Public Input No. 24-NFPA 440-2020 [Section No. 2.2]

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,* 2018 edition.

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

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

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

NFPA 424, *Guide for Airport/Community Emergency Planning,* 2018 edition.

NFPA 1003, *Standard for Airport Fire Fighter Professional Qualifications,* 2019 edition.

NFPA 1600®, Standard on Disaster/Emergency Management and Business Continuity/Continuity of Operations Programs,~~2016 edition~~ 2019 edition .

Statement of Problem and Substantiation for Public Input

Updates reference to most current edition of NFPA 1600.

Submitter Information Verification

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Submittal Date: Mon Nov 09 13:45:24 EST 2020
Committee: AIR-AAA

Committee Statement

Resolution: FR-1-NFPA 440-2021
Statement: These changes are being made in order to update/add referenced documents.

Public Input No. 37-NFPA 440-2020 [Section No. 2.2]

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,* 2018 edition.

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

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

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

NFPA 424, *Guide for Airport/Community Emergency Planning,* 2018 edition.

NFPA 855, *Standard for the Installation of Stationary Energy Storage Systems,* 2020 edition.

NFPA 1003, *Standard for Airport Fire Fighter Professional Qualifications,* 2019 edition.

NFPA 1600®, Standard on Disaster/Emergency Management and Business Continuity/Continuity of Operations Programs, 2016 edition.

Statement of Problem and Substantiation for Public Input

Adds new reference utilized in section 7.5.11.6.4.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 36-NFPA 440-2020 [New Section after 7.5.11.6.3]	new referenced document

Submitter Information Verification

Submitter Full Name: Aaron Johnson
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Submittal Date: Wed Nov 11 08:44:17 EST 2020
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Committee Statement

Resolution: FR-1-NFPA 440-2021
Statement: These changes are being made in order to update/add referenced documents.

Public Input No. 39-NFPA 440-2020 [Section No. 2.2]

2.2 NFPA Publications.

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

NFPA 111, *Standard on Stored Electrical Energy Emergency and Standby Power Systems,* 2019 edition.

NFPA 403, *Standard for Aircraft Rescue and Fire-Fighting Services at Airports,* 2018 edition.

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

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

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

NFPA 424, *Guide for Airport/Community Emergency Planning,* 2018 edition.

NFPA 1003, *Standard for Airport Fire Fighter Professional Qualifications,* 2019 edition.

NFPA 1600®, Standard on Disaster/Emergency Management and Business Continuity/Continuity of Operations Programs, 2016 edition.

Statement of Problem and Substantiation for Public Input

Proposal to add language to section 4.2.7 incorporates reference to NFPA 111.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 11-NFPA 440-2020 [Section No. 4.1.7]	references new document

Submitter Information Verification

Submitter Full Name: Aaron Johnson
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Committee: AIR-AAA

Committee Statement

Resolution: FR-1-NFPA 440-2021
Statement: These changes are being made in order to update/add referenced documents.

Public Input No. 40-NFPA 440-2020 [Section No. 2.2]

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,* 2018 edition.

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

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

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

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

NFPA 424, *Guide for Airport/Community Emergency Planning,* 2018 edition.

NFPA 1003, *Standard for Airport Fire Fighter Professional Qualifications,* 2019 edition.

NFPA 1600®, Standard on Disaster/Emergency Management and Business Continuity/Continuity of Operations Programs, 2016 edition.

Statement of Problem and Substantiation for Public Input

This document is referenced in proposed language to section 11.2.3.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 23-NFPA 440-2020 [Section No. 11.2.3]	section references new document

Submitter Information Verification

Submitter Full Name: Aaron Johnson
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Submittal Date: Wed Nov 11 09:02:25 EST 2020
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Committee Statement

Resolution: FR-1-NFPA 440-2021
Statement: These changes are being made in order to update/add referenced documents.

Public Input No. 8-NFPA 440-2020 [Section No. 2.3.3]

2.3.3 PHMSA Publications.

Pipeline and Hazard Materials Safety Administration, 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, ~~2012~~ 2020 .

Statement of Problem and Substantiation for Public Input

Updates use of the Emergency Response Guidebook to most current edition, 2020.

