment

Smoke cooling or " penciling" " spritzing" has no place in the American fire service

Related Item

- fr

Submitter Information Verification

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Submittal Date: Sun Nov 11 10:51:37 EST 2018
Committee: FCO-AAA

Public Comment No. 113-NFPA 1700-2018 [New Section after 10.5.5.4]

Reconsider "preferred technique" method of application

There is insufficient evidence to suggest that the 0.3mm droplet fog method, as is commonly used outside of North America, is the preferred or more effective smoke cooling technique. This is only one method. Recent research from UL has shown that a straight stream pattern used to sweep the ceiling in various ways is also effective. These two techniques have not been sufficiently compared to say conclusively that one is better than the other. And in my personal experience, the fog method can in fact be ineffective and dangerous due to a much higher rate of user error while operating under stress, zero or low visibility, and in a unknown environment. Conversely, the straight stream method is considerably easier for the nozzle operator to perform, thus potentially more effective and safer. For these reason, the straight stream application method should be added to the "preferred technique" section with explanation.

Statement of Problem and Substantiation for Public Comment

Problem: Insufficient evidence exists to state a specific preferred technique. By adjusting this section to include the straight stream method readers would be aware that they have multiple options to perform this smoke cooling technique.

Related Item

- NA

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Submittal Date: Wed Nov 14 01:55:18 EST 2018

Committee: FCO-AAA

Public Comment No. 3-NFPA 1700-2018 [Section No. 10.5.5.4]

10.5.5.4 Preferred Technique.

The following are examples of preferred techniques of interior advancement — surface cooling fire control:

(1) Water mist or fog stream is directed into the smoke track ~~in short or~~ long pulses (with a sweeping motion).

(2) Nozzle, cone angle, pulse duration, and flow rate are important in achieving an optimal droplet size of 0.12 in. (0.3 mm); this, ensures effective cooling and contraction of the smoke and lessens the disruption of the thermal balance.

(3) Avoid contact with hot surfaces to prevent excess wet steam and disruption of thermal balance.

(4) Reapplication is necessary during advance.

(5) Combine the smoke cooling as soon as possible with a direct or indirect attack on the source fire.

Statement of Problem and Substantiation for Public Comment

Short bursts of water are good for a training scenario, in an uncontrolled environment more water is needed especially if advancing towards it is the plan. Short burst in an uncontrolled environment is dangerous and can lead to a false sense of safety.

Related Item

- Penciling

Submitter Information Verification

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Submittal Date: Sun Sep 16 12:39:57 EDT 2018
Committee: FCO-AAA

Public Comment No. 58-NFPA 1700-2018 [Section No. 10.5.5.4]

10.5.5.4 Preferred Technique.

The following are examples of preferred techniques of interior advancement — surface cooling fire control:

(1) ~~Water mist or fog stream is directed into the smoke track in short or long pulses (with a sweeping motion).~~

(2) ~~Nozzle, cone angle, pulse duration, and flow rate are important in achieving an optimal droplet size of 0.12 in. (0.3 mm); this, ensures effective cooling and contraction of the smoke and lessens the disruption of the thermal balance~~ <u>Flow a solid stream into the overhead area to cool gases and control the fire back into the room of origion .</u>

(3) Avoid contact with hot surfaces to prevent excess wet steam and disruption of thermal balance.

(4) Reapplication is necessary during advance.

(5) Combine the smoke cooling as soon as possible with a ~~direct or indirect~~ <u>combination or direct</u> attack on the source fire.

Statement of Problem and Substantiation for Public Comment

Penciling or doing pulses of water to the ceiling is an ineffective fire attack method and it will get firefighters injured or killed. This entire standard has "safety" needlessly plastered throughout it and this is an unsafe tactic. The fire needs to be hit with overwhelming force and teaching penciling is not that overwhelming force.

Related Item

• Fire Attack

Submitter Information Verification

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Submittal Date: Tue Oct 23 22:34:39 EDT 2018
Committee: FCO-AAA

Public Comment No. 118-NFPA 1700-2018 [Section No. 10.5.6]

10.5.6 Interior <u>.</u> Direct ~~Attack.~~ <u>water application</u>

10.5.6.1 Tactical Objective.

The primary tactical objective is fire control and extinguishment.

10.5.6.2 How It Works.

The following are examples of successful outcomes of interior direct attack fire control:

(1) Water cools burning fuel surfaces interfering with pyrolysis, which halts flaming combustion and in turn reduces the heat release rate.

(2) The flame is displaced from the surface of burning fuels.

(3) Reducing surface temperature of unignited fuels stops pyrolysis.

(4) Secondary steam production absorbs energy from the environment to cool smoke.

10.5.6.3 Tactical Considerations.

The following are tactical considerations:

(1) Direct attack should be conducted as soon as the fire seat is located and can be reached with a water stream.

(2) Direct water application should be performed from an interior or exterior position to the fire room.

(3) The flow rate should be appropriate with the heat release rate and area of involvement and balanced to avoid excessive steam generation and water damage.

(4) The ideal position is the air intake side of the flow path with flow path control.

(5) Optimal position, nozzle pattern, and technique should be evaluated to maximize or minimize air entrainment/movement based on ventilation conditions and flow path.

(6) Advance should be matched to interior conditions.

(7) Smoke or surface cooling prior to direct attack may be appropriate.

10.5.6.4 Preferred Technique.

The following are preferred techniques:

(1) Straight or solid stream, applied in an unbroken pattern directly to burning fuels, where compartment/room is unvented opposite the attack line

(2) O, T, Z, or N pattern applied from furthest distance if compartment/room has vent opposite attack line

10.5.6.5 Alternative Technique.

An indirect attack is an alternative technique. Switching to a water spray may improve coverage and reduce water damage.

10.5.6.6 Safety Considerations.

The following are safety considerations:

(1) Avoid position between the seat of the fire and the exhaust outlet.

(2) Apply reach and penetration of the stream to provide standoff distance from the effects of fire.

(3) Wind speed and direction are in relation to the intended flow path.

Statement of Problem and Substantiation for Public Comment

Direct water application better defines the term of "applying water directly onto the burning fuels". Nozzle to fuel.

Related Item

• Direct Water Application

Submitter Information Verification

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Submittal Date:	Wed Nov 14 14:11:47 EST 2018
Committee:	FCO-AAA

Public Comment No. 59-NFPA 1700-2018 [Section No. 10.5.6.5]

10.5.6.5 Alternative Technique.

An indirect attack is an alternative technique. ~~Switching to a water spray may improve coverage and reduce water damage.~~

Statement of Problem and Substantiation for Public Comment

Water damage should not be a primary concern for the team performing fire attack, it shouldn't even be talked about in a fire attack section. The purpose of fire attack is putting water on the fire in a sufficient volume to defeat the heat release rate of the fire. If an attack team is more worried about water damage than fire extinguishment then they may not put a sufficient amount of water on the fire which could lead to a multitude of fire events.

Related Item

- Fire attack

Submitter Information Verification

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Submittal Date: Tue Oct 23 22:47:36 EDT 2018
Committee: FCO-AAA

Public Comment No. 103-NFPA 1700-2018 [Section No. 10.5.7]

~~**10.5.7** – Interior Indirect Attack.~~

~~**10.5.7.1** – Tactical Objective.~~

~~The primary tactical objective is fire suppression to improve tenability for follow-up direct attack and overhaul.~~

~~**10.5.7.2** – How It Works.~~

~~Water is applied to compartment linings, burning fuel, and the smoke layer to produce the maximum volume of steam. Steam production reduces temperature, dilutes smoke, and displaces oxygen.~~

~~**10.5.7.3** – Tactical Considerations.~~

~~The following are tactical considerations:~~

(1) ~~Application is made from outside the fire compartment/room that remains under-ventilated.~~

(2) ~~Smoke or surface cooling may be appropriate to gain access to the fire room prior to indirect attack.~~

(3) ~~Indirect water application can be utilized for shielded fires.~~

(4) ~~The flow rate should be appropriate with heat release rate and area of involvement and balanced to avoid excessive water damage.~~

(5) ~~Advance should be matched to interior conditions.~~

(6) ~~This technique is not intended for use in occupied spaces.~~

~~**10.5.7.4** – Preferred Technique.~~

~~The following are preferred techniques for interior indirect attack fire control:~~

(1) ~~Water is applied from the exterior of the compartment/room utilizing a fog stream.~~

(2) ~~A narrow fog is applied to compartment linings, burning fuel, and the smoke layer to quickly produce the maximum volume of steam.~~

(3) ~~The compartment/room is isolated to ensure maximum effectiveness of steam production.~~

~~**10.5.7.5** – Alternative Technique.~~

~~The following are alternative techniques for interior indirect attack fire control:~~

(1) ~~Broken straight or solid stream~~

(2) ~~Rotary nozzle~~

(3) ~~Fog- or mist- producing piercing nozzle~~

(4) ~~Fire extinguisher~~

~~**10.5.7.6** – Safety Considerations.~~

~~The following are safety considerations:~~

(1) ~~Fog application from a position exposed to resultant outflow of heated smoke and steam can be dangerous.~~

(2) ~~Steam production may reduce tenability in adjoining spaces.~~

Statement of Problem and Substantiation for Public Comment

The use of any stream except for straight should not be encouraged or recognized as a interior stream application. The risk/benefit to the use of fog streams on the interior of buildings fires cannot be justified. The use of straight streams has little to no negative consequences for interior fire attack.

Related Item

- fr

Submitter Information Verification

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Submittal Date: Sun Nov 11 11:32:01 EST 2018
Committee: FCO-AAA

Public Comment No. 119-NFPA 1700-2018 [Section No. 10.5.7]

10.5.7 Interior Indirect ~~Attack~~ water application .

10.5.7.1 Tactical Objective.

The primary tactical objective is fire suppression to improve tenability for follow-up direct attack and overhaul.

10.5.7.2 How It Works.

Water is applied to compartment linings, burning fuel, and the smoke layer to produce the maximum volume of steam. Steam production reduces temperature, dilutes smoke, and displaces oxygen.

10.5.7.3 Tactical Considerations.

The following are tactical considerations:

(1) Application is made from outside the fire compartment/room that remains under-ventilated.

(2) Smoke or surface cooling may be appropriate to gain access to the fire room prior to indirect attack.

(3) Indirect water application can be utilized for shielded fires.

(4) The flow rate should be appropriate with heat release rate and area of involvement and balanced to avoid excessive water damage.

(5) Advance should be matched to interior conditions.

(6) This technique is not intended for use in occupied spaces.

10.5.7.4 Preferred Technique.

The following are preferred techniques for interior indirect attack fire control:

(1) Water is applied from the exterior of the compartment/room utilizing a fog stream.

(2) A narrow fog is applied to compartment linings, burning fuel, and the smoke layer to quickly produce the maximum volume of steam.

(3) The compartment/room is isolated to ensure maximum effectiveness of steam production.

10.5.7.5 Alternative Technique.

The following are alternative techniques for interior indirect attack fire control:

(1) Broken straight or solid stream

(2) Rotary nozzle

(3) Fog- or mist- producing piercing nozzle

(4) Fire extinguisher

10.5.7.6 Safety Considerations.

The following are safety considerations:

(1) Fog application from a position exposed to resultant outflow of heated smoke and steam can be dangerous.

(2) Steam production may reduce tenability in adjoining spaces.

Statement of Problem and Substantiation for Public Comment

Indirect water application better describes the term of "deflecting water off of a surface, where it directly lands on the burning fuels". Nozzle, surface, fuels.

Related Item

• Indirect water application

Submitter Information Verification

Submitter Full Name: John Brunacini
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Affiliation: CEO
Street Address:
City:
State:
Zip:
Submittal Date: Wed Nov 14 14:16:26 EST 2018
Committee: FCO-AAA

Public Comment No. 60-NFPA 1700-2018 [Section No. 10.5.7.6]

10.5.7.6 Safety Considerations.

The following are safety considerations:

(1) ~~Fog application~~ Stream application from a position exposed to resultant outflow of heated smoke and steam can be dangerous.

(2) Steam production may reduce tenability in adjoining spaces.

(3) Ensure there are no victims in the area or they may be steam burned

(4) Steam will injure a victim with an unprotected airway more than dry heat from the fire.

(5) Steam production should be a last resort style of fire attack.

Statement of Problem and Substantiation for Public Comment

Steaming a room is a very specific style of fire attack following Loyd Layman's book when there is a controlled room with no ventilation and no victims. This is not appropriate when you have an unknown compartment with unknown victims and unknown ventilation.

Related Item

• fire attack

Submitter Information Verification

Submitter Full Name: Andrew McIntyre
Organization:
Street Address:
City:
State:
Zip:
Submittal Date: Tue Oct 23 22:52:15 EDT 2018
Committee: FCO-AAA

Public Comment No. 107-NFPA 1700-2018 [Section No. 10.6.4]

Vertical Ventilation - roof top vertical ventilation operations should be removed from the document. This recommendation is based on the UL vertical ventilation study indicated that post fire control, the CFM coming from roof top ventilation is drastically reduced once the fire was controlled and Don Abbotts mayday study (Project Mayday - 2017) has examined over 3,000 reported maydays. The number 1 activity when a mayday occurs in the professional fire service is performing roof-top vertical ventilation (20% of the maydays reported).

10.6.4 Vertical Ventilation.

10.6.4.1 Tactical Objectives.

To improve interior tenability by releasing smoke and heat during fire attack and to support search, extinguishment, overhaul, defensive trenching operations, and post-fire ventilation.

10.6.4.2 How It Works.

The following are examples of successful outcomes of horizontal ventilation:

(1) Buoyant smoke is replaced by denser fresh air due to the gravity current and/or air pressure differentials.

(2) Buoyant smoke is exhausted from an opening located above the level of fire utilizing the stack effect, and denser fresh air is entrained via a horizontal inlet(s) due to the gravity current and/or air pressure differentials.

10.6.4.3 Tactical Considerations.

The following are tactical considerations for vertical ventilation:

(1) Survivability profile in the fire room/compartment.

(2) Inability to horizontally ventilate.

(3) Coordinated inlet and outlet openings concurrent with effective application of water.

(4) Smoke cooling prior to a direct or indirect attack may be appropriate.

(5) Purposeful management of the flow path considering wind, wind speed, and direction.

(6) Raising of interface layer height and visibility will be temporary if fire is not controlled.

(7) Thermal imaging to source fire and monitor changing conditions.

(8) Plan for exposure control.

(9) Delays due to staffing, assembly time, or equipment.

(10) A 4 ft x 4 ft hole is rarely sufficient for effective ventilation.

10.6.4.4 Preferred Technique.

The following are preferred techniques for vertical ventilation:

(1) Door control and limited inlet ventilation until vertical outlet is established.

(2) Inlet opening is on the windward side and outlet is above or close to the source fire.

(3) Establish outlet openings followed by inlet openings coordinated with fire attack.

10.6.4.5 Alternative Technique.

Alternative techniques for vertical ventilation should be considered to minimize risk.

10.6.4.6 Safety Considerations.

The following are safety considerations for vertical ventilation:

(1) Failure to coordinate ventilation with effective water application will increase heat release rate.

(2) Rapid fire growth should be anticipated if ventilation is increased absent the application of water for both planned and unplanned ventilation.

(3) Consider wind speed and direction.

(4) Working at heights increases risks for falls from or through a roof.

(5) Working position, means of egress, and structural performance must be continually assessed.

Statement of Problem and Substantiation for Public Comment

This recommendation is based on the UL vertical ventilation study indicated that post fire control, the CFM coming from roof top ventilation is drastically reduced once the fire was controlled and Don Abbotts mayday study (Project Mayday - 2017) has examined over 3,000 reported maydays. The number 1 activity when a mayday occurs in the professional fire service is performing roof-top vertical ventilation (20% of the maydays reported).

Related Item

• Vertical Ventilation

Submitter Information Verification

Submitter Full Name:	Mark Smith
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Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Mon Nov 12 16:19:01 EST 2018
Committee:	FCO-AAA

Public Comment No. 110-NFPA 1700-2018 [Section No. 10.6.4]

Vertical ventilation should be removed from the document all together. In repeated fire testing it has been shown to be the least effective form of ventilation, especially once the fire has been controlled. Other issues caused by vertical ventilation is how it rapidly accelerates the fire if it isn't coordinated with water on the fire. It also places firefighters in one of the most hazardous physical locations on the fire ground - directly above the fire. The other problem with devoting one of the initial arriving companies to vertical ventilation is it takes away from a critical task (like putting water on the fire) in the very beginning of the incident.

10.6.4 Vertical Ventilation.

10.6.4.1 Tactical Objectives.

To improve interior tenability by releasing smoke and heat during fire attack and to support search, extinguishment, overhaul, defensive trenching operations, and post-fire ventilation.

10.6.4.2 How It Works.

The following are examples of successful outcomes of horizontal ventilation:

(1) Buoyant smoke is replaced by denser fresh air due to the gravity current and/or air pressure differentials.

