Public Input No. 13-NFPA 402-2015 [Section No. 1.3.1]

1.3.1

Providing protection for the occupants of an aircraft takes precedence over all other operations. Fire control is frequently an essential condition to ensure such survival. The objectives of the airport fire department should be to respond to any aircraft

~~emergency in the minimum possible time and~~

emergency as expeditiously and as safely possible and employ rescue and fire-fighting techniques effectively. These objectives can be accomplished when properly trained personnel work together as a team and apply the operational procedures presented in this guide.

Statement of Problem and Substantiation for Public Input

Substantiation: Committee believes that this wording takes into account the need for a fast response but insure that it's done in a safe manner.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub- Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 10 16:24:14 EDT 2015

Committee Statement

Resolution: FR-11-NFPA 402-2017
Statement: The committee believes that this wording takes into account the need for a fast response but ensures that it is done in a safe manner.

Public Input No. 2-NFPA 402-2014 [Chapter 2]

Chapter 2 Referenced Publications

2.1 General.

The documents or portions thereof listed in this chapter are referenced within this guide and should be considered part of the recommendations of this document.

2.2 NFPA Publications.

National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 403, *Standard for Aircraft Rescue and Fire-Fighting Services at Airports,* ~~2009 edition~~ ***2014*** .

NFPA 405, *Standard for the Recurring Proficiency of Airport Fire Fighters,* ~~2010 edition~~ ***2015*** .

NFPA 407, *Standard for Aircraft Fuel Servicing,* ~~2012 edition~~ ***2017*** .

NFPA 414, *Standard for Aircraft Rescue and Fire-Fighting Vehicles,* ~~2012 edition~~ ***2017*** .

NFPA 424, *Guide for Airport/Community Emergency Planning,* 2013 ~~edition~~ .

NFPA 1003, *Standard for Airport Fire Fighter Professional Qualifications,* ~~2010 edition~~ ***2015*** .

NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program,* 2013 ~~edition~~ .

2.3 Other Publications.

2.3.1 FAA Publications.

Federal Aviation Administration, 800 Independence Avenue, SW, Washington, DC 20591.

~~FAA Advisory Circular~~ FAA **AC** 150/~~5220–7~~ **5210-7D** , *Aircraft Rescue and Firefighting Communications***, 2008** .

FAA ~~Advisory Circular~~ **AC** 150/5220–17**B** , *Aircraft Rescue and Firefighting Training Facilities***, 2010** .

2.3.2 ICAO Publications.

International standards and recommended practices are promulgated by the International Civil Aviation Organization, **999** ~~University St., Montreal~~ **Robert-Bourassa Boulevard, Montréal , Quebec H3C 5H7 , Canada** ~~H3C 5H7~~ .

Airport Services Manual, Part 7: "Airport Emergency Planning," second edition, 1991.

2.3.3 ~~Research and Special Programs Administration, Materials Transportation Bureau~~ **PHMSA Publications** .

Request for single free copy for emergency service organizations may be addressed to U.S. Department of Transportation, ~~Materials Transportation Bureau, 400 Seventh Street SW, Attention: DMT-11~~ **Pipeline and Hazard Materials Safety Administartion, Office of Pipeline Safety, East Building, 2nd Floor , 1200 New Jersey Avenue SE , Mail Stop: E24-455** , Washington, DC 20590.

Emergency Response Guidebook, U.S. Department of Transportation, ~~2004 edition~~ **2012** .

2.3.4 U.S. Government Publications.

U.S. ~~Government Printing~~ Government **Publishing** Office, Washington, DC 20402.

Title 18, U.S. Code, Section 2332a, "Use of Weapons of Mass Destruction."

2.3.5 Other Publications.

Merriam-Webster's Collegiate Dictionary, 11th edition, Merriam-Webster, Inc., Springfield, MA, 2003.

2.4 References for Extracts in Advisory Sections.

NFPA 10, *Standard for Portable Fire Extinguishers,* ~~2010 edition~~ ***2017*** .

NFPA 11, *Standard for Low-, Medium-, and High-Expansion Foam,* ~~2010 edition~~ ***2015*** .

NFPA 16, *Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems,* ~~2011 edition~~ ***2015*** .

NFPA 17, *Standard for Dry Chemical Extinguishing Systems,* ~~2009 edition~~ ***2013*** .

NFPA 302, *Fire Protection Standard for Pleasure and Commercial Motor Craft,* ~~2010 edition~~ ***2015*** .

NFPA 403, *Standard for Aircraft Rescue and Fire-Fighting Services at Airports,* ~~2009 edition~~ ***2014*** .

NFPA 408, *Standard for Aircraft Hand Portable Fire Extinguishers,* ~~2010 edition~~ ***2017*** .

NFPA 424, *Guide for Airport/Community Emergency Planning,* 2013 ~~edition~~ .

NFPA 472, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents,* 2013 ~~edition~~ .

NFPA 600, *Standard on Industrial Fire Brigades,* ~~2010 edition~~ ***2015*** .

NFPA 921, *Guide for Fire and Explosion Investigations,* ~~2011 edition~~ ***2017*** .

NFPA 1051, *Standard for Wildland Fire Fighter Professional Qualifications,* ~~2012 edition~~ ***2016*** .

NFPA 1670, *Standard on Operations and Training for Technical Search and Rescue Incidents,* ~~2009 edition~~ ***2017*** .

NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services,*~~2007 edition~~ **2013** .

Statement of Problem and Substantiation for Public Input

Referenced current editions.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 3-NFPA 402-2014 [Chapter G]	

Submitter Information Verification

Submitter Full Name: Aaron Adamczyk
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 25 19:11:57 EDT 2014

Committee Statement

Resolution: FR-110-NFPA 402-2017
Statement: Referenced current editions.

Public Input No. 14-NFPA 402-2015 [Section No. 2.3.2]

2.3.2 _ ICAO Publications.

International standards and recommended practices are promulgated by the International Civil Aviation Organization, 999 University St., Montreal, Quebec, Canada H3C 5H7.

Airport Services Manual, Part 7: "Airport Emergency Planning,"

~~second edition, 1991.~~

Statement of Problem and Substantiation for Public Input

Substantiation: Remove edition. The references to the document in the body of the document only reference the document as a whole and therefore specific editions aren't needed.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 10 16:53:20 EDT 2015

Committee Statement

Resolution: These must stay in the document due to the NFPA MOS.
Statement: Not yet reviewed

Public Input No. 15-NFPA 402-2015 [Section No. 2.3.3]

2.3.3 Research and Special Programs Administration, Materials Transportation Bureau.

Request for single free copy for emergency service organizations may be addressed to U.S. Department of Transportation, Materials Transportation Bureau, 400 Seventh Street SW, Attention: DMT-11, Washington, DC 20590.

Emergency Response Guidebook, U.S. Department of Transportation~~, 2004 edition~~ .

Statement of Problem and Substantiation for Public Input

Substantiation: Remove edition. The references to the document in the body of the document only reference the document as a whole and therefore specific editions aren't needed.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 10 17:00:59 EDT 2015

Committee Statement

Resolution: These must stay in the document due to the NFPA MOS.

Public Input No. 16-NFPA 402-2015 [Section No. 2.3.5]

2.3.5 Other Publications.

Merriam-Webster's Collegiate Dictionary, 11th edition, Merriam-Webster, Inc., Springfield, MA~~, 2003~~ .

Statement of Problem and Substantiation for Public Input

Substantiation: Remove edition. The references to the document in the body of the document only reference the document as a whole and therefore specific editions aren't needed.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 10 17:02:34 EDT 2015

Committee Statement

Resolution: This is boiler plate language in all NFPA documents.

Public Input No. 25-NFPA 402-2015 [Section No. 2.3.5]

2.3.5 Other Publications.

Merriam-Webster's Collegiate Dictionary, ~~11th edition,~~ Merriam-Webster, Inc., Springfield, MA~~, 2003~~ .

Statement of Problem and Substantiation for Public Input

Remove edition. The references to the document in the body of the document only reference the document as a whole and therefore specific editions aren't needed.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jun 19 10:53:45 EDT 2015

Committee Statement

Resolution: This is boilerplate language in all NFPA documents.

Public Input No. 17-NFPA 402-2015 [Section No. 3.1]

3.1 General.

The definitions contained in this chapter apply to the terms used in this guide. Where terms are not defined in this chapter or within another chapter, they should be defined using their ordinarily accepted meanings within the context in which they are used. *Merriam-Webster's Collegiate Dictionary*~~, 11th edition,~~ is the source for the ordinarily accepted meaning.

Statement of Problem and Substantiation for Public Input

Substantiation: Remove edition. The references to the document in the body of the document only reference the document as a whole and therefore specific editions aren't needed.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 10 17:05:16 EDT 2015

Committee Statement

Resolution: This is boiler plate NFPA text and the reference should be kept in.

Public Input No. 35-NFPA 402-2015 [New Section after 3.2.4]

TITLE OF NEW CONTENT

Shall: Indicates a mandatory requirement

Statement of Problem and Substantiation for Public Input

Shall definition not listed in general definitions.

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN
Organization: CINCINNATINORTHERN KENTUCKY I
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 14:12:16 EDT 2015

Committee Statement

Resolution: Where this is a guide, it is not necessary to have this term defined as it is not used in the document.

Public Input No. 52-NFPA 402-2015 [New Section after 3.2.4]

TITLE OF NEW CONTENT

Type your content here ...

Standard: A document, the main text of which contains only mandatory provisions using the word “shall” to indicate requirements and which is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions are not to be considered a part of the requirements of a standard and shall be located in an appendix, annex, footnote, informational note, or other means as permitted in the *Manual of Style for NFPA Technical Committee Documents* .

Statement of Problem and Substantiation for Public Input

Consistent with NFPA 402, 414

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN
Organization: CINCINNATINORTHERN KENTUCKY I
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 13:20:43 EDT 2015

Committee Statement

Resolution: Where this document is a guide and not a standard it does not use the word that is being defined. That being said, the committee has chosen to not include it in the definitions.

Public Input No. 36-NFPA 402-2015 [Section No. 3.3.9]

3.3.9 * Aircraft Rescue and Fire Fighting (ARFF).

The fire-fighting action taken to prevent, control, or extinguish fire involved or adjacent to an aircraft for the purpose of maintaining maximum escape routes for occupants using normal and emergency routes for egress. Additionally, ARFF personnel will enter the aircraft to provide assistance to the extent possible in the evacuation of the occupants. Although life safety is primary to ARFF personnel, responsibilities such as fuselage integrity and salvage should be maintained to the extent possible

Statement of Problem and Substantiation for Public Input

Change to match 414.

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN
Organization: CINCINNATINORTHERN KENTUCKY I
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 14:16:06 EDT 2015

Committee Statement

Resolution: The change in text the is proposed is to move the annex material into the main part of the definition, which is just adding further information and to the term which should remain in the annex.

Public Input No. 18-NFPA 402-2015 [Section No. 3.3.13]

3.3.13 ~~Airport~~ _ Air Traffic Control (ATC).

A service established to provide air and ground traffic control for airports.

Statement of Problem and Substantiation for Public Input

Substantiation: Proper term is Air Traffic Control. The use in the document is only as air traffic control and air traffic controller.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 10 17:07:36 EDT 2015

Committee Statement

Resolution: FR-15-NFPA 402-2017
Statement: This change was made in order to reflect the proper term.

Public Input No. 19-NFPA 402-2015 [Section No. 3.3.16.1]

3.3.16.1 Critical Rescue and Fire-Fighting Access Area.

The rectangular area surrounding any runway within which most aircraft accidents can be expected to occur on airports. Its width extends 150 m (500 ft) from each side of the runway centerline, and its length is 1000 m (3300 ft) beyond each runway ~~end~~ threshold .

Statement of Problem and Substantiation for Public Input

Substantiation: Proper term for end of runway.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 10 17:09:35 EDT 2015

Committee Statement

Resolution: FR-16-NFPA 402-2017
Statement: The change was made in order to reflect the proper term that is used.

Public Input No. 21-NFPA 402-2015 [Section No. 3.3.18]

~~**3.3.18** – Backdraft.~~

~~A phenomenon that occurs when a fire takes place in a confined area, such as a sealed aircraft fuselage, and burns undetected until most of the oxygen within is consumed. The heat continues to produce flammable gases, mostly in the form of carbon monoxide. These gases are heated above their ignition temperature and when a supply of oxygen is introduced, as when normal entry points are opened, the gases could ignite with explosive force.~~

Statement of Problem and Substantiation for Public Input

Substantiation: This term is not used anywhere in the document.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 10 17:18:55 EDT 2015

Committee Statement

Resolution: FR-17-NFPA 402-2017
Statement: The committee is deleting this as it is not used in the document.

Public Input No. 45-NFPA 402-2015 [Section No. 3.3.18]

3.3.18 Backdraft.

A

~~phenomenon that occurs when a fire takes place in a confined area, such as a sealed aircraft fuselage, and burns undetected until most of the oxygen within is consumed. The heat continues to produce flammable gases, mostly in the form of carbon monoxide. These gases are heated above their ignition temperature and when a supply of oxygen is introduced, as when normal entry points are opened, the gases could ignite with explosive force.~~

deflagration resulting from the sudden introduction of air into a confined spcae containing oxygen-deficient products of incomplete combustion

Statement of Problem and Substantiation for Public Input

Maintain consistency with NFPA 921 and 1403.

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN
Organization: CINCINNATINORTHERN KENTUCKY I
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 14:45:47 EDT 2015

Committee Statement

Resolution: FR-17-NFPA 402-2017
Statement: The committee is deleting this as it is not used in the document.

Public Input No. 20-NFPA 402-2015 [Section No. 3.3.19]

~~**3.3.19** *~~ – ~~Bogie.~~

~~A tandem arrangement of aircraft landing gear wheels.~~

Statement of Problem and Substantiation for Public Input

Substantiation: This term is not used anywhere in the document.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 10 17:14:36 EDT 2015

Committee Statement

Resolution: FR-18-NFPA 402-2017
Statement: The committee is deleting this as it is not used in the document.

Public Input No. 37-NFPA 402-2015 [Section No. 3.3.32.1]

3.3.32.1 Complementary Extinguishing Agent.

~~Refers to an extinguishing agent that has the compatibility to perform fire-suppression functions in support of a primary extinguishing agent and where extinguishment might not be achievable using only the primary agent.~~

Agents that provide unique extinguishing capability beyond the primary chosen agent.

Statement of Problem and Substantiation for Public Input

Maintain consistency with 414.

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN
Organization: CINCINNATINORTHERN KENTUCKY I
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 14:19:33 EDT 2015

Committee Statement

Resolution: FR-19-NFPA 402-2017
Statement: This change was made for project consistency.

Public Input No. 46-NFPA 402-2015 [Section No. 3.3.36.1]

3.3.36.1 Class A.

~~Ordinary combustibles~~

Fire in ordinary combustible materials, such as wood, cloth, paper, rubber, and many plastics .

Statement of Problem and Substantiation for Public Input

Consistent with NFPA 11 and 16

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN
Organization: CINCINNATINORTHERN KENTUCKY I
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 14:47:31 EDT 2015

Committee Statement

Resolution: FR-20-NFPA 402-2017
Statement: This change was made for consistency purposes.

Public Input No. 47-NFPA 402-2015 [Section No. 3.3.36.2]

3.3.36.2 Class B.

~~Flammable liquids~~

A fire in flammable liquids, combustible liquids, petroleum greases, tars, oils, oil-based paints, solvents, lacquers, alcohols, and flammable gases .

Statement of Problem and Substantiation for Public Input

Maintain consistency with NFPA 11 and 16

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN
Organization: CINCINNATINORTHERN KENTUCKY I
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 14:48:45 EDT 2015

Committee Statement

Resolution: FR-21-NFPA 402-2017
Statement: These changes were made for the purpose of consistency.

Public Input No. 48-NFPA 402-2015 [Section No. 3.3.36.2]

3.3.36.2 Class B.

~~Flammable liquids~~

A fire that involves energized equipment where the electrical resistivity of the extinguishing media is of importance .

Statement of Problem and Substantiation for Public Input

Maintain consistency with NFPA 11

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN
Organization: CINCINNATINORTHERN KENTUCKY I
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 14:49:40 EDT 2015

Committee Statement

Resolution: FR-21-NFPA 402-2017
Statement: These changes were made for the purpose of consistency.

Public Input No. 22-NFPA 402-2015 [Section No. 3.3.43]

~~**3.3.43** – Flight Technical Crew (FTC).~~

~~Includes pilots, flight engineers, and flight attendants who crew on aircraft movement.~~

Statement of Problem and Substantiation for Public Input

Substantiation: This term is not used anywhere in the document.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 10 17:21:48 EDT 2015

Committee Statement

Resolution: FR-22-NFPA 402-2017
Statement: This term is being deleted as it is not used in the document.

Public Input No. 44-NFPA 402-2015 [Section No. 3.3.44.1]

3.3.44.1 * Aqueous Film Forming Foam (AFFF) Concentrate.

A concentrate based on fluorinated surfactants plus foam stabilizers to produce a fluid aqueous film for suppressing hydrocarbon fuel vapors and usually diluted with water to a 1 percent, 3 percent, or 6 percent solution. [~~16,~~ 2011]

solution

Statement of Problem and Substantiation for Public Input

Maintain consistency with NFPA 11, 403, and 412

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN
Organization: CINCINNATINORTHERN KENTUCKY I
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 14:43:43 EDT 2015

Committee Statement

Resolution: The committee has chosen not to make this change.

Public Input No. 38-NFPA 402-2015 [Section No. 3.3.44.3]

3.3.44.3 * Fluoroprotein Foam.

A protein

~~-based~~

foam concentrate

~~to which fluorochemical surfactants have been added.~~

incorporating one or more fluorochemical surfactants to enhance its tolerance to fuel contamination

Statement of Problem and Substantiation for Public Input

Consistency with 414

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN
Organization: CINCINNATINORTHERN KENTUCKY I
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 14:28:46 EDT 2015

Committee Statement

Resolution: FR-28-NFPA 402-2017
Statement: These changes were made for document and project consistency.

Public Input No. 136-NFPA 402-2015 [Section No. 3.3.44.4]

3.3.44.4 Protein Foam Concentrate .

A

~~protein-based foam concentrate that is stabilized with metal salts to make a fire-resistant foam blanket.~~
~~[**403,** 2009]~~

concentrate consisting primarily of products from a protein hydrolysate, plus stabilizing additives and inhibitors to protect against freezing, to prevent corrosion of equipment and containers, to resist bacterial decomposition, to control viscosity, and otherwise to ensure readiness for use under emergency conditions.

Statement of Problem and Substantiation for Public Input

Maintain same definition throughout NFPA documents

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN
Organization: CINCINNATINORTHERN KENTUCKY I
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jul 02 08:54:46 EDT 2015

Committee Statement

Resolution: FR-28-NFPA 402-2017
Statement: These changes were made for document and project consistency.

Public Input No. 49-NFPA 402-2015 [Section No. 3.3.46]

3.3.46 Foam Blanket.

A covering of foam over

~~the~~

a surface

~~of flammable liquids to provide extinguishment and~~

to insulate, prevent ignition , or extinguish the fire .

Statement of Problem and Substantiation for Public Input

Maintain consistency with NFPA 1145

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN
Organization: CINCINNATINORTHERN KENTUCKY I
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 14:52:01 EDT 2015

Committee Statement

Resolution: FR-23-NFPA 402-2017
Statement: These changes were made for document and project consistency.

Public Input No. 39-NFPA 402-2015 [Section No. 3.3.50]

3.3.50 Forward Looking Infrared (FLIR).

~~A thermal imaging system (camera), which can be vehicle-mounted, designed to detect thermal energy.~~

The detection of heat energy radiated by objects to produce a “thermal image.” This thermal image is converted by electronics and signal processing into a visual image that can be viewed by the operator.

Statement of Problem and Substantiation for Public Input

Maintain consistency with 414

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN
Organization: CINCINNATINORTHERN KENTUCKY I
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 14:31:40 EDT 2015

Committee Statement

Resolution: FR-30-NFPA 402-2017
Statement: This change was made for document and project consistency.

Public Input No. 40-NFPA 402-2015 [Section No. 3.3.56]

3.3.56 Halogenated ~~Agent~~ Agents .

A liquefied gas extinguishing agent that extinguishes fire by chemically interrupting the combustion reaction between fuel and oxygen. Halogenated agents leave no residue.

Statement of Problem and Substantiation for Public Input

Maintain consistency with 414

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN
Organization: CINCINNATINORTHERN KENTUCKY I
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 14:33:08 EDT 2015

Committee Statement

Resolution: FR-31-NFPA 402-2017
Statement: Editorial in nature.

Public Input No. 50-NFPA 402-2015 [Section No. 3.3.59]

3.3.59 Hazardous Materials.

~~A substance~~

Substances (

~~either matter —~~

solid, liquid, or gas

~~— or energy~~

) that when released

~~is~~

are

capable of creating harm to people, the environment, and

~~property, including weapons of mass destruction (WMD) as defined in 18, *U.S. Code, Section 2332a* , and as well as any other criminal use of hazardous materials, such as illicit labs, environmental crimes, or industrial sabotage. [**472,** 2013] *(See Annex F.)*~~

property

Statement of Problem and Substantiation for Public Input

Maintain consistency with NFPA 1851, 1855, 1991, 1992.

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN
Organization: CINCINNATINORTHERN KENTUCKY I

Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 14:53:40 EDT 2015

Committee Statement

Resolution: FR-32-NFPA 402-2017
Statement: These changes were editorial in nature and for document consistency.

Public Input No. 41-NFPA 402-2015 [Section No. 3.3.64]

3.3.64 International Civil Aviation Organization (ICAO).

An international

~~aviation~~

body

~~, operating under the auspices of the United Nations, that produces technical safety documents for civil air transport.~~

charged with matters dealing with the development, coordination, and preservation of international civil aviation.

Statement of Problem and Substantiation for Public Input

Maintain consistency with 403

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN
Organization: CINCINNATINORTHERN KENTUCKY I
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 14:34:33 EDT 2015

Committee Statement

Resolution: FR-34-NFPA 402-2017
Statement: This change was made for document and project consistency.

Public Input No. 51-NFPA 402-2015 [Section No. 3.3.72]

3.3.72 Overhaul.

The

~~process~~

final stages of

~~final extinguishment after~~

fire extinguishment, following knockdown

of the main body of

~~a fire has been knocked down. All traces of fire must be extinguished at this time~~

fire, during which pockets of fire are

sought out to complete extinguishment .

Statement of Problem and Substantiation for Public Input

Maintain consistency with 1145

Submitter Information Verification

Submitter Full Name: STEPHEN LISTERMAN
Organization: CINCINNATINORTHERN KENTUCKY I
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 14:56:08 EDT 2015

Committee Statement

Resolution: FR-37-NFPA 402-2017
Statement: This change was made for document consistency.

Public Input No. 23-NFPA 402-2015 [Section No. 3.3.82]

3.3.82 Runoff.

Liquids that flow by gravity away from an aircraft accident and might include aviation fuel (ignited or not), water/foam from fire-fighting streams, liquid cargo, or a combination of these liquids.

Statement of Problem and Substantiation for Public Input

Substantiation: "Foam" was not included and should be as it is part of the environmental concern.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 10 17:25:23 EDT 2015

Committee Statement

Resolution: FR-38-NFPA 402-2017
Statement: The committee has added this as it was not previously included and should be included as a part of the environmental concern.

Public Input No. 24-NFPA 402-2015 [Section No. 3.3.87]

3.3.87 – Aircraft Skin.

The outer covering of an aircraft fuselage, wings, and empennage.

Statement of Problem and Substantiation for Public Input

Substantiation: The word skin is used within the document for both aircraft and human terminology. Adding aircraft to the term clarifies the context of the term.

****Same addition of the word “aircraft” will be needed in the body in the following sections. This may require individual Task Group Comments or may be editorial. (3.3.15, 3.3.73, 6.11, 7.5.11.1(3), 8.1.2(4), Figure 8.1.2, 8.1.3, Figure 8.1.3, 9.4.3, 11.4.4, Figure 11.4.4 and E2 Substantial Damage).

Submitter Information Verification

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City:
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Submittal Date: Wed Jun 10 17:32:52 EDT 2015

Committee Statement

Resolution: FR-40-NFPA 402-2017
Statement: This change was made in order to provide the end user with further clarification.

****Same addition of the word “aircraft” will be needed in the body in the following sections. This may require individual Task Group Comments or may be editorial. (3.3.15, 3.3.73, 6.11, 7.5.11.1(3), 8.1.2(4), Figure 8.1.2, 8.1.3, Figure 8.1.3, 9.4.3, 11.4.4, Figure 11.4.4 and E2 Substantial Damage).

Public Input No. 43-NFPA 402-2015 [Section No. 3.3.93.2]

3.3.93.2 Response Time.

The total period of time measured from the time of an alarm until the first ARFF vehicle arrives at the scene of an aircraft accident /incident and is in position to apply

~~agent to any fire.~~

agent

Statement of Problem and Substantiation for Public Input

Maintain consistency with 403

Submitter Information Verification

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City:
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Submittal Date: Tue Jun 23 14:36:57 EDT 2015

Committee Statement

Resolution: FR-41-NFPA 402-2017
Statement: This change was made for document and project consistency.

Public Input No. 9-NFPA 402-2014 [New Section after 3.3.100.1]

3.3.101 US National Grid

The United States National Grid is a standard area and point grid reference system that quickly enables multi-discipline and multi-jurisdictional emergency service agencies to precisely locate incidents and universally communicate locations using paper maps and/or electronic applications. It is based upon the widely used Universal Transverse Mercator (UTM) Coordinate system developed in 1947 and the Military Grid Reference System (MGRS) used by all NATO forces and the National Guard, since 1949. It became the national standard (FGDC-STD-011-2001) for civilian purposes in 2001. It was designated as the land search & rescue standard coordinate system in 2011, by the National Search & Rescue Commitee; a group of federal agencies.