Submitter Information Verification

Submitter Full Name: Aaron Johnson
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Street Address:
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Submittal Date: Mon Nov 09 11:55:44 EST 2020
Committee: AIR-AAA

Committee Statement

Resolution: FR-2-NFPA 440-2021
Statement: This change is being made in order to update the reference to the Emergency Response Guidebook to most current edition, 2020.

Public Input No. 1-NFPA 440-2020 [New Section after 3.2]

TITLE OF NEW CONTENT

Type your content here ... **3.2.5 Shall** Indicates a mandatory requirement

3.2.6 Standard An NFPA Standard, the main text of which contains only mandatory provisions using the word “shall” to indicate requirements and that 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 NFPA Manuals of Style. When used in a generic sense, such as in the phrase “standards development process” or “standards development activities,” the term “standards” includes all NFPA Standards, including Codes, Standards, Recommended Practices, and Guides.

Statement of Problem and Substantiation for Public Input

Consistent with other ARFF NFPA documents.

Submitter Information Verification

Submitter Full Name: Stephen Listerman
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Submittal Date: Tue Aug 04 09:40:48 EDT 2020
Committee: AIR-AAA

Committee Statement

Resolution: We would not add this term and definition for two reasons, the first is since this is a guide we would not include “shall” since that is for use in standards. Secondly, since this is a guide the term shall is not used and we can only define terms that are used in the document.

Public Input No. 2-NFPA 440-2020 [Section No. 3.3.21]

3.3.21 ~~Airside (Airport Operational Area)~~ Airside .

~~The movement area~~ The part of an airport, ~~adjacent terrain, and buildings or portions thereof, access to which is controlled~~ including terminals buildings past security checks or passport and custom control, used for the loading, unloading, takeoff, and landing of aircraft .

Statement of Problem and Substantiation for Public Input

Clearer definition of the word.

Submitter Information Verification

Submitter Full Name: Stephen Listerman
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Submittal Date: Tue Aug 04 09:51:57 EDT 2020
Committee: AIR-AAA

Committee Statement

Resolution: FR-9-NFPA 440-2021
Statement: This change is being made in order to provide a clearer definition of the word.

Public Input No. 3-NFPA 440-2020 [Section No. 3.3.25.2]

3.3.25.2– _ *Casualty* *Collection* ~~*Area*~~ *Point* .

Location where seriously injured are collected initially.

Statement of Problem and Substantiation for Public Input

Standard term now used for this area by NIMS

Submitter Information Verification

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Submittal Date: Tue Aug 04 09:57:34 EDT 2020
Committee: AIR-AAA

Committee Statement

Resolution: FR-10-NFPA 440-2021
Statement: This change has been made as this is a standard term now used for this area by NIMS

Public Input No. 4-NFPA 440-2020 [Section No. 3.3.117]

3.3.117– Aircraft Undercarriage.

All components of an aircraft landing gear assembly.

Statement of Problem and Substantiation for Public Input

Undercarriage could mean vehicles or aircraft, defines this as aircraft

Submitter Information Verification

Submitter Full Name: Stephen Listerman
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Submittal Date: Tue Aug 04 10:11:19 EDT 2020
Committee: AIR-AAA

Committee Statement

Resolution: FR-50-NFPA 440-2021
Statement: This change is being made to provide further clarification as undercarriage could mean vehicles or aircraft, defines this as it is related to an aircraft undercarriage.

Public Input No. 10-NFPA 440-2020 [Chapter 4]

Chapter 4 Pre-Incident Planning for Aircraft Emergencies (NFPA 402)

4.1– General.

4.1.1 Many accidents within the critical rescue and ?firefighting access area involve undershoots, overshoots, and rejected takeoffs, and are generally survivable. Accidents occurring outside of the critical rescue and ?firefighting access area could involve impact with adverse terrain, with resultant rupture of the aircraft structure. Rapid response to these areas is crucial for the purpose of saving lives.

4.1.2 In addition to routine training programs, airport ARFF services and all structural ?re departments and community emergency services with jurisdictions adjacent to an airport or its traffic patterns are encouraged to frequently schedule and participate in multi-agency training sessions based on the mate- rial in this guide. The objective of these sessions should be to focus on achieving maximum unity, compatibility, and effective- ness at aircraft emergencies, should they be on or off the airport. (See Section 4.5.)