(2) Buoyant smoke is exhausted from an opening located above the level of fire utilizing the stack effect, and denser fresh air is entrained via a horizontal inlet(s) due to the gravity current and/or air pressure differentials.

10.6.4.3 Tactical Considerations.

The following are tactical considerations for vertical ventilation:

(1) Survivability profile in the fire room/compartment.

(2) Inability to horizontally ventilate.

(3) Coordinated inlet and outlet openings concurrent with effective application of water.

(4) Smoke cooling prior to a direct or indirect attack may be appropriate.

(5) Purposeful management of the flow path considering wind, wind speed, and direction.

(6) Raising of interface layer height and visibility will be temporary if fire is not controlled.

(7) Thermal imaging to source fire and monitor changing conditions.

(8) Plan for exposure control.

(9) Delays due to staffing, assembly time, or equipment.

(10) A 4 ft x 4 ft hole is rarely sufficient for effective ventilation.

10.6.4.4 Preferred Technique.

The following are preferred techniques for vertical ventilation:

(1) Door control and limited inlet ventilation until vertical outlet is established.

(2) Inlet opening is on the windward side and outlet is above or close to the source fire.

(3) Establish outlet openings followed by inlet openings coordinated with fire attack.

10.6.4.5 Alternative Technique.

Alternative techniques for vertical ventilation should be considered to minimize risk.

10.6.4.6 Safety Considerations.

The following are safety considerations for vertical ventilation:

(1) Failure to coordinate ventilation with effective water application will increase heat release rate.

(2) Rapid fire growth should be anticipated if ventilation is increased absent the application of water for both planned and unplanned ventilation.

(3) Consider wind speed and direction.

(4) Working at heights increases risks for falls from or through a roof.

(5) Working position, means of egress, and structural performance must be continually assessed.

Statement of Problem and Substantiation for Public Comment

Vertical ventilation should be removed from the document. It is the least effective form of ventilation and also unnecessarily risks firefighters safety and survival.

Related Item

•

Submitter Information Verification

Submitter Full Name:	nick bruno
Organization:	[Not Specified]
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Tue Nov 13 17:28:29 EST 2018
Committee:	FCO-AAA

Public Comment No. 111-NFPA 1700-2018 [Section No. 10.6.4]

10.6.4 Vertical Ventilation.

10.6.4.1 Tactical Objectives.

To improve interior tenability by releasing smoke and heat during fire attack and to support search, extinguishment, overhaul, defensive trenching operations, and post-fire ventilation.

10.6.4.2 How It Works.

The following are examples of successful outcomes of horizontal ventilation:

(1) Buoyant smoke is replaced by denser fresh air due to the gravity current and/or air pressure differentials.

(2) Buoyant smoke is exhausted from an opening located above the level of fire utilizing the stack effect, and denser fresh air is entrained via a horizontal inlet(s) due to the gravity current and/or air pressure differentials.

10.6.4.3 Tactical Considerations.

The following are tactical considerations for vertical ventilation:

(1) Survivability profile in the fire room/compartment.

(2) Inability to horizontally ventilate.

(3) Coordinated inlet and outlet openings concurrent with effective application of water.

(4) Smoke cooling prior to a direct or indirect attack may be appropriate.

(5) Purposeful management of the flow path considering wind, wind speed, and direction.

(6) Raising of interface layer height and visibility will be temporary if fire is not controlled.

(7) Thermal imaging to source fire and monitor changing conditions.

(8) Plan for exposure control.

(9) Delays due to staffing, assembly time, or equipment.

(10) A 4 ft x 4 ft hole is rarely sufficient for effective ventilation.

10.6.4.4 Preferred Technique.

The following are preferred techniques for vertical ventilation:

(1) Door control and limited inlet ventilation until vertical outlet is established.

(2) Inlet opening is on the windward side and outlet is above or close to the source fire.

(3) Establish outlet openings followed by inlet openings coordinated with fire attack.

10.6.4.5 Alternative Technique.

Alternative techniques for vertical ventilation should be considered to minimize risk.

10.6.4.6 Safety Considerations.

The following are safety considerations for vertical ventilation:

(1) Failure to coordinate ventilation with effective water application will increase heat release rate.

(2) Rapid fire growth should be anticipated if ventilation is increased absent the application of water for both planned and unplanned ventilation.

(3) Consider wind speed and direction.

(4) Working at heights increases risks for falls from or through a roof.

(5) Working position, means of egress, and structural performance must be continually assessed.

<u>Vertical ventilation should be removed fromt the document. The UL Vertical Ventilation study indicates that once the fire is controlled, the CFM released from a roof top opening is greatly reduced. The action must be highly coordinated and occur with 60 seconds of fire control. The risk versus benefit is not in balance.</u>

Statement of Problem and Substantiation for Public Comment

There are documented cases of maydays from roof top vertical ventilation, evidence from Don Abbott's mayday study, Project Mayday 2017. The benefit is greatly reduced once fire control is achieved. The risk versus gain is not in balance.

Related Item

- Vertical Ventilation

Submitter Information Verification

Submitter Full Name:	Pat Dale
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City:	
State:	
Zip:	
Submittal Date:	Tue Nov 13 22:45:13 EST 2018
Committee:	FCO-AAA

Public Comment No. 120-NFPA 1700-2018 [Section No. 10.6.4]

~~**10.6.4** – Vertical Ventilation.~~

~~**10.6.4.1** – Tactical Objectives.~~

~~To improve interior tenability by releasing smoke and heat during fire attack and to support search, extinguishment, overhaul, defensive trenching operations, and post-fire ventilation.~~

~~**10.6.4.2** – How It Works.~~

~~The following are examples of successful outcomes of horizontal ventilation:~~

(1) ~~Buoyant smoke is replaced by denser fresh air due to the gravity current and/or air pressure differentials.~~

(2) ~~Buoyant smoke is exhausted from an opening located above the level of fire utilizing the stack effect, and denser fresh air is entrained via a horizontal inlet(s) due to the gravity current and/or air pressure differentials.~~

~~**10.6.4.3** – Tactical Considerations.~~

~~The following are tactical considerations for vertical ventilation:~~

(1) ~~Survivability profile in the fire room/compartment.~~

(2) ~~Inability to horizontally ventilate.~~

(3) ~~Coordinated inlet and outlet openings concurrent with effective application of water.~~

(4) ~~Smoke cooling prior to a direct or indirect attack may be appropriate.~~

(5) ~~Purposeful management of the flow path considering wind, wind speed, and direction.~~

(6) ~~Raising of interface layer height and visibility will be temporary if fire is not controlled.~~

(7) ~~Thermal imaging to source fire and monitor changing conditions.~~

(8) ~~Plan for exposure control.~~

(9) ~~Delays due to staffing, assembly time, or equipment.~~

(10) ~~A 4 ft x 4 ft hole is rarely sufficient for effective ventilation.~~

~~**10.6.4.4** – Preferred Technique.~~

~~The following are preferred techniques for vertical ventilation:~~

(1) ~~Door control and limited inlet ventilation until vertical outlet is established.~~

(2) ~~Inlet opening is on the windward side and outlet is above or close to the source fire.~~

(3) ~~Establish outlet openings followed by inlet openings coordinated with fire attack.~~

~~**10.6.4.5** – Alternative Technique.~~

~~Alternative techniques for vertical ventilation should be considered to minimize risk.~~

~~**10.6.4.6** – Safety Considerations.~~

~~The following are safety considerations for vertical ventilation:~~

(1) ~~Failure to coordinate ventilation with effective water application will increase heat release rate.~~

(2) ~~Rapid fire growth should be anticipated if ventilation is increased absent the application of water for both planned and unplanned ventilation.~~

(3) ~~Consider wind speed and direction.~~

(4) ~~Working at heights increases risks for falls from or through a roof.~~

(5) ~~Working position, means of egress, and structural performance must be continually assessed.~~

Statement of Problem and Substantiation for Public Comment

Vertical ventilation (VV) operations should be removed from the document. This recommendation is based on several things, along with the UL 2013 VV study where VV prior to water application did the following several things.
-Creates the number 1 FF mayday
-Increases interior pressure
-Increases temperatures
-Increase HHRs
-Decreases O2 levels
-Decreases the occupant survivability profile
-Decreases our PPE ability to protect the FF

Related Item

- Remove Vertical Ventilation

Submitter Information Verification

Submitter Full Name: John Brunacini
Organization: Blue Card
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Street Address:
City:
State:
Zip:

Submittal Date: Wed Nov 14 14:23:55 EST 2018
Committee: FCO-AAA

Public Comment No. 132-NFPA 1700-2018 [Section No. 10.6.4]

10.6.4 Vertical Ventilation.

10.6.4.1 Tactical Objectives.

To improve interior tenability by releasing smoke and heat during fire attack and to support search, extinguishment, overhaul, defensive trenching operations, and post-fire ventilation.

10.6.4.2 How It Works.

The following are examples of successful outcomes of horizontal ventilation:

(1) Buoyant smoke is replaced by denser fresh air due to the gravity current and/or air pressure differentials.

(2) Buoyant smoke is exhausted from an opening located above the level of fire utilizing the stack effect, and denser fresh air is entrained via a horizontal inlet(s) due to the gravity current and/or air pressure differentials.

10.6.4.3 Tactical Considerations.

The following are tactical considerations for vertical ventilation:

(1) Survivability profile in the fire room/compartment.

(2) Inability to horizontally ventilate.

(3) Coordinated inlet and outlet openings concurrent with effective application of water.

(4) Smoke cooling prior to a direct or indirect attack may be appropriate.

(5) Purposeful management of the flow path considering wind, wind speed, and direction.

(6) Raising of interface layer height and visibility will be temporary if fire is not controlled.

(7) Thermal imaging to source fire and monitor changing conditions.

(8) Plan for exposure control.

(9) Delays due to staffing, assembly time, or equipment.

(10) A 4 ft x 4 ft hole is rarely sufficient for effective ventilation.

10.6.4.4 Preferred Technique.

The following are preferred techniques for vertical ventilation:

(1) Door control and limited inlet ventilation until vertical outlet is established.

(2) Inlet opening is on the windward side and outlet is above or close to the source fire.

(3) Establish outlet openings followed by inlet openings coordinated with fire attack.

10.6.4.5 Alternative Technique.

Alternative techniques for vertical ventilation should be considered to minimize risk.

10.6.4.6 Safety Considerations.

The following are safety considerations for vertical ventilation:

(1) Failure to coordinate ventilation with effective water application will increase heat release rate.

(2) Rapid fire growth should be anticipated if ventilation is increased absent the application of water for both planned and unplanned ventilation.

(3) Consider wind speed and direction.

(4) Working at heights increases risks for falls from or through a roof.

(5) Working position, means of egress, and structural performance must be continually assessed.

Roof top vertical ventilation operations should be removed from this section. Don Abbotts (Project Mayday - 2017) has studied thousands of maydays. The number 1 activity when a mayday occurs in the fire service is performing roof-top vertical ventilation (20% of the maydays reported).

Statement of Problem and Substantiation for Public Comment

Remove vertical ventilation due to the leading cause of firefighter maydays.

Related Item

- Vertical Ventilation

Submitter Information Verification

Submitter Full Name:	Sean Glaser
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Submittal Date:	Thu Nov 15 20:13:14 EST 2018
Committee:	FCO-AAA

Public Comment No. 88-NFPA 1700-2018 [Section No. 10.6.4]

10.6.4 – Vertical Ventilation.

10.6.4.1 – Tactical Objectives.

To improve interior tenability by releasing smoke and heat during fire attack and to support search, extinguishment, overhaul, defensive trenching operations, and post-fire ventilation.

10.6.4.2 – How It Works.

The following are examples of successful outcomes of horizontal ventilation:

(1) Buoyant smoke is replaced by denser fresh air due to the gravity current and/or air pressure differentials.

(2) Buoyant smoke is exhausted from an opening located above the level of fire utilizing the stack effect, and denser fresh air is entrained via a horizontal inlet(s) due to the gravity current and/or air pressure differentials.

10.6.4.3 – Tactical Considerations.

The following are tactical considerations for vertical ventilation:

(1) Survivability profile in the fire room/compartment.

(2) Inability to horizontally ventilate.

(3) Coordinated inlet and outlet openings concurrent with effective application of water.

(4) Smoke cooling prior to a direct or indirect attack may be appropriate.

(5) Purposeful management of the flow path considering wind, wind speed, and direction.

(6) Raising of interface layer height and visibility will be temporary if fire is not controlled.

(7) Thermal imaging to source fire and monitor changing conditions.

(8) Plan for exposure control.

(9) Delays due to staffing, assembly time, or equipment.

(10) A 4 ft x 4 ft hole is rarely sufficient for effective ventilation.

10.6.4.4 – Preferred Technique.

The following are preferred techniques for vertical ventilation:

(1) Door control and limited inlet ventilation until vertical outlet is established.

(2) Inlet opening is on the windward side and outlet is above or close to the source fire.

(3) Establish outlet openings followed by inlet openings coordinated with fire attack.

10.6.4.5 – Alternative Technique.

Alternative techniques for vertical ventilation should be considered to minimize risk.

~~**10.6.4.6** – Safety Considerations.~~

~~The following are safety considerations for vertical ventilation:~~

(1) ~~Failure to coordinate ventilation with effective water application will increase heat release rate.~~

(2) ~~Rapid fire growth should be anticipated if ventilation is increased absent the application of water for both planned and unplanned ventilation.~~

(3) ~~Consider wind speed and direction.~~

(4) ~~Working at heights increases risks for falls from or through a roof.~~

(5) ~~Working position, means of egress, and structural performance must be continually assessed.~~

Recommend roof top vertical ventilation operations be removed from the document. Recent research from Don Abbots Project Mayday 2017 that has studied over 3,000 reported maydays. The number 1 activity when a mayday occurs in the professional fire service is performing roof-top ventilation (20% of the maydays reported). In addition, the recent Ul vertical ventilation study showed that post fire control the CFM coming from roof-top ventilation was drastically reduced. Again, fireground activities should be coordiated around rapidly and safely achieving fire control. The research supports no vertical ventilation before fire control is achieved.

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Statement of Problem and Substantiation for Public Comment

The problem is vertical ventilation has been show by current research to dramatically increase heat release rate and fire behavior. 20% of all MayDays according to Don Abbott's Project MayDay 2017 study are caused by vertical ventilation operations. Removing vertical ventilation as a technique will save firefighters lives by helping to refocus us on getting water on the fire and never operating above a working fire that is constantly at work destroying the building components that firefighters are standing on.

Related Item

• Vertical Ventilation

Submitter Information Verification

Submitter Full Name: Daniel Bramble
Organization: Payson Fire Department
Street Address:
City:
State:
Zip:
Submittal Date: Sat Oct 27 10:54:53 EDT 2018
Committee: FCO-AAA

Public Comment No. 94-NFPA 1700-2018 [Section No. 10.6.4]

~~**10.6.4** – Vertical Ventilation.~~

~~**10.6.4.1** – Tactical Objectives.~~

~~To improve interior tenability by releasing smoke and heat during fire attack and to support search, extinguishment, overhaul, defensive trenching operations, and post-fire ventilation.~~

~~**10.6.4.2** – How It Works.~~

~~The following are examples of successful outcomes of horizontal ventilation:~~

(1) ~~Buoyant smoke is replaced by denser fresh air due to the gravity current and/or air pressure differentials.~~

(2) ~~Buoyant smoke is exhausted from an opening located above the level of fire utilizing the stack effect, and denser fresh air is entrained via a horizontal inlet(s) due to the gravity current and/or air pressure differentials.~~

~~**10.6.4.3** – Tactical Considerations.~~

~~The following are tactical considerations for vertical ventilation:~~

(1) ~~Survivability profile in the fire room/compartment.~~

(2) ~~Inability to horizontally ventilate.~~

(3) ~~Coordinated inlet and outlet openings concurrent with effective application of water.~~

(4) ~~Smoke cooling prior to a direct or indirect attack may be appropriate.~~

(5) ~~Purposeful management of the flow path considering wind, wind speed, and direction.~~

(6) ~~Raising of interface layer height and visibility will be temporary if fire is not controlled.~~

(7) ~~Thermal imaging to source fire and monitor changing conditions.~~

(8) ~~Plan for exposure control.~~

(9) ~~Delays due to staffing, assembly time, or equipment.~~

(10) ~~A 4 ft x 4 ft hole is rarely sufficient for effective ventilation.~~

~~**10.6.4.4** – Preferred Technique.~~

~~The following are preferred techniques for vertical ventilation:~~

(1) ~~Door control and limited inlet ventilation until vertical outlet is established.~~

(2) ~~Inlet opening is on the windward side and outlet is above or close to the source fire.~~

(3) ~~Establish outlet openings followed by inlet openings coordinated with fire attack.~~

~~**10.6.4.5** – Alternative Technique.~~

~~Alternative techniques for vertical ventilation should be considered to minimize risk.~~

~~**10.6.4.6** – Safety Considerations.~~

~~The following are safety considerations for vertical ventilation:~~

(1) ~~Failure to coordinate ventilation with effective water application will increase heat release rate.~~

(2) ~~Rapid fire growth should be anticipated if ventilation is increased absent the application of water for both planned and unplanned ventilation.~~

(3) ~~Consider wind speed and direction.~~

(4) ~~Working at heights increases risks for falls from or through a roof.~~

(5) ~~Working position, means of egress, and structural performance must be continually assessed.~~

<u>Recommend that vertical ventilation be completely eliminated as a technique for modern firefighting. The data from UL and NIST as well as Don Abbott's 2017 MayDay study is clear. 20% of all maydays reported occured because of vertical ventilation operations and vertical ventilation increases Heat Release Rate (HRR) thereby decreasing the margin of safety for the victims we are trying to rescue and for our firefighters trying to make the push to extinguish the fire. The influx of fresh air to replace the hot fire gases being released by vertical ventilation can cause windows to fail due to the change in pressure in the building thus creating additional sources of oxygen that we cannot control. A hole cut in a roof for vertical ventilation cannot be uncut, thus reducing any control we had on the ventilation profile of the fire. In the modern fireground environment, time is not on our side as firefighters and vertical ventilation reduces the time we have to do our jobs. Any doll-house burn shows that vertical ventilation dramatically increases fire behavior and makes firefighter operations less safe.</u>

Statement of Problem and Substantiation for Public Comment

The problems is vertical ventilation has been shown by current research by UL and NIST to increase heat release rate as the volume of gases released by vertical ventilation must be replaced by an equal amount of fresh air on the inlet. This decreases the margin of safety for our firefighters making the push to the fire. If a window fails our firefighters can then be in the exit side of the fire's flow path. Eliminating vertical ventilation as an acceptable technique will save firefighters lives in the modern fireground environment.