Statement of Problem and Substantiation for Public Input

In reference to Public Input submitted for 4.5.2.1 that is about US National Grid use, this is a definition for US National Grid. Corroboration: a) NAPSG Implementation Guide: http://napsgfoundation.org/wp-content/uploads/2014/01/Implementation-Guide-to-The-USNG.pdf b) land SAR: http://www.epcupdates.org/2012/03/nsarc-designates-usng-as-land-sar.html c) standard: https://www.fgdc.gov/usng

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 8-NFPA 402-2014 [New Section after 4.5.2]	Definition for grid type specified

Submitter Information Verification

Submitter Full Name: ALBERT W STUDT
Organization: URS FEDERAL TECHNICAL SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Wed Dec 24 09:47:15 EST 2014

Committee Statement

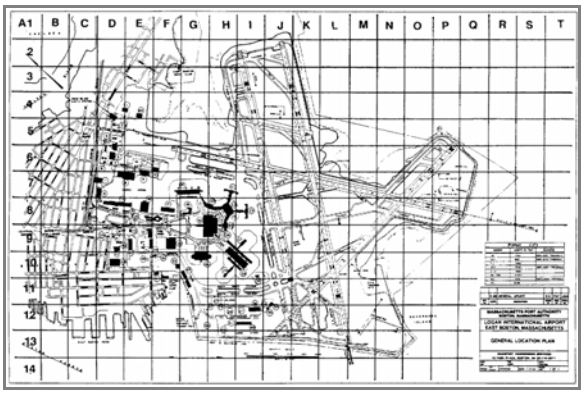
Resolution: FR-43-NFPA 402-2017
Statement: The committee has added this term to the document as it will be used throughout the document.

Public Input No. 26-NFPA 402-2015 [Section No. 4.2.6]

4.2.6

Grid maps should be provided for each airport and its environs. They should be ruled with numbered and lettered grids, as shown in Figure 4.2.6, to permit rapid identification of any response area. The area covered by a grid map should be a distance of 8 km (5 mi) from the center of the airport. This distance can vary depending upon the type of terrain or location of the airport in relation to other emergency facilities. Map nomenclature should be compatible with that used by off-airport public safety authorities. Two or more maps might be required where the area exceeds an 8 km (5 mi) radius. One map should display medical facilities, heliports, and other features according to the airport/community emergency plan. Where more than one grid map is used, grid identifications should differ by color and scale to assist in their identification. Prominent local features, access routes, staging areas, and compass headings should be shown to facilitate locating accident and medical facility sites. Copies of grid maps should be prominently displayed at ATC, the airport operations office, each airport and community fire station, and all mutual aid services, and should be carried on all appropriate emergency vehicles.

Figure 4.2.6 Typical Airport Grid Map. Update Grid Map



Statement of Problem and Substantiation for Public Input

Grid map provided is too busy and needs to be replaced with a less complex example. Committee will provide same samples to choose from.

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Submittal Date: Fri Jun 19 11:46:22 EDT 2015

Committee Statement

Resolution: The committee believes that the current grid map should be kept as they believe that this is just one example and the end user would be able to seek out a grid map they wanted to look at.

Public Input No. 27-NFPA 402-2015 [Section No. 4.2.10]

4.2.10

Sufficient ARFF vehicles ~~and~~ , personnel and equipment should be provided to meet the required level of protection as specified in NFPA 403, *Standard for Aircraft Rescue and Fire-Fighting Services at Airports*, for the airport during flight operations. When this protection level is reduced for any reason (e.g., off-airport response, mechanical breakdown, lack of qualified personnel, etc.), all incoming and departing aircraft should be notified of the change in ARFF capability.

Statement of Problem and Substantiation for Public Input

"personnel" should be included along with vehicles and equipment to complete the requirement.

Submitter Information Verification

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Street Address:
City:
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Submittal Date: Fri Jun 19 11:51:15 EDT 2015

Committee Statement

Resolution: FR-44-NFPA 402-2017
Statement: The committee has made these changes in order to ensure that personnel were also included in the section.

Public Input No. 29-NFPA 402-2015 [Section No. 4.2.10]

4.2.10

Sufficient ARFF vehicles and equipment should be provided to meet the required level of protection as specified in NFPA 403, *Standard for Aircraft Rescue and Fire-Fighting Services at Airports*, for the airport during flight operations. When this protection level is reduced for any reason (e.g., off-airport response, mechanical breakdown, lack of qualified personnel, etc.), all incoming and departing aircraft should be notified of the change in ARFF ~~capability~~ category .

Statement of Problem and Substantiation for Public Input

"category" more clearly defines the service level available.

Submitter Information Verification

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Submittal Date: Fri Jun 19 11:54:28 EDT 2015

Committee Statement

Resolution: FR-44-NFPA 402-2017
Statement: The committee has made these changes in order to ensure that personnel were also included in the section.

Public Input No. 30-NFPA 402-2015 [Section No. 4.3.3]

4.3.3

The complexity of modern aircraft and the variety of types in service make it difficult to train ARFF personnel in all the important design features of each model. However, personnel should become as familiar as possible with each type of aircraft that normally uses the airport. Particular emphasis should be placed on all of the following:

(1) Location and operation of normal and emergency exits, cargo doors, equipment, and galley access doors

(2) Seating configurations

(3) Type of fuel and location of fuel tanks

(4) Location of ejection seats and armament (military aircraft)

(5) Locations of batteries, hydraulics, and oxygen systems

(6) Positions of break-in points on the aircraft

(7) Location of rapidly activated standby generators or turbines

(8) Fire access panels

(9) Location of aircraft construction materials (carbon fibers, composite materials, etc.) that are subject to releasing hazardous/toxic substances while burning

(10) Hazard Areas e.g.collapse zones

Statement of Problem and Substantiation for Public Input

Add hazard areas to capture other hazards that might not be identified in 1-9.

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Submittal Date: Fri Jun 19 12:01:58 EDT 2015

Committee Statement

Resolution: FR-45-NFPA 402-2017
Statement: The committee believes it is important to take into consideration hazard areas and thus included it in this list.

Public Input No. 31-NFPA 402-2015 [Section No. 4.4.2]

4.4.2

It is desirable that airport ARFF vehicles be able to monitor or be in direct voice communications with an aircraft during an emergency situation. This procedure is especially important when airport control towers are not in operation. A discrete emergency frequency (DEF), where available, should be used for communications between the aircraft crew and the ARFF incident commander. ~~*(See 10.4.2.1 for additional information on this topic.)*~~

Statement of Problem and Substantiation for Public Input

10.4.2.1 provides no additional information on DEF.

Submitter Information Verification

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Submittal Date: Fri Jun 19 16:55:13 EDT 2015

Committee Statement

Resolution: FR-46-NFPA 402-2017
Statement: The committee deleted this as they believe it to be unnecessary.

Public Input No. 8-NFPA 402-2014 [New Section after 4.5.2]

4.5.2.1 Grid map standard

Grid maps of the airport and surrounding area shall display federal standard FGDC-STD-011-2001 US National Grid for interoperability across all jurisdications. Quick reference atlas grids (A-Z, 1-99) while not prohibited, are known to be non-interoperable.

Additional Proposed Changes

File Name	Description	Approved
USNG-NFPA402-Studt-1.jpg	US National Grid, 100 meter grid squares. Explanatory only, not intended for use as a figure	
USNG-NFPA402-Studt-2.jpg	US National Grid, 1 Km grid squares, location of crash plotted. Rules for USNG are "right, then up". Explanatory only, not intended for use as a figure	

Statement of Problem and Substantiation for Public Input

US National Grid is the national standard coordinate system of the USA. It is designed for ground based operations and is functionally equivalent to US military's and NATO's Military Grid Reference System. It is the land search & rescue standard per the National Search & Rescue Committee since 2011. Many after action reports for wide area events cite a need for a common grid system. The use of a grid on a map to make it a tool is not disputed as a grid concept is referenced in 4.5.2. However the type of grid is undefined. Crash maps showing atlas grid of A-Z, 1-99, are not interoperable. Coordinate B,27 cannot be displayed on a GPS or web application. Additionally, responders to B, 27 must have that specific map where B.27 is displayed. In contrast, and with valued-added, US National Grid can be on the local maps made & issued by the airport to surrounding jurisdictions. However, if that map was not in the hand of a responder, or if an incident was beyond the map's margins, all could use their own tools of GPS, computer aided dispatch, mobile data terminal, smart phone or web tool to display the grid and navigate accordingly. On 12/8/14, there was a crash in Maryland. The geo-location by US National Grid was: 18T UJ 116 390 on Drop Forge Lane, Gaithersburg. Those 11 characters are the worldwide coordinate to 100 meter square. For local operations, the reference could have been just 116 390, just six(6) digits. Regionally (state) the reference could have been UJ 116 390.

Corroboration: a) Land SAR directive: http://www.epcupdates.org/2012/03/nsarc-designates-usng-as-land-sar.html b) federal standard: https://www.fgdc.gov/standards/projects/FGDC-standards-projects /usng/fgdc_std_011_2001_usng.pdf c) Fire Engineering article: http://www.fireengineering.com/articles/2014/08 /the-us-national-grid-right-then-up.html d) link to map display of 18T UJ 116 390: http://t.co/sB6urn7pd8 e) crash notice: https://twitter.com/USNGFlorida/status/542006086069280768 f) crash to runway graphic: https://twitter.com/USNGFlorida/status/542013398415077377

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 9-NFPA 402-2014 [New Section after 3.3.100.1]	

Submitter Information Verification

Submitter Full Name: ALBERT W STUDT
Organization: URS FEDERAL TECHNICAL SERVICES
Street Address:
City:
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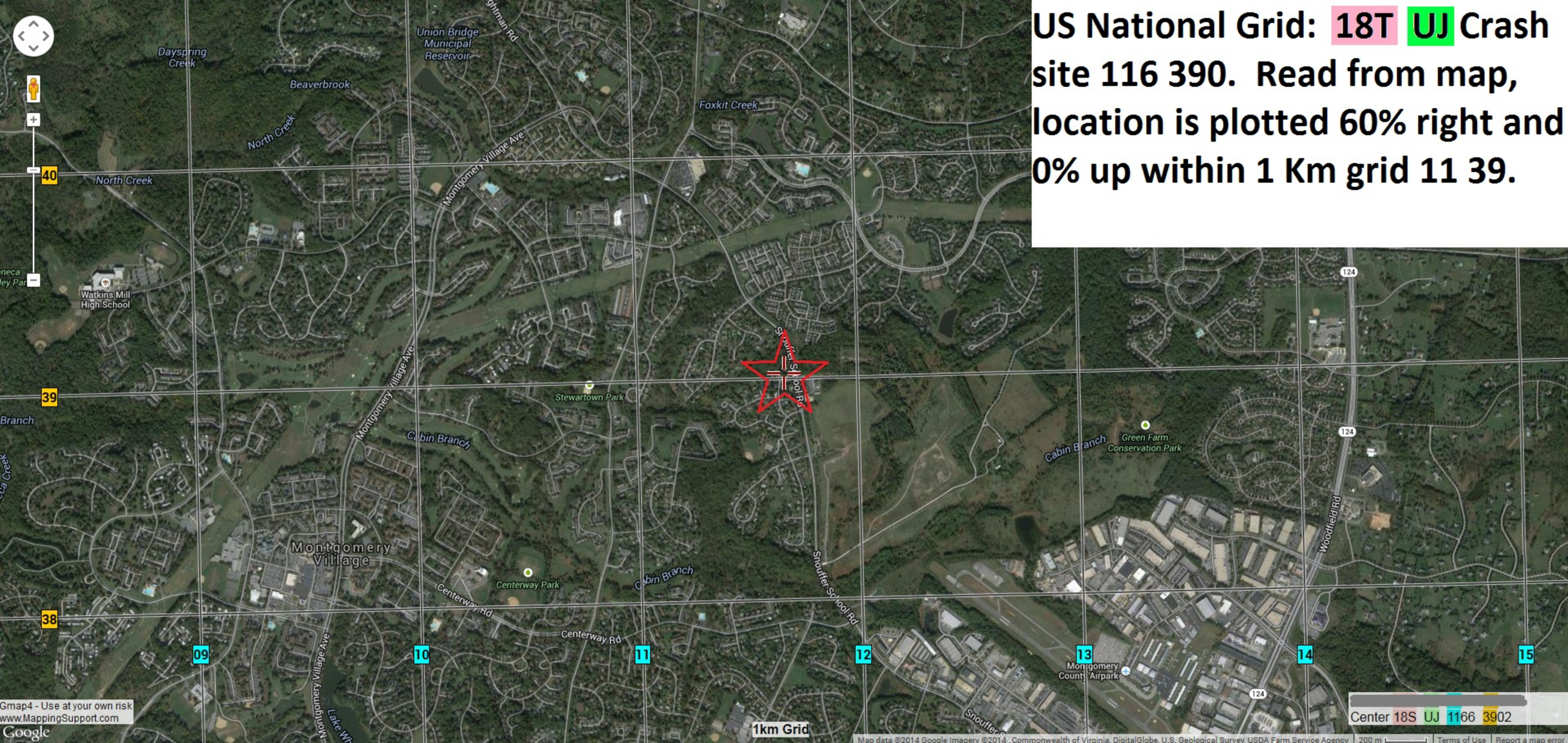
Zip:

Submittal Date: Wed Dec 24 08:14:10 EST 2014

Committee Statement

Resolution: The committee believes that this is already addressed within the document.


Plane Crash 12-8-14
US National Grid: 18T UJ
116 390
Cochrane Way
Chesley Knoll Dr
Cochrane Ct
Snouffer School Rd
Ivyberry Pl
Ivyberry Way
Ivyberry Ct
Drop Forge Ln
Blue Smoke Dr
Blue Smoke Ct
392
391
390
389
113
114
115
116
117
118
119
120
121
100m Grid
Center 18S UJ 1166 3902
Gmap4 - Use at your own risk
www.MappingSupport.com
Google
Map data ©2014 Google Imagery ©2014 , Commonwealth of Virginia, DigitalGlobe, U.S. Geological Survey, USDA Farm Service Agency
20 m
Terms of Use
Report a map error


US National Grid: 18T UJ Crash site 116 390. Read from map, location is plotted 60% right and 0% up within 1 Km grid 11 39.
Union Bridge Municipal Reservoir
Dayspring Creek
Beaverbrook
Foxkit Creek
North Creek
Montgomery Village Ave
Watkins Mill High School
Snouffer School Rd
Stewartown Park
Cabin Branch
Green Farm Conservation Park
Woodfield Rd
Montgomery Village
Centerway Park
Centerway Rd
Montgomery County Airpark
40
39
38
09
10
11
12
13
14
15
124
1km Grid
Center 18S UJ 1166 3902
Gmap4 - Use at your own risk
www.MappingSupport.com
Google
Map data ©2014 Google Imagery ©2014, Commonwealth of Virginia, DigitalGlobe, U.S. Geological Survey, USDA Farm Service Agency
200 m
Terms of Use
Report a map error

Public Input No. 32-NFPA 402-2015 [Section No. 5.1.2]

5.1.2

The prime mission of all concerned is the safety of all persons aboard the aircraft and any others involved in the emergency. Duties and responsibilities can generally be defined as follows:

(1) Flight deck crews ~~hold the primary responsibility~~ and flight attendants bility for the aircraft and for the safety of its occupants. The final decision to evacuate an aircraft, and how to do so, is made by the flight deck crew~~, provided they are able to function in the normal manner at the time~~ .

(2) Flight deck crews and flight attendants share responsibility for the aircraft and for the safety of its occupants. The final decision to evacuate an aircraft, and how to do so, is made by the flight deck crew and flight attendants, provided they are able to function in the normal manner at the time.

(3) It is the duty of responding ARFF personnel to create conditions in which survival is possible and evacuation or rescue can be conducted. As visibility from within an aircraft is limited, any external features or situations likely to be of significance in the evacuation process should be communicated to the aircraft's crew. Should it become apparent that crew incapacitation precludes their initiation of evacuation, the incident commander of the ARFF personnel should take the initiative to do so.

Statement of Problem and Substantiation for Public Input

The original first 2 paragraphs were identical with the exception of a few words. The proposed re-write is intended to remove the duplicate information and separate the two points.

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Submittal Date: Fri Jun 19 17:08:21 EDT 2015

Committee Statement

Resolution: FR-47-NFPA 402-2017
Statement: These changes were made in order to make the sections of text shorter and less repetitive.

Public Input No. 33-NFPA 402-2015 [Section No. 5.1.2]

5.1.2

The prime mission of all concerned is the safety of all persons aboard the aircraft and any others involved in the emergency. Duties and responsibilities can generally be defined as follows:

(1) Flight deck crews hold the primary responsibility for the aircraft and for the safety of its occupants. The final decision to evacuate an aircraft, and how to do so, is made by the flight deck crew, provided they are able to function in the normal manner at the time.

(2) ~~Flight deck crews and flight attendants share responsibility for the aircraft and for the safety of its occupants. The final decision to evacuate an aircraft, and how to do so, is made by the flight deck crew and flight attendants, provided they are able to function in the normal manner at the time.~~

(3)

(4) It is the duty of responding ARFF personnel to create conditions in which survival is possible and evacuation or rescue can be conducted. As visibility from within an aircraft is limited, any external features or situations likely to be of significance in the evacuation process should be communicated to the aircraft's crew. Should it become apparent that crew incapacitation precludes their initiation of evacuation, the incident commander of the ARFF personnel should take the initiative to do so.

Statement of Problem and Substantiation for Public Input

The original paragraphs were identical with the exception of a few words. The proposed re-write is intended to remove the duplicate information and separate the two points.

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Submittal Date: Fri Jun 19 17:11:01 EDT 2015

Committee Statement

Resolution: FR-47-NFPA 402-2017
Statement: These changes were made in order to make the sections of text shorter and less repetitive.

Public Input No. 34-NFPA 402-2015 [Section No. 5.1.2]

5.1.2

The prime mission of all concerned is the safety of all persons aboard the aircraft and any others involved in the emergency. Duties and responsibilities can generally be defined as follows:

(1) Flight deck crews hold the primary responsibility for the aircraft and for the safety of its occupants. The final decision to evacuate an aircraft, and how to do so, is made by the flight deck crew, provided they are able to function in the normal manner at the time.

(2) Flight deck crews and flight attendants share responsibility for the aircraft and for the safety of its occupants. The final decision to evacuate an aircraft, and how to do so, is made by the flight deck crew and flight attendants, provided they are able to function in the normal manner at the time.

(3) It is the duty of responding ARFF personnel to create conditions in which survival is possible and evacuation or rescue can be conducted. As visibility from within an aircraft is limited, any external features or situations likely to be of significance in the evacuation process should be communicated to the aircraft's crew. Should it become apparent that crew incapacitation precludes their initiation of evacuation, the incident commander of the ARFF personnel should take the initiative to do so.

(4) In some cases evacuation and passenger assisted rescues may have already commenced prior to the arrival of the ARFF crews.

Statement of Problem and Substantiation for Public Input

The addition of (4) takes into account all possible scenarios.

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Street Address:
City:
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Submittal Date: Fri Jun 19 17:16:02 EDT 2015

Committee Statement

Resolution: FR-47-NFPA 402-2017
Statement: These changes were made in order to make the sections of text shorter and less repetitive.

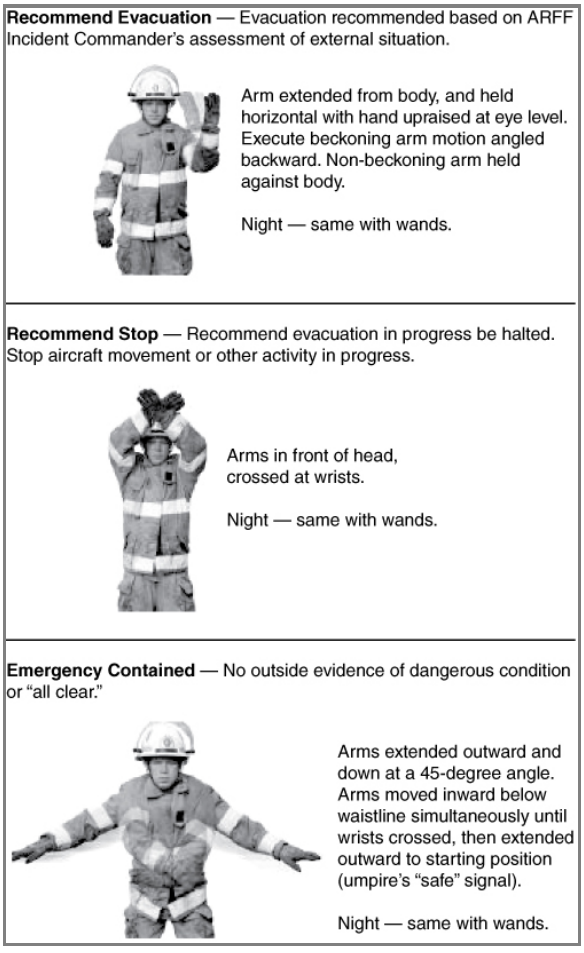
Public Input No. 53-NFPA 402-2015 [Section No. 5.2.3]

5.2.3

Where a more direct means of communication cannot be established, a designated ARFF individual should go to the left side of the aircraft nose and establish direct eye contact and voice communications with the captain of the flight deck crew. If engine noise is a problem and a power megaphone is not available, it might be necessary to resort to hand signals to communicate. Figure 5.2.3 depicts standard international ground-to-aircraft hand signals that should be used by ARFF personnel to communicate with the captain during emergencies. These hand signals are established for emergency communication between the ARFF Incident Commander and/or ARFF Fire Fighters and the Cockpit and/or Cabin Crews of the Incident Aircraft. ARFF Emergency Hand Signals should be given from the left front side of the aircraft for the cockpit crew. (Note: In order to communicate more effectively with the cabin crew, Emergency Hand Signals may be given by ARFF Fire Fighters from other positions.)

Figure 5.2.3 Standard International Ground-to-Aircraft Signals. (Photos courtesy of the Air Line Pilots Association.)

Add an additional hand signal for "Which side of the Aircraftthe Evacuation Should take Place On".



Statement of Problem and Substantiation for Public Input

This will provide a better level of safety of for occupants as well as ARFF crews.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS

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Affiliation: NFPA 402 Sub-Committee

Street Address:

City:

State:

Zip:

Submittal Date: Wed Jun 24 15:33:31 EDT 2015

Committee Statement

Resolution: FR-48-NFPA 402-2017

Statement: These changes were editorial in nature and the committee has chosen to retain these figures.

Public Input No. 10-NFPA 402-2015 [Section No. 5.2.4]

5.2.4

If aircraft engines are operating, ARFF personnel should use extreme caution when approaching an aircraft for communications purposes as described in 5.2.2 and 5.2.3. The aircraft should be approached only from the front and well ahead of the nose and, if possible, in full view of the captain. Vehicle and hand-held lights should be used in periods of darkness and poor visibility. See Table 5.2.4 for light-gun signals.

Table 5.2.4 Standard Air Traffic Control Tower Light-Gun Signals

Color and Type of Signal	Meaning		
	Movement of Vehicles, Equipment, and Personnel	Aircraft on the Ground	Aircraft in Flight
Steady green	Cleared to cross, proceed, or go	Cleared for takeoff	Cleared to land
Flashing green	Not applicable	Cleared for taxi	Return for landing (to be followed by steady green at the proper time)
Steady red	STOP	STOP	Give way to other aircraft and continue circling
Flashing red	Clear the taxiway/runway		
~~Return to starting point on airport~~			
Taxi clear of runway in use	Airport unsafe, do not land		
Flashing white	Return to starting point on airport	Return to starting point on airport	Not applicable
Alternating red and green	Exercise extreme caution	Exercise extreme caution	Exercise extreme caution

Statement of Problem and Substantiation for Public Input

The wrong text was inserted in this one box on table 5.2.4. Please see Advisory Circular 150/5210-7D to verify.

Submitter Information Verification

Submitter Full Name: Chad Greathouse
Organization: Blue Grass Airport
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City:
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Submittal Date: Tue Jan 20 14:33:18 EST 2015

Committee Statement

Resolution: FR-49-NFPA 402-2017

Statement: The committee has made this change in order to provide correct information.

Public Input No. 54-NFPA 402-2015 [Section No. 6.2.7]

6.2.7

Positioning equipment (e.g., ~~DEVS~~ Driver's Enhanced Vision Sysytem) can be installed on ARFF vehicles so drivers know their position on the airport at all times. See NFPA 414

Statement of Problem and Substantiation for Public Input

DEV need to be spelled out and reference NFPA 414

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
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Zip:
Submittal Date: Wed Jun 24 16:06:11 EDT 2015

Committee Statement

Resolution: FR-51-NFPA 402-2017
Statement: Editorial in nature.

Public Input No. 55-NFPA 402-2015 [Section No. 7.2.2.2]

~~7.2.2.2~~ –

~~A Local Standby Alert should also be initiated when an aircraft approaching the airport is known or suspected to have developed some defect, but the trouble is not such as would normally involve any serious difficulty in effecting a safe landing.~~

Statement of Problem and Substantiation for Public Input

This paragraph states the same thing as 7.2.2. There is no new or additional information provided.

Submitter Information Verification

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Affilliation: NFPA 402 Sub-Committee
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City:
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Submittal Date: Wed Jun 24 16:20:51 EDT 2015

Committee Statement

Resolution: FR-53-NFPA 402-2017
Statement: The committee has deleted this as they believe it is redundant.

Public Input No. 56-NFPA 402-2015 [Section No. 7.3.1]

7.3.1

ARFF vehicles should approach any aircraft accident by the route that provides the ~~quickest response time~~ most expeditious and safe as possible response . This might not necessarily be the shortest distance to the scene. Traversing unimproved areas can take longer than traveling a greater distance on paved surfaces such as taxiways, ramps, and roads. Total response time is vital. Preferred routes, especially those within the critical rescue and fire-fighting access area, should be preselected. Practice response runs should be made under both ideal and inclement weather conditions.

Statement of Problem and Substantiation for Public Input

: Committee believes that this wording takes into account the need for a fast response but insure that it's done in a safe manner. It is also consistent with recommendation in 1.3.1.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
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City:
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Submittal Date: Wed Jun 24 16:24:18 EDT 2015

Committee Statement

Resolution: FR-54-NFPA 402-2017
Statement: The committee has made this change in order to recognize that while there may be a need for a fast response, it just has to be done in the safest manner.

Public Input No. 57-NFPA 402-2015 [Section No. 7.5.9]

7.5.9

On a Boeing 767, if the ground spoilers are deployed and an ~~overwing plug~~ overwing exit is opened, the ground spoilers will rapidly retract down. This is done so that exiting passengers will not be hampered in evacuation. The slide also deploys from the side of the fuselage.

Statement of Problem and Substantiation for Public Input

The term overwing plug is not a term used in the document. In the situation explained in the text, a plug style door is described however an overwing exit is the object being discussed.

Submitter Information Verification

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Street Address:
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Submittal Date: Wed Jun 24 17:17:48 EDT 2015

Committee Statement

Resolution: FR-7-NFPA 402-2017
Statement: The committee has made this change as it is not unique to the Boeing 767 aircraft and the term over-wing plug is not a commonly used ter.

Public Input No. 65-NFPA 402-2015 [New Section after 7.5.11.1]

TITLE OF NEW CONTENT

Type your content here ...