4.1.3 All ARFF personnel should participate in regular exercises involving simulated aircraft accidents throughout the year. Frequent command-level training for those persons assigned to major roles in the airport/community emergency plan is also essential. Command training can be presented in the form of workshop or tabletop exercises designed to develop effective emergency management techniques. Guidance for emergency plan exercises is provided in NFPA 424.

4.1.4 Command authority at any accident site should be predetermined according to the jurisdictional responsibilities of the agencies involved and as designated in their airport/ community mutual aid agreement.

4.2 Emergency Response Preplanning.

4.1 2 .1

All ARFF vehicles in use at the airport should be able to meet the provisions of NFPA 414 upon acceptance from the manufacturer and should be maintained in a manner to ensure such levels of performance. Special training should be provided to enhance the skills of all vehicle operators, as their performance is critical to successful vehicle utilization, particularly under unfavorable conditions. ARFF drivers should actually drive all service roads and be familiar with any gates.

4.1 2 .2*

Operators assigned to each ARFF vehicle should make trial runs to all areas of the airport in all weather conditions during which flight operations take place. Particular emphasis should be placed on the ability to respond to the critical rescue and firefighting access area as this is where most accidents occur. These runs will demonstrate each vehicle's operational capability and the time required to reach each site. Because many aircraft accidents occur in the overrun areas of the runways, it is important to provide suitable routes for use by the vehicles to enable them to reach these areas. Bridges spanning gullies, streams, ditches, cattle grids, or other ground surface appurtenances should be capable of supporting at least 120 percent of the weight of the heaviest emergency vehicle.

4.1 2 .2.1

Some airports have installed Engineered Material Arresting Systems (EMAS) at runway ends. These passive systems are designed to bring overrunning aircraft to a safe stop.

4.1 2 .2.2

ARFF equipment can safely traverse these installations, but ARFF crews should be advised regarding specific maneuverability precautions and evacuation issues. *(See 9.4.3.1.)*

4.1 2 .3

Where construction work of any kind is likely to affect the response capability or operational performance of the ARFF service, prior notification of the work should be provided so that amendments can be made to operational procedures to overcome or minimize their effect. This is particularly important where work on airport water mains is likely to close down one or more fire hydrants.

4.1 2 .4

In order to provide multivehicle access to the accident site, service roads should be constructed so that one vehicle cannot block ingress or egress for other emergency vehicles. This can be accomplished by providing roads of sufficient width or suitable passing and turnaround areas. An access for service roads should also be strategically placed and maintained near the ends of runways, or key taxiways that will allow ARFF crews all-weather access. Where gates are secured using locks, all airport gates should be capable of being opened using the same key. Where remotely controlled, the operation should be provided from each ARFF vehicle.

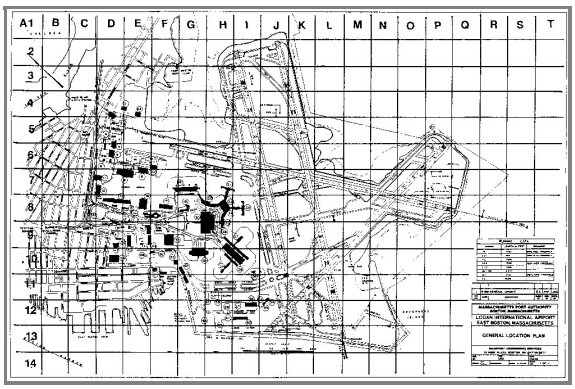
4.1 2 .5

Gates should be located at strategic locations to allow rapid access by ARFF vehicles to areas outside the airport boundary. Keys to gate locks should be carried on each authorized emergency vehicle, and by airport security personnel and designated local emergency services.

4.1 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 4.1.6, 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 4.1 2 .6 Typical Airport Grid Map.



4.1 2 .7

Backup systems should be provided in airport fire stations to allow for the rapid operation of vehicle bay doors, for the efficient reception/transmission of vital communications, and for the provision of emergency lighting.

4.1 2 .8

A communication system from the airport to community or regional emergency services should be provided. The reliability of the system should be tested daily.

4.1 2 .9

Any off-airport emergency services authorized to respond to an on-airport incident should pre-incident plan access to the various areas of the airport, particularly the designated staging areas. Personnel should also be trained in the special procedures to be followed once at the airport.

4.1 2 .10

Sufficient ARFF vehicles, personnel, and equipment should be provided to meet the required level of protection as specified in NFPA 403 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), all incoming and departing aircraft carriers should be notified of the change in ARFF capability.