Related Item

• Vertical Ventilation

Submitter Information Verification

Submitter Full Name: Daniel Bramble
Organization: Payson Fire Department
Street Address:
City:
State:
Zip:
Submittal Date: Thu Nov 08 08:18:03 EST 2018
Committee: FCO-AAA

Public Comment No. 18-NFPA 1700-2018 [Section No. 10.6.4.2]

10.6.4.2 How It Works.

The following are examples of successful outcomes of ~~horizontal ventilation~~ vertical ventilation :

(1) Buoyant smoke is replaced by denser fresh air due to the gravity current and/or air pressure differentials.

(2) Buoyant smoke is exhausted from an opening located above the level of fire utilizing the stack effect, and denser fresh air is entrained via a horizontal inlet(s) due to the gravity current and/or air pressure differentials.

Statement of Problem and Substantiation for Public Comment

This section is about vertical ventilation. Wording was for horizontal ventilation.

Related Item

- Vertical ventilation

Submitter Information Verification

Submitter Full Name: Matthew Woolston
Organization: District of Columbia Fire / EMS
Street Address:
City:
State:
Zip:
Submittal Date: Tue Sep 18 17:17:55 EDT 2018
Committee: FCO-AAA

Public Comment No. 100-NFPA 1700-2018 [Section No. 10.6.5]

~~**10.6.5** – Positive Pressure Attack (PPA).~~

~~**10.6.5.1** – Tactical Objectives.~~

~~The primary objective is to improve interior tenability conditions for advancing crews and trapped occupants. Additional objectives include purposeful direction of the flow path, extinguishment, and property conservation.~~

~~**10.6.5.2** – How It Works.~~

~~Fans are used to create a pressure differential influencing the flow of smoke, air, heat, and flame from the inlet to the exhaust.~~

~~**10.6.5.3** – Tactical Considerations.~~

~~The following are tactical considerations for positive pressure attack:~~

(1) ~~Staff controlling operation of the fan should have a radio to coordinate operations (e.g., change speed, angle) if adverse conditions develop.~~

(2) ~~Staff controlling exhaust should have a radio to coordinate operations if adverse conditions develop.~~

(3) ~~Bringing a line to the exhaust(s) for protection should be considered.~~

(4) ~~Fan activation should be communicated and the structure for negative effects should be continuously monitored.~~

(5) ~~Transitional attack may be utilized, if possible, prior to fan activation.~~

(6) ~~Fire growth due to ventilation must be reduced by applying water on the fire during fan operation.~~

(7) ~~PPA in domestic floor plans with many rooms and closed doors (compartmented) is more effective.~~

(8) ~~PPA will not be effective on a fire located in an open floor concept plan or any floor plan with high ceilings.~~

(9) ~~Source fire must be near or adjacent to an exterior outlet.~~

(10) ~~It should be understood that the inlet is the opening to the fire compartment, and not necessarily the exterior door.~~

(11) ~~During PPA, creating additional openings not in the fire room will create additional flow paths, making PPA ineffective with the potential to draw the fire into all flow paths~~

(12) ~~An exhaust larger than the inlet must be provided in the fire room to allow for effective PPA.~~

(13) ~~PPA should be coordinated with exhaust.~~

(14) ~~During PPA, an ongoing assessment of inlet and exhaust flow is imperative to understanding whether or not a fan flow path has been established and if conditions are improving/effective.~~

(15) ~~The setback of the fan or development of a cone of air is not as important as the exhaust size.~~

(16) ~~The application of water, as quickly as possible, whether from the interior or exterior prior to initiating PPA will increase the likelihood of a successful outcome~~

(17) ~~PPA is not a replacement for using the reach of your hose stream.~~

(18) ~~During PPA, extension into void spaces when using PPA is directly related to the exhaust capabilities of the void space.~~

(19) ~~PPA does not negatively affect the survivability of occupants behind a closed door.~~

~~**10.6.5.4** – Preferred Technique.~~

~~Exhaust ventilation should be established prior to mechanical ventilation at the inlet. The exhaust should be larger than the inlet. Interior advancement techniques can be used as appropriate, followed up by timely direct fire attack.~~

~~**10.6.5.5** – Alternative Technique.~~

~~Positive pressure ventilation or positive pressure isolation might be used as an alternative technique to PPA.~~

~~**10.6.5.6** – Safety Considerations.~~

~~The attack team should coordinate and communicate with the IC and fan and exhaust control personnel. The assessment of inlet and exhaust must be continuous for adverse conditions. Rapid fire growth should be anticipated if ventilation is increased absent the application of water for both planned and unplanned ventilation. Consideration should be given to wind speed and direction.~~

Statement of Problem and Substantiation for Public Comment

PPA should not be part of any fire attack method. After the UL PPA/ study, it becomes obvious that there are to many variables to attempt PPA.

Related Item

- fr

Submitter Information Verification

Submitter Full Name: Jeff Deetz
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Sun Nov 11 11:01:14 EST 2018
Committee: FCO-AAA

Public Comment No. 108-NFPA 1700-2018 [Section No. 10.6.5]

Positive Pressure Attack (PPA). The UL nozzle study indicates a firefighter can create the same CFM with their water streams equal to what a fan can produce. The difference between a fan and a nozzle is the nozzle puts water into the atmosphere. The UL data indicates the introduction of water is a good thing when something is burning. The UL study also states that giving a fire air is bad. There are too many variables that have to be executed to make this tactic work (A through S). The use of the should be introduced post fire control.

10.6.5 Positive Pressure Attack (PPA).

10.6.5.1 Tactical Objectives.

The primary objective is to improve interior tenability conditions for advancing crews and trapped occupants. Additional objectives include purposeful direction of the flow path, extinguishment, and property conservation.

10.6.5.2 How It Works.

Fans are used to create a pressure differential influencing the flow of smoke, air, heat, and flame from the inlet to the exhaust.

10.6.5.3 Tactical Considerations.

The following are tactical considerations for positive pressure attack:

(1) Staff controlling operation of the fan should have a radio to coordinate operations (e.g., change speed, angle) if adverse conditions develop.

(2) Staff controlling exhaust should have a radio to coordinate operations if adverse conditions develop.

(3) Bringing a line to the exhaust(s) for protection should be considered.

(4) Fan activation should be communicated and the structure for negative effects should be continuously monitored.

(5) Transitional attack may be utilized, if possible, prior to fan activation.

(6) Fire growth due to ventilation must be reduced by applying water on the fire during fan operation.

(7) PPA in domestic floor plans with many rooms and closed doors (compartmented) is more effective.

(8) PPA will not be effective on a fire located in an open floor concept plan or any floor plan with high ceilings.

(9) Source fire must be near or adjacent to an exterior outlet.

(10) It should be understood that the inlet is the opening to the fire compartment, and not necessarily the exterior door.

(11) During PPA, creating additional openings not in the fire room will create additional flow paths, making PPA ineffective with the potential to draw the fire into all flow paths

(12) An exhaust larger than the inlet must be provided in the fire room to allow for effective PPA.

(13) PPA should be coordinated with exhaust.

(14) During PPA, an ongoing assessment of inlet and exhaust flow is imperative to understanding whether or not a fan flow path has been established and if conditions are improving/effective.

(15) The setback of the fan or development of a cone of air is not as important as the exhaust size.

(16) The application of water, as quickly as possible, whether from the interior or exterior prior to initiating PPA will increase the likelihood of a successful outcome

(17) PPA is not a replacement for using the reach of your hose stream.

(18) During PPA, extension into void spaces when using PPA is directly related to the exhaust capabilities of the void space.

(19) PPA does not negatively affect the survivability of occupants behind a closed door.

10.6.5.4 Preferred Technique.

Exhaust ventilation should be established prior to mechanical ventilation at the inlet. The exhaust should be larger than the inlet. Interior advancement techniques can be used as appropriate, followed up by timely direct fire attack.

10.6.5.5 Alternative Technique.

Positive pressure ventilation or positive pressure isolation might be used as an alternative technique to PPA.

10.6.5.6 Safety Considerations.

The attack team should coordinate and communicate with the IC and fan and exhaust control personnel. The assessment of inlet and exhaust must be continuous for adverse conditions. Rapid fire growth should be anticipated if ventilation is increased absent the application of water for both planned and unplanned ventilation. Consideration should be given to wind speed and direction.

Statement of Problem and Substantiation for Public Comment

The UL nozzle study indicates a firefighter can create the same CFM with their water streams equal to what a fan can produce. The difference between a fan and a nozzle is the nozzle puts water into the atmosphere. The UL data indicates the introduction of water is a good thing when something is burning. The UL study also states that giving a fire air is bad. There are too many variables that have to be executed to make this tactic work (A through S). The use of the should be introduced post fire control.

Related Item

- Positive Pressure Ventilation

Submitter Information Verification

Submitter Full Name:	Mark Smith
Organization:	Vandenberg Fire Department
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Mon Nov 12 16:25:21 EST 2018
Committee:	FCO-AAA

Public Comment No. 112-NFPA 1700-2018 [Section No. 10.6.5]

~~**10.6.5** – Positive Pressure Attack (PPA).~~ UL studies indicate that giving fire air prior to water application will increase the fire size and intensity. There at too many variables to consider/control to advocate for PPA. At the same time, the UL studies indicate that the use of hydraulic ventilation outperforms the CFM of the fan. Water from within the fire compartment is superior to the use of a fan prior to gaining control of the fire. Utilize the fan only after the fire has been controlled.

10.6.5.1 Tactical Objectives.

The primary objective is to improve interior tenability conditions for advancing crews and trapped occupants. Additional objectives include purposeful direction of the flow path, extinguishment, and property conservation.

10.6.5.2 How It Works.

Fans are used to create a pressure differential influencing the flow of smoke, air, heat, and flame from the inlet to the exhaust.

10.6.5.3 Tactical Considerations.

The following are tactical considerations for positive pressure attack:

(1) Staff controlling operation of the fan should have a radio to coordinate operations (e.g., change speed, angle) if adverse conditions develop.

(2) Staff controlling exhaust should have a radio to coordinate operations if adverse conditions develop.

(3) Bringing a line to the exhaust(s) for protection should be considered.

(4) Fan activation should be communicated and the structure for negative effects should be continuously monitored.

(5) Transitional attack may be utilized, if possible, prior to fan activation.

(6) Fire growth due to ventilation must be reduced by applying water on the fire during fan operation.

(7) PPA in domestic floor plans with many rooms and closed doors (compartmented) is more effective.

(8) PPA will not be effective on a fire located in an open floor concept plan or any floor plan with high ceilings.

(9) Source fire must be near or adjacent to an exterior outlet.

(10) It should be understood that the inlet is the opening to the fire compartment, and not necessarily the exterior door.

(11) During PPA, creating additional openings not in the fire room will create additional flow paths, making PPA ineffective with the potential to draw the fire into all flow paths

(12) An exhaust larger than the inlet must be provided in the fire room to allow for effective PPA.

(13) PPA should be coordinated with exhaust.

(14) During PPA, an ongoing assessment of inlet and exhaust flow is imperative to understanding whether or not a fan flow path has been established and if conditions are improving/effective.

(15) The setback of the fan or development of a cone of air is not as important as the exhaust size.

(16) The application of water, as quickly as possible, whether from the interior or exterior prior to initiating PPA will increase the likelihood of a successful outcome

(17) PPA is not a replacement for using the reach of your hose stream.

(18) During PPA, extension into void spaces when using PPA is directly related to the exhaust capabilities of the void space.

(19) PPA does not negatively affect the survivability of occupants behind a closed door.

10.6.5.4 Preferred Technique.

Exhaust ventilation should be established prior to mechanical ventilation at the inlet. The exhaust should be larger than the inlet. Interior advancement techniques can be used as appropriate, followed up by timely direct fire attack.

10.6.5.5 Alternative Technique.

Positive pressure ventilation or positive pressure isolation might be used as an alternative technique to PPA.

10.6.5.6 Safety Considerations.

The attack team should coordinate and communicate with the IC and fan and exhaust control personnel. The assessment of inlet and exhaust must be continuous for adverse conditions. Rapid fire growth should be anticipated if ventilation is increased absent the application of water for both planned and unplanned ventilation. Consideration should be given to wind speed and direction.

Statement of Problem and Substantiation for Public Comment

Injecting air with a fan prior to gaining control of the fire increases the size and intensity of the fire. This is substantiated within the nozzle study that UL has published. Use a fan only after fire control has been achieved with water application.

Related Item

• Positive Pressure Attack

Submitter Information Verification

Submitter Full Name:	Pat Dale
Organization:	Fire
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City:	
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Zip:	
Submittal Date:	Tue Nov 13 23:00:01 EST 2018
Committee:	FCO-AAA

Public Comment No. 121-NFPA 1700-2018 [Section No. 10.6.5]

10.6.5 – Positive Pressure Attack (PPA).

10.6.5.1 – Tactical Objectives.

The primary objective is to improve interior tenability conditions for advancing crews and trapped occupants. Additional objectives include purposeful direction of the flow path, extinguishment, and property conservation.

10.6.5.2 – How It Works.

Fans are used to create a pressure differential influencing the flow of smoke, air, heat, and flame from the inlet to the exhaust.

10.6.5.3 – Tactical Considerations.

The following are tactical considerations for positive pressure attack:

(1) Staff controlling operation of the fan should have a radio to coordinate operations (e.g., change speed, angle) if adverse conditions develop.

(2) Staff controlling exhaust should have a radio to coordinate operations if adverse conditions develop.

(3) Bringing a line to the exhaust(s) for protection should be considered.

(4) Fan activation should be communicated and the structure for negative effects should be continuously monitored.

(5) Transitional attack may be utilized, if possible, prior to fan activation.

(6) Fire growth due to ventilation must be reduced by applying water on the fire during fan operation.

(7) PPA in domestic floor plans with many rooms and closed doors (compartmented) is more effective.

(8) PPA will not be effective on a fire located in an open floor concept plan or any floor plan with high ceilings.

(9) Source fire must be near or adjacent to an exterior outlet.

(10) It should be understood that the inlet is the opening to the fire compartment, and not necessarily the exterior door.

(11) During PPA, creating additional openings not in the fire room will create additional flow paths, making PPA ineffective with the potential to draw the fire into all flow paths

(12) An exhaust larger than the inlet must be provided in the fire room to allow for effective PPA.

(13) PPA should be coordinated with exhaust.

(14) During PPA, an ongoing assessment of inlet and exhaust flow is imperative to understanding whether or not a fan flow path has been established and if conditions are improving/effective.

(15) The setback of the fan or development of a cone of air is not as important as the exhaust size.

(16) The application of water, as quickly as possible, whether from the interior or exterior prior to initiating PPA will increase the likelihood of a successful outcome

(17) PPA is not a replacement for using the reach of your hose stream.

(18) During PPA, extension into void spaces when using PPA is directly related to the exhaust capabilities of the void space.