7.5.11.5 Lithium Ion Main Battery Events

Some airplanes, both commercial and military are being equipped with lithium-ion batteries. These batteries store energy that can generate intense heat in the event of a short circuit or other failures. Lithium-ion batteries can short circuit if they are improperly packaged, dropped, damaged or have manufacturing defects.

Each lithium-ion cell contains a flammable electrolyte. If the cell has a short circuit or is exposed to high temperatures, it can swell and the electrolyte may begin to vaporize creating internal pressure resulting in a thermal runaway.

For example on the Boeing 787 the lithium-ion batteries are secured inside a reinforced stainless steel enclosure that is capable of containing a lithium-ion battery event. Venting of vapor during a battery failure event may be visible from an exterior vent on the bottom of the airplane under the forward or aft Electrical and Electronic (E&E) bay. During active venting, there is no reason to make access to the E&E bay.

Statement of Problem and Substantiation for Public Input

Consideration needs to be given to other Lithium battery locations on the aircraft as well as batteries that are carried and in cargo.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
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Affilliation: NFPA 402 Sub-Committee
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Submittal Date: Wed Jun 24 19:14:09 EDT 2015

Committee Statement

Resolution: FR-56-NFPA 402-2017
Statement: Consideration needs to be given to other Lithium battery locations on the aircraft as well as batteries that are carried and in cargo.

Public Input No. 58-NFPA 402-2015 [Section No. 7.5.11.1]

7.5.11.1 (Add a diagram)

A size-up (risk assessment) of whether or not composite materials are involved should be undertaken, and the appropriate level of personnel protection for site management established. Factors to be considered should include the following:

(1) Whether composite materials, carbon, aramid, boron, fiberglass, or other synthetics are involved.

(2) The scale of involvement.

(3) Whether the composite material components in the internal airframe structure (e.g., flooring, seating) (internal containment if fuselage is intact) or external airframe structure (e.g., skin panel control surfaces, rotor blades) are free to atmosphere.

(4) The prevailing wind and weather conditions.

(5) Composite material fibers cannot normally be detected by the naked eye.

(6) Whether there is a fire or immediate risk of fire. ARFF vehicles should be positioned on the upwind side whenever possible. This must be taken into consideration when dealing with wheel assembly fires in the initial fire-fighting attack. Once the smoke plume has been controlled, the traditional fore and aft ARFF vehicle deployment can be implemented. Composite material characteristics relative to heat are as follows:

(7) Carbon fiber gives off cyanide gas at 150°C (328°F).

(8) Carbon fiber supports a flame at 195°C (409°F).

(9) Delamination occurs between 250°C and 300°C (508°F and 598°F).

(10) The size, type, age, and contents of the aircraft. (ARFF crews should be aware of retrofitted structures and components on aircraft.)

(11) A minimum distance of 100 m (321 ft) from the main fuselage and 30 m (96 ft) from debris, whichever is greater, should be considered contaminated initially and become the boundary in establishing a restricted area. Personnel should, whenever tactically possible, remain upwind and uphill on the crash scene, although this should not impair the effective operational deployment of ARFF vehicles, equipment, or personnel.

(12) If crew and passengers self-evacuate an aircraft, assembly and coaching points must be upwind and outside of the restricted area (inner cordon).

(13) Airborne fibers are highly conductive and can seriously damage electrical installations.

(14) All aircraft and buildings downwind must be warned that there may be fibers in the atmosphere. It is to be advised that ventilation systems drawing air into buildings are closed, as this will minimize the risk of the polluted atmosphere being drawn into the interior of the building.

(15) All foot traffic through the area must be curtailed.

(16) Motorized traffic in the area must be kept to a minimum.

(17) Helicopters must not be allowed over the affected area, as this could disturb the foam blanket and agitate the fibers by the downdraft helicopters create.

(18) Any machinery or electrical equipment likely to be affected by smoke in any composite material related to the incident should not be used until it has been checked. Where smoke from composite materials has been involved, a sticky lacquer-type residue is left that can seriously impair moving parts in machinery.

(19) Vehicle marshaling areas and subsequent triage areas should be established upwind and in accordance with established procedures.

(20) Accident sites may involve large numbers of people, many of whom may go to the scene unnecessarily if not controlled. Clear command structures are essential for overall effectiveness.

(21) The spread of exposure of composite materials should be limited.

(22) The exposure of personnel and valuable equipment to composite materials should be limited.

Statement of Problem and Substantiation for Public Input

Diagram could possibly provide better clarity of what the ARFF crews should be looking for.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
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Submittal Date: Wed Jun 24 17:24:36 EDT 2015

Committee Statement

Resolution: FR-112-NFPA 402-2017
Statement: These are standard tactics that is not unique to composites. Contamination should be considered on all fire responses. Coordination should always be done with the proper environmental agency for proper disposal and clean up.

Public Input No. 59-NFPA 402-2015 [Section No. 7.5.11.1]

7.5.11.1

A size-up (risk assessment) of whether or not composite materials are involved should be undertaken, and the appropriate level of personnel protection for site management established. Factors to be considered should include the following:

(1) Whether composite materials, carbon, aramid, boron, fiberglass, or other synthetics are involved.

(2) The scale of involvement.

(3) Whether the composite material components in the internal airframe structure (e.g., flooring, seating) (internal containment if fuselage is intact) or external airframe structure (e.g., skin panel control surfaces, rotor blades) are free to atmosphere.

(4) The prevailing wind and weather conditions.

(5) Composite material fibers cannot normally be detected by the naked eye.

(6) Whether there is a fire or immediate risk of fire. ARFF vehicles should be positioned on the upwind side whenever possible. This must be taken into consideration when dealing with wheel assembly fires in the initial fire-fighting attack. Once the smoke plume has been controlled, the traditional fore and aft ARFF vehicle deployment can be implemented.

~~Composite material characteristics relative to heat are as follows:~~

(1)

- ~~Carbon fiber gives off cyanide gas at 150°C (328°F).~~
- ~~Carbon fiber supports a flame at 195°C (409°F).~~
- ~~Delamination occurs between 250°C and 300°C (508°F and 598°F).~~

(1) The size, type, age, and contents of the aircraft. (ARFF crews should be aware of retrofitted structures and components on aircraft.)

(1) A minimum distance of 100 m (321 ft) from the main fuselage and 30 m (96 ft) from debris, whichever is greater, should be considered contaminated initially and become the boundary in establishing a restricted area. Personnel should, whenever tactically possible, remain upwind and uphill on the crash scene, although this should not impair the effective operational deployment of ARFF vehicles, equipment, or personnel.

(2) If crew and passengers self-evacuate an aircraft, assembly and coaching points must be upwind and outside of the restricted area (inner cordon).

(3) Airborne fibers are highly conductive and can seriously damage electrical installations.

(4) All aircraft and buildings downwind must be warned that there may be fibers in the atmosphere. It is to be advised that ventilation systems drawing air into buildings are closed, as this will minimize the risk of the polluted atmosphere being drawn into the interior of the building.

(5) All foot traffic through the area must be curtailed.

(6) Motorized traffic in the area must be kept to a minimum.

(7) Helicopters must not be allowed over the affected area, as this could disturb the foam blanket and agitate the fibers by the downdraft helicopters create.

(8) Any machinery or electrical equipment likely to be affected by smoke in any composite material related to the incident should not be used until it has been checked. Where smoke from composite materials has been involved, a sticky lacquer-type residue is left that can seriously impair moving parts in machinery.

(9) Vehicle marshaling areas and subsequent triage areas should be established upwind and in accordance with established procedures.

(10) Accident sites may involve large numbers of people, many of whom may go to the scene unnecessarily if not controlled. Clear command structures are essential for overall effectiveness.

(11) The spread of exposure of composite materials should be limited.

(12) The exposure of personnel and valuable equipment to composite materials should be limited.

Statement of Problem and Substantiation for Public Input

The validity of the information is debatable. The information is very specific to certain types of composites. The point of the section is simply to be cognizant of the hazards of composite materials.

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Submittal Date: Wed Jun 24 17:27:57 EDT 2015

Committee Statement

Resolution: FR-112-NFPA 402-2017

Statement: These are standard tactics that is not unique to composites. Contamination should be considered on all fire responses. Coordination should always be done with the proper environmental agency for proper disposal and clean up.

Public Input No. 60-NFPA 402-2015 [Section No. 7.5.11.1]

7.5.11.1

A size-up (risk assessment) of whether or not composite materials are involved should be undertaken, and the appropriate level of personnel protection for site management established. Factors to be considered should include the following:

(1) Whether composite materials, carbon, aramid, boron, fiberglass, or other synthetics are involved.

(2) The scale of involvement.

(3) Whether the composite material components in the internal airframe structure (e.g., flooring, seating) (internal containment if fuselage is intact) or external airframe structure (e.g., skin panel control surfaces, rotor blades) are free to atmosphere.

(4) The prevailing wind and weather conditions.

(5) Composite material fibers cannot normally be detected by the naked eye.

(6) Whether there is a fire or immediate risk of fire. ARFF vehicles should be positioned on the upwind side whenever possible. This must be taken into consideration when dealing with wheel assembly fires in the initial fire-fighting attack. Once the smoke plume has been controlled, the traditional fore and aft ARFF vehicle deployment can be implemented. Composite material characteristics relative to heat are as follows:

(7) Carbon fiber gives off cyanide gas at 150°C (328°F).

(8) Carbon fiber supports a flame at 195°C (409°F).

(9) Delamination occurs between 250°C and 300°C (508°F and 598°F).

(10) ~~The size, type, age, and contents of the aircraft. (ARFF crews should be aware of retrofitted structures and components on aircraft.)~~

(11)

(12) A minimum distance of 100 m (321 ft) from the main fuselage and 30 m (96 ft) from debris, whichever is greater, should be considered contaminated initially and become the boundary in establishing a restricted area. Personnel should, whenever tactically possible, remain upwind and uphill on the crash scene, although this should not impair the effective operational deployment of ARFF vehicles, equipment, or personnel.

(13) If crew and passengers self-evacuate an aircraft, assembly and coaching points must be upwind and outside of the restricted area (inner cordon).

(14) Airborne fibers are highly conductive and can seriously damage electrical installations.

(15) All aircraft and buildings downwind must be warned that there may be fibers in the atmosphere. It is to be advised that ventilation systems drawing air into buildings are closed, as this will minimize the risk of the polluted atmosphere being drawn into the interior of the building.

(16) All foot traffic through the area must be curtailed.

(17) Motorized traffic in the area must be kept to a minimum.

(18) Helicopters must not be allowed over the affected area, as this could disturb the foam blanket and agitate the fibers by the downdraft helicopters create.

(19) Any machinery or electrical equipment likely to be affected by smoke in any composite material related to the incident should not be used until it has been checked. Where smoke from composite materials has been involved, a sticky lacquer-type residue is left that can seriously impair moving parts in machinery.

(20) Vehicle marshaling areas and subsequent triage areas should be established upwind and in accordance with established procedures.

(21) Accident sites may involve large numbers of people, many of whom may go to the scene unnecessarily if not controlled. Clear command structures are essential for overall effectiveness.

(22) The spread of exposure of composite materials should be limited.

(23) The exposure of personnel and valuable equipment to composite materials should be limited.

Statement of Problem and Substantiation for Public Input

No recommended action provided with this statement and topic is covered elsewhere.

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Submittal Date: Wed Jun 24 17:38:41 EDT 2015

Committee Statement

Resolution: FR-112-NFPA 402-2017

Statement: These are standard tactics that is not unique to composites. Contamination should be considered on all fire responses. Coordination should always be done with the proper environmental agency for proper disposal and clean up.

Public Input No. 62-NFPA 402-2015 [Section No. 7.5.11.1]

7.5.11.1

A size-up (risk assessment) of whether or not composite materials are involved should be undertaken, and the appropriate level of personnel protection for site management established. Factors to be considered should include the following:

(1) Whether composite materials, carbon, aramid, boron, fiberglass, or other synthetics are involved.

(2) The scale of involvement.

(3) Whether the composite material components in the internal airframe structure (e.g., flooring, seating) (internal containment if fuselage is intact) or external airframe structure (e.g., skin panel control surfaces, rotor blades) are free to atmosphere.

(4) The prevailing wind and weather conditions.

(5) ~~Composite material fibers cannot normally be detected by the naked eye.~~

(6)

(7) Whether there is a fire or immediate risk of fire. ARFF vehicles should be positioned on the upwind side whenever possible. This must be taken into consideration when dealing with wheel assembly fires in the initial fire-fighting attack. Once the smoke plume has been controlled, the traditional fore and aft ARFF vehicle deployment can be implemented. Composite material characteristics relative to heat are as follows:

(8) Carbon fiber gives off cyanide gas at 150°C (328°F).

(9) Carbon fiber supports a flame at 195°C (409°F).

(10) Delamination occurs between 250°C and 300°C (508°F and 598°F).

(11) The size, type, age, and contents of the aircraft. (ARFF crews should be aware of retrofitted structures and components on aircraft.)

(12) A minimum distance of 100 m (321 ft) from the main fuselage and 30 m (96 ft) from debris, whichever is greater, should be considered contaminated initially and become the boundary in establishing a restricted area. Personnel should, whenever tactically possible, remain upwind and uphill on the crash scene, although this should not impair the effective operational deployment of ARFF vehicles, equipment, or personnel.

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(16) All foot traffic through the area must be curtailed.

(17) Motorized traffic in the area must be kept to a minimum.

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(22) The spread of exposure of composite materials should be limited.

(23) The exposure of personnel and valuable equipment to composite materials should be limited.

Statement of Problem and Substantiation for Public Input

This is not a valid statement. Composites are utilized in varying degrees. Individually products of combustion are not discernable

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Submittal Date: Wed Jun 24 18:40:15 EDT 2015

Committee Statement

Resolution: FR-112-NFPA 402-2017
Statement: These are standard tactics that is not unique to composites. Contamination should be considered on all fire responses. Coordination should always be done with the proper environmental agency for proper disposal and clean up.

Public Input No. 63-NFPA 402-2015 [Section No. 7.5.11.1]

7.5.11.1

A size-up (risk assessment) of whether or not composite materials are involved should be undertaken, and the appropriate level of personnel protection for site management established. Factors to be considered should include the following:

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(2) The scale of involvement.

(3) Whether the composite material components in the internal airframe structure (e.g., flooring, seating) (internal containment if fuselage is intact) or external airframe structure (e.g., skin panel control surfaces, rotor blades) are free to atmosphere.

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(5) Composite material fibers cannot normally be detected by the naked eye.

(6) Whether there is a fire or immediate risk of fire. ARFF vehicles should be positioned on the upwind side whenever possible. ~~This must be taken into consideration when dealing with wheel assembly fires in the initial fire-fighting attack. Once the smoke plume has been controlled, the traditional fore and aft ARFF vehicle deployment can be implemented. Composite material characteristics relative to heat are as follows:~~

(7) ~~Carbon fiber gives off cyanide gas at 150°C (328°F).~~

(8) ~~Carbon fiber supports a flame at 195°C (409°F).~~

(9) ~~Delamination occurs between 250°C and 300°C (508°F and 598°F).~~

(10)

(11)

(12)

(13) The size, type, age, and contents of the aircraft. (ARFF crews should be aware of retrofitted structures and components on aircraft.)

(14) A minimum distance of 100 m (321 ft) from the main fuselage and 30 m (96 ft) from debris, whichever is greater, should be considered contaminated initially and become the boundary in establishing a restricted area. Personnel should, whenever tactically possible, remain upwind and uphill on the crash scene, although this should not impair the effective operational deployment of ARFF vehicles, equipment, or personnel.

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(22) Vehicle marshaling areas and subsequent triage areas should be established upwind and in accordance with established procedures.

(23) Accident sites may involve large numbers of people, many of whom may go to the scene unnecessarily if not controlled. Clear command structures are essential for overall effectiveness.

(24) The spread of exposure of composite materials should be limited.

(25) The exposure of personnel and valuable equipment to composite materials should be limited.

Statement of Problem and Substantiation for Public Input

Not necessary due to the fact that the section does not provide a special tactic or strategy for composite material.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
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Street Address:
City:
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Submittal Date: Wed Jun 24 19:02:29 EDT 2015

Committee Statement

Resolution: FR-112-NFPA 402-2017
Statement: These are standard tactics that is not unique to composites. Contamination should be considered on all fire responses. Coordination should always be done with the proper environmental agency for proper disposal and clean up.

Public Input No. 64-NFPA 402-2015 [Section No. 7.5.11.1]

7.5.11.1

A size-up (risk assessment) of whether or not composite materials are involved should be undertaken, and the appropriate level of personnel protection for site management established. Factors to be considered should include the following:

(1) Whether composite materials, carbon, aramid, boron, fiberglass, or other synthetics are involved.

(2) The scale of involvement.

(3) Whether the composite material components in the internal airframe structure (e.g., flooring, seating) (internal containment if fuselage is intact) or external airframe structure (e.g., skin panel control surfaces, rotor blades) are free to atmosphere.

(4) The prevailing wind and weather conditions.

(5) Composite material fibers cannot normally be detected by the naked eye.

(6) Whether there is a fire or immediate risk of fire. ARFF vehicles should be positioned on the upwind side whenever possible. This must be taken into consideration when dealing with wheel assembly fires in the initial fire-fighting attack. Once the smoke plume has been controlled, the traditional fore and aft ARFF vehicle deployment can be implemented. Composite material characteristics relative to heat are as follows:

(7) Carbon fiber gives off cyanide gas at 150°C (328°F).

(8) Carbon fiber supports a flame at 195°C (409°F).

(9) Delamination occurs between 250°C and 300°C (508°F and 598°F).

(10) The size, type, age, and contents of the aircraft. (ARFF crews should be aware of retrofitted structures and components on aircraft.)

(11) ~~A minimum distance of 100 m (321 ft) from the main fuselage and 30 m (96 ft) from debris, whichever is greater, should be considered contaminated initially and become the boundary in establishing a restricted area. Personnel should, whenever tactically possible, remain upwind and uphill on the crash scene, although this should not impair the effective operational deployment of ARFF vehicles, equipment, or personnel.~~

(12) ~~If crew and passengers self-evacuate an aircraft, assembly and coaching points must be upwind and outside of the restricted area (inner cordon).~~

(13) ~~Airborne fibers are highly conductive and can seriously damage electrical installations.~~

(14) ~~All aircraft and buildings downwind must be warned that there may be fibers in the atmosphere. It is to be advised that ventilation systems drawing air into buildings are closed, as this will minimize the risk of the polluted atmosphere being drawn into the interior of the building.~~

(15) ~~All foot traffic through the area must be curtailed.~~

(16) ~~Motorized traffic in the area must be kept to a minimum.~~

(17) ~~Helicopters must not be allowed over the affected area, as this could disturb the foam blanket and agitate the fibers by the downdraft helicopters create.~~

(18) ~~Any machinery or electrical equipment likely to be affected by smoke in any composite material related to the incident should not be used until it has been checked. Where smoke from composite materials has been involved, a sticky lacquer-type residue is left that can seriously impair moving parts in machinery.~~

(19) ~~Vehicle marshaling areas and subsequent triage areas should be established upwind and in accordance with established procedures.~~

(20) ~~Accident sites may involve large numbers of people, many of whom may go to the scene unnecessarily if not controlled. Clear command structures are essential for overall effectiveness.~~

(21) ~~The spread of exposure of composite materials should be limited.~~

(22) ~~The exposure of personnel and valuable equipment to composite materials should be limited.~~

(23)

(24)

(25)

(26)

(27)

(28)

(29)

(30)

(31)

(32)

(33)

(34)

Statement of Problem and Substantiation for Public Input

These are standard tactics that is not unique to composites. Contamination should be considered on all fire responses. Coordination should always be done with the proper environmental agency for proper disposal and clean up.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
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Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
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Submittal Date: Wed Jun 24 19:06:18 EDT 2015

Committee Statement

Resolution: FR-112-NFPA 402-2017
Statement: These are standard tactics that is not unique to composites. Contamination should be considered on all fire responses. Coordination should always be done with the proper environmental agency for proper disposal and clean up.

Public Input No. 66-NFPA 402-2015 [Section No. 7.5.11.4]

7.5.11.4 Ballistic Parachutes Recovery System .

7.5.11.4.1

An increasing number of certified general aviation, amateur built, light sport, and ultralight aircraft are now being fitted with a Ballistic Recovery System (~~BRS~~ BPRS). In the event of an aircraft structural failure or loss of flight control, the pilot can activate the ~~BRS~~ BPRS . The ~~BRS~~ BPRS is designed to recover control and lower the aircraft and occupants to the ground at a survivable rate. A typical ~~BRS~~ BPRS consists of a parachute, attachment cables, and a propellant system for deployment.

7.5.11.4.2

The components of the propellant system will contain detonators, small explosive charges, and solid-fuel rocket motors, which cannot be rendered safe by emergency response personnel.

7.5.11.4.3

Inadvertent operation of a ~~BRS~~ BPRS may result in serious injury or death. When approaching a general aviation accident, an early assessment should be made to determine if a ~~BRS~~ BPRS is installed. A robust emergency plan should be developed for dealing with ~~BRS~~ BPRS that safeguards emergency responding personnel and the aircraft occupants against inadvertent operation during extrication activities and wreckage movement. Further information can be found on the NTSB website (www.ntsb.gov).

Statement of Problem and Substantiation for Public Input

BRS is a manufacturers name and BPRS is considered a more accurate term.

Submitter Information Verification

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Street Address:
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Submittal Date: Wed Jun 24 19:31:25 EDT 2015

Committee Statement

Resolution: FR-55-NFPA 402-2017
Statement: These changes were made to address a TIA that was submitted to 402 to correct the reference from the NTSB to the FAA website. It was also done to provide the end user with a more accurate term, as BRS is a manufacturers name while BPRS is not.

Public Input No. 12-NFPA 402-2015 [Section No. 7.5.11.4.3]

7.5.11.4.3

Inadvertent operation of a BRS may result in serious injury or death. When approaching a general aviation accident, an early assessment should be made to determine if a BRS is installed. A robust emergency plan should be developed for dealing with BRS that safeguards emergency responding personnel and the aircraft occupants against inadvertent operation during extrication activities and wreckage movement. Further information can be found on ~~the NTSB~~ the FAA website (http:// www. ~~ntsb~~ faa .gov /airports/airport_safety/aircraft_rescue_fire_fighting/) u n d er ARFF and first responder training and also specifically see Certification Alert 13-04 under ARFF related CertAlerts .

Additional Proposed Changes

File Name	Description	Approved
NFPA_402_TIA_13-1.pdf	NFPA TIA 13-1 Log # 1154	

Statement of Problem and Substantiation for Public Input

"Note: This public input originates from Tentative Interim Amendment No. 13-1 (Log #1154) issued by the Standards Council on August 14, 2014 and per the NFPA Regs., needs to be reconsidered by the Technical Committee for the next edition of the Document"

Emergency Nature: This proposed temporary interim amendment (TIA) meets the emergency nature threshold due to the fact that the link to the NTSB website that is in the current document does not provide any training on the ballistic recovery systems (BRS). In fact the NTSB website does not contain any of the information that is suggested in the text of the section, thus necessitating the submission of this TIA. The new text that is being proposed and provided offers users some in-depth training and information on the BRS that can be incorporated into an emergency plan keeping emergency personnel safe.

Submitter Information Verification

Submitter Full Name: TC on AIR-AAA
Organization: NFPA 402 TC on Aircraft Rescue and Fire Fighting
Street Address:
City:
State:
Zip:
Submittal Date: Mon Mar 30 13:11:51 EDT 2015

Committee Statement

Resolution: FR-55-NFPA 402-2017
Statement: These changes were made to address a TIA that was submitted to 402 to correct the reference from the NTSB to the FAA website. It was also done to provide the end user with a more accurate term, as BRS is a manufacturers name while BPRS is not.

Tentative Interim Amendment

NFPA® 402

Guide for Aircraft Rescue and Fire-Fighting Operations

2013 Edition

Reference: 7.5.11.4.3
TIA 13-1
(SC 14-8-30 / TIA Log #1154)

Pursuant to Section 5 of the NFPA *Regulations Governing the Development of NFPA Standards*, the National Fire Protection Association has issued the following Tentative Interim Amendment to NFPA 402, *Guide for Aircraft Rescue and Fire-Fighting Operations*, 2013 edition. The TIA was processed by the Technical Committee on Aircraft Rescue and Fire Fighting, and was issued by the Standards Council on August 14, 2014, with an effective date of September 3, 2014.

A Tentative Interim Amendment is tentative because it has not been processed through the entire standards-making procedures. It is interim because it is effective only between editions of the standard. A TIA automatically becomes a public input of the proponent for the next edition of the standard; as such, it then is subject to all of the procedures of the standards-making process.

1. Revise 7.5.11.4.3 to read as follows:

7.5.11.4.3 Inadvertent operation of a BRS may result in serious injury or death. When approaching a general aviation accident, an early assessment should be made to determine if a BRS is installed. A robust emergency plan should be developed for dealing with BRS that safeguards emergency responding personnel and the aircraft occupants against inadvertent operation during extrication activities and wreckage movement. Further information can be found on the FAA website (http://www.faa.gov/airports/airport_safety/aircraft_rescue_fire_fighting/) under ARFF and first responder training and also specifically see Certification Alert 13-04 under ARFF related CertAlerts. ~~NTSB website (www.ntsb.gov)~~.

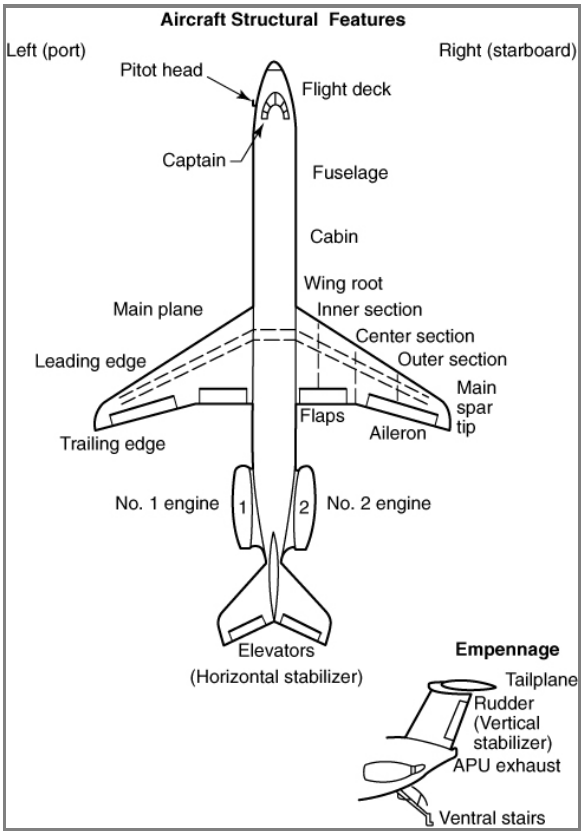
Issue Date: August 14, 2014
Effective Date: September 3, 2014

Public Input No. 67-NFPA 402-2015 [Section No. 8.1.1]

8.1.1

It is fundamental that ARFF personnel have a working knowledge of named parts and construction of an aircraft to ensure commonality in terms used and recognition of potential difficulties and hazards when gaining access or extricating casualties. Aircraft are manufactured in many sizes. However, the terms used in respect to identification of structural features are common to most sizes of aircraft. These are identified in Figure 8.1.1.