4.1 2 .11

It is important that pre-incident planning includes response of additional pumping vehicles, ladder trucks, elevated platform vehicles, portable lighting equipment, hoisting and lifting equipment, medical supplies, and any other available specialized equipment or vehicle for which a requirement is anticipated. It is extremely important that the pre-incident plan also ensures the immediate availability of the special vehicles and equipment, provision for qualified driver/operators, and especially the availability of an approving authority on an around-the-clock basis.

4.2 3 Airport Firefighter Basic Knowledge.

4.2 3 .1

To assure that airport firefighters have a suitable degree of skill, basic training should be provided in accordance with NFPA 1003.

4.2 3 .2

Comprehensive, continuous in-service training in accordance with NFPA 405 should be provided to maintain each firefighter's proficiency. For further information on training subjects, see the references listed in Chapter 2 and Annex K.

4.2 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)

4.2 3 .4

Airports are large commercial complexes that contain many potential life and fire hazards. These hazards vary relative to aircraft operations, time of day, weather conditions, construction, or a combination of these factors. It is, therefore, vital that ARFF personnel become extensively knowledgeable about the airport and any changes that could adversely affect immediate response or the efficient performance of their rescue and firefighting responsibilities. Minimum requirements should include knowledge of all of the following:

(1) Water supply locations (hydrants)

(2) Runway identifications and locations

(3) Taxiway identifications and locations

(4) Airport lighting systems

(5) Most effective response routes and alternatives

(6) Fuel handling and storage areas

(7) Key airport locations

(8) Airport service roads

(9) Gates and fences

(10) Airport drainage systems

4.3 4 Communications.

4.3 4 .1

All airport emergency vehicles should be provided with multi-channel two-way radios operating on the airport's assigned ground control frequency and other airport emergency frequencies.

4.3 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.

4.3 4 .3

At an aircraft accident site, power megaphones can be valuable tools to coordinate flight deck crew/ARFF activities, direct evacuating aircraft occupants to safe locations, and so forth.

4.3 4 .4

Portable radios can be utilized at an accident site to communicate with the command post, airport emergency dispatcher, airport management, arriving back-up units, and so forth. Where personnel and vehicles from more than one agency will operate in mutual support, common radio frequencies or other interoperable solutions should be available. If common frequencies or other interoperable solutions are not used, pre-incident planning procedures should be established so that portable radios can be exchanged, the use of messengers employed, or methods of relaying messages through the command post utilized. When portable radios are exchanged, consideration should be given to avoiding channel saturation and the maintenance of communication discipline.

4.3 4 .5

Experience from recent accidents has shown that the use of automated voice notification systems greatly facilitates emergency response/mutual aid notification.

4.3 4 .6

The use of cellular telephones in ambulances, in supervisory vehicles, and in command post vehicles can provide significant benefits in command and control functions.

4.4 5 Mutual Aid Considerations.

4.4 5 .1

It is essential to have mutual firefighting assistance agreements with community and regional off-airport fire departments. Successful rescue operations and handling of aircraft accident fires both on and off the airport depend on pre-incident planning the effective use of mutual aid *(see also Annex D)*. The following considerations are significant:

(1) Special attention should be given to ensuring compatibility in equipment designs (e.g., fire hose threads, communications equipment) and to fire control operational techniques.

(2) It is important to familiarize structural fire department personnel with the special problems relating to aircraft rescue and firefighting, including methods of access to aircraft operating areas and how to operate vehicles while at the airport.

4.4 5 .2

Airport orientation visits should be arranged by fire departments bordering airports for consultations with the airport fire department, airlines, the military services, and others as appropriate. Their training in airport/aircraft familiarization should include those items listed in 4.2.3 and 4.2.4, and grid maps of the airport and surrounding area.

4.4 5 .3

Structural firefighting vehicles normally carry small amounts of water compared to the amounts usually carried on major airport ARFF vehicles. However, they can be useful in relaying water from hydrants, reservoirs, or other sources to maintain ARFF vehicle supplies.

4.4 5 .4

Structural firefighters can be utilized to provide assistance to airport ARFF personnel by handling hose lines, operating tools and equipment, assisting in rescue operations, and protecting exposures.

Statement of Problem and Substantiation for Public Input

Section 4.1 was inadvertently deleted in the transfer to TerraView. This proposal adds 4.1 back into the document and adjusts the section numbers correspondingly.