(19) PPA does not negatively affect the survivability of occupants behind a closed door.

10.6.5.4 – Preferred Technique.

Exhaust ventilation should be established prior to mechanical ventilation at the inlet. The exhaust should be larger than the inlet. Interior advancement techniques can be used as appropriate, followed up by timely direct fire attack.

~~**10.6.5.5** – Alternative Technique.~~

~~Positive pressure ventilation or positive pressure isolation might be used as an alternative technique to PPA.~~

~~**10.6.5.6** – Safety Considerations.~~

~~The attack team should coordinate and communicate with the IC and fan and exhaust control personnel. The assessment of inlet and exhaust must be continuous for adverse conditions. Rapid fire growth should be anticipated if ventilation is increased absent the application of water for both planned and unplanned ventilation. Consideration should be given to wind speed and direction.~~

Statement of Problem and Substantiation for Public Comment

Positive Pressure Attack (PPA) should be removed from this document. The 2017 UL nozzle study indicates a firefighter can create winds speeds with their water streams greater than what a fan can produce out of the same opening. The difference between a fan and a nozzle is the nozzle puts water into the atmosphere. All UL data indicates this is a good thing, water into the compartment when something is burning. On the other side, UL states that giving a fire air - is bad (fan). There are too many variables that have to be executed to make this tactic work (1-19). When any of the 19 steps aren't done correctly - very bad things can happen. Giving the fire air prior to water is bad. Turn the fan on post fire control.

Related Item

• Eliminate PPA from document

Submitter Information Verification

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Submittal Date:	Wed Nov 14 14:30:43 EST 2018
Committee:	FCO-AAA

Public Comment No. 134-NFPA 1700-2018 [Section No. 10.6.5]

10.6.5 Positive Pressure Attack (PPA).

10.6.5.1 Tactical Objectives.

The primary objective is to improve interior tenability conditions for advancing crews and trapped occupants. Additional objectives include purposeful direction of the flow path, extinguishment, and property conservation.

10.6.5.2 How It Works.

Fans are used to create a pressure differential influencing the flow of smoke, air, heat, and flame from the inlet to the exhaust.

10.6.5.3 Tactical Considerations.

The following are tactical considerations for positive pressure attack:

(1) Staff controlling operation of the fan should have a radio to coordinate operations (e.g., change speed, angle) if adverse conditions develop.

(2) Staff controlling exhaust should have a radio to coordinate operations if adverse conditions develop.

(3) Bringing a line to the exhaust(s) for protection should be considered.

(4) Fan activation should be communicated and the structure for negative effects should be continuously monitored.

(5) Transitional attack may be utilized, if possible, prior to fan activation.

(6) Fire growth due to ventilation must be reduced by applying water on the fire during fan operation.

(7) PPA in domestic floor plans with many rooms and closed doors (compartmented) is more effective.

(8) PPA will not be effective on a fire located in an open floor concept plan or any floor plan with high ceilings.

(9) Source fire must be near or adjacent to an exterior outlet.

(10) It should be understood that the inlet is the opening to the fire compartment, and not necessarily the exterior door.

(11) During PPA, creating additional openings not in the fire room will create additional flow paths, making PPA ineffective with the potential to draw the fire into all flow paths

(12) An exhaust larger than the inlet must be provided in the fire room to allow for effective PPA.

(13) PPA should be coordinated with exhaust.

(14) During PPA, an ongoing assessment of inlet and exhaust flow is imperative to understanding whether or not a fan flow path has been established and if conditions are improving/effective.

(15) The setback of the fan or development of a cone of air is not as important as the exhaust size.

(16) The application of water, as quickly as possible, whether from the interior or exterior prior to initiating PPA will increase the likelihood of a successful outcome

(17) PPA is not a replacement for using the reach of your hose stream.

(18) During PPA, extension into void spaces when using PPA is directly related to the exhaust capabilities of the void space.

(19) PPA does not negatively affect the survivability of occupants behind a closed door.

10.6.5.4 Preferred Technique.

Exhaust ventilation should be established prior to mechanical ventilation at the inlet. The exhaust should be larger than the inlet. Interior advancement techniques can be used as appropriate, followed up by timely direct fire attack.

10.6.5.5 Alternative Technique.

Positive pressure ventilation or positive pressure isolation might be used as an alternative technique to PPA.

10.6.5.6 Safety Considerations.

The attack team should coordinate and communicate with the IC and fan and exhaust control personnel. The assessment of inlet and exhaust must be continuous for adverse conditions. Rapid fire growth should be anticipated if ventilation is increased absent the application of water for both planned and unplanned ventilation. Consideration should be given to wind speed and direction.

Firefighter can create the same force with their water streams equal to what a fan can produce. The difference between a fan and a nozzle is the nozzle puts water into the atmosphere while putting water on the fire. Hydraulic ventilaion is the best option for ventilation until the fire is under control. Once fire is under control, PPV fans can be utilized.

Statement of Problem and Substantiation for Public Comment

PPA should not be used....hydraulic ventilation will perform as well as a fan and not introduce air to an active fire.

Related Item

- PPA

Submitter Information Verification

Submitter Full Name: Sean Glaser
Organization: DOD Vandenberg AFB Fire Dept
Affiliation: Asst Chief of Operations Vandenberg Fire Dept
Street Address:
City:
State:
Zip:
Submittal Date: Thu Nov 15 20:36:13 EST 2018
Committee: FCO-AAA

Public Comment No. 101-NFPA 1700-2018 [Section No. 10.6.6.6]

10.6.6.6 Safety Considerations.

The attack team coordinates and communicates with the IC and fan and exhaust control personnel. ~~Rapid~~ A primary search should be completed prior to PPV. The IC should seriously consider removing all personnel from building prior to PPV. Rapid fire development should be anticipated if ventilation is increased absent the application of water for both planned and unplanned ventilation. Consideration should be given to wind speed and direction.

Statement of Problem and Substantiation for Public Comment

Improve 1700

Related Item

- fr

Submitter Information Verification

Submitter Full Name:	Jeff Deetz
Organization:	[Not Specified]
Street Address:	
City:	
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Zip:	
Submittal Date:	Sun Nov 11 11:15:32 EST 2018
Committee:	FCO-AAA

Public Comment No. 109-NFPA 1700-2018 [Section No. 10.6.7]

There is no definitive research on this tactic, it should be removed from the document. The fan should only be introduced post fire control.

10.6.7 Positive Pressure Isolation (PPI).

10.6.7.1 Tactical Objective.

The primary objective is to create a positive pressure in the non-fire area greater than the pressure in the fire area to limit fire and smoke propagation.

10.6.7.2 How It Works.

Mechanical fans or systems are used to increase the pressure in an adjoining room or compartment to contain smoke to the fire room or compartment. Protected areas have a mechanical fan at the inlet with limited or no exhaust openings.

10.6.7.3 Tactical Considerations.

PPI is contra-indicated in compartments impacted by fire extension from the compartment of origin. Fan activation should be communicated and the structure should be continuously monitored for fire/smoke propagation. As long as a flow path through the seat of fire is not created there is no fire growth. Pressurize areas of the structure that are isolated from the fire compartment. Anticipate rapid fire growth if ventilation is increased absent the application of water for both planned and unplanned ventilation.

10.6.7.4 Preferred Technique.

All inlet and exhaust openings should be controlled to maintain desired pressure differential and isolate the fire.

10.6.7.5 Alternative Technique.

Nonventilation might be a viable alternative.

10.6.7.6 Safety Considerations.

Progress reports should be given to the IC and should be coordinated with fan control personnel. Consideration should be given to wind speed and direction. Rapid fire development is possible if the fire has extended to concealed spaces.

Statement of Problem and Substantiation for Public Comment

There is no definitive research on this tactic, it should be removed from the document. The fan should only be introduced post fire control.

Related Item

- Positive Pressure Isolation

Submitter Information Verification

Submitter Full Name: Mark Smith
Organization: Vandenberg Fire Department
Street Address:
City:
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Zip:
Submittal Date: Mon Nov 12 17:12:53 EST 2018
Committee: FCO-AAA

Public Comment No. 122-NFPA 1700-2018 [Section No. 10.6.7]

~~**10.6.7** – Positive Pressure Isolation (PPI).~~

~~**10.6.7.1** – Tactical Objective.~~

~~The primary objective is to create a positive pressure in the non-fire area greater than the pressure in the fire area to limit fire and smoke propagation.~~

~~**10.6.7.2** – How It Works.~~

~~Mechanical fans or systems are used to increase the pressure in an adjoining room or compartment to contain smoke to the fire room or compartment. Protected areas have a mechanical fan at the inlet with limited or no exhaust openings.~~

~~**10.6.7.3** – Tactical Considerations.~~

~~PPI is contra-indicated in compartments impacted by fire extension from the compartment of origin. Fan activation should be communicated and the structure should be continuously monitored for fire/smoke propagation. As long as a flow path through the seat of fire is not created there is no fire growth. Pressurize areas of the structure that are isolated from the fire compartment. Anticipate rapid fire growth if ventilation is increased absent the application of water for both planned and unplanned ventilation.~~

~~**10.6.7.4** – Preferred Technique.~~

~~All inlet and exhaust openings should be controlled to maintain desired pressure differential and isolate the fire.~~

~~**10.6.7.5** – Alternative Technique.~~

~~Nonventilation might be a viable alternative.~~

~~**10.6.7.6** – Safety Considerations.~~

~~Progress reports should be given to the IC and should be coordinated with fan control personnel. Consideration should be given to wind speed and direction. Rapid fire development is possible if the fire has extended to concealed spaces.~~

Statement of Problem and Substantiation for Public Comment

I submit to remove this section if there is no data (tests) done to support it.

Related Item

- Data on PPI??

Submitter Information Verification

Submitter Full Name: John Brunacini
Organization: Blue Card
Affiliation: CEO
Street Address:
City:
State:
Zip:

Submittal Date: Wed Nov 14 14:37:38 EST 2018
Committee: FCO-AAA

Public Comment No. 135-NFPA 1700-2018 [Section No. 10.6.7]

10.6.7 Positive Pressure Isolation (PPI).

10.6.7.1 Tactical Objective.

The primary objective is to create a positive pressure in the non-fire area greater than the pressure in the fire area to limit fire and smoke propagation.

10.6.7.2 How It Works.

Mechanical fans or systems are used to increase the pressure in an adjoining room or compartment to contain smoke to the fire room or compartment. Protected areas have a mechanical fan at the inlet with limited or no exhaust openings.

10.6.7.3 Tactical Considerations.

PPI is contra-indicated in compartments impacted by fire extension from the compartment of origin. Fan activation should be communicated and the structure should be continuously monitored for fire/smoke propagation. As long as a flow path through the seat of fire is not created there is no fire growth. Pressurize areas of the structure that are isolated from the fire compartment. Anticipate rapid fire growth if ventilation is increased absent the application of water for both planned and unplanned ventilation.

10.6.7.4 Preferred Technique.

All inlet and exhaust openings should be controlled to maintain desired pressure differential and isolate the fire.

10.6.7.5 Alternative Technique.

Nonventilation might be a viable alternative.

10.6.7.6 Safety Considerations.

Progress reports should be given to the IC and should be coordinated with fan control personnel. Consideration should be given to wind speed and direction. Rapid fire development is possible if the fire has extended to concealed spaces.

I was unable to find any research or information on this. It should be removed

Statement of Problem and Substantiation for Public Comment

No research on PPI. Should be removed.

Related Item

- PPI

Submitter Information Verification

Submitter Full Name:	Sean Glaser
Organization:	DOD Vandenberg AFB Fire Dept
Affiliation:	Assistant Chief of Operations Vandenberg Fire Dept
Street Address:	
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State:	
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Submittal Date:	Thu Nov 15 20:44:03 EST 2018
Committee:	FCO-AAA

Public Comment No. 83-NFPA 1700-2018 [Section No. 10.6.7]

10.6.7 Positive Pressure Isolation (PPI). Has there been research in this tactic on the fireground? In absence of data, should be removed.

10.6.7.1 Tactical Objective.

The primary objective is to create a positive pressure in the non-fire area greater than the pressure in the fire area to limit fire and smoke propagation.

10.6.7.2 How It Works.

Mechanical fans or systems are used to increase the pressure in an adjoining room or compartment to contain smoke to the fire room or compartment. Protected areas have a mechanical fan at the inlet with limited or no exhaust openings.

10.6.7.3 Tactical Considerations. I would think building layout would dictate if this option would even be viable as many interior compartment spaces only have one access point. Access to these compartments to set up this tactic could potentially require traveling through the flowpath for access, by opening these interior compartments for access for fan set-up would pressureize the space your intended to protect. A conseptual tactic that requires more study. Many departments don't carry that many fans or cords to assemble on the fireground practically.

PPI is contra-indicated in compartments impacted by fire extension from the compartment of origin. Fan activation should be communicated and the structure should be continuously monitored for fire/smoke propagation. As long as a flow path through the seat of fire is not created there is no fire growth. Pressurize areas of the structure that are isolated from the fire compartment. Anticipate rapid fire growth if ventilation is increased absent the application of water for both planned and unplanned ventilation.

10.6.7.4 Preferred Technique.

All inlet and exhaust openings should be controlled to maintain desired pressure differential and isolate the fire.

10.6.7.5 Alternative Technique.

Nonventilation might be a viable alternative.

10.6.7.6 Safety Considerations.

Progress reports should be given to the IC and should be coordinated with fan control personnel. Consideration should be given to wind speed and direction. Rapid fire development is possible if the fire has extended to concealed spaces.

Statement of Problem and Substantiation for Public Comment

10.6.7 I believe in absence of testing or data from UL or other credited fire science studies, this tactic should be removed to prevent misapplication of the tactic on the fire-ground. I feel some departments will apply this tactic (in absence) of testing because it is listed in NFPA 1700, which could lead to unnecessary injury, property damage or death.

Related Item

• Postive Pressure Isolation

Submitter Information Verification

Submitter Full Name: Chad Hensch

Organization: Urbana Fire Department

Affiliation: Urbana Fire Department

Street Address:

City:

State:

Zip:

Submittal Date: Fri Oct 26 22:05:36 EDT 2018
Committee: FCO-AAA

Public Comment No. 95-NFPA 1700-2018 [Section No. 10.6.7]

~~**10.6.7** – Positive Pressure Isolation (PPI).~~

~~**10.6.7.1** – Tactical Objective.~~

~~The primary objective is to create a positive pressure in the non-fire area greater than the pressure in the fire area to limit fire and smoke propagation.~~

~~**10.6.7.2** – How It Works.~~

~~Mechanical fans or systems are used to increase the pressure in an adjoining room or compartment to contain smoke to the fire room or compartment. Protected areas have a mechanical fan at the inlet with limited or no exhaust openings.~~

~~**10.6.7.3** – Tactical Considerations.~~

~~PPI is contra-indicated in compartments impacted by fire extension from the compartment of origin. Fan activation should be communicated and the structure should be continuously monitored for fire/smoke propagation. As long as a flow path through the seat of fire is not created there is no fire growth. Pressurize areas of the structure that are isolated from the fire compartment. Anticipate rapid fire growth if ventilation is increased absent the application of water for both planned and unplanned ventilation.~~

~~**10.6.7.4** – Preferred Technique.~~

~~All inlet and exhaust openings should be controlled to maintain desired pressure differential and isolate the fire.~~

~~**10.6.7.5** – Alternative Technique.~~

~~Nonventilation might be a viable alternative.~~

~~**10.6.7.6** – Safety Considerations.~~

~~Progress reports should be given to the IC and should be coordinated with fan control personnel. Consideration should be given to wind speed and direction. Rapid fire development is possible if the fire has extended to concealed spaces.~~

I am not aware of any definitive research on this area of fire science. Until such research exists, I recommend this section be removed from the document.

Statement of Problem and Substantiation for Public Comment

The problem is there is no definitive research on this topic that I am aware of. My proposed change of eliminating this section would remove a section listing a technique that is not listed in any training materials, textbooks, or validated by any current research.