Figure 8.1.1 Nomenclature for Aircraft Structural Features. (Update diagram and add a side view)



Statement of Problem and Substantiation for Public Input

Need to provide the most up to date diagrams possible. The current diagram is out of date and there should also include a diagram of a side view of the aircraft.

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Zip:

Submittal Date: Wed Jun 24 19:36:27 EDT 2015

Committee Statement

Resolution: The committee has chosen to keep this in the document as is.

Public Input No. 68-NFPA 402-2015 [Section No. 8.2.7]

8.2.7

Many aircraft cabin materials in current and continuing use, as well as newer fire-resistive materials, can produce high concentrations of toxic gases when heated even though no open flaming is visible. Some examples of toxic gases given off by cabin materials are ~~shown in~~ ~~Table 8.2.7 . (Therefore, it~~ Hydrogen Cyanide (HCN), Ammonia (NH_3), Benzene and Sulfur Dioxide (SO_2). (It is imperative that positive-pressure SCBA be worn by all fire fighters engaged in rescue, fire-fighting, and overhauling operations.)

Table 8.2.7 Toxic Gases Given Off by Aircraft Materials

Material	Use	Toxic Gases
Nylon	Seats, curtains, carpeting	Hydrogen cyanide (HCN) Ammonia (NH_3)
Silk	Headcloth and curtains	Hydrogen cyanide (HCN) Ammonia (NH_3)
Wool	Seats, curtains, carpeting	Hydrogen cyanide (HCN) Ammonia (NH_3) Nitrogen dioxide (NO_2)
Acrylics	Glazing	Hydrogen cyanide (HCN)
Polystyrene	Insulation	Benzene
Rubber	Wiring systems	Sulfur dioxide (SO_2) Hydrogen sulfide (H_2S)
Urethanes	Seating and insulation	Hydrogen cyanide (HCN) Ammonia (NH_3) Nitrogen dioxide (NO_2)
Melamine	Decorative laminates	Hydrogen cyanide (HCN) Ammonia (NH_3)
Polyvinylchoride (PVC)	Wiring insulation, paneling, and trim	Nitrogen dioxide (NO_2) Hydrogen chloride (HCl) Carbon dioxide (CO_2) Carbon monoxide (CO) Halogen acids
Acrylo-nitrile-butadiene-styrene (ABS)	Window surrounds, seat side paneling	Hydrogen cyanide (HCN)
Fluorocarbon materials	Wiring insulation/covering	Hydrofluoric acid (HF)

Statement of Problem and Substantiation for Public Input

A few examples of toxic gases are needed here to make the point rather than a full table of all possibilities and locations.

Submitter Information Verification

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Street Address:
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Submittal Date: Wed Jun 24 19:38:23 EDT 2015

Committee Statement

Resolution: FR-57-NFPA 402-2017
Statement: The committee is deleting the table as they believe that just a few examples are needed in this section.

Public Input No. 69-NFPA 402-2015 [Section No. 8.2.7]

~~8.2.7~~

~~Many aircraft cabin materials in current and continuing use, as well as newer fire-resistive materials, can produce high concentrations of toxic gases when heated even though no open flaming is visible. Some examples of toxic gases given off by cabin materials are shown in Table 8.2.7 . (Therefore, it is imperative that positive-pressure SCBA be worn by all fire fighters engaged in rescue, fire-fighting, and overhauling operations.)~~

~~Table 8.2.7 Toxic Gases Given Off by Aircraft Materials~~

~~Material Use Toxic Gases Nylon Seats, curtains, carpeting Hydrogen cyanide (HCN) Ammonia (NH_3) Silk Headcloth and curtains Hydrogen cyanide (HCN) Ammonia (NH_3) Wool Seats, curtains, carpeting Hydrogen cyanide (HCN) Ammonia (NH_3) Nitrogen dioxide (NO_2) Acrylics Glazing Hydrogen cyanide (HCN) Polystyrene Insulation Benzene Rubber Wiring systems Sulfur dioxide (SO_2) Hydrogen sulfide (H_2S) Urethanes Seating and insulation Hydrogen cyanide (HCN) Ammonia (NH_3) Nitrogen dioxide (NO_2) Melamine Decorative laminates Hydrogen cyanide (HCN) Ammonia (NH_3) Polyvinylchoride (PVC) Wiring insulation, paneling, and trim Nitrogen dioxide (NO_2) Hydrogen chloride (HCl) Carbon dioxide (CO_2) Carbon monoxide (CO) Halogen acids Acrylo-nitrile-~~

~~butadiene-~~

~~styrene (ABS) Window surrounds, seat side paneling Hydrogen cyanide (HCN) Fluorocarbon materials Wiring insulation/covering Hydrofluoric acid (HF)~~

Statement of Problem and Substantiation for Public Input

A few examples of toxic gases in the body text make the point rather than a full table of all possibilities and locations. The table could be moved to the annex if so there is a strong desire to keep the full table.

Submitter Information Verification

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Affilliation: NFPA 402 Sub-Committee
Street Address:
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Submittal Date: Wed Jun 24 19:42:53 EDT 2015

Committee Statement

Resolution: FR-57-NFPA 402-2017

Statement: The committee is deleting the table as they believe that just a few examples are needed in this section.

Public Input No. 70-NFPA 402-2015 [Section No. 8.3.1]

8.3.1

In some aircraft, where the wing joins the fuselage there is no substantial separation to provide a desired fire wall. As all aircraft have wing tanks, many without separate metal or synthetic bladders within the wing cavity, vapors are seriously exposed under fire conditions. Fuel is carried in storage tanks that are structurally separate but interconnected, incorporating vent systems to ensure equalization of pressure and prevent collapse of the tank. Aircraft with a high rate of climb have fuel tanks that are pressurized to prevent the fuel from boiling off or with vapor locks.

8.3.1.1

~~The principal types~~ Types of fuel tanks in use are as follows:

(1) *Rigid Tanks.* These are usually made of aluminum or Duralumin with internal baffles to brace the tank and reduce surging of fuel. These tanks are normally covered in fabric, fitted with cradles, and held by metal straps.

(2) *Integral Tanks.* These are shaped by compartments formed by the airframe structure, and are made fueltight. The advantage to this type of tank is that it does not add weight to the structure.

(3) *Flexible/Semi-flexible Tanks.* These are bags made from plastic or other man-made material that are held in place by rubber-buttoned area press studs. The advantage to this type of tank is that it is not ruptured by shock; however, they are susceptible to rupture by piercing.

(4) *Auxiliary Tanks.* These are normally constructed of metal or fiberglass, and found in the form of pods, which can be fitted under wing, wing tips, or within the fuselage. The fuel in auxiliary tanks is usually used in flight first, and in some circumstances, these tanks may be jettisoned in an emergency.

Statement of Problem and Substantiation for Public Input

Should begin “type” the lead in of “The principal” add no further clarity to the statement.

Submitter Information Verification

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Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 19:48:27 EDT 2015

Committee Statement

Resolution: FR-58-NFPA 402-2017
Statement: The committee believes that this should begin “type” the lead in of “The principal” to add further clarity to the statement.

Public Input No. 71-NFPA 402-2015 [Section No. 8.3.3]

8.3.3

~~Currently entering commercial service are wide~~ Wide ~~-~~body ~~aircraft with~~ aircraft have provisions for additional fuel storage within both the horizontal and vertical stabilizers. Damage to these tanks in the event of an aircraft accident poses a number of problems, including those where fuel or vapors might enter occupied sections of the aircraft and become ignited. These additional fuel storage locations can complicate the fire-fighting operations and will require additional agent. *(See also NFPA 403, Standard for Aircraft Rescue and Fire-Fighting Services at Airports.)*

Statement of Problem and Substantiation for Public Input

The lead in statement gives the impression that these fuel storage locations are new. These locations for fuel tanks are now common.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
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Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
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Submittal Date: Wed Jun 24 19:51:19 EDT 2015

Committee Statement

Resolution: FR-59-NFPA 402-2017
Statement: The lead in statement gives the impression that these fuel storage locations are new. These locations for fuel tanks are now common.

Public Input No. 72-NFPA 402-2015 [Section No. 8.3.5]

8.3.5 *

Aviation fuels that are in use for civil and military aircraft include the following (Table 8.3.5 provides a summary of aviation fuel designations and their significant fire hazard characteristics):

(1) Fuels for piston-driven aircraft are aviation gasoline (AVGAS) or motor gasoline (MOGAS).

(2) Fuels in use in turbine engines are Jet A and Jet A1 (AVTUR) kerosene, Jet B (AVTAG) 60 percent gasoline 40 percent kerosene, and JP-5 (AVCAT) for naval carrier–borne aircraft.

Note: Bio fuels are currently being developed for use in commercial aviation and are generally blended with other fuels . Limited informations was available during time of publication.

Table 8.3.5 Aviation Fuel Designations and Characteristics

Fuel Type	Civil Aviation Designation	UK Designation	Military Designation	Minimum Flash Point	Auto-Ignition Temp	Explosive Range (Volume %)
Kerosene	Jet A Jet A1	AVTUR	JP-8	37.8°C (100°F)	246.1°C (475°F)	0.7–5.3
Kerosene (high flash)	JP-5	AVCAT	JP-5	60°C (140°F)	246.1°C (475°F)	0.7–5.3
Kerosene and gasoline mixture	Jet B	AVTAG	JP-4	–23.3°C (-10°F)	248.9°C (480°F)	1.2–7.6
Aviation gasoline	AVGAS	AVGAS	AVGAS	–45.6°C (-50°F)	448.9°C (840°F)	1.4–7.6
Motor gasoline	MOGAS	MOGAS	MOGAS	–45.6°C (-50°F)	448.9°C (840°F)	1.4–7.6

Statement of Problem and Substantiation for Public Input

Bio Fuels are being used in the industry. Their mixtures and characteristic vary and it might be better served with a simple note at the end of the table referencing them.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
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Street Address:
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State:

Zip:

Submittal Date: Wed Jun 24 19:54:29 EDT 2015

Committee Statement

Resolution: FR-60-NFPA 402-2017

Statement: Bio Fuels are being used in the industry. Their mixtures and characteristic vary and it might be better served with a simple note at the end of the table referencing them.

Public Input No. 73-NFPA 402-2015 [New Section after 8.4.10]

8.4.11 Re-enforced Flight Deck Doors

Commercial aircraft flight deck doors are secured and in the event that the aircraft is unoccupied or occupants are incapacitated forcible entry will be required for access in the event emergency.

Statement of Problem and Substantiation for Public Input

Flight deck door previously unsecured and required no special training or consideration.

Submitter Information Verification

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Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
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Submittal Date: Wed Jun 24 19:59:01 EDT 2015

Committee Statement

Resolution: FR-61-NFPA 402-2017
Statement: Flight deck door previously unsecured and required no special training or consideration.

Public Input No. 74-NFPA 402-2015 [New Section after 9.1]

9.1 Suggested Addition

It is imperative that, before commencing rescue operations, a scene survey and risk assessment is carried out. This should consider at least the following: -

(1) Stability of the aircraft and/or its wreckage

(2) Training and competence of crews

(3) Availability and suitability of equipment

(4) Hazards arising from the accident site

(5) Prevailing weather conditions

(6) Hazards that may emerge during rescue operations

Statement of Problem and Substantiation for Public Input

Committee feels that this is a good introductory paragraph for Chapter 8

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
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Submittal Date: Wed Jun 24 21:24:13 EDT 2015

Committee Statement

Resolution: FR-62-NFPA 402-2017
Statement: Committee believes that this is a good introductory paragraph for Chapter 9. Make this a the new 9.1 and renumber accordingly.

Public Input No. 75-NFPA 402-2015 [Section No. 9.2.1]

9.2.1

Evacuation slides are provided to expedite occupant egress from aircraft that have normal door sill heights above 1.5 m (5 ft). Because passengers are not trained in proper evacuation slide use, as shown in Figure 9.2.1, there is a degree of personal injury risk (approximately 6 percent) when slides are used. ARFF personnel should expect the occurrence of sprains, bruises, friction burns, and other minor injuries whenever evacuation slides are used.

Figure 9.2.1 Deployed Evacuation Slide. (Update photo)

Statement of Problem and Substantiation for Public Input

Needs to be up to date

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
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Submittal Date: Wed Jun 24 21:26:54 EDT 2015

Committee Statement

Resolution: The committee has chosen to reject this as they believe the current photo is still accurate.

Public Input No. 76-NFPA 402-2015 [Section No. 9.2.2]

9.2.2

If the nose gear fails during landing, the aircraft might come to rest in a tail-high attitude. The failure of one or more landing gears can result in a nose-high or listing attitude. In these instances, evacuation slides become somewhat ineffective because they do not deploy at the proper angle to the ground. A high percentage of injuries can be expected when evacuation slides are used under these circumstances. ARFF personnel should be able to reduce the amount and severity of injuries and expedite evacuation by manipulating the slides and assisting evacuees as shown in Figure 9.2.2.

Figure 9.2.2 Assisting Evacuees at the Base of an Evacuation Slide. (Update photo)

Statement of Problem and Substantiation for Public Input

Needs to be up to date

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
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Street Address:
City:
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Submittal Date: Wed Jun 24 21:28:45 EDT 2015

Committee Statement

Resolution: FR-1-NFPA 402-2017
Statement: The committee has chosen to delete this photo as it is out of date.

Public Input No. 77-NFPA 402-2015 [Section No. 9.2.3]

9.2.3

Aircraft evacuation slides are ~~susceptible to~~ coated with grey aluminized paint to protect them from nearby fires for up to 90 seconds however they remain susceptible to heat and fire exposure. They are combustible, and when exposed to radiant heat they may melt and deflate , ~~then deflate,~~ rendering them unusable. ARFF personnel should protect evacuation slides from heat and flame to the best of their ability but should be extremely careful not to apply foam to the operational area of the slide. Foam on the slide makes it very slippery and increases the descent speed of evacuees, potentially causing severe injuries.

Statement of Problem and Substantiation for Public Input

This description better depicts the current manufacturer standard for slides

Submitter Information Verification

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Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
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Submittal Date: Wed Jun 24 21:30:26 EDT 2015

Committee Statement

Resolution: FR-63-NFPA 402-2017
Statement: This description better depicts the current manufacturer standard for slides.

Public Input No. 80-NFPA 402-2015 [New Section after 9.2.4]

9.2.4 XX Suggested Addition

Emergency stairs and equipment are now being used provided at larger aerodromes particularly where multi-deck aircraft operate

Statement of Problem and Substantiation for Public Input

Suggested addition calls attention to the use of emergency air stairs and other equipment that is currently being utilized by ARFF responders

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
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Zip:
Submittal Date: Wed Jun 24 21:41:59 EDT 2015

Committee Statement

Resolution: FR-64-NFPA 402-2017
Statement: The committee believes these changes provide the end user with clarification with regards to AIAV's.

Public Input No. 78-NFPA 402-2015 [Section No. 9.2.4]

9.2.4

If time and conditions permit, mobile stairways should be used as an alternative to deploying evacuation slides. This method of evacuation, when there is no immediate danger to aircraft occupants, would prevent many injuries. Response of available non-emergency mobile stairways should be prearranged between ARFF personnel and one or more of the following:

(1) Airlines

(2) Airport maintenance facilities

(3) Airport operations

Statement of Problem and Substantiation for Public Input

“non-emergency” takes into account that there also is “Emergency Stairs” e.g. Air Stairs.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
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Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
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Submittal Date: Wed Jun 24 21:34:50 EDT 2015

Committee Statement

Resolution: FR-64-NFPA 402-2017
Statement: The committee believes these changes provide the end user with clarification with regards to AIAV's.

Public Input No. 79-NFPA 402-2015 [Section No. 9.2.4]

9.2.4

If time and conditions permit, mobile stairways should be used as an alternative to deploying evacuation slides. This method of evacuation, when there is no immediate danger to aircraft occupants, would prevent many injuries. Response of available mobile stairways should be prearranged between ARFF personnel and one or more of the following ~~:~~ and detailed in the aerodrome Emergency oders/Aerodrome manual.

(1) Airlines

(2) Airport maintenance facilities

(3) Airport operations

Statement of Problem and Substantiation for Public Input

Suggested addition provides clarity and a reference point

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
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City:
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Submittal Date: Wed Jun 24 21:37:59 EDT 2015

Committee Statement

Resolution: FR-64-NFPA 402-2017
Statement: The committee believes these changes provide the end user with clarification with regards to AIAV's.

Public Input No. 81-NFPA 402-2015 [Section No. 9.4.3]

9.4.3

Turbine-powered aircraft have heavier skins and structures than the older piston aircraft. Due to this heavy construction, the only practical method of entry, other than using normal or emergency exits, is through the use of portable power tools. Power saws can be used to cut through aircraft skin and structural materials *[see Figure 9.4.3(a)].* CAUTION SHOULD BE EXERCISED WHEN USING SPARK-PRODUCING POWER TOOLS WHERE FLAMMABLE VAPORS EXIST. Claw and pry tools can be used for forcing doors and hatches that are jammed, to pull down panels and partitions, to dislodge aircraft seats, and so forth *[see Figure 9.4.3(b)]*. The air chisel can be used to cut aluminum and other light metals found on aircraft *[see Figure 9.4.3(c)]*. Hydraulic rescue tools are used to assist with forcible entry during aircraft accident operations *[see Figure 9.4.3(d)]*. These tools take the form of electric-, pneumatic-, hydraulic-, or gasoline-powered cutting, spreading, or shifting equipment. At best, this type of entry into a modern jet aircraft fuselage is very difficult and time consuming. Areas safe to cut or pry into should be depicted on aircraft emergency diagrams.

Figure 9.4.3(a) Rescue Saws. (Update all photos)

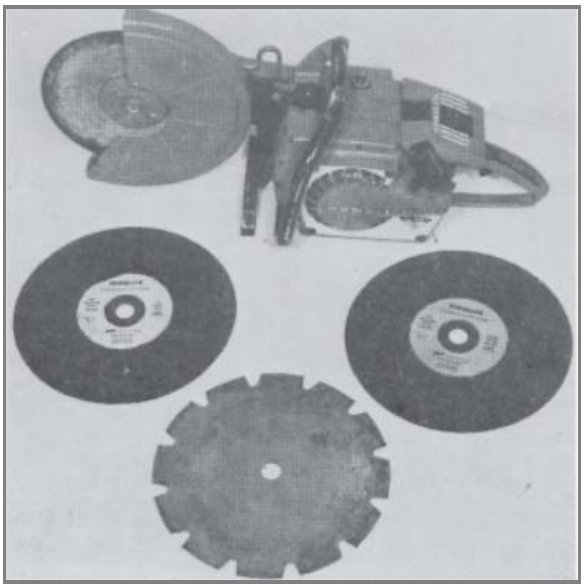

Figure 9.4.3(b) Prying Tools.

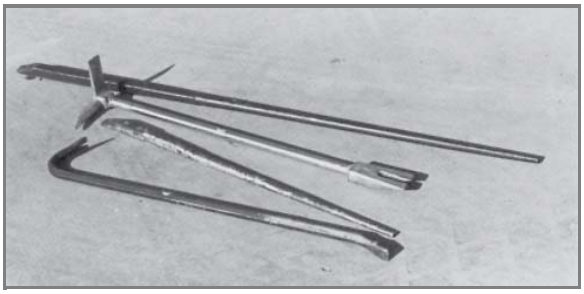

Figure 9.4.3(c) Air Chisel.

Figure 9.4.3(d) Hydraulic Rescue Tools [from left: life or spread (long), spread cut, and lift or spread (short)].

Statement of Problem and Substantiation for Public Input

All photos need to be up to date

Submitter Information Verification

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Submittal Date: Wed Jun 24 21:43:40 EDT 2015

Committee Statement

Resolution: FR-2-NFPA 402-2017
Statement: The committee is deleting these as they believe these photos are outdated and add no value to the document.

Public Input No. 82-NFPA 402-2015 [Section No. 9.4.4.2]

9.4.4.2

Caution should be exercised in ~~the area at the front of~~ 360 degree area around this type of aircraft because it can carry fixed guns and rockets.

Statement of Problem and Substantiation for Public Input

This better depicts true danger area all the way around an aircraft equipped with munitions.

Submitter Information Verification

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Street Address:
City:
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Submittal Date: Wed Jun 24 21:47:07 EDT 2015

Committee Statement

Resolution: FR-65-NFPA 402-2017
Statement: The committee believes this text better depicts true danger areas all around the aircraft that are equipped with munitions.

Public Input No. 11-NFPA 402-2015 [Section No. 9.5.7]

9.5.7

Aircraft accidents can occur during temperature extremes. These conditions can seriously aggravate the condition of persons trapped within an aircraft wreckage for an extended period. During this time it is extremely important to maintain the critical body temperature and vital functions of trapped victims. Tarps, blankets, portable lights, fans, oxygen units, and portable temperature control units (heating and cooling) should be immediately available at an accident site. Portable heating ~~and cooking~~ and cooling units should be designed or located so as not to be an ignition hazard.

Statement of Problem and Substantiation for Public Input

It appears there is a typo in section 9.5.7. Please review to see if you intended to refer to "cooling" of "cooking".

Thanks,

Chad

Submitter Information Verification

Submitter Full Name: Chad Greathouse
Organization: Blue Grass Airport
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 23 14:26:14 EST 2015

Committee Statement

Resolution: FR-66-NFPA 402-2017
Statement: This change corrects an error in the text.

Public Input No. 83-NFPA 402-2015 [Section No. 10.1.4]

10.1.4

Aircraft designers are continuously studying design factors and construction material changes that will increase “crashworthiness” and limit the development of fire situations that can impede evacuation. Additional modifications intended to increase the impact survivability of occupants are also being developed. ~~Other changes being planned include improved passenger~~ Passenger restraints, reduced combustibility of cabin interiors, better marking of exit routes, upgraded emergency exits, and greater emphasis on the training of flight deck crews. ~~If these design improvement measures are as successful as anticipated, the prompt~~ Prompt and effective intervention by trained ARFF personnel becomes even more important ~~than at present~~ because a greater number of aircraft accident survivors needing assistance can be expected. ARFF personnel should become intimately familiar with all aircraft types using the airport and should pre-incident plan the optimum rescue and fire-fighting effort that the fire department can produce with the resources it has at its disposal. Careful consideration of the recommendations in this guide can facilitate the development of practical operational plans.

Statement of Problem and Substantiation for Public Input

These upgrades are now in place and no longer a future vision.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
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Submittal Date: Wed Jun 24 21:50:21 EDT 2015

Committee Statement

Resolution: FR-67-NFPA 402-2017
Statement: These changes were made to note that these upgrades are now in place and are no longer a future vision.

Public Input No. 85-NFPA 402-2015 [Section No. 10.1.4]

10.1.4

Aircraft designers are continuously studying design factors and construction material changes that will increase “crashworthiness” and limit the development of fire situations that can impede evacuation. Additional modifications intended to increase the impact survivability of occupants are also being developed. Other changes being planned include improved passenger restraints, reduced combustibility of cabin interiors, better marking of exit routes, upgraded emergency exits, and greater emphasis on the training of flight deck crews. If these design improvement measures are as successful as anticipated, the prompt and effective intervention by trained ARFF personnel becomes even more important than at present because a greater number of aircraft accident survivors needing assistance can be expected. ARFF personnel should become ~~intimately~~ familiar with all aircraft types using the airport and should pre-incident plan the optimum rescue and fire-fighting effort that the fire department can produce with the resources it has at its disposal. Careful consideration of the recommendations in this guide can facilitate the development of practical operational plans.

Statement of Problem and Substantiation for Public Input

The term “intimately” is not a measurable term.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
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Zip:
Submittal Date: Wed Jun 24 21:55:18 EDT 2015

Committee Statement

Resolution: FR-67-NFPA 402-2017
Statement: These changes were made to note that these upgrades are now in place and are no longer a future vision.

Public Input No. 87-NFPA 402-2015 [New Section after 10.2.1]

10.2.1 Suggested addition

It is important that complementary and principal agents are carefully selected to ensure they do not adversely affect each other's firefighting or vapour suppression capability

Statement of Problem and Substantiation for Public Input

Provides clear and concise direction in regards to complimentary agent selection and is a good lead in statement for complimentary agents.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 21:58:50 EDT 2015

Committee Statement

Resolution: FR-68-NFPA 402-2017
Statement: Provides clear and concise direction in regards to complimentary agent selection and is a good lead in statement for complimentary agents.

Public Input No. 86-NFPA 402-2015 [Section No. 10.2.1]

10.2.1

~~Aqueous film forming foam (AFFF), film forming fluoroproteins (FFFP), protein foam, and fluoroprotein foam~~ Approved foam solutions are the primary extinguishing agents preferred for aircraft rescue and fire fighting.

Statement of Problem and Substantiation for Public Input

There are serval different types of foams and there's a strong chance that there will be more in the near future. The 402 committee suggested the use of the term "approved foam" rather than listing all of them every time. This should be done throughout the document.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
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Street Address:
City:
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Submittal Date: Wed Jun 24 21:56:26 EDT 2015

Committee Statement

Resolution: FR-69-NFPA 402-2017
Statement: The committee has noted that different types of foams are defined in the document and chose to make these changes to reflect as such.

Public Input No. 88-NFPA 402-2015 [Section No. 10.2.2]

10.2.2

Complementary extinguishing agents consist of approved dry chemicals or halogenated/gaseous agents. These are generally best for use on three-dimensional flammable liquid fires or on fires in concealed spaces, such as those occurring behind wall panels, engine nacelles, or wheel wells.

Statement of Problem and Substantiation for Public Input

The 402 committee suggested the use of the term “halogenated/gaseous” rather than listing all of them every time. This should be done throughout the document. This will cover the regulatory removal of halogenated agent in future rewrites.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 22:01:10 EDT 2015

Committee Statement

Resolution: FR-70-NFPA 402-2017
Statement: The committee has added carbon dioxide as a recognized agent.

Public Input No. 89-NFPA 402-2015 [Section No. 10.2.4]

10.2.4

If dry chemicals or halogenated agents are used, a fire area, once extinguished, ~~could reflash~~ could re-ignite if exposed to a source of ignition. Therefore, a follow-up application of foam is recommended when these agents are used.