Submitter Information Verification

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Committee Statement

Resolution: FR-3-NFPA 440-2021

Statement: Section 4.1 was inadvertently deleted in the transfer to TerraView. This revision adds that text back into the document and adjusts the section numbers correspondingly.

It is important to identify the specific type of emergency backup power to be installed. A level 1 system allows for critical operations that require power to be accounted for. This language will provide guidance to airport personnel when selecting and installing backup

systems. (CHANGE TO EXISTING 4.1.7)

As new aircraft technologies are being developed it is important that the ARFF community understand the need to be aware and maintain knowledge of these new technologies and proper emergency response. These technologies can include, new construction materials, hydrogen power, electric power, and hybrid fuel configurations. (CHANGE TO EXISTING 4.2.3)

It is important for ARFF personnel to have an understanding of the types and capabilities of fire protection systems within aircraft hangars. This could also apply to new technologies and alternative energy sources, as these items have fire protection system requirements that may differ from what is currently installed within a hangar space. (CHANGE TO EXISTING 4.2.4)

Public Input No. 11-NFPA 440-2020 [Section No. 4.1.7]

4.1.7

Backup systems meeting the Level 1 requirements of, and installed in accordance with NFPA 111, should be provided in airport fire stations to allow for the rapid operation of vehicle bay doors, for the efficient reception/transmission of vital communications, and for the provision of emergency lighting.

Statement of Problem and Substantiation for Public Input

It is important to identify the specific type of emergency backup power to be installed. A level 1 system allows for critical operations that require power to be accounted for. This language will provide guidance to airport personnel when selecting and installing backup systems.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 39-NFPA 440-2020 [Section No. 2.2]	

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It is important to identify the specific type of emergency backup power to be installed. A level 1 system allows for critical operations that require power to be accounted for. This language will provide guidance to airport personnel when selecting and installing backup systems. (CHANGE TO EXISTING 4.1.7)

As new aircraft technologies are being developed it is important that the ARFF community understand the need to be aware and maintain knowledge of these new technologies and proper emergency response. These technologies can include, new construction materials, hydrogen power, electric power, and hybrid fuel configurations. (CHANGE TO EXISTING 4.2.3)

It is important for ARFF personnel to have an understanding of the types and capabilities

of fire protection systems within aircraft hangars. This could also apply to new technologies and alternative energy sources, as these items have fire protection system requirements that may differ from what is currently installed within a hangar space. (CHANGE TO EXISTING 4.2.4)

Public Input No. 12-NFPA 440-2020 [Section No. 4.2.3]

4.2.3

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)

(11) Use and application of new and emerging technologies for aircraft and alternative energy sources

Statement of Problem and Substantiation for Public Input

As new aircraft technologies are being developed it is important that the ARFF community understand the need to be aware and maintain knowledge of these new technologies and proper emergency response. These technologies can include, new construction materials, hydrogen power, electric power, and hybrid fuel configurations.

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Statement: Section 4.1 was inadvertently deleted in the transfer to TerraView. This revision adds that text back into the document and adjusts the section numbers correspondingly.

It is important to identify the specific type of emergency backup power to be installed. A level 1 system allows for critical operations that require power to be accounted for. This language will provide guidance to airport personnel when selecting and installing backup systems. (CHANGE TO EXISTING 4.1.7)

As new aircraft technologies are being developed it is important that the ARFF community understand the need to be aware and maintain knowledge of these new technologies and proper emergency response. These technologies can include, new construction materials, hydrogen power, electric power, and hybrid fuel configurations. (CHANGE TO EXISTING 4.2.3)

It is important for ARFF personnel to have an understanding of the types and capabilities of fire protection systems within aircraft hangars. This could also apply to new technologies and alternative energy sources, as these items have fire protection system requirements that may differ from what is currently installed within a hangar space. (CHANGE TO EXISTING 4.2.4)

Public Input No. 13-NFPA 440-2020 [Section No. 4.2.4]

4.2.4

Airports are large commercial complexes that contain many potential life and fire hazards. These hazards vary relative to aircraft operations, time of day, weather conditions, construction, or a combination of these factors. It is, therefore, vital that ARFF personnel become extensively knowledgeable about the airport and any changes that could adversely affect immediate response or the efficient performance of their rescue and firefighting responsibilities. Minimum requirements should include knowledge of all of the following:

(1) Water supply locations (hydrants)

(2) Runway identifications and locations

(3) Taxiway identifications and locations

(4) Airport lighting systems

(5) Most effective response routes and alternatives

(6) Fuel handling and storage areas

(7) Key airport locations

(8) Airport service roads

(9) Gates and fences

(10) Airport drainage systems

(11) Fire protection systems and components within airport hangars and facilities

Statement of Problem and Substantiation for Public Input

It is important for ARFF personnel to have an understanding of the types and capabilities of fire protection systems within aircraft hangars. This could also apply to new technologies and alternative energy sources, as these items have fire protection system requirements that may differ from what is currently installed within a hangar space.

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Statement: Section 4.1 was inadvertently deleted in the transfer to TerraView. This revision adds that text back into the document and adjusts the section numbers correspondingly.

It is important to identify the specific type of emergency backup power to be installed. A level 1 system allows for critical operations that require power to be accounted for. This language will provide guidance to airport personnel when selecting and installing backup systems. (CHANGE TO EXISTING 4.1.7)

As new aircraft technologies are being developed it is important that the ARFF community understand the need to be aware and maintain knowledge of these new technologies and proper emergency response. These technologies can include, new construction materials, hydrogen power, electric power, and hybrid fuel configurations. (CHANGE TO EXISTING 4.2.3)

It is important for ARFF personnel to have an understanding of the types and capabilities of fire protection systems within aircraft hangars. This could also apply to new technologies and alternative energy sources, as these items have fire protection system requirements that may differ from what is currently installed within a hangar space. (CHANGE TO EXISTING 4.2.4)

Public Input No. 14-NFPA 440-2020 [Section No. 5.1.1]

5.1.1

The flight deck crew, flight attendants, and ARFF personnel should have the skills to deal with aircraft emergencies and should be familiar with each others' responsibilities to ensure that all their efforts are clearly directed toward the common goals of life ~~and~~ safety and fire ~~safety~~ protection .

Statement of Problem and Substantiation for Public Input

Minor change to wording for easier reading.

Submitter Information Verification

Submitter Full Name: Aaron Johnson
Organization: Rural/Metro Corporation
Affiliation: NFPA 440 Task Group
Street Address:
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Submittal Date: Mon Nov 09 12:28:59 EST 2020
Committee: AIR-AAA

Committee Statement

Resolution: FR-6-NFPA 440-2021
Statement: Minor change to wording for easier reading.

Public Input No. 15-NFPA 440-2020 [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 and flight attendants are responsible 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.

(2) 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.

(3) In some cases, evacuation and passenger-assisted rescues might have already commenced prior to the arrival of ARFF crews. Extra care should be taken by ARFF operators in order to avoid causing further injury or death to evacuating personnel.

Statement of Problem and Substantiation for Public Input

Additional language serve as reminder to ARFF personnel to be aware of personnel on the ground that may be disoriented, or possible running in the direction of the ARFF apparatus and lights.

Submitter Information Verification

Submitter Full Name: Aaron Johnson
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Submittal Date: Mon Nov 09 12:42:07 EST 2020
Committee: AIR-AAA

Committee Statement

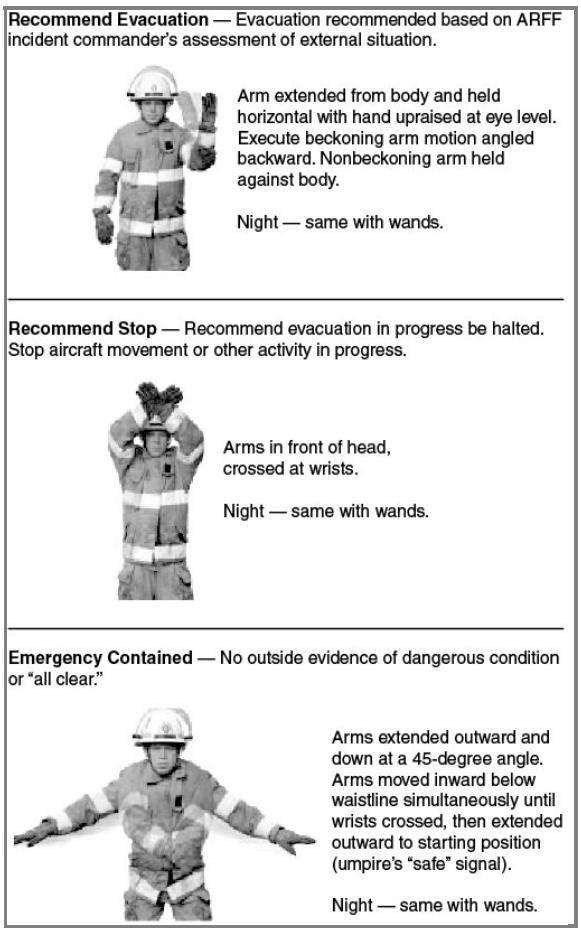
Resolution: FR-7-NFPA 440-2021
Statement: Additional language serve as reminder to ARFF personnel to be aware of personnel on the ground that may be disoriented, or possible running in the direction of the ARFF apparatus and lights.