Related Item

• Positive Pressure Isolation

Submitter Information Verification

Submitter Full Name: Daniel Bramble
Organization: Payson Fire Department
Street Address:
City:
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Submittal Date: Thu Nov 08 08:42:52 EST 2018
Committee: FCO-AAA

Public Comment No. 136-NFPA 1700-2018 [Chapter 11]

~~**Chapter 11** – Exposure and Hygiene Considerations~~

~~**11.1** – Scope.~~

~~This chapter provides the fundamental linkage between fire dynamics research and the need for implementing health hygiene policies for the fire service.~~

~~**11.2** – Purpose.~~

~~The purpose of this chapter is to provide science-based information to fire-fighting personnel regarding procedures to minimize the exposure and health risks of firefighting.~~

~~**11.3** – Application.~~

~~The intent of this chapter is to apply the principles of science-based research to minimize fire fighters' risk on the fireground and reduce secondary impacts before and after the incident.~~

~~**11.4** – General.~~

~~Cancer is one of the leading causes of line-of-duty deaths among fire fighters today. Fire-fighting duties significantly increase an individual's risks for contracting several types of cancers. Cancer rates for fire fighters have risen dramatically in correlation with the increase in toxicity of smoke. Smoke from a fire always contains contaminants, which are harmful to health when these toxins enter the body via mouth, respiratory tract, mucous tissue, or skin. During working fire responses ("hot smoke"), these contaminants occur in high concentrations as gases, which are easily absorbed. During overhaul operations or other lower heat conditions ("cold smoke"), contaminants may be bonded to soot, run off water, or ash. Additional hazards at the fireground may be caused by hazardous materials, such as asbestos or flame-retardant materials found in the products of combustion.~~

~~**11.4.1** –~~

~~Prior to complete fire suppression, combustion products are released as smoke. Initially many of these substances are mobile. The toxic and/or caustic gases and vapors that occur in high concentrations during this phase, such as carbon monoxide (CO), carbon dioxide (CO_2), hydrogen chloride (HCl, hydrochloric acid when condensed), acrolein, and hydrogen cyanide (HCN, prussic acid when condensed), constitute a potential hazard for operating members and civilians. The smoke plume must be considered when the incident commander designates the hot zone at an operation.~~

~~**11.4.2** –~~

~~Once the fire has been extinguished and the burnt materials have cooled down to ambient temperature, hazardous organic substances, in particular soot particles, are still present. Operating personnel continue to have the potential for contamination, and members continue to utilize the appropriate level of personal protective equipment (PPE), including respiratory protection. Care must be taken not to transport contaminants outside the hot zone.~~

~~**11.4.3** –~~

~~There are three primary ways in which airborne harmful substances produced by fires can make their way into the body: via inhalation, via skin absorption, and via the mouth (orally). Fire fighters should be aware of good hygiene practices to minimize their exposure to harmful substances both on scene and post-incident. Ensuring fire fighters have the proper tools, processes, and knowledge is essential in minimizing exposure to harmful substances involved with structural firefighting.~~

~~**11.4.4** –~~

~~Fire fighters can protect themselves to a great extent by limiting exposure and conducting fireground decontamination. During and after extinguishing the fire, respiratory protection should be worn when contaminants are present. To further limit exposures, the incident commander (IC) should establish zones on the fireground similar to those commonly accepted at the scene of a haz-mat release (hot, warm, cold). Operating apparatus should, if possible, be positioned outside the hot zone, and effort should be made to limit entry of smoke into the crew compartment by closing cab windows and additional openings. Structural fire-fighting gear will continue to off gas after the fire fighter leaves the hot zone. PPE should be removed prior to removing the face piece (as dictated by best practices).~~

11.4.5 –

A critical on-scene tactical consideration is setting up decontamination and rehabilitation areas. Gross on-scene decontamination of PPE and fire-fighting equipment should be undertaken in the warm zone prior to PPE or equipment being removed to the cold zone and placed back on the fire apparatus. If necessary, contaminated PPE and equipment should be bagged and transported back to the station outside the crew compartment. In the cold zone adjacent to the rehabilitation areas, rehabilitation should be set up where drinking and eating is permissible.

11.4.6 –

Upon return to the fire station, personnel who were exposed to smoke and contaminants in the hot zone should shower immediately. Clothing should be laundered at the station and not transported in a private vehicle to a member's home. Contaminated equipment should be thoroughly cleaned before being placed back into service

11.5 – On Scene.

The fireground size up conducted by the IC must take smoke production and associated contaminants' potential impact on operating members, equipment, civilians, and the environment into account. Special consideration may be given under certain circumstances when known hazardous materials are burning to let the fire continue to burn under controlled conditions.

11.5.1 –

During and after extinguishing the fire, respiratory protection should be worn when contaminants are present. Lack of visible contaminants does not mean that the environment is free from contaminants; therefore, strict compliance with respiratory protection must be enforced. The IC should establish zones on the fireground similar to those commonly accepted at the scene of a hazardous materials release. A hot, warm, and cold zone should be designated, and appropriate levels of PPE should be required in the designated zones. The contamination zones are to be set as follows: hot zones for contaminated areas; warm zones to designate where gross on-scene decontamination takes place, decontaminated PPE is doffed, and contaminated equipment is stored; and cold zones for debriefings and rehabilitation. The incident commander should take into account the travel of the smoke plume when designating the perimeter of the hot zone.

11.5.2 –

The IC should limit the amount of operating personnel assigned to the hot zone. The fireground must always be secured and cordoned off during fire operations, removing non-essential personnel, civilians, apparatus, and equipment from the hot zone where contamination may occur. The incident commander should provide for timely relief of members operating in the hot zone to limit individual exposure to the lowest possible limits. Crews should be rotated when possible to reduce exposure and thermal risks to fire fighters. Chemicals found on the fireground pose an immediate threat to the respiratory tract if self-contained breathing apparatus (SCBA) is not worn and there is a latent threat through cutaneous exposure. Time influences the levels of airborne chemicals post knock-down; if crews are able to exit the structure as soon as reasonably possible and allow for the chemicals to dissipate naturally, their exposure will be reduced. Timely replacement of crews working in the fire structure and allowing them to rehabilitate can also reduce the exposure times of individual crews.

11.5.3 –

Fire engine cabs should be kept shut during operations and aired out briefly when operations have ended. After the fire has been extinguished, involved and contaminated rooms should be ventilated for a sufficient time prior to entry without respiratory protection for investigation purposes. Known carcinogens and hazardous chemicals can attach themselves to PPE and exposed skin. Proper use of PPE, including SCBA, is important and can minimize the smoke exposure risks to fire fighters. Members, apparatus, and equipment in the hot zone should be decontaminated. PPE that has been contaminated should be removed while using respiratory protection and placed in an area remote from operating personnel. This procedure will limit the exposure of operating personnel to the off gassing of contaminants from the PPE. Contaminated gear should not be removed from the warm zone unless decontaminated or bagged. Personnel working with equipment contaminated during a structure fire should use nitrile or latex emergency medical services (EMS) gloves and particulate filtering facepiece (N95 minimum) during the cleaning process.

11.5.4 –

Upon doffing of PPE, gear should be allowed to "air out" and off-gas volatile compounds released in the open air, upwind from the fire and away from personnel who are working on the incident and in decontamination or rehabilitation. Prior to transport of contaminated gear, it should be encapsulated utilizing an airtight container. The container should be of sufficient size and strength to contain all contaminated gear, including turnouts, helmet, mask, gloves, and boots. The contaminated gear should be placed outside of the passenger compartment. Gear should be transported in a similar manner to a facility with a specialized PPE washer (i.e., extractor) or to an independent service provider (ISP). The fire department should attempt to complete as much of the decontamination process on scene as possible to reduce exposures in the fire station. When possible, departments should hold responding companies out of service until the decontamination process is complete.

11.5.5 –

Gross on-scene decontamination of PPE and fire-fighting equipment should be undertaken on the fireground prior to PPE or equipment being placed back on the fire apparatus. The criterion for successful pre-cleaning is the removal of all visible traces of soot. PPE with traces of soot should be kept outside the crew compartment or transported separately. The pre-cleaned equipment should also be transported separately and only placed back into service when final decontamination is complete.

11.5.6 –

Gross on-scene decontamination of personnel should occur as soon as possible after the operating member exits the hot zone. After the fire, fire fighters who operated in the hot zone should immediately remove soot from the head and neck using skin cleansing wipes or soap and water washing if available. Wipes should be used during air cylinder changes and in rehabilitation areas between operational periods whenever possible. Gross on-scene decontamination should also be used prior to entering the rehabilitation area and consumption of fluids and/or food. Drinking and eating is permissible outside the area where smoke and contamination can occur after operating personnel have removed contaminated gear, conducted a gross on-scene decontamination, and thoroughly washed hands and faces. Washing can be considered as adequate when there are no visible traces of soot afterwards.

11.6 – Post-Incident.

On returning to quarters, fire fighters should ensure gear is cleaned in accordance with Chapter 7 of NFPA 1851 immediately after the fire has been extinguished and fire-fighting operations have concluded. Contaminated equipment should be initially cleaned on scene prior to being stored on the fire apparatus. Contaminated apparatus should be cleaned prior to leaving the scene.

11.6.1 –

No equipment, including SCBA, should be stored in the passenger compartment prior to decontamination. Crews should provide detailed cleaning of all contaminated tools, equipment, and apparatus while utilizing particulate filtering facepiece (N95 minimum) and nitrile or latex EMS gloves during the station decontamination process. Personnel should not enter clean areas of the station until they have completed the entire decontamination process.

11.6.2 –

With proper use of PPE at structure fires, most contaminants will likely remain outside the epidermis; however, a wash down on scene and a shower at quarters could reduce further exposure. After equipment has been decontaminated, fire fighters should shower as soon as possible to decontaminate their person. Care should be used to clean finger nails and other areas prone to absorption.

11.6.3 –

Personnel should utilize fresh uniforms when entering the clean areas of the fire station. After showering and changing to a clean uniform, any tools should be removed from turnouts and laundered in an extractor or repackaged for transport to a designated cleaning station or ISP. Departments should maintain documentation of gross exposures or contaminations in fire-fighter records.

11.7 – Suppression Specific Concerns.

Interior operations during live fire response typically expose fire fighters to the highest thermal conditions (heat flux and ambient temperatures) and highest concentration of fireground chemicals. As a result, the environmental risk is typically considered maximum for this group of fire fighters. Fire fighters working on the interior of the structure are most likely to be wearing a full complement of fire-fighting PPE. This reduces the risk for contamination and burn injuries but increases the physiological and thermal strain of the operations. PPE also increases the restrictions on movement and range of motion, increasing risk for slips, trips, and falls; overexertion; and other biomechanics-related injuries.

11.8 – Incident Commander and Driver/Operator Specific Concerns.

Exterior operations of incident command, engineer, and safety officers are often conducted with a reduced set of PPE due to the perceived reduced risk. As a result, breathing protection is often not worn. Skin exposures potential due to the lack of PPE or incomplete closure of PPE (even not wearing a hood) are increased. Significant exposures are still possible on the exterior of the structure due to incomplete lift of the smoke plume, diesel exhaust from operating apparatus (a known carcinogen), and radiant heat from exterior plumes and exposure to sun.

11.9 – Overhaul Specific Concerns.

After extinguishing the main body of fire, the IC should be aware that potential chemical exposure will remain elevated due to the continued chemical breakdown and off gassing of structural elements and furnishings. Many of these contaminants will be present in hazardous levels even when the environment appears free of visible smoke. Strict use of all PPE must continue in the post-control phase of operations in the hot zone. The number of operating members in the hot zone should be kept to the necessary minimum to limit exposure. Non-deployed members should be stationed in the cold zone to limit chemical exposure.

11.9.1 –

Overhaul operations are often viewed as reduced risk due to the lack of working fire conditions and the apparent heat and smoke production. Despite the apparent reduction in risk during overhaul, full PPE should be worn throughout operations. Significant physical exertion is required during overhaul operations, increasing metabolic heat generation inside the PPE. As a result, high core and skin temperatures have been measured during overhaul operations.

11.9.2 –

Ventilation is an important step to ensure that the environment becomes more tenable and ambient temperatures are reduced for the crews operating on the fireground. Studies have evaluated ventilation techniques related to the levels of toxicants, showing a reduction of airborne levels. However, toxicant levels rapidly increased when ventilation was discontinued. Care should be taken while using gas-powered fans that may increase carbon monoxide (CO) levels within the structure.

11.9.3 –

Discerning and quantifying the gasses and particulates present not only indicates when it is safe to doff SCBA, it provides the information that dictates proper decontamination and post-fire medical monitoring. The ability to monitor the air for particulates and harmful toxicants provides the best information to fireground personnel. However, current technology is limited. A four-gas or six-gas meter may not be adequate to effectively analyze the fireground, particularly for gasses other than those directly measured by the meter itself. A simple CO detector, or any other detection device by itself, cannot be relied upon to make this determination.

11.10 – Apparatus.

Operating apparatus should be positioned outside the hot zone in an effort to limit contamination whenever possible. Closing cab windows and additional openings will limit contamination of the crew cab. The exposure of operating apparatus and equipment to smoke and contaminants should be avoided wherever possible. Operating apparatus and equipment that has been severely contaminated with smoke and contaminants should receive a gross on-scene decontamination prior to leaving the scene.

11.10.1 –

Dust found inside apparatus has been found to be significantly contaminated. Apparatus windows left open during a working fire can result in smoke transport through the cab, which can deposit on surfaces. Wearing contaminated turnouts back to the fire station will transfer contaminants to apparatus seats, resulting in exposure to the next member who sits there due to cross-contamination. Storing and transporting contaminated PPE within the apparatus cab, particularly with closed windows, can lead to an increase in the concentration of compounds off-gassing from PPE. Decontamination, particularly of soft surfaces, of the cab is challenging.

11.10.2 –

Diesel exhaust is a known carcinogen. Where possible, apparatus should be placed so that the exhaust will not be upwind from operational personnel. In particular, engineers and command personnel without respiratory protection should not operate downwind from apparatus where feasible. Newer apparatus have improved emission controls, which has reduced their particulate contamination. However, this does not mean that it has removed all gasses of concern.

11.11 – Support Personnel.

PPE worn by support personnel should be appropriate for the services provided. Non-fire-service personnel often support air bottle changes and may assist with decontamination and rehabilitation. Nitrile or latex EMS gloves and potentially airway protection should be provided to reduce risk to these individuals.

11.12 – Operational Hygiene at the Fire Station.

Science-based research has characterized the significant level of contamination that is occurring on the fireground. Appropriate measures must be taken during the pre-control as well as the post-control phases of the fire control operations to limit exposure and decontaminate appropriately. Fireground exposure poses an ongoing health risk to civilians and fire-fighting personnel. Operating apparatus and equipment must be thoroughly decontaminated after every operation.

11.12.1 –

PPE should be laundered in an industrial extractor after exposed to smoke and contaminants on the fireground. Members who operated in the hot zone should be considered contaminated, and the IC should ensure that proper decontamination measures are taken. Boots must be thoroughly cleaned, and dirt and soot must be washed off (including the soles) using an appropriate cleaning solution.

11.12.2 –

Body areas contaminated with soot should be pre-cleaned with cold water and soap in an attempt to minimize the penetration of contaminants through open pores and allow the soot to be more easily removed. Thorough body washing with hot water should begin once all visible traces of soot have been removed. Cleaning with organic solvents or substances containing grease should also be avoided as pollutants can dissolve in these products and penetrate into the skin. Final cleaning can be regarded as successful if there are no visible traces of soot after washing with conventional body cleansing products. Only skin care products should be used after a thorough body washing.

11.12.3 –

Clothing that is worn during fire operations must be kept separate at the fire station and properly laundered. Care should be given not to cross-contaminate bedding and personal clothing during the laundering process. Fire fighters and support personnel should not leave the fire station in work clothing that has been contaminated with smoke.

11.13 – Fireground Tactical Consideration — Gross On-Scene Decontamination.

11.13.1 – Strategic Objective.

Gross on-scene contamination is the systematic removal of the byproducts of the fireground from tools, equipment, and PPE. Fire fighters should make efforts to remove all byproducts from their equipment in an effort to promote a healthier environment, including reducing exposure to potential carcinogens and keeping tools and equipment serviceable.

11.13.2 – How it Works.

11.13.2.1 – Wet Decontamination.

Water should be used with soap and/or physical brushing to remove contaminants that have been deposited onto the fire fighters' PPE, tools, and equipment while still on scene. The following are considerations for wet decontamination:

(1) Depending on the situation, gross decontamination may be performed prior to fire fighters doffing PPE or after it has been removed. Considerations must include environmental conditions and potential for contaminating exposed skin through splash or dermal contamination.

(2) Members should brush large debris first and then spray each other with water to remove loose particulates from turnouts and equipment.

(3) Some products of combustion result in a "sticky" deposit on the gear, requiring detergents or other surfactants to remove.

(4) Wet decontamination techniques may temporarily place PPE out of service, and a second set of turnout gear fit to the fire fighter should be put in service where possible.