Statement of Problem and Substantiation for Public Input

Reflash is not an approved or recognized term.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 22:04:15 EDT 2015

Committee Statement

Resolution: FR-71-NFPA 402-2017

Statement: The recommendation to delete this paragraph is due to its confusing nature. Regardless of the fire source or agent used, there is always a possibility for rekindle. Foam is not the solution to preventing a rekindle. The dry chemical or halogenated agent was chosen initially based on tactics such as an E&E bay fire. Flowing foam in that bay would not be a recommended practice.

Public Input No. 90-NFPA 402-2015 [Section No. 10.2.4]

~~10.2.4~~ –

~~If dry chemicals or halogenated agents are used, a fire area, once extinguished, could reflash if exposed to a source of ignition. Therefore, a follow-up application of foam is recommended when these agents are used.~~

Statement of Problem and Substantiation for Public Input

The recommendation to delete this paragraph is due to its confusing nature. Regardless of the fire source or agent used, there is always a possibility for rekindle. Foam is not the solution to preventing a rekindle. The dry chemical or halogenated agent was chosen initially based on tactics such as an E&E bay fire. Flowing foam in that bay would not be a recommended practice.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 22:06:20 EDT 2015

Committee Statement

Resolution: FR-71-NFPA 402-2017
Statement: The recommendation to delete this paragraph is due to its confusing nature. Regardless of the fire source or agent used, there is always a possibility for rekindle. Foam is not the solution to preventing a rekindle. The dry chemical or halogenated agent was chosen initially based on tactics such as an E&E bay fire. Flowing foam in that bay would not be a recommended practice.

Public Input No. 91-NFPA 402-2015 [Section No. 10.2.5]

10.2.5

~~AFFF and FFFP should not be mixed with protein-based concentrates. Before film-forming foams are used in equipment that formerly contained protein-based foam concentrate, the foam tank and system must be thoroughly flushed with fresh water.~~

It is imperative that differing foam types are not mixed. The ARFF vehicle manufacturer should be consulted to ensure that the agent system design is compatible with the agent to be used.

Statement of Problem and Substantiation for Public Input

Suggested rewrite incorporates all types of approved foams and stresses the fact that they should not be mixed without manufacturers approval.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 22:08:07 EDT 2015

Committee Statement

Resolution: FR-72-NFPA 402-2017
Statement: Suggested rewrite incorporates all types of approved foams and stresses the fact that they should not be mixed without manufacturers approval.

Public Input No. 92-NFPA 402-2015 [Section No. 10.2.11]

10.2.11

If the fire has not been completely extinguished by foam, the secured area will “burn back” at a rate that is dependent on the stability of the foam being used. ~~Also, under certain circumstances, fire can “flash back” over a portion of an area covered by foam.~~

Statement of Problem and Substantiation for Public Input

The recommendationis is to delete this sentence. It is unclear what type of situation is being explained. It is also improper to use what appears to be a slang term; “flash back”. The intent of the paragraph is to remind the operator that the foam blanket will not hold back fire spread indefinitely.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 22:10:55 EDT 2015

Committee Statement

Resolution: FR-73-NFPA 402-2017
Statement: The recommendationis is to delete this sentence. It is unclear what type of situation is being explained. It is also improper to use what appears to be a slang term; “flash back”. The intent of the paragraph is to remind the operator that the foam blanket will not hold back fire spread indefinitely.

Public Input No. 93-NFPA 402-2015 [Section No. 10.3]

10.3 Water and Agent Resupply and Conservation.

~~Auxiliary~~ Additional water ~~tankers~~ supplies should be ~~dispatched whenever~~ available whenever there is any indication of possible need, especially when the aircraft accident site is known to be beyond water relay capability. Prearrangements should be made to ensure that additional supplies of extinguishing agents are brought to the scene. Prudent utilization of agents under these circumstances is particularly important, and application methods should be carefully selected to ensure their most effective use.

10.3.1

It is considered impractical to require airport authorities to provide quantities of extinguishing agents to deal with the worst situation that could arise using only the equipment located on the airport. Therefore, it is necessary for airport emergency plans to contain instructions for requesting support from externally based fire services following an emergency. It is not easy to specify an operational requirement that makes adequate provision in all circumstances. It is clear that a need for additional water could arise in as little as 5 minutes, although in this time the initial fire situation should be greatly reduced. If total extinguishment has not been achieved, the fire can quickly extend and the equipment must be replenished.

10.3.2

Airports should consider providing additional water as a support facility. There might be exceptions where airports have adequate piped, stored, or natural water supplies, provided that these are available at an accident in sufficient quantity and in time to meet the operational requirement.

10.3.3

In each case, the authority having jurisdiction (AHJ) should consult closely with the Chief Fire Officer of the Mutual Aid Fire Service regarding response and supply of additional agent/media supplies. The airport authority will need to assess the suitability of the agent/media resources that can be mobilized to support the airport fire service when a serious and prolonged post-accident fire occurs. The speed of mobilization and the rate at which the agent/media can be delivered to the accident site, and its compatibility, are important factors.

Statement of Problem and Substantiation for Public Input

This takes into account other water sources beyond tankers

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 22:12:29 EDT 2015

Committee Statement

Resolution: FR-74-NFPA 402-2017
Statement: This takes into account other water sources beyond tankers

Public Input No. 94-NFPA 402-2015 [Section No. 10.4.2 [Excluding any Sub-Sections]]

Occupant survival is generally limited to aircraft accidents that are of low impact in nature, where the fuselage is not severely broken up and a fuel fire has not developed. In more severe accidents, even those where fire does develop, ARFF personnel should assume that there is always the possibility of survivors and ~~take aggressive steps~~ take actions to control the fire, initiate evacuation, and rescue those unable to self-evacuate.

Statement of Problem and Substantiation for Public Input

“aggressive steps” is not measureable.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 22:15:00 EDT 2015

Committee Statement

Resolution: FR-75-NFPA 402-2017
Statement: “aggressive steps” is not measureable.

Public Input No. 95-NFPA 402-2015 [Section No. 10.4.2.1]

10.4.2.1

Local procedures should be in place for ARFF/pilot communications ~~on a discrete emergency frequency~~ during declared emergency situation .

Statement of Problem and Substantiation for Public Input

Many airports do not have a discrete emergency frequency. Important point here is that there ‘is” a means of communication between ARFF and Pilot.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 22:16:53 EDT 2015

Committee Statement

Resolution: FR-76-NFPA 402-2017
Statement: Many airports do not have a discrete emergency frequency. Important point here is that there ‘is” a means of communication between ARFF and Pilot.

Public Input No. 96-NFPA 402-2015 [Section No. 10.4.4]

~~10.4.4~~ –

~~One rescue team method consists of four ARFF personnel equipped with full PPE and SCBA. Two of the persons are handline operators and precede the other two, who are equipped with appropriate hand-held tools needed for forcible entry, extrication, and access to hidden fuselage fires behind panels, floors, and compartments. A procedure preferred by some fire departments is to provide an additional handline operator, similarly attired and equipped with SCBA, operating behind the rescue team with a spray stream, as their protection throughout the entire operation.~~

Statement of Problem and Substantiation for Public Input

This is explanatory material and should be removed or moved to the Annex.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 22:19:24 EDT 2015

Committee Statement

Resolution: FR-78-NFPA 402-2017
Statement: This is explanatory material and should be removed.

Public Input No. 97-NFPA 402-2015 [Section No. 10.5.1]

10.5.1

The size-up (risk assessment) process is

~~the gathering of facts in preparation for making decisions. The facts pertaining to an aircraft accident, when mentally assembled, enable the responsible ARFF personnel to establish both initial tactics and overall strategy~~

initiated by first responding ARFF personnel and is carried on throughout the duration of the incident in varying degrees of depth and scope by later-arriving superior officers .

Statement of Problem and Substantiation for Public Input

Suggested rewrite provide a better description of what truly takes place in a more concise manner.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 22:24:55 EDT 2015

Committee Statement

Resolution: FR-79-NFPA 402-2017
Statement: Suggested rewrite provide a better description of what truly takes place in a more concise manner.

Public Input No. 6-NFPA 402-2014 [Section No. 10.7.2]

10.7.2

The location of survivors, if known, and the area of fire will determine where the first streams should be applied. If the fire has penetrated the fuselage, a direct interior attack with handlines and/or boom-mounted turrets and/or boom-mounted penetrating nozzles should be initiated as soon as possible.

Statement of Problem and Substantiation for Public Input

Immediate interior fire suppression with all available ARFF resources is necessary to stop an immediate life danger hazard to any surviving incapacitated passengers. This was noted by the NTSB in the recent Asiana 214 accident at SFO. This is a recommendation by the NTSB.

Submitter Information Verification

Submitter Full Name: Danny Pierce
Organization: ARFF Solutions
Street Address:
City:
State:
Zip:
Submittal Date: Tue Sep 30 16:25:28 EDT 2014

Committee Statement

Resolution: FR-80-NFPA 402-2017
Statement: Immediate interior fire suppression with all available ARFF resources is necessary to stop an immediate life danger hazard to any surviving incapacitated passengers. This was noted by the NTSB in the recent Asiana 214 accident at SFO. This is a recommendation by the NTSB.

Public Input No. 98-NFPA 402-2015 [Section No. 10.7.10]

10.7.10

~~AFFF and FFFP agent~~ Fire fighting foam solutions can be applied with ~~aspirating nozzles,~~ turret nozzles ~~used for protein and fluoroprotein foams, or~~ or handline nozzles or conventional water spray nozzles. Either spray or straight streams can be used as the situation dictates. It is best to approach the fire area as closely as possible and apply the foam in a wide spray pattern initially, changing to a narrower pattern after the heat has been reduced. The stream should be applied gently to avoid unnecessary plunging of the stream into the burning fuel. The foam should be applied to the near edge of the fire with a rapid side-to-side sweeping motion to distribute the foam rapidly and thinly over the burning fuel. Advance as the fire is controlled, always applying the foam to the nearest burning fuel surface, and advance only after a continuous, unbroken foam cover is established. The entire foam blanket integrity should be maintained to compensate for voids created by movements of ARFF personnel, evacuees, and equipment, as well as the normal drain down of the foam.

Statement of Problem and Substantiation for Public Input

Rewrite provides better clarity.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 22:29:04 EDT 2015

Committee Statement

Resolution: FR-81-NFPA 402-2017
Statement: Rewrite provides better clarity.

Public Input No. 99-NFPA 402-2015 [Section No. 10.8.2]

10.8.2

When selecting vehicle positions for applying ~~foam~~ from a turret, remember that wind has a considerable influence upon the quality of the ~~foam~~ pattern and the rate of fire and heat travel. Utilize the wind whenever possible to achieve more effective fire control.

Statement of Problem and Substantiation for Public Input

Changes covers “all” agents and not just foam.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 22:34:11 EDT 2015

Committee Statement

Resolution: FR-82-NFPA 402-2017
Statement: Changes covers “all” agents and not just foam.

Public Input No. 100-NFPA 402-2015 [Section No. 10.9]

10.9 ~~AFFF and FFFP for~~ Turret Application.

10.9.1

The basic principle of this type of foam application is to distribute a visible AFFF or FFFP blanket of sufficient thickness over the burning fuel to act as a blanket for vapor suppression. The original blanket should not be relied on to be permanent and should be maintained as necessary until the fuel vapor hazard no longer exists.

10.9.2

Both aspirating and nonaspirating nozzles can be used for AFFF or FFFP application. A nonaspirated nozzle typically provides longer reach and quicker control and extinguishment. However, expansion rates and foam drainage times are generally less when AFFF or FFFP is applied with nonaspirating nozzles, and it should be understood that the foam blanket might be less stable and have a lower resistance to burnback than that formed using aspirating nozzles. Manufacturers should be consulted for guidance on nozzle performance. Extreme caution should be taken when using the straight stream method, as this can cause an increase in the liquid pool surface or cause an opening in the foam blanket, releasing flammable vapors.

Statement of Problem and Substantiation for Public Input

No reason to call out particular types of foam.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 22:36:50 EDT 2015

Committee Statement

Resolution: FR-83-NFPA 402-2017
Statement: These changes were made as the committee believes that there is no reason to call out particular types of foam.

Public Input No. 101-NFPA 402-2015 [Section No. 10.9.1]

10.9.1

The basic principle of this type of foam application is to distribute a visible ~~AFFF or FFFP~~ blanket ~~of sufficient thickness~~ over the burning fuel ~~to act as a blanket~~ for vapor suppression. The original blanket should not be relied on to be permanent and should be maintained as necessary until the fuel vapor hazard no longer exists.

Statement of Problem and Substantiation for Public Input

No reason to call out particular types of foam. “Sufficient thickness” and “to act as a blanket” are hard to measure and more descriptive than anything. The objective is to cover the fuel to keep vapors suppressed.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 22:38:14 EDT 2015

Committee Statement

Resolution: FR-83-NFPA 402-2017
Statement: These changes were made as the committee believes that there is no reason to call out particular types of foam.

Public Input No. 102-NFPA 402-2015 [Section No. 10.10]

10.10 ~~Foam Turret Application~~ . ~~10.10.~~ 1

Foaming agents should be applied to burning fuel so that they gently form a uniform and cohesive blanket with the least possible turbulence to the fuel surface.

10.10.2

Aspirating nozzles should be used for applying protein and fluoroprotein foams in either the straight stream or dispersed patterns to distribute the foam over a wide area. When using the straight stream method of application, the foam should be applied indirectly using deflection techniques, and special care should be exercised to avoid disturbing the established foam blanket.

Statement of Problem and Substantiation for Public Input

Suggest removing since it's already covered in 10.9

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 22:40:44 EDT 2015

Committee Statement

Resolution: FR-84-NFPA 402-2017
Statement: The committee made this change for further clarification to what the section is about.

Public Input No. 103-NFPA 402-2015 [Section No. 10.11.2]

~~10.11.2~~ –

~~Charged handlines should be placed in strategic positions as soon as possible after ARFF personnel arrive on the scene. This practice would ensure their immediate availability for use when the need arises.~~

Statement of Problem and Substantiation for Public Input

The recommendation to delete this paragraph. The recommendation is in conflict with 10.8.5 which identifies the "pump and roll" technique as being an effective fire control technique. Pulling and charging handlines "as soon as possible after ARFF personnel arrive on scene" prohibits the relocation of the vehicle for better fire attack or agent re-servicing. Transitioning from a turret based attack to a handline attack or foam blanket maintenance is a command decision based on the scenario and should not be a described as a "reflex" step for any event incurred.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 22:42:50 EDT 2015

Committee Statement

Resolution: FR-85-NFPA 402-2017

Statement: The committee believes this section is in conflict with 10.8.5 which identifies the "pump and roll" technique as being an effective fire control technique. Pulling and charging handlines "as soon as possible after ARFF personnel arrive on scene" prohibits the relocation of the vehicle for better fire attack or agent re-servicing. Transitioning from a turret based attack to a handline attack or foam blanket maintenance is a command decision based on the scenario and should not be a described as a "reflex" step for any event incurred.

Public Input No. 104-NFPA 402-2015 [New Section after 11.1]

11.1.1

ARFF personnel should consider the development and behavior of fire in interior aircraft fires, and adopt firefighting techniques that minimize the risk of sudden conflagration.

Statement of Problem and Substantiation for Public Input

The additional text provides the reader with a more detailed description of circumstances that can lead to aircraft interior fires.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 22:45:27 EDT 2015

Committee Statement

Resolution: FR-114-NFPA 402-2017
Statement: The committee believes that the additional text provides the reader with a more detailed description of circumstances that can lead to aircraft interior fires.

Public Input No. 105-NFPA 402-2015 [Section No. 11.1.1]

11.1.1

The recommendations contained in this chapter are provided for the guidance of ARFF personnel encountering interior aircraft fires occurring in both parked, unoccupied aircraft and aircraft with passengers and crew aboard.

The following are some examples of the circumstances that could lead to an aircraft internal fire: -

(1) An external fire (normally burning aviation fuel) penetrates the fuselage skin and combustible materials inside are ignited

(2) Combustible materials inside the aircraft cabin are for some reason ignited. In this situation the fire may be discovered early and may be dealt with by trained aircraft crew or, the fire may have developed and the crew can merely strive to contain or minimize the effects of the fire until the aircraft can effect an emergency landing at a suitable airport

(3) Smoke or fumes may be present in the aircraft cabin but the source may not be obvious and may be difficult to locate

(4) A fire involving aircraft engines, auxiliary power units, or undercarriages may spread to areas inside the fuselage

(5) Cargo or baggage carried on the aircraft may for some reason cause a fire which may develop and spread to occupied areas of the aircraft

However an internal fire comes about, if there is, or there is suspected to be, life involvement, a prompt response following the correct tactics is vital

Statement of Problem and Substantiation for Public Input

The additional text provides the reader with a more detailed description of circumstances that can lead to aircraft interior fires.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 22:47:48 EDT 2015

Committee Statement

Resolution: FR-86-NFPA 402-2017
Statement: The additional text provides the reader with a more detailed description of circumstances that can lead to aircraft interior fires.

Public Input No. 109-NFPA 402-2015 [Section No. 11.1.7]

11.1.7

An interior aircraft fire location and its intensity can, to some degree, be determined by observation through cabin windows, smoke characteristics, aircraft skin that shows buckling or paint blisters, or by use of a handheld or boom mounted thermal imaging camera.

Statement of Problem and Substantiation for Public Input

Covers both types of thermal imaging cameras.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 23:07:59 EDT 2015

Committee Statement

Resolution: FR-88-NFPA 402-2017
Statement: Covers both types of thermal imaging cameras.

Public Input No. 110-NFPA 402-2015 [Section No. 11.2.2]

11.2.2

Aircraft emergency landings or accidents can be the result of uncontrolled fires occurring in flight. The ~~most frequent~~ most common types of in-flight fires involve the following:

(1) Engines
(2) Cabin areas
(3) Lavatories
(4) Heaters
(5) Cargo areas
(6) Electrical compartments

Statement of Problem and Substantiation for Public Input

"Common" is a better word. "Frequent" implies that it happens all the time.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 23:10:44 EDT 2015

Committee Statement

Resolution: FR-89-NFPA 402-2017
Statement: "Common" is a better word. "Frequent" implies that it happens all the time.

Public Input No. 111-NFPA 402-2015 [Section No. 11.2.4]

11.2.4

When the aircraft is on the ground, ~~whether or not the air-conditioning system is operating,~~ heat, smoke, and gases will build up, creating a toxic atmosphere and setting the stage for a flashover.

Statement of Problem and Substantiation for Public Input

Suggest removing non-relevant information.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 23:12:12 EDT 2015

Committee Statement

Resolution: FR-90-NFPA 402-2017
Statement: Suggest removing non-relevant information.

Public Input No. 112-NFPA 402-2015 [Section No. 11.2.6]

11.2.6

If there is no evidence of occupant evacuation, immediate steps should be taken to make entry for control of the fire and rescue of occupants. Entry will permit an inrush of fresh air into a possibly overheated or unstable atmosphere that could rapidly accelerate the fire. Toxic gases will be present, so ventilation and a thorough search for survivors should take place immediately and simultaneously with the fire-fighting effort. In darkness or heavy smoke conditions these efforts will be much more difficult.

Consideration should be given to details of such aspects as:

(1) Options for gaining access

(2) Methodical search patterns

(3) Communications

(4) Hose management

Statement of Problem and Substantiation for Public Input

Addition provides more detail and help clarify what the responder should be thinking about and looking for.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 23:17:12 EDT 2015

Committee Statement

Resolution: FR-91-NFPA 402-2017
Statement: Addition provides more detail and help clarify what the responder should be thinking about and looking for.

Public Input No. 113-NFPA 402-2015 [Section No. 11.3.4 [Excluding any Sub-Sections]]

Extinguishment of a hot, smoldering, internal aircraft fire can be very difficult. Where this type of fire exists, one method is worth consideration. It can be referred to as an indirect attack that is made from small fuselage openings such as slightly opened exits or openings made in cabin windows. A coordinated multiple-point attack is more effective than a single-point attack and is necessary when applying the method to fires in wide-body ~~or jumbo aircraft~~ or muli deck with large-volume interiors. It must be remembered that this method is not suitable if there is any possibility of occupants being onboard the aircraft.

Statement of Problem and Substantiation for Public Input

“Multi deck” is a more common day term.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 23:18:46 EDT 2015

Committee Statement

Resolution: FR-92-NFPA 402-2017
Statement: “Multi deck” is a more common day term.

Public Input No. 114-NFPA 402-2015 [Section No. 11.3.4.2]

11.3.4.2

Should a smoldering, interior aircraft fire occur in compartments below the passenger and flight deck levels, the indirect attack method can also be applied and adapted to the particular circumstances involved. However, it can be more difficult to achieve convenient openings in these compartments. ~~Consideration should be given to attacking fires in these areas through openings in the cabin floor.~~

Statement of Problem and Substantiation for Public Input

This is not a sound tactic to recommend.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 23:20:40 EDT 2015

Committee Statement

Resolution: FR-93-NFPA 402-2017
Statement: This is not a sound tactic to recommend.

Public Input No. 106-NFPA 402-2015 [Section No. 11.4.4]

11.4.4

The skin penetrator agent applicator tool (SPAAT), shown in Figure 11.4.4, was introduced by the U.S. Air Force. This tool incorporates a pneumatic device that drills through aircraft skin and windows within 10 seconds and can immediately inject any of several agents into the fuselage.

Figure 11.4.4 Skin Penetrator Agent Applicator Tool (SPAAT). (Suggest moving to Annex A)

Statement of Problem and Substantiation for Public Input

The recommendation to move this figure to Annex A. This section describes 3 handheld penetrators, SPAATs and boom mounted penetrating nozzle. Why would this be the only style shown in the body of the document?

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
Organization: THE BOEING COMPANY
Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 22:52:08 EDT 2015

Committee Statement

Resolution: FR-94-NFPA 402-2017
Statement: The committee has chosen to remove this from the document as they believe it is outdated.

Public Input No. 5-NFPA 402-2014 [Section No. 11.4.5]

11.4.5*– _ _ Boom Mounted Turrets & Penetrating Nozzles

Boom-mounted turrets and penetrating nozzles can be used to discharge extinguishing agents inside the aircraft. Boom-mounted penetrating nozzles can easily knock cabin/fuselage windows of the aircraft inward allowing access for interior agent application. Boom mounted penetrating nozzles should not be used to penetrate forward facing cockpit windows. Boom-mounted turrets can also be extended and oriented through open doors to discharge agent into the interior of the fuselage. Boom-mounted penetrating nozzles should pierce the aircraft fuselage approximately 12" above windows for effective interior fire suppression by penetrating below overhead baggage storage compartments. Boom mounted penetrating nozzles have proven themselves effective at penetrating the fuselage below the cabin floor level and baggage compartments to extinguish fire burning in concealed spaces. Boom-mounted penetrating nozzles should be deployed rapidly when arriving on scene if any evidence of an interior fire exists before the aircraft is known to be completely evacuated.

Statement of Problem and Substantiation for Public Input

Priority should be given to immediate use of boom-mounted turrets and penetrating nozzles for interior fire suppression. This was demonstrated by the recent Asiana 214 aircraft accient at SFO. This is a recommendation in the NTSB accident report.

Submitter Information Verification

Submitter Full Name: Danny Pierce
Organization: ARFF Solutions
Street Address:
City:
State:
Zip:
Submittal Date: Tue Sep 30 15:47:19 EDT 2014

Committee Statement

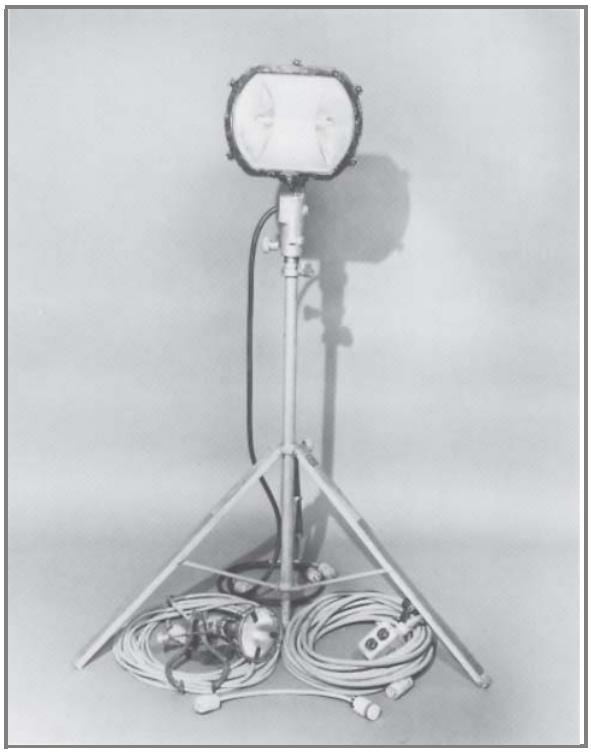
Resolution: FR-113-NFPA 402-2017
Statement: Priority should be given to immediate use of boom-mounted turrets and penetrating nozzles for interior fire suppression. This was demonstrated by the recent Asiana 214 aircraft accident at SFO. This is a recommendation in the NTSB accident report

Public Input No. 107-NFPA 402-2015 [Section No. 11.5]

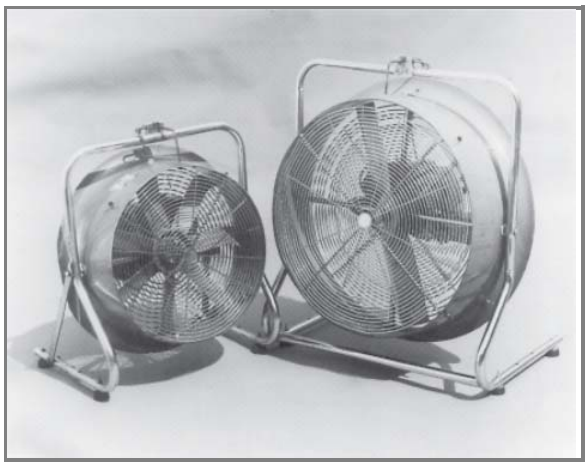
11.5 Interior Aircraft Fire Overhaul.

During the overhaul phase of an interior aircraft fire, hose lines should remain charged and available to extinguish any deep-seated fire, hidden uncovered fire, or reignition. Carpeting, wall panels, partitions, and ceiling covering should be removed when necessary to ensure that all fire is extinguished and that there is no threat of reignition. The use of portable lighting units and ventilation fans, as shown in Figure 11.5(a) and Figure 11.5(b), will help to make the aircraft interior safer and more tenable for ARFF personnel. Any person entering the aircraft during the overhaul phase should use positive-pressure SCBA.

Figure 11.5(a) ~~Portable Lighting Units.~~



~~Figure 11.5(b) Ventilation Fans.~~



Statement of Problem and Substantiation for Public Input

The recommendation to delete this figure. It should not be necessary to provide a visual reference for what a portable lighting unit is.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
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Submittal Date: Wed Jun 24 22:56:04 EDT 2015

Committee Statement

Resolution: FR-3-NFPA 402-2017
Statement: The committee is deleting these photos as they are outdated.

Public Input No. 108-NFPA 402-2015 [Section No. 11.5]

11.5 Interior Aircraft Fire Overhaul.

During the overhaul phase of an interior aircraft fire, hose lines should remain charged and available to extinguish any deep-seated fire, hidden uncovered fire, or reignition. Carpeting, wall panels, partitions, and ceiling covering should be removed when necessary to ensure that all fire is extinguished and that there is no threat of reignition. The use of portable lighting units and ventilation fans, as shown in Figure 11.5(a) and Figure 11.5(b), will help to make the aircraft interior safer and more tenable for ARFF personnel. Any person entering the aircraft during the overhaul phase should use positive-pressure SCBA.

Figure 11.5(a) Portable Lighting Units.

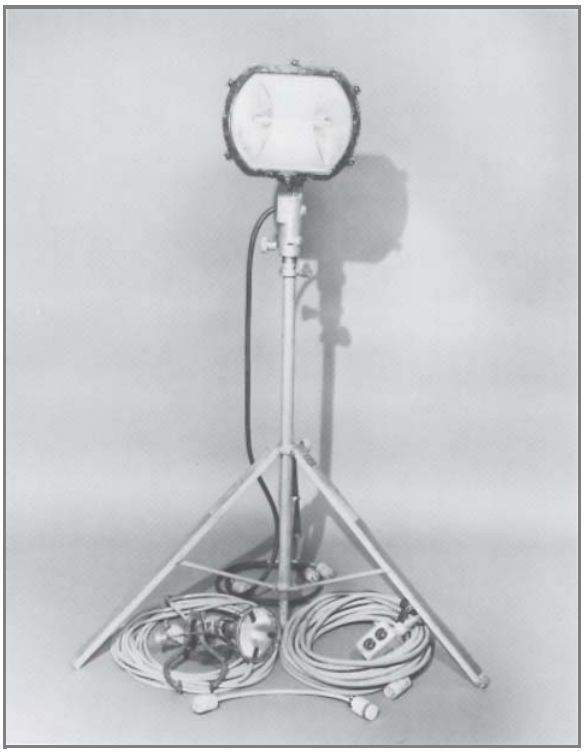
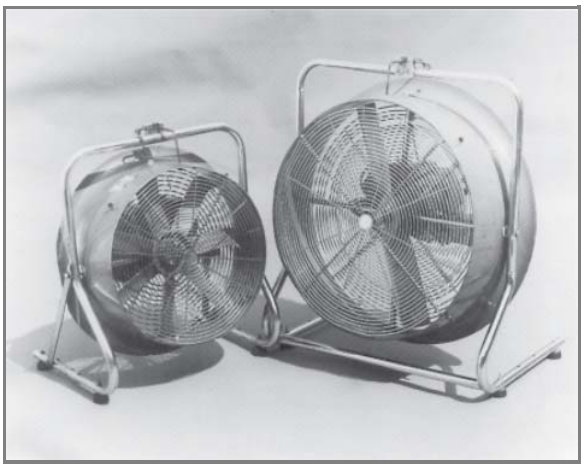


Figure 11.5(b) Ventilation Fans. (Update photo)



Statement of Problem and Substantiation for Public Input

The recommendation is to update this photo to a more modern style ventilation fan. These look more like a workshop fan.

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Committee Statement

Resolution: FR-3-NFPA 402-2017
Statement: The committee is deleting these photos as they are outdated.

Public Input No. 115-NFPA 402-2015 [Section No. 12.2.1 [Excluding any Sub-Sections]]

It is reasonable for ARFF personnel responding to aircraft engine fires to expect that all of the following actions have probably been accomplished by the flight deck crew, where appropriate:

(1) Engine shut down

(2) Engine fire extinguishing system (if any) activated

(3) Electrical power to the affected engine(s) de-energized

(4) Fuel ~~and hydraulic fluid~~ supply to the affected engine(s) shut down

(5) Hydraulic Fluid

Statement of Problem and Substantiation for Public Input

Hydraulic fluid cannot be shut down in the same manner as fuel.

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Committee Statement

Resolution: FR-95-NFPA 402-2017
Statement: Hydraulic fluid cannot be shut down in the same manner as fuel.

Public Input No. 116-NFPA 402-2015 [Section No. 12.2.6]

~~12.2.6~~ –

~~Most jet engines are constructed with magnesium and titanium parts that, if ignited, are very difficult to extinguish. If these fires are contained within the nacelle, they should be permitted to burn themselves out as long as the following conditions exist:~~

(1) ~~There are no external vapors present that cannot be eliminated.~~

(2) ~~Sufficient foam or water spray is available to maintain the integrity of the nacelle and surrounding exposed aircraft components.~~

Statement of Problem and Substantiation for Public Input

Not a reasonable tactic

Submitter Information Verification

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Committee Statement

Resolution: FR-96-NFPA 402-2017
Statement: The committee chose to delete this as they believe that it is not a reasonable tactic.

Public Input No. 117-NFPA 402-2015 [Section No. 12.9.3]

12.9.3

When a bomb threat involving an aircraft is declared an emergency, the aircraft should be evacuated without delay. ~~Passengers should be directed to leave their carry-on materials and depart the aircraft as quickly as possible.~~ The situation might dictate the use of the emergency evacuation slides or built-in stairs. Use of portable stairways might be the safest and most practical alternative.

Statement of Problem and Substantiation for Public Input

The recommendation is to delete the sentence from the paragraph. This is a function of the cockpit or cabin crew and not the ARFF responders.

Submitter Information Verification

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City:
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Committee Statement

Resolution: FR-97-NFPA 402-2017
Statement: The recommendation is to delete the sentence from the paragraph. This is a function of the cockpit or cabin crew and not the ARFF responders.

Public Input No. 118-NFPA 402-2015 [Section No. 12.11.2]

12.11.2

Hydraulic problems on landing aircraft can involve the brake systems, flaps, spoilers, and so forth. This has a tendency to lengthen the rollout after touchdown and can also affect the aircraft's directional control. As soon as the aircraft touches down and passes each ARFF vehicle that is standing by, that vehicle should immediately follow the aircraft and be ready to perform any necessary operation when it comes to a stop. ~~IT IS EXTREMELY IMPORTANT THAT ALL OTHER AIRPORT VEHICLES AND PERSONNEL REMAIN CLEAR OF THE AIRCRAFT, THUS PERMITTING ARFF VEHICLES AND PERSONNEL TO MANEUVER AND POSITION FOR EFFECTIVE RESCUE AND FIRE FIGHTING.~~

Statement of Problem and Substantiation for Public Input

The recommendation is to delete the sentence from the paragraph. This statement is applicable to every emergency response to an aircraft incident or accident. Why would the statement need to be expressed in BOLD for this type of emergency only?

Submitter Information Verification

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Committee Statement

Resolution: FR-98-NFPA 402-2017
Statement: The recommendation is to delete the sentence from the paragraph. This statement is applicable to every emergency response to an aircraft incident or accident. Why would the statement need to be expressed in BOLD for this type of emergency only?

Public Input No. 119-NFPA 402-2015 [Section No. 13.3.2]

13.3.2

~~Removal of~~ Movement of fatalities remaining in or around an aircraft wreckage ~~after the fire has been extinguished should be done only by or under the direction of the AHJ.~~ wreckage can be done to minimize further hazard and preserve evidence . . Premature body removal can interfere with identification and destroy pathological evidence. If body removal is absolutely necessary, the original location and the body should be photographed, identified with a number, and reported to investigators. Consideration should be given to tactics involved in extinguishment, rescue operations, preservation of evidence and showing proper respect toward deceased prior to move confirmed fatality.

Statement of Problem and Substantiation for Public Input

In the wake of the unfortunate Asiana accident in San Francisco, it is important to make a statement in regards to removing victims from the vehicle operating area around the accident aircraft. Proper documentation of location (eg. Photos and location flags) should be considered. Scene and evidence preservation is critical to the accident investigation process however, proper respect for the deceased and prevention of further damage to the body has to be considered a crucial step in the response.

Submitter Information Verification

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Committee Statement

Resolution: FR-99-NFPA 402-2017
Statement: In the wake of the unfortunate Asiana accident in San Francisco, it is important to make a statement in regards to removing victims from the vehicle operating area around the accident aircraft. Proper documentation of location (eg. Photos and location flags) should be considered. Scene and evidence preservation is critical to the accident investigation process however, proper respect for the deceased and prevention of further damage to the body has to be considered a crucial step in the response.

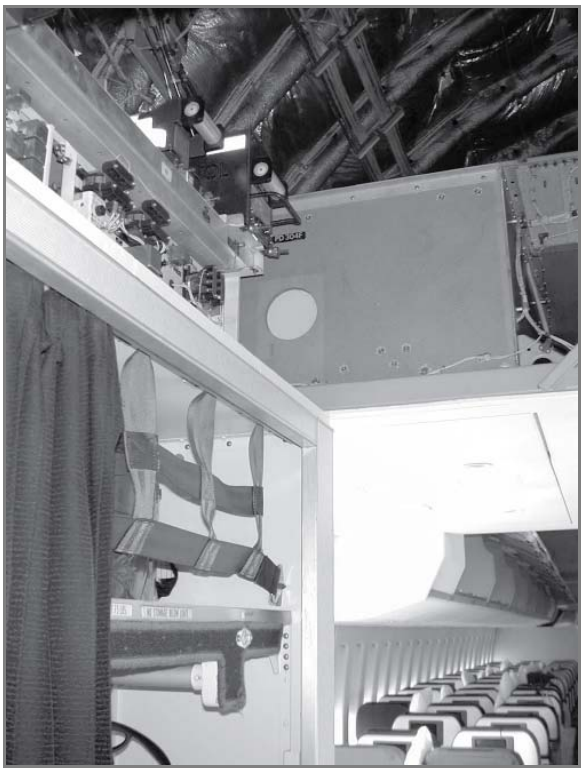
Public Input No. 121-NFPA 402-2015 [Section No. 13.5]

13.5 Flight Data and Cockpit Voice Recorders.

Flight data and cockpit voice recorders, as shown in Figure 13.5(a), are usually located in the aft fuselage area of most commercial aircraft, as shown in Figure 13.5(b), and are designed to be resistant to crash forces and fire. The outer surface is normally painted “International Orange.” ARFF personnel should be able to recognize these recorders so that they can be protected from loss or damage until accident investigators assume responsibility. Although no attempt should be made to remove these recorders from the aircraft, as they could be damaged by such efforts, if failure to remove them will result in their total loss, recovery should be made.

Figure 13.5(a) Flight Data Recorder and Cockpit Voice Recorder.

Figure 13.5(b) Location of Flight Data Recorder and Cockpit Voice Recorder.
MOVE Figure - Move the figure in document to immediately following Figure 13.5(a)



Statement of Problem and Substantiation for Public Input

Editorial – In the print version of the document, this figure is in the middle of text of section 13.6 Defueling Accident Aircraft

Submitter Information Verification

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Submittal Date: Wed Jun 24 23:39:06 EDT 2015

Committee Statement

Resolution: The committee has chosen to keep these figures in the document, even though locations might differ they believe that where this is a guide, it does provide some level of guidance in these devices.

Public Input No. 120-NFPA 402-2015 [Section No. 13.6.2]

13.6.2

Defueling of aircraft should not take place until there has been full consultation between the ~~Airport Fire Service, Police, Airline, and Accident Investigation Authority~~ airport fire service, police, airline, and accident investigation authority . Aircraft should not be defueled during rescue operations. If there is fuel leakage, it should be dealt with in the same manner as any other fuel leak, regardless of the aircraft's attitude.

Statement of Problem and Substantiation for Public Input

Editorial – The words should not be capitalized as they are not formal names.

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
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Affilliation: NFPA 402 Sub-Committee
Street Address:
City:
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Committee Statement

Resolution: FR-100-NFPA 402-2017
Statement: Editorial – The words should not be capitalized as they are not formal names.

Public Input No. 122-NFPA 402-2015 [Section No. 13.7.2]

13.7.2 (make to separate sections)

Prior to moving the wreckage, the interior of the aircraft should be well ventilated to ~~remove all flammable vapors.~~ insure a fire safe environment.

13.7.3 After removal of the aircraft, hard ground surfaces should be thoroughly cleaned to remove any flammable liquids or debris before permitting normal traffic to resume. Soft ground surfaces may be contaminated. Advice should be sought from the environmental agency as to whether removal of contaminated ground surfaces may be required.

Statement of Problem and Substantiation for Public Input

Two completely different points are being made here so the paragraph needs to be split. One issue is removal of vapors inside the fuselage and the other is ground contamination.

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Committee Statement

Resolution: FR-101-NFPA 402-2017
Statement: Two completely different points are being made here so the paragraph needs to be split. One issue is removal of vapors inside the fuselage and the other is ground contamination.

Public Input No. 123-NFPA 402-2015 [Chapter 14]

Chapter 14 Structural Fire Department Operations at ARFF Incidents (Suggest Removing)

14.1 General.

Aircraft incidents can involve structures and structural fire departments.

14.1.1

A prerequisite for the application of information contained in this chapter is a thorough review of the preceding chapters. Recommended procedures using apparatus, equipment, and resources available to most structural fire departments are discussed, and emphasis is placed on rescue of aircraft occupants.

14.1.2

Fire control is often the means by which rescue and evacuation of aircraft occupants can be accomplished. Aircraft fuel fires require extinguishing agents and techniques common to Class B fires. Structural fire fighters, therefore, should be trained to effectively combat this type of fire utilizing available equipment and extinguishing agents. It is imperative that fire departments located near airports or aircraft flight paths be thoroughly familiar with the recommendations set forth in this guide.

14.1.3

The recommendations presented in this chapter should not be interpreted as an alternative for adequate airport-based rescue and fire-fighting services as outlined in NFPA 403, *Standard for Aircraft Rescue and Fire-Fighting Services at Airports*.

14.2 Pre-Incident Planning and Training.

14.2.1

Fire departments located near airports should make appropriate arrangements to participate in the airport/community emergency plan. The fire department's services should also be made available to the airport during any special events such as air shows or during periods of unusually heavy aircraft traffic. Because no community is immune to an aircraft accident, all fire departments should implement pre-incident planning and training for this type of incident.

14.2.2

At an aircraft accident, teamwork is so important that fire department officers should review pre-incident planning as the one absolutely indispensable element in aircraft rescue and fire fighting.

14.2.3

The psychological factors involved in aircraft rescue and fire fighting can be successfully overcome only by realistic pre-incident planning and training. Consideration should be given to conducting a critical incident stress debriefing for responding personnel. Each fire department should conduct realistic simulated aircraft fire drills using the types of extinguishing agents and equipment it expects to have available. One important training objective should be to learn the capabilities and limitations of the department's pre-incident plan procedures.

14.2.4

Live-fire training is essential in maintaining qualified and certified fire fighters. Traditionally, hydrocarbon fuel from various sources has been the fuel of choice used to conduct this training. However, with stricter environmental laws and improved technology, propane live-fire simulators are in use and fulfilling training needs of the fire fighter.

14.2.4.1

The size of the mock-up should come as close as possible to that of the aircraft utilizing the facility. Training should include interior, engine, wheel brake, exterior pool fire, running fuel, and three-dimensional scenarios. The propane-fired simulator should be equipped with the necessary automatic features to maximize fire fighter safety as recommended in FAA Advisory Circular 150/5220-17, *Aircraft Rescue and Firefighting Training Facilities*, Chapter 4, Mobile ARFF Training Devices.

14.2.4.2

An aggressive attack using hose lines with spray nozzles, employing pre-incident planned operating techniques, can help fire fighters develop the confidence necessary to handle these types of incidents successfully.

14.2.5

The volume of smoke, fire, and intense heat accompanying an aircraft fire can appear to be an overwhelming situation to untrained fire fighters. They might be reluctant to attack and control the fire with a limited water supply and conventional equipment for the amount of time required to complete rescue operations. Experience has proven that rescues can be accomplished even where large quantities of spilled aircraft fuel are burning.

14.2.6

Training coordination between military, civil airport, and structural fire departments is strongly recommended. Execution of mutual aid agreements between these agencies will help ensure well-coordinated plans for rescue and fire fighting. Military air base commanders are urged to make their training facilities available to nearby fire departments, particularly where those departments are likely to be called upon to assist in rescue and fire-fighting operations.

14.2.7

Structural fire department personnel should be thoroughly familiar with the most efficient response routes to the airport and the surrounding area. They should know all the airport's accesses and entrances and be familiar with all rules governing the operational area. This should include procedures to prevent runway incursions. A standard operating procedure for entering locked gates should be established. As a minimum, fire fighter training should include the information in 4.3.4 of this guide.

14.2.8

Aircraft familiarization is also an important part of aircraft rescue and fire-fighting pre-incident planning.

14.2.8.1

Structural fire departments should be provided aircraft familiarization training, including hands-on training, where possible. When inspecting the aircraft, the following should be noted:

(1) Location of fuel, hydraulic oil, and lubricating oils, and other storage locations and their capacities

(2) Seating arrangements

(3) Emergency exits and hatches and how to open them

(4) Fire departments should also be familiar with ballistic parachutes. *(See 7.5.11.4.)*

14.2.8.2

Also important are the locations of batteries, oxygen storage, and various system shutoffs. *(See also 4.3.3.)*

14.2.9

Fire departments should avail themselves of informational charts of all aircraft types using the airport. Airport fire departments as well as airlines and aircraft manufacturers can provide these charts, which depict most information pertinent to rescue and fire-fighting operations.

14.2.10

As a part of preplanning, fire departments should determine that their apparatus and equipment are compatible with the airport fire department. This would include necessary couplings and connections used in water fill and transfer.

14.2.11

Communication is critical to any mutual aid response and particularly so in the case of airport response because of the addition of operating aircraft around the scene. Preplanning should provide knowledge of the capabilities in this area.

14.3 Aircraft Accident Operations.

14.3.1

When fire departments receive a report that an aircraft is experiencing an in-flight emergency or that it is down in the vicinity, they should immediately alert the fire forces that could be affected. Fire and police units should coordinate their efforts. Use of a helicopter, if available, could help coordinate operations and serve as a communication link between the fire units and the control tower.

14.3.2

Size-up (risk assessment) begins with the fire department's first notification of an incident. Multiple calls from various sources in the vicinity of the airport should alert fire dispatchers of a possible major aircraft accident and warrant an immediate first-alarm response. A multi-unit response would ensure arrival at the scene of at least one unit despite the likelihood of blocked access due to debris and traffic. During the initial response, pre-incident plans should be activated, and all pertinent information should be transmitted to the responding units.

14.3.3

The following factors are among those that are important to the size-up (risk assessment) process:

(1) Occupant survival is generally limited to accidents where the fuselage is not severely broken up and a fire has not yet developed.

(2) Environmental and geographical factors have a major impact on response capability. An accident in a wooded area during a winter snowstorm presents different problems from a similar accident on a clear summer afternoon.

(3) Time of day is a factor. An aircraft accident that occurs in a shopping center parking lot has a different life hazard potential at 4:00 a.m. on Sunday from a similar event at 4:00 p.m. on Friday.

(4) The magnitude and nature of the aircraft accident should be considered. An aircraft accident in an open field can set off a major grass or brush fire, but an accident in a populated area can be more complex. If structures are involved, their occupancy, construction type, and stability need to be evaluated. In addition, an assessment of damage to public utilities and their possible effect on operations should be made. Because of the possibility that water supply from hydrants might not be available due to system damage, it is good practice to include water tanks in the first response.

(5) The nature of the aircraft operation at the time of the accident is of importance. If a crop-dusting aircraft accident occurs, steps need to be taken to protect emergency personnel and limit the spread of pesticide contamination.

(6) Aircraft accidents that occur on takeoff usually involve large amounts of fuel. In addition to the fire that could evolve, steps need to be taken to prevent a fire or fuel or fuel vapors from entering waterways, streets, and underground facilities.

14.3.4

An arriving fire department should be governed by established response protocols.

14.4 Basic Fire Control.

14.4.1

Specific implementation of basic aircraft fire control methods should depend upon the fire-fighting equipment and types of extinguishing agents available to individual fire departments.

14.4.2

Always assume that there are survivors of an aircraft accident until it is confirmed otherwise. In some instances, however, rescue of occupants cannot be accomplished because of the remoteness of the accident or the severity of the impact forces. In such instances, fire fighters should make a thorough search for survivors, protect any exposures, attack and extinguish the fire, and preserve the scene until the proper authorities arrive to assume responsibility.

14.4.3

Fire fighters should be aware that aircraft construction differs from most other structures in ways that make fires more dangerous for the occupants and for themselves. Aircraft occupants are enclosed in a thin shell and are surrounded by large amounts of fuel with tremendous heat potential. Large aircraft have hollow wall construction with the void filled with blanket-type insulation. Present-day aircraft are constructed using a large percentage of composite materials that present unique hazards peculiar to this type of construction. Fire walls and draft stops are nonexistent except for engine, galley, and cargo bay areas. These deterrents to fire spread are not comparable to fire barriers found in building construction.

14.4.4

In all large aircraft and in many smaller models, plumbing, electrical, heating, and cooling services are provided. Consequently there are aircraft equivalents of pipe chases, electrical load centers, busbars, and so forth. The aircraft electrical system should be treated with the same safety precautions as any other electrical installation.

14.4.5

Most aircraft contain pressure hydraulic reservoirs and liquid or gaseous oxygen lines constructed mostly of aluminum. These, as well as brake lines, will rupture quickly under fire conditions. Fuel tanks are interconnected, and fire can propagate through ventilation ducts or manifolds. Fire impingement on empty or near-empty fuel spaces often results in a violent rupture of tanks and wings.

14.4.6

Aircraft also differ from other structures in the critical aspect of stability. Most non-aircraft structures are cubical in shape and will collapse in place. Aircraft are cylindrical, conical, and usually on wheels. Therefore, movement such as tilting and rotation effects should be considered. Guy lines, chocks, air bags, and cribbing should be required when working around damaged aircraft. Modern aircraft can weigh 363,200 kg (800,000 lb) or more and have a height greater than a five-story building.

14.4.6.1

Experience has shown that cribbing and shoring material should be unpainted to avoid the inherent slipperiness of painted surfaces when wet and should be made of hard wood so as not to be easily compressed. It should be available and included as a resource in the airport's emergency preparedness plan. It should be of appropriate thickness and length to accommodate the largest aircraft scheduled into the airport. Aircraft recovery manuals should be used to ascertain appropriate cribbing sizes.

14.4.6.2

It should be noted that the training of ARFF personnel to shore up unstable aircraft wreckage to facilitate rescue implies the provision of suitable materials. To be effective these materials must be constantly available for immediate deployment. To achieve this, the materials should be stored either in a palletized form (requiring ready access to appropriate lifting and transport equipment) or on a dedicated vehicle such as a trailer. In either case, a designated responder should be capable of deploying these supplies at all times under all conditions of weather, visibility, and adverse terrain.

14.4.6.3

As an alternative to the logistics of cribbing, consideration might also be given to the deployment of earth-moving or similar heavy-duty lifting equipment, designed for off-road performance and having the weight and flexibility of electrohydraulics to support or suspend any unstable elements of a damaged aircraft. Skilled operators should also be readily available if this type of equipment is to be used at an aircraft accident site.

14.4.6.4

Regardless of the method or equipment chosen for raising, shoring, or moving a damaged aircraft, guidance based on aircraft structural knowledge is required. It is important to understand that imposing loads at unsuitable locations on the aircraft could merely exacerbate the situation, promoting rather than preventing further disruption of the wreckage. It is advantageous for the task to be performed under the supervision of aircraft maintenance personnel, preferably those familiar with the specific type and model of aircraft involved.

14.5 Accidents Without Fire.

14.5.1

When an aircraft accident occurs without fire, the following fire prevention procedures should be initiated. Hose lines should always be laid out and charged. Any spilled fuel should be covered with foam. Ignition sources such as hot aircraft components or energized electrical circuits should be eliminated. When moving wreckage, care should be taken to avoid causing sparks.

14.5.2

When foam is not available, water spray can be used to cool hot aircraft components and to move fuel away from the fuselage. However, washing fuel away with water requires that special attention be given to exposures, low areas, and drains where fuel and vapors can flow. The fuel should be directed to an area of containment free from ignition sources where it can later be safely removed.

14.6 Accidents with Fire.

14.6.1

The location of survivors and the sources of heat or flame impingement against the aircraft will determine where hose streams should be applied first. Fire fighters should keep in mind that the heat input into the occupied portion will be reduced if the surfaces of the fuselage exposed to flame or heat can be kept wet. If the fire has penetrated the fuselage, a direct internal attack should be initiated. Care should be taken to see that water runoff does not cause the fire to spread.

14.6.2

Normally, hose streams should be directed along the fuselage and efforts concentrated on driving the flames outward, allowing occupants to escape and permitting entry by fire fighters for rescue operations. The fuselage and fuel tank areas should be kept cool. It might be necessary to create an escape path from an exit point by “sweeping” fire out of the area with spray streams. Once an escape path has been established, it should be maintained for evacuating occupants and fire fighters performing rescue.

14.6.3

All available hose lines should attack the fire from the same general direction. If crews are operating on opposite sides of the fuselage, they should be cautious not to push the fire toward each other. Because prompt action is necessary to effect rescue, the first hose line in operation should be advanced immediately to keep the fuselage cool.

14.6.4

For aircraft rescue and fire fighting, there are too many variables to establish hard-and-fast rules regarding use of equipment. Spray streams are normally more effective than straight streams in applying water or foam and afford much more personal protection.

14.6.5

The number and deployment of handlines will be determined by the availability of the water, equipment, and personnel. For example, immediately upon arrival, all deployed hose lines should be charged, regardless of the fire situation. However, if the apparatus is equipped with pre-connect master stream capability, the office may choose different tactics.

14.6.6

Fire fighters who engage in or are exposed to the hazard of proximity fire fighting should be protected in accordance with NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*.

14.7 Fire Fighting with Water.

14.7.1

If an aircraft accident occurs in a remote area with limited water available on responding apparatus, a supplemental source of water should be established. The use of tank vehicles to shuttle water between the nearest water source and the accident site should be considered.