~~**11.13.2.2** – Dry Decontamination.~~

~~Techniques that do not wet the PPE may be employed depending on the level of contamination, environmental conditions (particularly cold conditions), and materials available on scene. Dry brushing and air-based brushing methods have been proposed as means to remove the toxic products of combustions from the fire fighters. The following are considerations for dry decontamination:~~

(1) ~~If wet decontamination is not an option, dry decontamination should be performed prior to the fire fighter doffing PPE unless there is a medical condition needing immediate attention or other emergency such as running out of air. Specifically, consider the impact of environmental conditions as well as the potential for the breathing of airborne contaminants and cross-contamination of exposed skin.~~

(2) ~~Personnel should initiate off-gassing procedures indicated in 11.5.4 prior to bagging their gear for the return to the station.~~

(3) ~~All fire fighters engaged in suppression activities, overhaul, or exposure to smoke should exchange their contaminated hoods and gloves after exiting the immediately dangerous to life and health (IDLH) environment.~~

~~**11.13.3** – Application.~~

~~**11.13.3.1** – Mitigation of Contaminated PPE.~~

~~**11.13.3.1.1** –~~

~~Upon exiting the hot zone, no PPE should be removed, including the SCBA facepiece.~~

~~**11.13.3.1.2** –~~

~~To reduce exposure to airborne particulates and gasses from off-gassing PPE, the SCBA facepiece should remain in place while doffing remaining PPE components.~~

~~**11.13.3.1.3** –~~

~~If directly returning to the hot zone after an air cylinder change, the following should take place:~~

(1) ~~Dry brush debris from helmet, facepiece, and SCBA prior to change-out.~~

(2) ~~If available, fire fighters engaged in suppression activities or overhaul or who are otherwise exposed to smoke can further reduce contamination by exchanging their contaminated hood for a clean one when they exit the IDLH. Replacement hoods should be readily available on scene.~~

(3) ~~Personnel performing mitigation should wear gloves, eye protection, and suitable PPE for the suspected contaminants.~~

~~**11.13.3.1.4** –~~

~~Prior to removing fire-fighting ensembles worn in the hot zone, an appropriate gross decontamination procedure should be performed to remove potentially harmful contaminants.~~

~~**11.13.3.1.4.1** –~~

~~If wet decontamnation procedures are employed, members should brush large debris first and then spray each other with water to remove loose particulates from turnouts and equipment. Utilizing the pump operator for decontamination should not be allowed due to the lack of respiratory protection. A designated gross decontamination line may be deployed, preferably distant from the pump panel to eliminate overspray and unwanted exposure of the pump operator. Measures should be taken to position the decontamination area upwind of the incident scene in an effort to not expose personnel to more contaminants from smoke. The following should be considered for wet decontamination:~~

(1) ~~Wet mitigation should begin using a fine mist from a decontamination hose line to rinse debris from the helmet, facepiece, SCBA, bunker gear, gloves, and boots.~~

(2) ~~Initial decontamination of all PPE can be completed with a 1-in. hose line utilizing a 10 to 40 gpm (25.4 mm hose line utilizing 37.8 to 151.4 L/m) nozzle or a garden hose.~~

(3) ~~Personnel performing mitigation should wear gloves, eye protection, and suitable PPE for the suspected contaminants.~~

(4) ~~Personnel may require tents or buses to provide privacy and protect against extreme environmental exposure.~~

(5) ~~Tyvek suits should be made available for members as necessary.~~

~~**11.13.3.1.4.2**~~ –

~~During cold weather operations, dry brushing should be conducted to remove the products of combustions from the fire fighters prior to removing respiratory protection and doffing SCBA face pieces. Contaminated PPE that is dry brushed should be allowed to off-gas in an open area away from any firefighting, decontamination, or rehabilitation activities and away from locations where additional contamination may be experienced. Air-based decontamination methods have been proposed and are currently being studied in place of dry brushing techniques. Data on effectiveness and risks/benefits should be available shortly.~~

~~**11.13.3.1.5**~~ –

~~Certain parts of the PPE ensemble cannot be effectively deconned on scene due to their typically porous nature (e.g., hoods and gloves). These parts of the ensemble should be switched out on the scene until they can be properly cleaned in accordance with NFPA 1851.~~

~~**11.13.3.1.6**~~ –

~~After gross decontamination and before eating or drinking, a personal hand washing station, including hand soap and towels, should be set up. In lieu of soap and water, disposable wipes should be utilized for hands, face, and neck. Personnel should wash their hands before rehabilitation, at the end of suppression activities including overhaul, and before returning to the living quarters. The hand wash station or wipes should be available at the entry point to rehabilitation.~~

~~**11.13.3.2**~~ – ~~Containment of Contaminated PPE.~~

~~**11.13.3.2.1**~~ –

~~When released from the incident, fire fighters should place their contaminated turnouts in large, encapsulating leak-proof bags or totes for transport back to the station. Wearing contaminated turnouts back to the fire station will transfer contaminants to apparatus seats, resulting in exposure to the next member who sits there due to cross-contamination.~~

~~**11.13.3.2.2**~~ –

~~To protect hands from dermal absorption of contaminants while packaging turnouts, a minimum of nitrile or latex EMS gloves should be worn. Personnel should shower upon returning to quarters, or as soon as practical.~~

~~**11.13.3.2.3**~~ –

~~Contaminated turnouts, including hood, gloves, boots, and helmets, should be cleaned in accordance with NFPA 1851 or they should be sent out to a designated station or an ISP for cleaning.~~

~~**11.13.3.2.4**~~ –

~~When cleaning contaminated equipment, appropriate PPE [gloves, splash gown, and particulate filtering facepiece (N95 minimum) if equipment is dry and particles could become airborne] should always be worn to protect against exposures from contaminated equipment.~~

~~**11.14**~~ – ~~Fireground Tactical Consideration — Rehabilitation.~~

~~Rehabilitation is an intervention to mitigate against the physical, physiological, and emotional stress of firefighting — in order to sustain a member's energy, improve performance, and decrease likelihood of on-scene injury or death.~~ ~~*(See NFPA 1584.)*~~

~~**11.14.1**~~ – ~~Strategic Objectives.~~

~~Objectives for rehabilitation are to provide a refuge area where personnel who have been engaged in emergency incident activities can be properly rested, cooled, re-hydrated, nourished, and medically and psychologically evaluated to help prevent incident-related illness and/or injury, and to prepare them physically and mentally to be able to continue to perform operational tasks as an incident dictates. Rehabilitation provides a controlled means for on-scene personal hygiene activities to be conducted, monitored, and verified.~~

~~**11.14.2**~~ – ~~How it Works.~~

~~On-scene rehabilitation operations could consider location and services to be provided.~~

~~**11.14.2.1**~~ –

~~The rehabilitation setup should be located in the cold zone and the following should be considered when determining the rehabilitation setup location:~~

(1) ~~Protected from dangerous environmental elements~~

  (2) ~~Smoke, particulate, and radiant heat from the fire~~

  (3) ~~Exhaust fumes~~

  (4) ~~Environmental heat, cold, wind, precipitation, and noise~~

(5) ~~Far enough away from the scene that members may safely remove PPE~~

(6) ~~Located near emergency medical services (EMS)~~

~~**11.14.2.2**~~ –

~~Services provided by rehabilitation should include the following:~~

(1) ~~Relief from incident and environmental conditions~~

(2) ~~Personal hygiene~~

(3) ~~Rest and recovery~~

(4) ~~Rehydration~~

(5) ~~Nourishment~~

(6) ~~Medical monitoring~~

~~**11.14.2.3**~~ –

~~Rehabilitation should operate within the established accountability system. Fire fighters should be tracked as they enter and leave the rehabilitation sector, and their vitals, fluid intake, and what was eaten should be recorded.~~

~~**11.14.3**~~ – ~~Application.~~

~~**11.14.3.1**~~ –

~~Relief from incident and environmental conditions should be provided for the following considerations:~~

(1) ~~When ambient temperature is elevated, shaded areas should be provided at a minimum. For extreme temperatures and high humidity, active cooling may include moving to an air-conditioned area, using misting systems/fans or wet towels, or submersion of extremities in water.~~

(2) ~~When ambient temperatures are low, areas protected from precipitation or overspray from hose streams should be provided. Dry, warm clothing and hot beverages may need to be provided. During extreme cold conditions, structures (temporary or permanent) or large, heated vehicles may be required to provide protection from the elements and personnel warming.~~

11.14.3.2 –

Hygiene practices should be implemented directly into the rehab process for the following considerations:

(1) Skin must be decontaminated so that contamination isn't further distributed through the following:

(2) Eating

(3) Touching other body parts

(4) Exposing members of the rehab team

(5) Turnout coats, pants, helmets, hoods, and SCBA should be removed to allow the following:

(6) Distance from PPE that may be potentially off-gassing chemicals absorbed during the fire event

(7) Cooling of the fire fighter through sweat evaporation from the skin

11.14.3.3 –

Rest and recovery provided by rehabilitation includes providing an environmentally comfortable area to sit down. Typical work/rest ratios recommended for rehabilitation include the following:

(1) 10-minute self-rehabilitation after working for 30 minutes on an SCBA cylinder or 20 minutes of intense work

(2) Formal 20-minute rehabilitation after two 30-minute SCBA cylinders or one 45-minute or 60-minute cylinder or 40 minutes of work without SCBA

11.14.3.3.1 –

Recent studies have shown a significant reduction in typical fire fighters' physical capabilities while working through a second 30-minute bottle or the second half of the first 60-minute bottle.

11.14.3.3.2 –

This same study found that one-third of the fire fighters were unable to complete a second bout of activity. This effect was elevated in fire fighters who were less fit and had a larger body size.

11.14.3.3.3 –

Significant thermal and cardiovascular strain may be experienced during outside ventilation operations that may not result in significant consumption of air. This effect can be further exacerbated by elevated ambient temperatures and direct sun exposure. Yet, the fire fighter may not have worked through SCBA.

11.14.3.3.4 –

Exposures on the fireground may be significant for exterior operations (command officers, engineers), yet prompts for rehab may not come from SCBA usage.

11.14.3.4 –

Replenishing lost fluids and expended fuels is critical and should include consideration of the following:

(1) Rehydration should be actively provided since a large portion of the human body is water. At a minimum, it is recommended that water be consumed during air bottle changes and during rehabilitation. Additional water should be consumed after the incident. Sports drinks with electrolytes may be desirable during prolonged incidents and are typically recommended after water. Carbonated and energy drinks should be avoided.

(2) Very cold incidents may necessitate hot beverages.

(3) Excessive fat and empty calories should be avoided.

11.14.3.5 –

Rehabilitation staffers should continually monitor personnel for signs of exhaustion, stress, and/or physical injury. Vital signs should be recorded upon entry, every 10 minutes and before exit from rehabilitation.

Statement of Problem and Substantiation for Public Comment

This chapter is outside the scope of this document and conflicts with the scope of the Technically Committee for Occupational Safety and Health. The material contained in this proposed chapter may conflict with material that the OSH TC has incorporated in to their documents. The NFPA's correlation mechanism for issues such as this is for technical committees to limit requirements in their documents to material within their scope.

Related Item

- Chapter 11

Submitter Information Verification

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Public Comment No. 56-NFPA 1700-2018 [Chapter 11]

~~**Chapter 11** – Exposure and Hygiene Considerations~~

~~**11.1** – Scope.~~

~~This chapter provides the fundamental linkage between fire dynamics research and the need for implementing health hygiene policies for the fire service.~~

~~**11.2** – Purpose.~~

~~The purpose of this chapter is to provide science-based information to fire-fighting personnel regarding procedures to minimize the exposure and health risks of firefighting.~~

~~**11.3** – Application.~~

~~The intent of this chapter is to apply the principles of science-based research to minimize fire fighters' risk on the fireground and reduce secondary impacts before and after the incident.~~

~~**11.4** – General.~~

~~Cancer is one of the leading causes of line-of-duty deaths among fire fighters today. Fire-fighting duties significantly increase an individual's risks for contracting several types of cancers. Cancer rates for fire fighters have risen dramatically in correlation with the increase in toxicity of smoke. Smoke from a fire always contains contaminants, which are harmful to health when these toxins enter the body via mouth, respiratory tract, mucous tissue, or skin. During working fire responses ("hot smoke"), these contaminants occur in high concentrations as gases, which are easily absorbed. During overhaul operations or other lower heat conditions ("cold smoke"), contaminants may be bonded to soot, run off water, or ash. Additional hazards at the fireground may be caused by hazardous materials, such as asbestos or flame-retardant materials found in the products of combustion.~~

~~**11.4.1** –~~

~~Prior to complete fire suppression, combustion products are released as smoke. Initially many of these substances are mobile. The toxic and/or caustic gases and vapors that occur in high concentrations during this phase, such as carbon monoxide (CO), carbon dioxide (CO_2), hydrogen chloride (HCl, hydrochloric acid when condensed), acrolein, and hydrogen cyanide (HCN, prussic acid when condensed), constitute a potential hazard for operating members and civilians. The smoke plume must be considered when the incident commander designates the hot zone at an operation.~~

~~**11.4.2** –~~

~~Once the fire has been extinguished and the burnt materials have cooled down to ambient temperature, hazardous organic substances, in particular soot particles, are still present. Operating personnel continue to have the potential for contamination, and members continue to utilize the appropriate level of personal protective equipment (PPE), including respiratory protection. Care must be taken not to transport contaminants outside the hot zone.~~

~~**11.4.3** –~~

~~There are three primary ways in which airborne harmful substances produced by fires can make their way into the body: via inhalation, via skin absorption, and via the mouth (orally). Fire fighters should be aware of good hygiene practices to minimize their exposure to harmful substances both on scene and post-incident. Ensuring fire fighters have the proper tools, processes, and knowledge is essential in minimizing exposure to harmful substances involved with structural firefighting.~~

~~**11.4.4** –~~

~~Fire fighters can protect themselves to a great extent by limiting exposure and conducting fireground decontamination. During and after extinguishing the fire, respiratory protection should be worn when contaminants are present. To further limit exposures, the incident commander (IC) should establish zones on the fireground similar to those commonly accepted at the scene of a haz-mat release (hot, warm, cold). Operating apparatus should, if possible, be positioned outside the hot zone, and effort should be made to limit entry of smoke into the crew compartment by closing cab windows and additional openings. Structural fire-fighting gear will continue to off gas after the fire fighter leaves the hot zone. PPE should be removed prior to removing the face piece (as dictated by best practices).~~

~~**11.4.5**~~ –

~~A critical on-scene tactical consideration is setting up decontamination and rehabilitation areas. Gross on-scene decontamination of PPE and fire-fighting equipment should be undertaken in the warm zone prior to PPE or equipment being removed to the cold zone and placed back on the fire apparatus. If necessary, contaminated PPE and equipment should be bagged and transported back to the station outside the crew compartment. In the cold zone adjacent to the rehabilitation areas, rehabilitation should be set up where drinking and eating is permissible.~~

~~**11.4.6**~~ –

~~Upon return to the fire station, personnel who were exposed to smoke and contaminants in the hot zone should shower immediately. Clothing should be laundered at the station and not transported in a private vehicle to a member's home. Contaminated equipment should be thoroughly cleaned before being placed back into service~~

~~**11.5**~~ – ~~On Scene.~~

~~The fireground size up conducted by the IC must take smoke production and associated contaminants' potential impact on operating members, equipment, civilians, and the environment into account. Special consideration may be given under certain circumstances when known hazardous materials are burning to let the fire continue to burn under controlled conditions.~~

~~**11.5.1**~~ –

~~During and after extinguishing the fire, respiratory protection should be worn when contaminants are present. Lack of visible contaminants does not mean that the environment is free from contaminants; therefore, strict compliance with respiratory protection must be enforced. The IC should establish zones on the fireground similar to those commonly accepted at the scene of a hazardous materials release. A hot, warm, and cold zone should be designated, and appropriate levels of PPE should be required in the designated zones. The contamination zones are to be set as follows: hot zones for contaminated areas; warm zones to designate where gross on-scene decontamination takes place, decontaminated PPE is doffed, and contaminated equipment is stored; and cold zones for debriefings and rehabilitation. The incident commander should take into account the travel of the smoke plume when designating the perimeter of the hot zone.~~

~~**11.5.2**~~ –

~~The IC should limit the amount of operating personnel assigned to the hot zone. The fireground must always be secured and cordoned off during fire operations, removing non-essential personnel, civilians, apparatus, and equipment from the hot zone where contamination may occur. The incident commander should provide for timely relief of members operating in the hot zone to limit individual exposure to the lowest possible limits. Crews should be rotated when possible to reduce exposure and thermal risks to fire fighters. Chemicals found on the fireground pose an immediate threat to the respiratory tract if self-contained breathing apparatus (SCBA) is not worn and there is a latent threat through cutaneous exposure. Time influences the levels of airborne chemicals post knock-down; if crews are able to exit the structure as soon as reasonably possible and allow for the chemicals to dissipate naturally, their exposure will be reduced. Timely replacement of crews working in the fire structure and allowing them to rehabilitate can also reduce the exposure times of individual crews.~~

~~**11.5.3**~~ –

~~Fire engine cabs should be kept shut during operations and aired out briefly when operations have ended. After the fire has been extinguished, involved and contaminated rooms should be ventilated for a sufficient time prior to entry without respiratory protection for investigation purposes. Known carcinogens and hazardous chemicals can attach themselves to PPE and exposed skin. Proper use of PPE, including SCBA, is important and can minimize the smoke exposure risks to fire fighters. Members, apparatus, and equipment in the hot zone should be decontaminated. PPE that has been contaminated should be removed while using respiratory protection and placed in an area remote from operating personnel. This procedure will limit the exposure of operating personnel to the off gassing of contaminants from the PPE. Contaminated gear should not be removed from the warm zone unless decontaminated or bagged. Personnel working with equipment contaminated during a structure fire should use nitrile or latex emergency medical services (EMS) gloves and particulate filtering facepiece (N95 minimum) during the cleaning process.~~

~~**11.5.4**~~ –

~~Upon doffing of PPE, gear should be allowed to "air out" and off-gas volatile compounds released in the open air, upwind from the fire and away from personnel who are working on the incident and in decontamination or rehabilitation. Prior to transport of contaminated gear, it should be encapsulated utilizing an airtight container. The container should be of sufficient size and strength to contain all contaminated gear, including turnouts, helmet, mask, gloves, and boots. The contaminated gear should be placed outside of the passenger compartment. Gear should be transported in a similar manner to a facility with a specialized PPE washer (i.e., extractor) or to an independent service provider (ISP). The fire department should attempt to complete as much of the decontamination process on scene as possible to reduce exposures in the fire station. When possible, departments should hold responding companies out of service until the decontamination process is complete.~~

~~**11.5.5**~~ –

~~Gross on-scene decontamination of PPE and fire-fighting equipment should be undertaken on the fireground prior to PPE or equipment being placed back on the fire apparatus. The criterion for successful pre-cleaning is the removal of all visible traces of soot. PPE with traces of soot should be kept outside the crew compartment or transported separately. The pre-cleaned equipment should also be transported separately and only placed back into service when final decontamination is complete.~~

~~**11.5.6**~~ –

~~Gross on-scene decontamination of personnel should occur as soon as possible after the operating member exits the hot zone. After the fire, fire fighters who operated in the hot zone should immediately remove soot from the head and neck using skin cleansing wipes or soap and water washing if available. Wipes should be used during air cylinder changes and in rehabilitation areas between operational periods whenever possible. Gross on-scene decontamination should also be used prior to entering the rehabilitation area and consumption of fluids and/or food. Drinking and eating is permissible outside the area where smoke and contamination can occur after operating personnel have removed contaminated gear, conducted a gross on-scene decontamination, and thoroughly washed hands and faces. Washing can be considered as adequate when there are no visible traces of soot afterwards.~~

~~**11.6**~~ – ~~Post-Incident.~~

~~On returning to quarters, fire fighters should ensure gear is cleaned in accordance with Chapter 7 of NFPA 1851 immediately after the fire has been extinguished and fire-fighting operations have concluded. Contaminated equipment should be initially cleaned on scene prior to being stored on the fire apparatus. Contaminated apparatus should be cleaned prior to leaving the scene.~~

~~**11.6.1**~~ –

~~No equipment, including SCBA, should be stored in the passenger compartment prior to decontamination. Crews should provide detailed cleaning of all contaminated tools, equipment, and apparatus while utilizing particulate filtering facepiece (N95 minimum) and nitrile or latex EMS gloves during the station decontamination process. Personnel should not enter clean areas of the station until they have completed the entire decontamination process.~~

~~**11.6.2**~~ –

~~With proper use of PPE at structure fires, most contaminants will likely remain outside the epidermis; however, a wash down on scene and a shower at quarters could reduce further exposure. After equipment has been decontaminated, fire fighters should shower as soon as possible to decontaminate their person. Care should be used to clean finger nails and other areas prone to absorption.~~

~~**11.6.3**~~ –

~~Personnel should utilize fresh uniforms when entering the clean areas of the fire station. After showering and changing to a clean uniform, any tools should be removed from turnouts and laundered in an extractor or repackaged for transport to a designated cleaning station or ISP. Departments should maintain documentation of gross exposures or contaminations in fire-fighter records.~~

~~**11.7**~~ – ~~Suppression Specific Concerns.~~

~~Interior operations during live fire response typically expose fire fighters to the highest thermal conditions (heat flux and ambient temperatures) and highest concentration of fireground chemicals. As a result, the environmental risk is typically considered maximum for this group of fire fighters. Fire fighters working on the interior of the structure are most likely to be wearing a full complement of fire-fighting PPE. This reduces the risk for contamination and burn injuries but increases the physiological and thermal strain of the operations. PPE also increases the restrictions on movement and range of motion, increasing risk for slips, trips, and falls; overexertion; and other biomechanics-related injuries.~~

~~**11.8** – Incident Commander and Driver/Operator Specific Concerns.~~

~~Exterior operations of incident command, engineer, and safety officers are often conducted with a reduced set of PPE due to the perceived reduced risk. As a result, breathing protection is often not worn. Skin exposures potential due to the lack of PPE or incomplete closure of PPE (even not wearing a hood) are increased. Significant exposures are still possible on the exterior of the structure due to incomplete lift of the smoke plume, diesel exhaust from operating apparatus (a known carcinogen), and radiant heat from exterior plumes and exposure to sun.~~

~~**11.9** – Overhaul Specific Concerns.~~

~~After extinguishing the main body of fire, the IC should be aware that potential chemical exposure will remain elevated due to the continued chemical breakdown and off gassing of structural elements and furnishings. Many of these contaminants will be present in hazardous levels even when the environment appears free of visible smoke. Strict use of all PPE must continue in the post-control phase of operations in the hot zone. The number of operating members in the hot zone should be kept to the necessary minimum to limit exposure. Non-deployed members should be stationed in the cold zone to limit chemical exposure.~~

~~**11.9.1** –~~

~~Overhaul operations are often viewed as reduced risk due to the lack of working fire conditions and the apparent heat and smoke production. Despite the apparent reduction in risk during overhaul, full PPE should be worn throughout operations. Significant physical exertion is required during overhaul operations, increasing metabolic heat generation inside the PPE. As a result, high core and skin temperatures have been measured during overhaul operations.~~

~~**11.9.2** –~~

~~Ventilation is an important step to ensure that the environment becomes more tenable and ambient temperatures are reduced for the crews operating on the fireground. Studies have evaluated ventilation techniques related to the levels of toxicants, showing a reduction of airborne levels. However, toxicant levels rapidly increased when ventilation was discontinued. Care should be taken while using gas-powered fans that may increase carbon monoxide (CO) levels within the structure.~~

~~**11.9.3** –~~

~~Discerning and quantifying the gasses and particulates present not only indicates when it is safe to doff SCBA, it provides the information that dictates proper decontamination and post-fire medical monitoring. The ability to monitor the air for particulates and harmful toxicants provides the best information to fireground personnel. However, current technology is limited. A four-gas or six-gas meter may not be adequate to effectively analyze the fireground, particularly for gasses other than those directly measured by the meter itself. A simple CO detector, or any other detection device by itself, cannot be relied upon to make this determination.~~

~~**11.10** – Apparatus.~~

~~Operating apparatus should be positioned outside the hot zone in an effort to limit contamination whenever possible. Closing cab windows and additional openings will limit contamination of the crew cab. The exposure of operating apparatus and equipment to smoke and contaminants should be avoided wherever possible. Operating apparatus and equipment that has been severely contaminated with smoke and contaminants should receive a gross on-scene decontamination prior to leaving the scene.~~

~~**11.10.1** –~~

~~Dust found inside apparatus has been found to be significantly contaminated. Apparatus windows left open during a working fire can result in smoke transport through the cab, which can deposit on surfaces. Wearing contaminated turnouts back to the fire station will transfer contaminants to apparatus seats, resulting in exposure to the next member who sits there due to cross-contamination. Storing and transporting contaminated PPE within the apparatus cab, particularly with closed windows, can lead to an increase in the concentration of compounds off-gassing from PPE. Decontamination, particularly of soft surfaces, of the cab is challenging.~~

~~**11.10.2** –~~

~~Diesel exhaust is a known carcinogen. Where possible, apparatus should be placed so that the exhaust will not be upwind from operational personnel. In particular, engineers and command personnel without respiratory protection should not operate downwind from apparatus where feasible. Newer apparatus have improved emission controls, which has reduced their particulate contamination. However, this does not mean that it has removed all gasses of concern.~~

11.11 – Support Personnel.

PPE worn by support personnel should be appropriate for the services provided. Non-fire-service personnel often support air bottle changes and may assist with decontamination and rehabilitation. Nitrile or latex EMS gloves and potentially airway protection should be provided to reduce risk to these individuals.

11.12 – Operational Hygiene at the Fire Station.

Science-based research has characterized the significant level of contamination that is occurring on the fireground. Appropriate measures must be taken during the pre-control as well as the post-control phases of the fire control operations to limit exposure and decontaminate appropriately. Fireground exposure poses an ongoing health risk to civilians and fire-fighting personnel. Operating apparatus and equipment must be thoroughly decontaminated after every operation.

11.12.1 –

PPE should be laundered in an industrial extractor after exposed to smoke and contaminants on the fireground. Members who operated in the hot zone should be considered contaminated, and the IC should ensure that proper decontamination measures are taken. Boots must be thoroughly cleaned, and dirt and soot must be washed off (including the soles) using an appropriate cleaning solution.

11.12.2 –

Body areas contaminated with soot should be pre-cleaned with cold water and soap in an attempt to minimize the penetration of contaminants through open pores and allow the soot to be more easily removed. Thorough body washing with hot water should begin once all visible traces of soot have been removed. Cleaning with organic solvents or substances containing grease should also be avoided as pollutants can dissolve in these products and penetrate into the skin. Final cleaning can be regarded as successful if there are no visible traces of soot after washing with conventional body cleansing products. Only skin care products should be used after a thorough body washing.

11.12.3 –

Clothing that is worn during fire operations must be kept separate at the fire station and properly laundered. Care should be given not to cross-contaminate bedding and personal clothing during the laundering process. Fire fighters and support personnel should not leave the fire station in work clothing that has been contaminated with smoke.

11.13 – Fireground Tactical Consideration — Gross On-Scene Decontamination.

11.13.1 – Strategic Objective.

Gross on-scene contamination is the systematic removal of the byproducts of the fireground from tools, equipment, and PPE. Fire fighters should make efforts to remove all byproducts from their equipment in an effort to promote a healthier environment, including reducing exposure to potential carcinogens and keeping tools and equipment serviceable.

11.13.2 – How it Works.

11.13.2.1 – Wet Decontamination.

Water should be used with soap and/or physical brushing to remove contaminants that have been deposited onto the fire fighters' PPE, tools, and equipment while still on scene. The following are considerations for wet decontamination:

(1) Depending on the situation, gross decontamination may be performed prior to fire fighters doffing PPE or after it has been removed. Considerations must include environmental conditions and potential for contaminating exposed skin through splash or dermal contamination.

(2) Members should brush large debris first and then spray each other with water to remove loose particulates from turnouts and equipment.

(3) Some products of combustion result in a "sticky" deposit on the gear, requiring detergents or other surfactants to remove.

(4) Wet decontamination techniques may temporarily place PPE out of service, and a second set of turnout gear fit to the fire fighter should be put in service where possible.

11.13.2.2 – Dry Decontamination.

Techniques that do not wet the PPE may be employed depending on the level of contamination, environmental conditions (particularly cold conditions), and materials available on scene. Dry brushing and air-based brushing methods have been proposed as means to remove the toxic products of combustions from the fire fighters. The following are considerations for dry decontamination:

(1) If wet decontamination is not an option, dry decontamination should be performed prior to the fire fighter doffing PPE unless there is a medical condition needing immediate attention or other emergency such as running out of air. Specifically, consider the impact of environmental conditions as well as the potential for the breathing of airborne contaminants and cross-contamination of exposed skin.

(2) Personnel should initiate off-gassing procedures indicated in 11.5.4 prior to bagging their gear for the return to the station.

(3) All fire fighters engaged in suppression activities, overhaul, or exposure to smoke should exchange their contaminated hoods and gloves after exiting the immediately dangerous to life and health (IDLH) environment.

11.13.3 – Application.

11.13.3.1 – Mitigation of Contaminated PPE.

11.13.3.1.1 –

Upon exiting the hot zone, no PPE should be removed, including the SCBA facepiece.

11.13.3.1.2 –

To reduce exposure to airborne particulates and gasses from off-gassing PPE, the SCBA facepiece should remain in place while doffing remaining PPE components.

11.13.3.1.3 –

If directly returning to the hot zone after an air cylinder change, the following should take place:

(1) Dry brush debris from helmet, facepiece, and SCBA prior to change-out.

(2) If available, fire fighters engaged in suppression activities or overhaul or who are otherwise exposed to smoke can further reduce contamination by exchanging their contaminated hood for a clean one when they exit the IDLH. Replacement hoods should be readily available on scene.

(3) Personnel performing mitigation should wear gloves, eye protection, and suitable PPE for the suspected contaminants.

11.13.3.1.4 –

Prior to removing fire-fighting ensembles worn in the hot zone, an appropriate gross decontamination procedure should be performed to remove potentially harmful contaminants.

11.13.3.1.4.1 –

If wet decontamnation procedures are employed, members should brush large debris first and then spray each other with water to remove loose particulates from turnouts and equipment. Utilizing the pump operator for decontamination should not be allowed due to the lack of respiratory protection. A designated gross decontamination line may be deployed, preferably distant from the pump panel to eliminate overspray and unwanted exposure of the pump operator. Measures should be taken to position the decontamination area upwind of the incident scene in an effort to not expose personnel to more contaminants from smoke. The following should be considered for wet decontamination:

(1) Wet mitigation should begin using a fine mist from a decontamination hose line to rinse debris from the helmet, facepiece, SCBA, bunker gear, gloves, and boots.

(2) Initial decontamination of all PPE can be completed with a 1-in. hose line utilizing a 10 to 40 gpm (25.4 mm hose line utilizing 37.8 to 151.4 L/m) nozzle or a garden hose.

(3) Personnel performing mitigation should wear gloves, eye protection, and suitable PPE for the suspected contaminants.

(4) Personnel may require tents or buses to provide privacy and protect against extreme environmental exposure.

(5) Tyvek suits should be made available for members as necessary.

~~**11.13.3.1.4.2**~~ –

~~During cold weather operations, dry brushing should be conducted to remove the products of combustions from the fire fighters prior to removing respiratory protection and doffing SCBA face pieces. Contaminated PPE that is dry brushed should be allowed to off-gas in an open area away from any firefighting, decontamination, or rehabilitation activities and away from locations where additional contamination may be experienced. Air-based decontamination methods have been proposed and are currently being studied in place of dry brushing techniques. Data on effectiveness and risks/benefits should be available shortly.~~

~~**11.13.3.1.5**~~ –

~~Certain parts of the PPE ensemble cannot be effectively deconned on scene due to their typically porous nature (e.g., hoods and gloves). These parts of the ensemble should be switched out on the scene until they can be properly cleaned in accordance with NFPA 1851.~~

~~**11.13.3.1.6**~~ –

~~After gross decontamination and before eating or drinking, a personal hand washing station, including hand soap and towels, should be set up. In lieu of soap and water, disposable wipes should be utilized for hands, face, and neck. Personnel should wash their hands before rehabilitation, at the end of suppression activities including overhaul, and before returning to the living quarters. The hand wash station or wipes should be available at the entry point to rehabilitation.~~

~~**11.13.3.2**~~ – ~~Containment of Contaminated PPE.~~

~~**11.13.3.2.1**~~ –

~~When released from the incident, fire fighters should place their contaminated turnouts in large, encapsulating leak-proof bags or totes for transport back to the station. Wearing contaminated turnouts back to the fire station will transfer contaminants to apparatus seats, resulting in exposure to the next member who sits there due to cross-contamination.~~

~~**11.13.3.2.2**~~ –

~~To protect hands from dermal absorption of contaminants while packaging turnouts, a minimum of nitrile or latex EMS gloves should be worn. Personnel should shower upon returning to quarters, or as soon as practical.~~

~~**11.13.3.2.3**~~ –

~~Contaminated turnouts, including hood, gloves, boots, and helmets, should be cleaned in accordance with NFPA 1851 or they should be sent out to a designated station or an ISP for cleaning.~~

~~**11.13.3.2.4**~~ –

~~When cleaning contaminated equipment, appropriate PPE [gloves, splash gown, and particulate filtering facepiece (N95 minimum) if equipment is dry and particles could become airborne] should always be worn to protect against exposures from contaminated equipment.~~

~~**11.14**~~ – ~~Fireground Tactical Consideration — Rehabilitation.~~

~~Rehabilitation is an intervention to mitigate against the physical, physiological, and emotional stress of firefighting — in order to sustain a member’s energy, improve performance, and decrease likelihood of on-scene injury or death. *(See NFPA 1584.)*~~

~~**11.14.1**~~ – ~~Strategic Objectives.~~

~~Objectives for rehabilitation are to provide a refuge area where personnel who have been engaged in emergency incident activities can be properly rested, cooled, re-hydrated, nourished, and medically and psychologically evaluated to help prevent incident-related illness and/or injury, and to prepare them physically and mentally to be able to continue to perform operational tasks as an incident dictates. Rehabilitation provides a controlled means for on-scene personal hygiene activities to be conducted, monitored, and verified.~~

~~**11.14.2**~~ – ~~How it Works.~~

~~On-scene rehabilitation operations could consider location and services to be provided.~~

11.14.2.1 –

The rehabilitation setup should be located in the cold zone and the following should be considered when determining the rehabilitation setup location:

(1) Protected from dangerous environmental elements

(2) Smoke, particulate, and radiant heat from the fire

(3) Exhaust fumes

(4) Environmental heat, cold, wind, precipitation, and noise

(5) Far enough away from the scene that members may safely remove PPE

(6) Located near emergency medical services (EMS)

11.14.2.2 –

Services provided by rehabilitation should include the following:

(1) Relief from incident and environmental conditions

(2) Personal hygiene

(3) Rest and recovery

(4) Rehydration

(5) Nourishment

(6) Medical monitoring

11.14.2.3 –

Rehabilitation should operate within the established accountability system. Fire fighters should be tracked as they enter and leave the rehabilitation sector, and their vitals, fluid intake, and what was eaten should be recorded.