14.7.2

When using water to combat flammable liquid fires, nozzle pressure should be set at the nozzle manufacturer's recommended pressure and flow. Spray patterns, on initial approach to the fire, should be set at a wide angle momentarily to reduce the heat and flame and then be reduced to 30 degrees to attack the fire.

14.7.2.1

The best technique is to sweep the flame off the surface of the fuel by maintaining the lower portion of the spray pattern at the lowest level of the flame. This action also tends to cool the fuel surface and reduce vaporization. However, because there is no vapor seal provided, as when foam is used, chances for reignition remain, and fire fighters should take the necessary precautions to prevent reignition from occurring *(see Section 14.5).* Additional hose lines, used exclusively for the protection of rescue and fire-fighting personnel, are encouraged.

14.7.2.2

Figure 14.7.2.2 shows a variety of typical spray nozzles currently used by structural fire departments. All have the feature of adjustable spray patterns and straight stream settings. Some also have variable flow settings. Most fire chiefs agree that a nozzle setting of 30 degrees provides the best pattern for fighting flammable liquid fires with either water, AFFF, or FFFP solutions.

Figure 14.7.2.2 Typical Spray Nozzles.

14.7.3

Runoff from water streams can cause the spread of fire to exposures. Straight streams should be used when the heat is too intense to approach initially with spray streams or when the objective is to wash the burning liquid away from the fuselage to an area where there is no exposure.

14.7.4

Trained fire fighters employing proper operating techniques can accomplish a successful rescue operation at an aircraft accident with a limited amount of water if they concentrate all their efforts on establishing a fire-free evacuation path. Efforts to save the aircraft hull or exposures might have to be delayed until additional resources arrive.

14.7.5

Addition of a wetting agent might increase the effectiveness of available water; however, certain wet water additives can destroy some foams. Compatibility of the agents should be checked prior to their use.

14.7.6

Approved portable dry-chemical agents (effective on pressure-fed and running fuel line fires), foam (effective on wheel and brake fires), or halogenated agents (effective on engine and electrical fires and localized fires or areas not easily reached by hose streams) can be used as extinguishers to supplement the primary attack with hose streams. In some instances, bulk supplies of dry-chemical agent, foam, or halogenated agent are made available to fire departments on an emergency basis. This resource should be considered when pre-incident planning for aircraft accidents.

14.7.7

The technique of using multiple spray nozzles with overlapping 30-degree patterns creates a continuous curtain of water spray. The nozzles should be advanced directly to the aircraft, parallel to the fuselage, from either the nose or tail section, dependent on wind direction. This procedure will open an area for evacuation and rescue. If possible, hose lines should be advanced with the wind at the fire fighters' backs, as greater reach is possible with the spray streams and less heat is experienced. Progress and stream effectiveness can be monitored more easily from upwind with the smoke moving away. If there is an adequate water supply, a large spray nozzle attached to a deck gun or a portable deluge set can be used to keep the fuselage and fuel tank areas cool.

14.7.8

Protection of exposed property should be considered whether fire exists or not. In addition to structures, exposure protection plans should include drains, sewers, waterways, power lines, and other properties where a flowing fire or unignited fuel could cause fire extension or contamination. Public utility authorities should be notified of any involvement affecting facilities under their control. Master streams from deluge sets, deck guns, or ladder pipes can be used to protect exposures if water supplies are adequate.

14.8 Fire-Fighting Foam.

14.8.1

AFFF, FFFP, or protein foam concentrates properly proportioned into fresh water are more effective than just water on flammable liquid fires.

14.8.2

Techniques for the application of foam vary with the type used. Protein and fluoroprotein foam solutions should be applied with an aspirating foam nozzle at the nozzle manufacturer's recommended pressure and flow. A constant flow from the nozzle should be maintained to ensure an even pickup of the concentrate. The proper operating pressure should be maintained during the entire foam application for effective results. AFFF and FFFP can be applied using either an aspirating foam nozzle or a conventional spray nozzle operating at the nozzle manufacturer's recommended pressure and flow.

14.8.3

A foam-water solution using protein, fluoroprotein, or AFFF can be made up in the water tank of a structural fire-fighting apparatus for direct foam application through hose lines equipped with appropriate nozzles.

14.8.4

Some fire departments have purchased combined agent vehicles for special purposes such as vehicle accidents and flammable liquid spills. Such combined agent vehicles are a valuable tool for the initial response to an aircraft accident.

14.9 Vehicles.

Fire-fighting apparatus designed and intended for use on paved surfaces should not be used for cross-country travel. Extended hose lines from a position on a hard road surface should be used rather than risking immobilization. Once a vehicle has become immobilized, it could not be moved if it became endangered by a developing fire. It can also block or delay other emergency vehicles responding to the site.

14.10 Post-Accident Procedures.

Fire department personnel should be familiar with the information contained in Chapter 13 and Annex E of this guide.

Statement of Problem and Substantiation for Public Input

Repeated information of entire document summarized in 1 chapter.

For task group discussion… This entire chapter is a rewrite of the previous 13 chapters all collected under the title Structural Fire Department Operations at ARFF Incidents. Is it necessary to repeat this information or can it be deleted?

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Committee Statement

Resolution: FR-102-NFPA 402-2017

Statement: Repeated information of entire document summarized in 1 chapter. This entire chapter is a rewrite of the previous 13 chapters all collected under the title Structural Fire Department Operations at ARFF Incidents.

Public Input No. 124-NFPA 402-2015 [Section No. A.3.3.19]

A.3.3.19 Bogie. (Suggest Removing)

The bogie can swivel up and down so that all wheels follow the ground as the attitude of the aircraft changes or the ground surface changes.

Statement of Problem and Substantiation for Public Input

Removed from the document

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Statement: The committee is deleting this as it is not used in the document.

Public Input No. 125-NFPA 402-2015 [Section No. A.3.3.23]

A.3.3.23 Composite Materials.

Composite materials do not present unusual fire-fighting problems, but products of their combustion should be considered ~~a~~ one of the respiratory ~~hazard~~ hazards to fire fighters arising from aircraft fire .

Statement of Problem and Substantiation for Public Input

Clarification of hazards

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Public Input No. 127-NFPA 402-2015 [New Section after C.1]

Annex C _ Specialized Vehicles and Equipment

Add _ Rescue Air stairs/Stair Trucks

Statement of Problem and Substantiation for Public Input

Covered in other volumes and need to be added.

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Committee Statement

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Public Input No. 130-NFPA 402-2015 [Chapter D]

~~Annex D~~ ~~– Driver's Enhanced Vision System (DEVS): A Technical Approach for Aircraft Rescue and Fire-Fighting Services~~ **(Suggest Removing)**

This annex is not a part of the recommendations of this NFPA document but is included for informational purposes only.

D.1 Introduction.

Several accidents have occurred in poor visibility conditions, and, with the proliferation of category IIIC landing systems, more requirements for fire fighting in low-visibility conditions can be expected. ARFF services currently have no reliable way to locate and navigate crash sites at airports under conditions of poor visibility.

D.2 Background.

ARFF services are required to demonstrate an ability to respond anywhere on the airport operational runway areas as part of earning their annual certificate. This response requirement is considered vital to the ability of ARFF services to gain control of a rapidly growing external post-crash fuel fire and their ability to protect the evacuating passengers from the aircraft fuselage. A response in 3 minutes is dependent on the vehicle's ability to accelerate rapidly from the rescue service's facilities and to maintain approximately a 80.5 km/h (50 mph) approach to the accident site. Operating this task under substandard visibility conditions, such as fog and rain, prevents the responding vehicles from reaching this speed.

There is a clear need to provide operational equipment in the rescue vehicles that maintains their response ability if low-visibility flight operations are to be conducted.

The problem of poor visibility response at airports for rescue and fire-fighting services can be broken down into the following three components:

(1) Locating the accident sites

(2) Navigating aircraft rescue and fire-fighting vehicles to crash sites

(3) Negotiating terrain and obstacles in low-visibility conditions

Airport fire services need a DEVS that addresses these three components.

Aircraft rescue and fire-fighting services should obtain an accurate position fix on the crash site within a time parameter that is comparable to their response time (under 3 minutes). The current system for locating crash sites that are not visible to ARFF services relies on visual observations, estimates, and verbal descriptions of airport landmarks provided by air traffic controllers. This system is prone to human error. The optimal solution to this problem is a system that automatically locates a crash site on a digital map of the airport and transmits this location to aircraft rescue and fire-fighting services.

Navigation of aircraft rescue and fire-fighting vehicles to crash sites is an issue that can be solved with today's technology. Sophisticated radio navigation systems such as the global positioning system (GPS) provide precise positioning capability. This position information, combined with digital maps of the airport area, can be displayed on a geographic map or heads-up display (HUD) to guide the crews.

Negotiating terrain and locating obstacles in low-visibility conditions is an important capability that ARFF services currently do not possess. The only aids that rescue services currently use for improving vision under poor visibility conditions are windshield wipers and headlights. These devices often do not improve visibility enough to allow rescue teams to drive safely at the high speeds necessary to reach a crash site within a reasonable time. One aid that would provide improvement is a forward looking infrared device (FLIR). FLIRs currently are used by the military to improve visibility at night and during severe weather conditions. The FLIR system needs to be fully functional as soon as the fire equipment departs the fire station facility. Exit time typically is under 30 seconds from the time of accident notification. On-line and operational equipment should in no way impede the ability of ARFF services to respond. Equipment is to be automated and is to necessitate little attention by the truck operator.

D.3 General Requirements.

A DEVS is required in an ARFF vehicle for airport emergency equipment. It facilitates faster and safer travel to emergency situations at night and in adverse weather conditions. It provides a substantial increase in the ability to locate people, other aircraft, vehicles, and debris at the emergency site. Its ability to allow the driver to see through flames, smoke, and fog during both the day and night provides ARFF vehicles with a significant increase in effectiveness in every phase of emergency operations.

The DEVS requires a transparent window display (TWD), which is often called a HUD, combined with a GPS and geographic information system (GIS), onboard sensors, a central data and command RF link (radio communications), and a FLIR sensor. These elements are to be integrated into a single functional system. A validation demonstration program is necessary to provide the quantitative information needed to justify the DEVS and refine it for the ARFF services application.

D.4 Operating Scenarios and Capabilities — Mission Description.

From the moment that an alert is received until the end of the emergency, the ARFF services mission is subject to stress and uncertainty. At any given moment, day or night, the equipment needs to be fully functional within a few seconds, regardless of adverse weather. Often vehicles and aircraft are positioned on the runways and taxiways in unusual or unexpected locations. In the event of an aircraft accident, victims and debris can be present anywhere on the airport. At the same time, the large size of modern airports, with multiple parallel runways and taxiways, places a priority on the ability to travel at high speed to the emergency site.

Once ARFF services have arrived at the location, the ability to assess the situation is crucial to carrying out the mission. The information available to the vehicle operator contributes directly to the level of performance of the ARFF mission. This information needs to be obtained without any increase in the workload. The DEVS reduces the impact of night conditions, adverse weather, fire, and smoke so that the operator's performance approaches that achieved during the optimum daylight scenario.

To achieve this goal, information is to be provided in an easily recognizable form, without the need for vehicle operator intervention. Rescue vehicle location, the location of the emergency, the location of other vehicles (ground and aircraft), the location of people, and the location of debris are the basic data needed (and normally available during the least difficult situations). The condition of the aircraft, location of victims, presence and location of spilled burning fuel, and location of other ARFF personnel are also crucial. In addition, the possible presence of toxic gases caused by spilled or burning cargo needs to be assessed to provide for a safe response to the situation. Finally, since multiple vehicles and ARFF crews are involved in most emergency situations, a centralized command and control system is needed to coordinate the activities of all elements of the emergency response team. The DEVS is one element of this command and control system.

D.5 Required Capabilities.

The DEVS increases the knowledge available to the emergency crew. The crew are able to see through fog, rain, sleet, and snow, as well as smoke and flames in and around the burning aircraft, to detect the position of evacuees and trapped passengers, to distinguish them among the debris, and to move into a position for fire fighting. They are able to apply extinguishing agents to the hottest areas of the burning fire more precisely. They also can track other fire fighters through the smoke and fire while rescue efforts are under way.

The FLIR device provides the ARFF operator with the ability to detect debris and other vehicles (stationary or moving) in the vicinity, as well as to detect passengers evacuating from the aircraft. The FLIR detector can illuminate humans in a smoke or fog environment where normal vision is inadequate. The FLIR stores information for normal driving conditions and uses the brighter-than-background standard runway and taxiway lights, which are detectable as it travels to the site.

D.6 System Elements.

The elements of the DEVS for the ARFF vehicle demonstration include a FLIR, a TWD or HUD, and a GPS with GIS or mapping.

D.7 Forward Looking Infrared Device (FLIR).

The FLIR is a high-resolution infrared detector. It is enhanced with wide dynamic range processing for increased penetration of smoke and fog. The FLIR contains a two-dimensional focal plane array using platinum silicide as the detector material. It operates at wavelengths from 8 µm to 12 µm and has a sensitivity of 0.1°C (32.2°F). An alternate FLIR of 3 µm to 5 µm with similar sensitivity also is implemented to establish whether the shorter wavelength provides significant benefits in the smoke environment. A key element in the use of the FLIR device for this application includes a total hands-off automation philosophy. Rapid cool-down is another function dictated by the nature of FLIR detectors. To achieve the best performance, these detectors should be cooled to very low temperatures [in the range of –270°C (–454°F)]. The cooling systems that have been developed have an operating life of about 2500 hours. Rapid cool-down or extended standby life cycle is considered essential to an ARFF application. Zero (0) or near-zero start-up time is an operational requirement for effectiveness.

D.8 Dynamic Range Issues.

To detect people and debris, the FLIR has a sensitivity of approximately 0.1°C (32.2°F). At the same time, the FLIR can be expected to deliver this sensitivity in the presence of flames that could reach temperatures of 1000°C (1832°F). In order to accomplish this, the FLIR operates over an instantaneous dynamic range of about 10,000:1.

D.9 Transparent Window Display (TWD).

The TWD system hardware consists of a projector, an optical element, and a symbol generator to provide information to an operational position. The symbol generator provides data to the projector by means of dedicated signal cables. The symbol generator has the capability to receive and to process data links from up to six video inputs and two serial inputs while formatting messages based on a control program. The control program uses the data's priority, refresh rate, and other site-specific criteria to implement the sequence and content of the information presentation.

D.10 Projector.

The DEVS projector is a high-brightness CRT, monochrome emitter that creates and projects a focused image onto the window of the ARFF vehicle. The projector is designed to be placed 152.4 cm to 182.9 cm (60 in. to 72 in.) from the window. There are optional mounting schemes that allow the projector to be mounted off-axis from the window to accommodate existing mechanical obstructions. The projector is to be equipped to accept standard signal inputs that include RS-170 to utilize the TWDs as a simple replacement of an existing heads-down display (HDD).

D.11 Optical Element.

The optical element is mounted to the window of the ARFF vehicle to act as a dynamic display surface within the truck cab. The optical element should be 38.7 cm^2 to 77.4 cm^2 (6 $in.^2$ to 12 $in.^2$) and affixed to a selected location on the window with room temperature vulcanizing material. The location should be predefined to reflect data in a uniform manner that is specified by both lateral and vertical angles perpendicular to the plane of the window. The viewing zone should offer a lateral reflection angle of 30 degrees and a vertical reflection angle of 15 degrees. The information is to be presented in a bright green color and is to be focused at the plane of the window. The DEVS is not to obstruct the view to the outside of the vehicle.

D.12 Symbol Generator.

The symbol generator is to be a microcomputer-based system designed for rack mounting in an equipment bay. This remote computer offers the capability to interface directly with a selected set of onboard data channels or discrete indicator inputs and is linked with a GPS tracker and a FLIR. The symbol generator is programmed with the mission-specific control scheme and operates in an automatic mode. There is a keyboard and monitor option that supports on-site changes of the data communications and control routines. The symbol generator formats data "pages" and routes this information to the appropriate projector based on priority or currency, or on demand. The symbol generator is capable of being configured to accept a variety of standard signal inputs including RS-232, RS-422, and RS-170.

D.13 Global Positioning System (GPS).

A GPS receiver is to be mounted on the ARFF vehicle and interfaced with the transparent window display system for display of position information. The GPS is to be a six-channel receiver capable of tracking up to eight satellites. The GPS receiver calculates new position data once every second. Position accuracy is specified at a maximum of 25 m (82 ft), with a typical accuracy of about 10 m to 15 m (32.8 ft to 49.2 ft). An additional ground-based differential transmitter on the airfield provides accuracy from 1 m to 3 m (3.3 ft to 9.8 ft).

D.14 Geographic Information System (GIS).

The airport mapping system by which the ARFF vehicle is navigated can be developed by several methods. One method being considered is the digital reconstructive method. This is accomplished by taking an aerial photograph of the airport and digitizing it so it then can be displayed on the computer screen for mapping. This method, as it is developed, could provide the increased local terrain and hazards definition needed by the ARFF vehicle to travel on and around the airfield. Additional mapping capability with definitions of 1.6 m, 4.8 m, and 16.1 m (1 mi, 3 mi, and 10 mi) provide for call-up mapping in the event of an accident in off-airport operational areas. Digital aerial mapping is an emerging technology that provides three-dimensional hazard definition of streams, swales, and drainage culverts, as well as other hazards that could impede the progress of the rescue.

D.15 Computer Information Enhancements.

Once an operational computer is placed in the ARFF vehicle, it provides a host of other fire-fighting capabilities. Fire fighters are able to have the airport's complete emergency plan available in the computer with menu-driven software. Toxic and hazardous material indexes can be provided, as well as complete instructions on emergency door and entryway door operations for every type of commercial aircraft.

D.16 Vehicle Electrical Upgrade.

Because of the need for better power sources, vehicles with new technology equipment need to undergo some modifications to the existing electrical systems. Computers and electronically controlled devices need smooth-filtered and stable voltage sources. The equipment targeted for installation is modified to operate in the voltage ranges used on the existing vehicles. This usually is 12 V or 24 V dc. Special power converters and voltage stabilizers should be considered. There also are requirements for the addition of 115 V ac in some cases. Power from portable generator power sources that might already exist on some of these vehicles does not, in most cases, provide the smooth, stabilized power sources needed by these new technologies. Transformer rectifiers and power converters do not provide a major challenge for the technological requirements of this upgrade. Low-cost portable battery back-up systems also should be considered to provide power for start-up of the vehicle as well as accidental shutoff of the vehicle system supply. The cost of implementing these required voltage sources is minimal when compared to the trouble-free environment that they provide for the electronic boards and computer systems.

D.17 Final Assessment.

The object of this assessment program is to provide information about the new computer-based equipment and vision enhancement devices that help the airport rescue services perform their assigned mission under suboptimal visibility conditions. The cost of installing this equipment can be justified by the need to operate aircraft under these poor visibility conditions. If operations are conducted that allow the aircraft to take off and land under poor visibility conditions, it is reasonable to expect that additional requirements for fire-fighting response under low-visibility conditions will be established.

The technology needed to perform the DEVS is available now. Although the equipment can be bought off the shelf, installation necessitates some additional research effort because ARFF mission requirements were not considered in the research efforts that produced this technology. In the case of each individual element of the DEVS, it was considered that the proposed system should require low operational workload by the operator. Each piece of the system endeavors to use existing technological equipment with some hardware and software modifications. Finally, the DEVS should be designed for easy installation and a maintenance-free duty life cycle or at the least a modular rack installation design allowing the removal and replacement of components by current maintenance personnel without adding to the personnel burden of a rescue and fire-fighting service.

Finally, the most important issue is cost. Historically, this technology has been expensive. Some of the reasons for these high costs were low production runs and the survivability conditions for which the equipment was originally designed. Equipment meeting the rigorous requirements necessary for military applications can add many thousands of dollars to the final purchase price. It is hoped that, with the careful redesign and unique adaptation of existing equipment designs and unit cost price decreases, the cost of using this technology in an aircraft rescue fire-fighting vehicle can be reduced substantially in the near future.

D.18 DEVS Guidelines.

D.18.1 DEVS Performance Characteristics.

The DEVS is an integrated system of sensors, computers, and navigational equipment designed to improve the response and operation of ARFF crews in low-visibility conditions. The DEVS consists of three components: a night- or low-visibility capability, a vehicle navigation capability, and a vehicle tracking capability, which are integrated using a digital radio data link.

To meet the DEVS requirements, systems need to integrate all three components cohesively. Each component should be integrated into the vehicle's normal operations through a systematic approach of understanding and adapting the technology to the needs of the fire-fighting population.

In the sections that follow, the base performance characteristics are detailed. It is important to note that technology development in the enhanced vision area is progressing rapidly; therefore, the criteria that follow should be considered minimal. Questions regarding specific production systems, new performance capabilities, or recommended systems should be directed to the FAA's airports office.

D.18.2 Low-Visibility Capability.

The intent of the low-visibility capability is to provide an enhanced picture of the environmental scene through the use of a chamber or other sensor system displayed inside the cab. For the immediate future, it appears that FLIR technology holds the most promise for aiding visibility in smoke, fog, and haze, and at night. The minimum recommended performance characteristics of the low-visibility system are provided in the following list:

(1) *General*	
(a) Expected worst-case visibility	0 ft range/0 ft ceiling
(b) Time to operational	≤30 sec
(c) Detection of humans	152.4 m (500 ft), temp: –28.9°C to 46.1°C (–20°F to 115°F), moving 88.5 km/h (55 mph), clear conditions
	152.4 m (500 ft), temp: –28.9°C to 46.1°C (–20°F to 115°F), moving 80.5 km/h (50 mph), light fog conditions
	121.9 m (400 ft), temp: –28.9°C to 46.1°C (–20°F to 115°F), moving 64.4 km/h (40 mph), heavy fog conditions
	121.9 m (400 ft), temp: –28.9°C to 46.1°C (–20°F to 115°F), moving 64.4 km/h (40 mph), smoke conditions
	91.4 m (300 ft), temp: –28.9°C to 46.1°C (–20°F to 115°F), moving 56.3 km/h (35 mph), rain/snow conditions
(d) Detection of GA aircraft	762.0 m (2500 ft), temp: –28.9°C to 46.1°C (–20°F to 115°F), moving 88.5 km/h (55 mph), clear conditions
	304.8 m (1000 ft), temp: –28.9°C to 46.1°C (–20°F to 115°F), moving 80.5 km/h (50 mph), light fog conditions
	152.4 m (500 ft), temp: –28.9°C to 46.1°C (–20°F to 115°F), moving 64.4 km/h (40 mph), heavy fog conditions
	152.4 m (500 ft), temp: –28.9°C to 46.1°C (–20°F to 115°F), moving 64.4 km/h (40 mph), smoke conditions
	152.4 m (500 ft), temp: –28.9°C to 46.1°C (–20°F to 115°F), moving 56.3 km/h (35 mph), rain/snow conditions
(e) Detection of objects near fires	People, debris, wreckage, and equipment within 6.1 m (20 ft) of a 1.8 m (6 ft) diameter Jet A–fuel fire, from a range of 304.8 m (1000 ft)
(2) *FLIR Specific*	
(a) IR waveband	Long wave IR energy (8 µm to 12 µm)
(b) Video output	RS-170 or industry standard video
(c) Gain and level controls	Automatic
(d) Horizontal field of view	≥28 degrees (40 degrees preferred)
(e) Vertical field of view	>20 degrees, aspect ratio to match vertical
(f) Lens clearing capability	Windshield wiper, high-pressure air, or equivalent
(g) Temperature and humidity changes	Changes in ambient temperature and humidity should not result in condensation inside the FLIR housing or optics assembly
(h) Mounting	On top of vehicle with pan and tilt capability, remote-control equipped, line of sight aligned with driver's line of sight
(i) Video monitor	20.3 cm to 25.4 cm (8 in. to 10 in.) diagonal display mounted near driver's line of sight
	Alternative : Heads-up display with field-of-view to match FLIR

D.18.3 Navigation Capability.

The intent of the navigation capability is to allow for accurate positioning of the vehicle on or around the airport surface. The navigation capability should provide a depiction of the vehicle, notable landmarks, roadways, and other guidance aids. Information should be provided to the driver in a meaningful form appropriate to the needs of the fire response.

The navigation capability consists of three main components: a GPS receiver, a computer system containing supporting maps and navigation information, and a display/control system for driver information.

For full capability on the airport, the DEVS should incorporate both capabilities into the design. The performance characteristics of the components in the list in D.18.2 are as follows:

(1) *Position Availability*	Computed position within 30 sec/hr/day, 7 days/week
(2) *Accuracy*	Two-dimensional position within 4.6 m (15 ft)
(3) *Dead Reckoning*	Coasting capability when satellite track is lost due to shadowing
(4) *Position Update Rate*	< 1/sec
(5) *Initialization and Operation*	Fully automatic
(6) *Map*	
(a) Levels of detail	Level 1 — Airport operations area
	Level 2 — Airport property boundary
	Level 3 — 8 km (5 mi) radius of the airport center; either variable or fixed zooms within each level should be provided
(b) Orientation	North-up or heading-up, selectable (Note: Heading-up orientation is required for situational awareness in low-visibility conditions and unfamiliar areas)
(c) Visual orientation cues	Vehicle orientation, vehicle heading, direction of low-visibility coverage
(7) *Driving Cues*	Range/bearing indicator in line of sight (on FLIR display or separate)
(8) *Data Link*	
(a) Error checking	Standard error checking
(b) Frequency selection	Selectable to airport location
(9) *Display — Color*	≥ 256 colors

D.18.4 Tracking Capability.

The tracking capability components include the following:

(1) Differential GPS (DGPS) correction software

(2) Data link hardware/software

(3) Integrated display/control system for command center operations

The command center can be either fixed or mobile, depending on individual airport ARFF operations. This capability is intrinsically tied to the tracking capability, which allows for the monitoring of the positions of other vehicles, the crash site, identified victims, and other factors, as well as linkage to a centralized display for emergency coordination. The performance characteristics of the tracking capability function are as follows:

(1) *Map — Orientation*	North-up with dynamic zoom and pan
(2) *Data Link*	
(a) Error checking	Standard error checking
(b) Frequency selection	Selectable to airport location
(3) *Display — Color*	Large high-resolution monitor [>48.3 cm (>19 in.) diagonal color monitor, 1280 × 1024 resolution]

D.19 Glossary of Technical Terms.

D.19.1 Aircraft Rescue and Fire Fighting (ARFF).

Formerly known in the fire-fighting industry as crash, fire, and rescue.

D.19.2 Cool-Down in the Operational Environment of an Infrared Detector.

Term used to describe the period of time needed for the refrigeration unit of the optical sensor to cool the unit to approximately -270.2°C (-454°F). This cool-down mode provides the necessary sensitivity of 10,000:1 for infrared thermal detection.