11.14.3 – Application.

11.14.3.1 –

Relief from incident and environmental conditions should be provided for the following considerations:

(1) When ambient temperature is elevated, shaded areas should be provided at a minimum. For extreme temperatures and high humidity, active cooling may include moving to an air-conditioned area, using misting systems/fans or wet towels, or submersion of extremities in water.

(2) When ambient temperatures are low, areas protected from precipitation or overspray from hose streams should be provided. Dry, warm clothing and hot beverages may need to be provided. During extreme cold conditions, structures (temporary or permanent) or large, heated vehicles may be required to provide protection from the elements and personnel warming.

~~**11.14.3.2**~~ –

~~Hygiene practices should be implemented directly into the rehab process for the following considerations:~~

(1) ~~Skin must be decontaminated so that contamination isn't further distributed through the following:~~

(2) ~~Eating~~

(3) ~~Touching other body parts~~

(4) ~~Exposing members of the rehab team~~

(5) ~~Turnout coats, pants, helmets, hoods, and SCBA should be removed to allow the following:~~

(6) ~~Distance from PPE that may be potentially off-gassing chemicals absorbed during the fire event~~

(7) ~~Cooling of the fire fighter through sweat evaporation from the skin~~

~~**11.14.3.3**~~ –

~~Rest and recovery provided by rehabilitation includes providing an environmentally comfortable area to sit down. Typical work/rest ratios recommended for rehabilitation include the following:~~

(1) ~~10-minute self-rehabilitation after working for 30 minutes on an SCBA cylinder or 20 minutes of intense work~~

(2) ~~Formal 20-minute rehabilitation after two 30-minute SCBA cylinders or one 45-minute or 60-minute cylinder or 40 minutes of work without SCBA~~

~~**11.14.3.3.1**~~ –

~~Recent studies have shown a significant reduction in typical fire fighters' physical capabilities while working through a second 30-minute bottle or the second half of the first 60-minute bottle.~~

~~**11.14.3.3.2**~~ –

~~This same study found that one-third of the fire fighters were unable to complete a second bout of activity. This effect was elevated in fire fighters who were less fit and had a larger body size.~~

~~**11.14.3.3.3**~~ –

~~Significant thermal and cardiovascular strain may be experienced during outside ventilation operations that may not result in significant consumption of air. This effect can be further exacerbated by elevated ambient temperatures and direct sun exposure. Yet, the fire fighter may not have worked through SCBA.~~

~~**11.14.3.3.4**~~ –

~~Exposures on the fireground may be significant for exterior operations (command officers, engineers), yet prompts for rehab may not come from SCBA usage.~~

~~**11.14.3.4**~~ –

~~Replenishing lost fluids and expended fuels is critical and should include consideration of the following:~~

(1) ~~Rehydration should be actively provided since a large portion of the human body is water. At a minimum, it is recommended that water be consumed during air bottle changes and during rehabilitation. Additional water should be consumed after the incident. Sports drinks with electrolytes may be desirable during prolonged incidents and are typically recommended after water. Carbonated and energy drinks should be avoided.~~

(2) ~~Very cold incidents may necessitate hot beverages.~~

(3) ~~Excessive fat and empty calories should be avoided.~~

~~**11.14.3.5**~~ –

~~Rehabilitation staffers should continually monitor personnel for signs of exhaustion, stress, and/or physical injury. Vital signs should be recorded upon entry, every 10 minutes and before exit from rehabilitation.~~

Statement of Problem and Substantiation for Public Comment

This chapter should be it's own stand alone standard or rolled into an updated NFPA 1584. The financial burden alone from the clean cab section would deter many departments from adopting the standard as is. There is already a standard on fireground rehab, maybe this section would be a better fit there

Related Item

- Decon

Submitter Information Verification

Submitter Full Name:	Shawn Donovan
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Submittal Date:	Mon Oct 15 19:08:35 EDT 2018
Committee:	FCO-AAA

Public Comment No. 62-NFPA 1700-2018 [Section No. 11.13.2.2]

11.13.2.2 Dry Decontamination.

Techniques that do not wet the PPE may be employed depending on the level of contamination, environmental conditions (particularly cold conditions), and materials available on scene. Dry brushing and air-based brushing methods have been proposed as means to remove the toxic products of combustions from the fire fighters. The following are considerations for dry decontamination:

(1) If wet decontamination is not an option, dry decontamination should be performed prior to the fire fighter doffing PPE unless there is a medical condition needing immediate attention or other emergency such as running out of air. Specifically, consider the impact of environmental conditions as well as the potential for the breathing of airborne contaminants and cross-contamination of exposed skin.

(2) ~~Personnel should initiate off-gassing procedures indicated~~ <u>When feasible, personnel should allow PPE to off-gas as described</u> in 11.5.4 prior to bagging their gear for the return to the station.

(3) All fire fighters engaged in suppression activities, overhaul, or exposure to smoke should exchange their contaminated hoods and gloves after exiting the immediately dangerous to life and health (IDLH) environment.

Statement of Problem and Substantiation for Public Comment

Clarifying language. The term 'off gassing procedure' is not used and misleading.

Related Item

• FR40

Submitter Information Verification

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Submittal Date: Wed Oct 24 10:23:10 EDT 2018
Committee: FCO-AAA

Public Comment No. 4-NFPA 1700-2018 [Section No. 12.5.3]

~~12~~

~~.~~

~~5.3~~

~~An interior fire control and primary search should be implemented as soon as the visible fire is controlled.~~

Statement of Problem and Substantiation for Public Comment

The point as written states all fires need to be attacked from the exterior before any interior operations can be conducted.
This decision should not be taken away from IC's. Interior operations should begin as soon as possible in areas uninvolved with fire.
Attacking visible fire on the 2nd or 3rd floor leaves the floors below available for primary search and handline advancement.

Related Item

- Visible fire

Submitter Information Verification

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Committee:	FCO-AAA

Public Comment No. 63-NFPA 1700-2018 [Section No. 12.9.7]

12.9.7

Large open areas include long spans typically using lightweight truss construction. These structural characteristics can lead to early structural failure, primarily roof and floor collapse. ~~For the reasons mentioned, vertical ventilation should not be utilized due to the potential for early collapse.~~ Incident commanders should thoroughly consider the risks and benefits before assigning crews to perform roof operations such as vertical ventilation.

Statement of Problem and Substantiation for Public Comment

Last two sentences of this section provide conflicting guidance; the first saying vertical ventilation should not be utilized and the second suggesting a risk-benefit analysis be performed prior to vertical ventilation. I believe consideration of the risk-benefit trade off to be more appropriate language for the Guide.

Related Item

- FR47

Submitter Information Verification

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Submittal Date: Wed Oct 24 10:29:49 EDT 2018
Committee: FCO-AAA

Public Comment No. 13-NFPA 1700-2018 [Section No. 12.11.3]

12.11.3

An interior attack and primary search should be implemented as soon as ~~the visible fire is controlled.~~ resources are available.

Statement of Problem and Substantiation for Public Comment

The current language limits the ability of a department to begin interior fire attack and searches until visible fire is extinguished. In some cases the most effective tactic may be an interior attack. This section should either be changed or deleted.

Related Item

- Ability of departmets to choose the correct action

Submitter Information Verification

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Submittal Date: Sun Sep 16 20:51:45 EDT 2018
Committee: FCO-AAA

Public Comment No. 6-NFPA 1700-2018 [Section No. 12.11.3]

~~**12.11.3**~~ –

~~An interior attack and primary search should be implemented as soon as the visible fire is controlled.~~

Statement of Problem and Substantiation for Public Comment

Proposing "Visible fire knocked down" before entry is essentially proposing all fires be attacked from the outside first, AKA transitional. This takes tactical decisions away from IC. This statement is literally mandating transitional attack and/or a "see fire-hit fire" mentality instead of allowing crews to prioritize tactical objectives based on the knowledge of their area, resources, and staffing. Also resetting a fire before search is even attempted runs contrary to a previous point about initiating evacuation.

Related Item

- visible fire

Submitter Information Verification

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Submittal Date: Sun Sep 16 13:33:47 EDT 2018

Committee: FCO-AAA

Public Comment No. 15-NFPA 1700-2018 [Section No. 12.13]

12.13 Abandoned and Vacant Structures.

Abandoned ~~and vacant structures~~ are buildings that are no longer in use, and in many cases are in an unknown state of condition or compromise, which could result in weakened structural components, holes in floors, and structural deficiencies. Vacant structures may just not be occupied but are not deteriorated the same as abandoned streuctures may be. The following should be considered when controlling fires in these structures:

(1) An exterior fire control should ~~be used~~ be considered to control the fire prior to entry.

(2) Early collapse should be anticipated.

(3) Gutted, deteriorated, and modified interiors can result in unpredictable and increased fire activity. These conditions may impede normal fire-fighting operations.

(4) Reports of squatters and transients should be ~~verified before rescue operations are considered. As such, an evaluation of occupant survivability and rescue potential should be made~~ treated the same as any other report of victims. Personnel should factor the condition of the structure into their operations .

Statement of Problem and Substantiation for Public Comment

Vacant structures are not necessarily derelict. Binding Departments to a broad brush consideration may cause their decision making to be affected.

Without a definition of how "reports of squatters" should be verified, the last sentence essentially writes them off.

Related Item

- Limits the departments ability to make decisions

Submitter Information Verification

Submitter Full Name: David LeBlanc

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City:

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Submittal Date: Sun Sep 16 21:05:54 EDT 2018

Committee: FCO-AAA

Public Comment No. 64-NFPA 1700-2018 [Section No. 12.13]

12.13 Abandoned and Vacant Structures.

Abandoned and vacant structures are buildings that are no longer in use, and in many cases are in an unknown state of condition or compromise, which could result in weakened structural components, holes in floors, and structural deficiencies. The following should be considered when controlling fires in these structures:

(1) ~~An exterior~~ Exterior fire control should be ~~used to control the fire~~ considered prior to entry.

(2) Early collapse should be anticipated.

(3) Gutted, deteriorated, and modified interiors can result in unpredictable and increased fire activity. These conditions may impede normal fire-fighting operations.

(4) ~~Reports of~~ Occupancy by squatters and transients should be ~~verified before rescue operations are~~ considered. As such, an evaluation of occupant survivability and rescue potential should be made.

Statement of Problem and Substantiation for Public Comment

Cleaning up language in bullet #1. Original language in bullet #4 (prior to changes in FR47) was more appropriate to a guide. It is not clear why consideration for rescue operations should be delayed until after verification of squatters and transients.

Related Item

• FR47

Submitter Information Verification

Submitter Full Name: Gavin Horn

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City:

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Zip:

Submittal Date: Wed Oct 24 10:35:52 EDT 2018

Committee: FCO-AAA

Public Comment No. 7-NFPA 1700-2018 [Section No. 12.13]

12.13 Abandoned and Vacant Structures.

Abandoned and vacant structures are buildings that are no longer in use, and in many cases are in an unknown state of condition or compromise, which could result in weakened structural components, holes in floors, and structural deficiencies. The following should be considered when controlling fires in these structures:

(1) An exterior fire control should be used to control the fire prior to entry.

(2) Early collapse should be anticipated.

(3) Gutted, deteriorated, and modified interiors can result in unpredictable and increased fire activity. These conditions may impede normal fire-fighting operations.

(4) Reports of squatters and transients should be ~~verified before rescue operations are considered~~ treated the same manner as structures that appear to be occupied . As such, an evaluation of occupant survivability and rescue potential should be made.

Statement of Problem and Substantiation for Public Comment

We cannot treat homeless and/or transients as if their lives are less valuable than people who can afford to live in better maintained properties. As a fire department we treat all reports of occupants the same and do the same risk analysis before committing our members to chance of saving a life.

Related Item

• Vacant

Submitter Information Verification

Submitter Full Name: Shawn Donovan
Organization: Boston Fire Dept
Street Address:
City:
State:
Zip:
Submittal Date: Sun Sep 16 13:38:05 EDT 2018
Committee: FCO-AAA

Public Comment No. 9-NFPA 1700-2018 [Section No. 12.15.1]

12.15.1

Key risk factors for warehouse fires include the following:

(1) Construction features including construction type, total building size, details of fire-rated enclosures, and the presence of large open fire areas

(2) The types and hazard level of material stored

(3) Details on the storage configurations such as height and type (e.g., rack storage, floor storage.)

(4) Presence, type, and suitability of fire protection and detection systems

(5) Any available methods to facilitate ventilation such as roof vents and smoke control and exhaust systems

(6) Available water supply sources and adequacy

(7) Equipment and machines used for handling material

Statement of Problem and Substantiation for Public Comment

We cannot forget the material handling equipment that can also cause fires and hazards, Whether it is recharging stations for batteries or propane cylinders

Related Item

- warehouse

Submitter Information Verification

Submitter Full Name: Shawn Donovan
Organization: Boston Fire Dept
Street Address:
City:
State:
Zip:
Submittal Date: Sun Sep 16 13:44:13 EDT 2018
Committee: FCO-AAA

Public Comment No. 10-NFPA 1700-2018 [Section No. 12.19.1]

<u>12.19.1</u>

A thermal imager can be utilized on the exterior to assess the temperature of windows, vents, and doorways to assess the potential for a fire within the basement. It should be noted that thermal imagers cannot see temperature through ~~concrete or masonry walls~~ <u>walls or barriers, only the tempurature the material's surface and reflected tempuratures</u> .

Statement of Problem and Substantiation for Public Comment

This section implies there are only 2 limitations to a imager's view. They cannot "See temperature" through anything, they can only see the surface temperature and reflected temps if the surface is reflective

Related Item

- Imager

Submitter Information Verification

Submitter Full Name: Shawn Donovan
Organization: Boston Fire Dept
Street Address:
City:
State:
Zip:
Submittal Date: Sun Sep 16 13:57:05 EDT 2018
Committee: FCO-AAA

Public Comment No. 11-NFPA 1700-2018 [Section No. 12.20.4]

12.20.4

The rear of these structures usually has no windows and only doors. The rear doors need to be forced open early in the incident to create a flow path and egress .

Statement of Problem and Substantiation for Public Comment

Just another reason to commit crews to getting the rear open

Related Item

- doors

Submitter Information Verification

Submitter Full Name:	Shawn Donovan
Organization:	Boston Fire Dept
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Sun Sep 16 14:30:08 EDT 2018
Committee:	FCO-AAA

Public Comment No. 65-NFPA 1700-2018 [Section No. 12.20.4]

12.20.4

The rear of these structures usually has no windows and only doors. The rear doors need to be forced open early in the incident to create a flow path.

Statement of Problem and Substantiation for Public Comment

The sentence "The rear doors need to be forced open early in the incident to create a flow path." needs to be clarified as to intent and coordination.

Related Item

- FR47

Submitter Information Verification

Submitter Full Name:	Gavin Horn
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Submittal Date:	Wed Oct 24 10:43:25 EDT 2018
Committee:	FCO-AAA

Public Comment No. 67-NFPA 1700-2018 [Section No. A.3.3.96.3]

A.3.3.96.3 Hot Zone.

For a structure fire, the structure is part of the hot zone, regardless of what can be seen from the outside.

Statement of Problem and Substantiation for Public Comment

The determination of the "hot zone" in a structure fire should start with the structure, but not necessarily be limited to this area. Current appendix information appears to be unnecessarily limiting.

Related Item

- FR99

Submitter Information Verification

Submitter Full Name: Gavin Horn
Organization: University of Illinois Fire Service Institute
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City:
State:
Zip:
Submittal Date: Wed Oct 24 11:02:52 EDT 2018
Committee: FCO-AAA