D.19.3 Driver's Enhanced Vision System (DEVS).

A vision enhancement system utilizing several electronic and computer-based components that aids in improving sight as well as movement or navigation around the airport during reduced-visibility operational conditions.

D.19.4 Forward Looking Infrared (FLIR).

A thermal imaging system (camera), which can be vehicle-mounted, designed to detect thermal energy.

D.19.5 Geographic Information System (GIS).

A device that allows an aerial map of the airport to be displayed with markers that move along the image as the vehicle changes position.

D.19.6 Global Positioning System (GPS).

A device that picks up signals from orbiting satellites and determines positions of location on earth by reference to longitude and latitude.

D.19.7 Heads-Up Display (HUD).

The military name for a device that allows a person to look and operate a device while viewing through the cockpit window of an aircraft. This device displays information on the cockpit window.

D.19.8 Transparent Window Display (TWD).

An electronic device that projects an image on a special coated glass or plastic that also allows the viewer to see through the clearplate with a slight reduction in visibility.

Statement of Problem and Substantiation for Public Input

Remove, this is already covered in NFPA 414.

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Public Input No. 131-NFPA 402-2015 [Chapter E]

~~**Annex E** – Civil Aircraft Accident Investigation~~ (Consider removing or at least updating)

This annex is not a part of the recommendations of this NFPA document but is included for informational purposes only.

E.1 General.

In the United States, major aircraft accidents are investigated by the National Transportation Safety Board (NTSB), 800 Independence Avenue SW, Washington, DC 20591. In some instances responsibility for investigation is delegated by the Board to the Federal Aviation Administration (FAA).

RESCUE: The occupants.

GUARD: The wreckage — Allow no one inside the wreckage area other than those necessary for occupant removal, fire fighting, and the possible removal of mail and cargo where necessary to protect it from further damage. Items removed for protection must be retained locally for examination by a Federal Air Safety Investigator.

ADVISE: The county coroner/medical examiners — Fatally injured occupants of the aircraft should be held for possible pathological or toxicological examination or both prior to embalmment.

IDENTIFY: The position of fatalities — Prior to removing the remains of fatally injured occupants, tag or otherwise identify each body, and mark its location in the wreckage or on the ground (photograph in position, if possible).

PERMIT: News media coverage — Accredited news media can be permitted to enter and photograph the area as long as the wreckage is not disturbed.

NOTIFY: The local authorities, the Safety Board, FAA.

E.2 National Transportation Safety Board Rules.

(The following material is extracted from 49 CFR 175, Chapter VIII.)

Title 49 — Transportation

Chapter VIII — National Transportation Safety Board

Revised: March 20, 1985

Part 830 — Notification and Reporting of Aircraft Accidents or Incidents and Overdue Aircraft, and Preservation of Aircraft Wreckage, Mail, Cargo, and Records.

Subpart A — General.

Sec.

830.1 Applicability.

830.2 Definitions.

Subpart B — Initial Notification of Aircraft Accidents, Incidents, and Overdue Aircraft.

830.5 Immediate notification.

830.6 Information to be given in notification.

Subpart C — Preservation of Aircraft Wreckage, Mail, Cargo, and Records.

830.10 Preservation of aircraft wreckage, mail, cargo, and records.

Subpart D — Reporting of Aircraft Accidents, Incidents, and Overdue Aircraft.

830.15 Reports and statement to be filed.

Authority: Title VII, Federal Aviation Act of 1958, as amended, 72 Stat. 781, as amended by 76 Stat. 921 (49 U.S.C. 1441 et seq.), and the Independent Safety Board Act of 1974, Pub. L. 93-633, 88 Stat. 2166 (49 U.S.C. 1901 et seq.).

Subpart A — General.

830.1 Applicability.

This part contains rules pertaining to:

(1) Notification and reporting aircraft accidents and incidents and certain other occurrences in the operation of aircraft when they involve civil aircraft of the United States wherever they occur, or foreign civil aircraft when such events occur in the United States, its territories, or possessions.

(2) Preservation of aircraft wreckage, mail, cargo, and records involving all civil aircraft in the United States, its territories or possessions.

830.2 Definitions.

As used in this part, the following words or phrases are defined as follows:

Aircraft accident means an occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight and all such persons have disembarked, and in which any person suffers death or serious injury, or in which the aircraft receives substantial damage.

Fatal injury means any injury which results in death within 30 days of the accident.

Incident means an occurrence other than an accident, associated with the operation of an aircraft, which affects or could affect the safety of operations.

Operator means any person who causes or authorizes the operation of an aircraft, such as the owner, lessee, or bailee of an aircraft.

Serious injury means any injury which:

(1) Requires hospitalization for more than 48 hours, commencing within 7 days from the date the injury was received

(2) Results in a fracture of any bone (except simple fractures of fingers, toes, or nose)

(3) Causes severe hemorrhages, nerve, muscle, or tendon damage

(4) Involves any internal organ

(5) Involves second or third degree burns, or any burns affecting more than 5 percent of the body surface

Substantial damage means damage or failure which adversely affects the structural strength, performance, or flight characteristics of the aircraft, and which would normally require major repair or replacement of the affected component. Engine failure or damage limited to an engine if only one engine fails or is damaged, bent fairings or cowling, dented skin, small punctured holes in the skin or fabric, ground damage to rotor or propeller blades, and damage to landing gear, wheels, tires, flaps, engine accessories, brakes, or wingtips, are not considered *substantial damage* for the purpose of this part.

Subpart B — Initial Notification of Aircraft Accidents, Incidents, and Overdue Aircraft.

830.5 Immediate notification.

The operator of an aircraft shall immediately, and by the most expeditious means available, notify the nearest National Transportation Safety Board field office[1] when:

(1) An aircraft accident or any of the following listed incidents occur:

(2) Flight control system malfunction or failure;

(3) Inability of any required flight crewmember to perform normal flight duties as a result of injury or illness;

(4) Failure of structural components of a turbine engine excluding compressor and turbine blades and vanes;

(5) In-flight fire; or

(6) Aircraft collide in flight.

(7) An aircraft is overdue and is believed to have been involved in an accident.

[1]The National Transportation Safety Board field offices are listed under U. S. Government in the telephone directories in the following cities: Anchorage, AK; Atlanta, GA; Chicago, IL; Denver, CO; Fort Worth, TX; Kansas City, MO; Los Angeles, CA; Miami, FL; New York, NY; Seattle, WA.

830.6 Information to be given in notification.

The notification required in section 830.5 shall contain the following information, if available:

(1) Type, nationality, and registration marks of the aircraft;

(2) Name of owner, and operator of the aircraft;

(3) Name of the pilot-in-command;

(4) Date and time of the accident;

(5) Last point of departure and point of intended landing of the aircraft;

(6) Position of the aircraft with reference to some easily defined geographical point;

(7) Number of persons aboard, number killed, and number seriously injured;

(8) Nature of the accident, the weather, and the extent of damage to the aircraft, so far as is known; and

(9) A description of any explosives, radioactive materials, or other dangerous articles carried.

Subpart C — Preservation of Aircraft Wreckage, Mail, Cargo, and Records.

830.10 Preservation of aircraft wreckage, mail, cargo, and records.

(1) The operator of an aircraft involved in an accident or incident for which notification must be given is responsible for preserving to the extent possible any aircraft wreckage, cargo, and mail aboard the aircraft, and all records, including all recording mediums of flight, maintenance, and voice recorders, pertaining to the operation and maintenance of the aircraft and to the airmen until the Board takes custody thereof or a release is granted pursuant to Section 831.10(b).

(2) Prior to the time the Board or its authorized representative takes custody of aircraft wreckage, mail, or cargo, such wreckage, mail, or cargo may not be disturbed or moved except to the extent necessary:

(3) To remove persons injured or trapped;

(4) To protect the wreckage from further damage; or

(5) Where it is necessary to move aircraft wreckage, mail, or cargo, sketches, descriptive notes, and photographs shall be made, if possible, of the original position and condition of the wreckage and any significant impact marks.

(6) The operator of an aircraft involved in an accident or incident shall retain all records, reports, internal documents, and memoranda dealing with the accident or incident, until authorized by the Board to the contrary.

Subpart D — Reporting of Aircraft Accidents, Incidents, and Overdue Aircraft.

830-15 Reports and statements to be filed.

(1) *Reports.* The operator of an aircraft shall file a report on Board Form 6120.1 or Board Form 6120.2[2] within 10 days after an accident, or after 7 days if an overdue aircraft is still missing. A report on an incident for which notification is required by Section 830.5(a) shall be filed only as requested by an authorized representative of the Board.

(2) *Crewmember Statement.* Each crewmember, if physically able at the time the report is submitted, shall attach a statement setting forth the facts, conditions and circumstances relating to the accident or incident as they appear to him. If the crewmember is incapacitated, he shall submit the statement as soon as he is physically able.

(3) *Where to File the Reports.* The operator of an aircraft shall file any report with the field office of the Board nearest the accident or incident.

[2]Forms are obtainable from the Board field offices (see footnote 1), the National Transportation Safety Board, Washington, DC 20594, and the Federal Aviation Administration, Flight Standards District Office.

NOTE: The reporting and recordkeeping requirements contained herein have been approved by the Office of Management and Budget in accordance with the Federal Report Act of 1942.

Signed at Washington, DC, on September 4, 1980.

James B. King

Chairman

Statement of Problem and Substantiation for Public Input

Consider removing or at least updating

Submitter Information Verification

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Submittal Date: Thu Jun 25 00:03:38 EDT 2015

Committee Statement

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Statement: The committee has chosen to delete this as much of this information is already covered in the document.

Public Input No. 3-NFPA 402-2014 [Chapter G]

Annex G Informational References

G.1 Referenced Publications.

The documents or portions thereof listed in this annex are referenced within the informational sections of this guide and are not advisory in nature unless also listed in Chapter 2 for other reasons.

G.1.1 NFPA Publications.

National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 407, *Standard for Aircraft Fuel Servicing*, ~~2012 edition~~ **2017** .

NFPA 410, *Standard on Aircraft Maintenance*, ~~2010 edition~~ **2015** .

NFPA 1561, *Standard on Emergency Services Incident Management System*, ~~2008 edition~~ **2014** .

Fire Protection Guide on Hazardous Materials, ~~13th edition, 2002~~ **2010** .

G.1.2 Other Publications.

G.1.2.1 IATA Publications.

International Air Transport Association Headquarters, IATA Building, 2000 Peel Street, Montreal, Canada H3A 2R4.

Restricted Articles Regulations.

G.1.2.2 ICAO Publications.

International Civil Aviation Organization, **999** ~~University St., Montreal~~ **Robert-Bourassa Boulevard, Montréal , Quebec H3C 5H7 , Canada** ~~H3C 5H7~~ .

Aircraft Accident and Incident Investigation (Annex 13), ~~8th~~ **10** th edition, July ~~1994, Reprinted 1999~~ **2010** .

DOC 9284 ~~AN/905~~ , Technical Instructions for the Safe Transport of Dangerous Goods by Air, ~~2012.~~

~~*Manual of Aircraft Accident Investigation* (Document 6920), 4th edition, 1970, Reprinted 1995.~~

2015-2016 .

Airport Service Manual, Part 5, Removal of Disabled Aircraft,~~3rd~~ **4th** edition, ~~1996~~ **2009** .

G.1.2.3 U.S. Government Publications.

U.S. ~~Government Printing~~ Government **Publishing** Office, Washington, DC 20402.

A Policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials, ~~1990~~ **6th edition, 2011** .

Title 44, Code of Federal Regulations, Part 151, “Reimbursement for Costs of Firefighting on Federal Property.”

Title 49, Code of Federal Regulations, Part 175, “Transportation.”

G.2 Informational References.

The following documents or portions thereof are listed here as informational resources only. They are not directly referenced in this guide.

G.2.1 ICAO Publications.

International standards and recommended practices are promulgated by the International Civil Aviation Organization, **999** ~~University St., Montreal~~ **Robert-Bourassa Boulevard, Montréal , Quebec** ~~PQ~~ **H3C 5H7 , Canada** ~~H3C 5H7~~ .

Aerodromes (Annex 14), ~~3rd~~ **6th** edition, July ~~1999~~ **2013** .

Airport Services Manual, Part 1: "Rescue and Fire Fighting," 3rd edition, 1990**, Reprinted 2004** .

Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods, ~~1st edition, March 2001-2002~~ **2015-2016** .

Technical Instructions for the Transport of Dangerous Goods by Air, Document 9284-AN/905, ~~March 2005~~ **2015-2016** .

G.2.2 U.S. Government Publications.

U.S. ~~Government Printing~~ Government **Publishing** Office, Washington, DC 20402.

G.2.2.1

Federal Aviation Register Part 139. Part 139 is sold on a subscription basis by the Superintendent of Documents. Subscribers will receive changes to this part automatically.

G.2.2.2 Federal Aviation Administration Publications.

Available from Department of Transportation, Distribution Unit, M-494.3, Washington, DC 20590.

Advisory Circulars. This listing is limited to those free advisory circulars relating to aircraft rescue and fire-fighting services. For a complete listing of FAA advisory circulars, write to the address above and request a copy of the latest "Advisory Circular Checklist and Status of Other FAA Publications." This checklist is also published periodically in the Federal Register.

FAA AC 150/5200-12**C** ,~~First Responder~~ First Responders ' ~~s~~ Responsibility ~~in~~ for Protecting Evidence at the Scene *of an Aircraft Accident /Incident, 2009.* (AAS-100). Furnishes general guidance for airport employees, airport management, and other personnel responsible for fire-fighting and rescue operations, at the scene of an aircraft accident, on the proper presentation of evidence.

FAA AC 150/5200-18**C** , *Airport Safety Self-Inspection***, 2004** (AAS-310). Suggests functional responsibility, procedures, a checklist, and schedule for an airport safety self-inspection.

FAA AC 150/5210-6**D** , *Aircraft Fire Extinguishing Agents***, 2004** (AAS-100). Outlines scales of protection considered as the recommended level — compared with the minimum level in Federal Aviation Regulation Part 139.49 — and tells how these levels were established from test and experience data.

FAA AC 150/5210-13**C** , Airport *Water Rescue Plans ~~, Airport,~~ and Equipment***, 2010** (AAS-300). Suggests planning procedures, facilities, and equipment to effectively perform rescue operations when an aircraft lands in a body of water, swamp, or tidal area where normal aircraft fire-fighting and rescue service vehicles are unable to reach the accident scene.

FAA AC 150/5210-14**B** , *Airport Rescue* **Fire** ~~and Rescue Personnel Protective Clothing~~ **Fighting Equipment, Tools, and Clothing, 2008** (AAS-100). Developed to assist airport management in the development of local procurement specifications for an acceptable, cost-effective proximity suit for use in aircraft rescue and fire-fighting operations.

FAA AC 150/5210-15**A** , *Airport Rescue and Fire Fighting Station Building Design***, 2008** (AAS-100). Provides standards and guidance for planning, designing, and constructing an airport rescue and fire-fighting station.

FAA AC 150/5210-5**D** , *Painting, Marking, and Lighting of Vehicles Used on an Airport***, 2010** (AAA-120). Provides guidance, specifications, and standards — in the interest of airport personnel safety and operational efficiency — for painting, marking, and lighting of vehicles operating in the airport air operations areas.

FAA AC 150/5210-7**D** , ~~*Aircraft Fire and Rescue Communications*~~ *Aircraft* **Rescue and Fire Fighting** *Communications* **, 2008.** (AAS-120). Provides guidance and information for planning and implementing an airport communications system for airport fire and rescue service.

(Cancelled 9-19-2011) FAA AC 150/5220-4, *Water Supply Systems for Aircraft Fire and Rescue Protection* (AAS-120). Provides guidance for the water source selection and standards for a water distribution system designed to support aircraft rescue and fire-fighting (ARFF) service operations on airports.

FAA AC 150/5220-9**A** , *Aircraft Arresting Systems***, 2006** (AAS-300). Updates existing policy, and describes and illustrates the various types of military aircraft emergency arresting systems that are now installed at various joint civil/military airports. It also informs users of criteria concerning installations of such systems at joint civil/military airports.

FAA AC 150/5220-10**E** , *Guide Specification for Aircraft Rescue and Fire Fighting Vehicles* ~~(Consolidated reprint incorporates changes 1 and 2) (~~ **, 2011.** (AAS-100). Assists airport management in the development of local procurement specifications.

FAA AC 150/5230-4**B** , *Aircraft Fuel Storage, Handling, and Dispensing on Airports***, 2011.** (AAS-300). Provides information on aviation fuel deliveries to airport storage and the handling, cleaning, and dispensing of fuel into aircraft.

~~150/5230-4, Chg. 1.~~

~~150/5230-4, Chg. 2.~~

~~150/5280-1, Chg. 1.~~

~~150/~~ **FAA AC** 150/ 5340-1**L** , *Standards for Airport* **Markings , 2013** (AAS-200). Describes standards for marking paved runways, taxiways, closed and/or hazardous areas on airports.

FAA AC 150/5340-18**F** , *Standards for Airport Sign Systems***, 2010** (AAS-200). Contains the Federal Aviation Administration standards for use of sign systems on airports.

FAA AC 150/5370-2**F** , *Operational Safety on Airports During Construction***, 2011** (AAS-300). Concerns operational safety on airports — with special emphasis on safety during periods of construction activity — to assist airport operators in complying with *Part 139*.

FAA AC 150/~~5380~~ **5210** ~~-5,~~ ~~*Debris Hazards at Civil Airports*~~ ~~(AAS-100~~ **24** , **Airport Foreign Object Debris (FOD) Management, 2010. (Supersedes FAA AC 150/5380-5B)** (AAS- **300**). Discusses problems of debris at airports, gives information on foreign objects, and tells how to eliminate such objects from operational areas.

G.2.2.3 U.S. Military Publications.

Air Force: Technical Manual 00-105E-9, *Aircraft Emergency (Fire Protection Information)*, available from HQ WR-ALC (MMEOTD), Robbins AFB, GA 31093.

Navy and Marine: NAVAIR 00-80R-14, *Aircraft Fire Fighting and Rescue Manual for US Naval and Marine Air Stations and Facilities*, available from Naval Air Technical Services Facility, 700 Robins Avenue, Philadelphia, PA 19111.

Army: *Technical Manual 5-315*, available from Superintendent of Public Documents, Public Documents Department, U.S. ~~Government Printing~~ Government **Publishing** Office, Washington, DC 20402.

G.2.2.4 Other Publications.

Advanced Techniques in Impact Protection and Emergency Egress from Air Transport Aircraft, R.G. Snyder Report, HEARD-AG 221, National Transportation Safety Board Accident Reports.

G.3 References for Extracts in Informational Sections.

NFPA 16, *Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems*, ~~2011 edition~~ **2017** .

NFPA 302, *Fire Protection Standard for Pleasure and Commercial Motor Craft*, ~~2010 edition~~ **2015** .

NFPA 472, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, 2013 ~~edition~~ .

NFPA 921, *Guide for Fire and Explosion Investigations*, ~~2011 edition~~ **2017** .

NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services*, ~~2007 edition~~ **2013** .

Statement of Problem and Substantiation for Public Input

Referenced current editions and FAA Circulars.

Related Public Inputs for This Document

Related Input	Relationship
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G.1.2.2 ICAO Publications.

International standards and recommendatioed practices are promulgated by the Civil Aviation Organization, 999 ~~University St.~~ Robert-Bourassa Boulevard , Montreal, Quebec PQ , Canada H3C 5H7.

~~*Aircraft Accident and Incident Investigation*~~
Aerodromes (Annex

~~13~~
14),

~~8th~~
3rd edition, July

~~1994, Reprinted~~
1999.

~~9284-AN/905,~~
(6 th edition 2013)

Airport Services Manual, Part 1: “Rescue and Fire Fighting,” 3rd edition, 1990. (4 th edition 2014)

Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods, 1st edition, March 2001-2002 (2011-2012)

Technical Instructions for the

~~Safe~~
Transport of Dangerous Goods by Air,

~~2012.~~

~~*Manual of Aircraft Accident Investigation* (Document 6920), 4th edition, 1970, Reprinted 1995.~~

~~*Airport Service Manual* , Part 5, Removal of Disabled Aircraft, 3rd edition, 1996.~~

Document 9284-AN/905, March 2005. (May 2015)

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G.1.2.3 U.S. Government Publications.

U.S. Government Printing Office, Washington, DC 20402.

A Policy on Geometric Design of Highways and Streets, ~~American Association of State Highway and Transportation Officials, 1990~~ *6th Edition, 2011, commonly referred to as the "Green Book," contains the current design research and practices for highway and street geometric design .*

Title 44, Code of Federal Regulations, Part 151, "Reimbursement for Costs of Firefighting on Federal Property."

Title 49, Code of Federal Regulations, Part 175, "Transportation - Carriage by Aircraft ."

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G.2.2.2 Federal Aviation Administration Publications.

~~Available from Department of Transportation, Distribution Unit, M-494.3, Washington, DC 20590.~~

Advisory Circulars. This listing is limited to those free advisory circulars relating to aircraft rescue and fire-fighting services. ~~For a complete listing of FAA advisory circulars, write to the address above and request a copy of the latest "Advisory Circular Checklist and Status of Other FAA Publications." This checklist is also published periodically in the Federal Register.~~ Advisory Circulars are available for free download at: www.faa.gov.

150/5200-12, *First Responder's Responsibility in Protecting Evidence at the Scene of an Aircraft Accident* (AAS-100). Furnishes general guidance for airport employees, airport management, and other personnel responsible for fire-fighting and rescue operations, at the scene of an aircraft accident, on the proper presentation of evidence.

150/5200-18, *Airport Safety Self-Inspection*~~.~~ ~~(AAS-310)~~ . Suggests functional responsibility, procedures, a checklist, and schedule for an airport safety self-inspection.

150/5210-6, *Aircraft Fire Extinguishing Agents*~~.~~ ~~(AAS-100)~~ . Outlines scales of protection considered as the recommended level — compared with the minimum level in Federal Aviation Regulation Part 139.49 — and tells how these levels were established from test and experience data.

150/5210-13, *Water Rescue Plans, Airport, and Equipment*~~.~~ ~~(AAS-300)~~ . Suggests planning procedures, facilities, and equipment to effectively perform rescue operations when an aircraft lands in a body of water, swamp, or tidal area where normal aircraft fire-fighting and rescue service vehicles are unable to reach the accident scene.

150/5210-14, *Airport Fire and Rescue Personnel Protective Clothing*~~.~~ ~~(AAS-100)~~ . Developed to assist airport management in the development of local procurement specifications for an acceptable, cost-effective proximity suit for use in aircraft rescue and fire-fighting operations.

150/5210-15, *Airport Rescue and Fire Fighting Station Building Design*~~.~~ ~~(AAS-100)~~ . Provides standards and guidance for planning, designing, and constructing an airport rescue and fire-fighting station.

150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport*~~.~~ ~~(AAA-120)~~ . Provides guidance, specifications, and standards — in the interest of airport personnel safety and operational efficiency — for painting, marking, and lighting of vehicles operating in the airport air operations areas.

150/5210-7, *Aircraft Fire and Rescue Communications*~~.~~ ~~(AAS-120)~~ . Provides guidance and information for planning and implementing an airport communications system for airport fire and rescue service.

150/ 5210-23 - ARFF Vehicle and High Reach Extendable Turret (HRET) Operation, Training and Qualifications. Provides FAA standards and recommendations for the training of airport firefighting and rescue personnel in the proper operation and tactical use of Aircraft Rescue and Fire Fighting (ARFF) vehicles and ARFF vehicles equipped with High Reach Extendable Turret (HRETs)

150/ 5220-4, *Water Supply Systems for Aircraft Fire and Rescue Protection*~~.~~ ~~(AAS-120)~~ . Provides guidance for the water source selection and standards for a water distribution system designed to support aircraft rescue and fire-fighting (ARFF) service operations on airports.

150/5220-9, *Aircraft Arresting Systems*~~.~~ ~~(AAS-300)~~ . Updates existing policy, and describes and illustrates the various types of military aircraft emergency arresting systems that are now installed at various joint civil/military airports. It also informs users of criteria concerning installations of such systems at joint civil/military airports.

150/5220-10, *Guide Specification for Aircraft Rescue and Fire Fighting Vehicles* (Consolidated reprint incorporates changes 1 and 2)~~.~~ ~~(AAS-100)~~ . Assists airport management in the development of local procurement specifications of ARFF vehicles .

150/5230-4, *Aircraft Fuel Storage, Handling, and Dispensing on Airports*~~.~~ ~~(AAS-300)~~ . Provides information on aviation fuel deliveries to airport storage and the handling, cleaning, and dispensing of fuel into aircraft.

150/~~5230-4, Chg. 1.~~

~~150/5230-4, Chg. 2.~~

~~150/5280-1, Chg. 1.~~

~~150/~~ 5340-1, *Standards for Airport Markings*~~.~~ ~~(AAS-200)~~ . Describes standards for marking paved runways, taxiways, closed and/or hazardous areas on airports.

150/5340-18, *Standards for Airport Sign Systems*~~.~~ ~~(AAS-200)~~ . Contains the Federal Aviation Administration standards for use of sign systems on airports.

150/5370-2, *Operational Safety on Airports During Construction*- ~~(AAS-300)~~ . Concerns operational safety on airports — with special emphasis on safety during periods of construction activity — to assist airport operators in complying with *Part 139*.

150/5380-5, *Debris Hazards at Civil Airports*- ~~(AAS-100)~~ . Discusses problems of debris at airports, gives information on foreign objects, and tells how to eliminate such objects from operational areas.

Statement of Problem and Substantiation for Public Input

Updated references per FAA

Submitter Information Verification

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Committee Statement

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G.2.2.3 U.S. Military Publications.

Air Force: Technical Manual 00-105E-9, *Aircraft Emergency (Fire Protection Information)*, available from HQ WR-ALC (MMEOTD), Robbins AFB, GA 31093.

Navy and Marine: NAVAIR 00-80R-14, *Aircraft Fire Fighting and Rescue Manual for US Naval and Marine Air Stations and Facilities*, available from ~~Naval Air Technical Services Facility, 700 Robins Avenue, Philadelphia, PA 19111.~~
Commanding Officer, PMA-251,47123 Buse Rd. Unit IPT, Bldg. 2272 Suite 348 Patuxent River, MD. 20670-1547

Army: *Technical Manual 5-315*, available from Superintendent of Public Documents, Public Documents Department, U.S. Government Printing Office, Washington, DC 20402.

Statement of Problem and Substantiation for Public Input

Updated reference per FAA

Submitter Information Verification

Submitter Full Name: ROBERT MATHIS
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