Public Input No. 16-NFPA 440-2020 [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 (pilot's left) 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 firefighters 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 firefighters from other positions.)~~

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



Helicopters and aircraft with different seating configurations may require communication from the other side of the aircraft.

Statement of Problem and Substantiation for Public Input

The task group had multiple conversations with airline pilots, airport and pilot associations, and fire service agencies. These conversations revealed a complete lack of knowledge of hand signals, no standardization of these signals, and no training that is currently being done to create a standardized system. This proposal removes the hand signals as they should not be relied upon in the case of an emergency.

Submitter Information Verification

Submitter Full Name: Aaron Johnson
Organization: Rural/Metro Corporation
Affiliation: NFPA 440 Task Group
Street Address:
City:
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Submittal Date: Mon Nov 09 12:51:17 EST 2020
Committee: AIR-AAA

Committee Statement

Resolution: FR-4-NFPA 440-2021
Statement: The task group had multiple conversations with airline pilots, airport and pilot associations, and fire service agencies. These conversations revealed a complete lack of knowledge of hand signals, no standardization of these signals, and no training that is currently being done to create a standardized system. This proposal removes the hand signals as they should not be relied upon in the case of an emergency.

Public Input No. 38-NFPA 440-2020 [Section No. 7.1.1]

7.1.1

The primary hazard associated with aircraft accidents is that liquid fuels are likely to be released and ignited during the accident sequence. A secondary hazard is that fuels released but not ignited could subsequently be ignited prior to or during the egress of occupants. In addition, fires can occur involving combustible materials such as interior furnishings, stored goods, and aircraft system components. Further complications could result if the aircraft comes to rest in such an attitude that forcible fuselage entry or shoring for stabilization might be required. (see also 'new annex section' for information related to electrical and hydrogen powered aircraft hazards]

Statement of Problem and Substantiation for Public Input

Adds direction and points the user to the information resource in the new proposed annex section. This information pertains to specific hazards associated with electrical and hydrogen powered aircraft.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 35-NFPA 440-2020 [New Section after K.4]	section 7.1.1 points to this new section

Submitter Information Verification

Submitter Full Name: Aaron Johnson
Organization: Rural/Metro Corporation
Affiliation: NFPA 440 Task Group
Street Address:
City:
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Submittal Date: Wed Nov 11 08:52:25 EST 2020
Committee: AIR-AAA

Committee Statement

Resolution: FR-12-NFPA 440-2021
Statement: Adds direction and points the user to the information resource in the new proposed annex section. This information pertains to specific hazards associated with electrical and hydrogen powered aircraft.

Public Input No. 17-NFPA 440-2020 [New Section after 7.4.3]

7.4.3.1

Vehicles should be positioned in a manner which would allow optimal application of extinguishing agents and deployment of handlines. Consideration should be given to allow the apparatus operator to apply foam to the maximum amount of surface area around and under the aircraft in a minimum amount of time. Additional consideration should be given to the rapid deployment of handlines around, and into the aircraft.

Statement of Problem and Substantiation for Public Input

Provides additional direction and consideration to ARFF operators in regards to best positioning of apparatus.

Submitter Information Verification

Submitter Full Name: Aaron Johnson
Organization: Rural/Metro Corporation
Affiliation: NFPA 440 Task Group
Street Address:
City:
State:
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Submittal Date: Mon Nov 09 12:57:19 EST 2020
Committee: AIR-AAA

Committee Statement

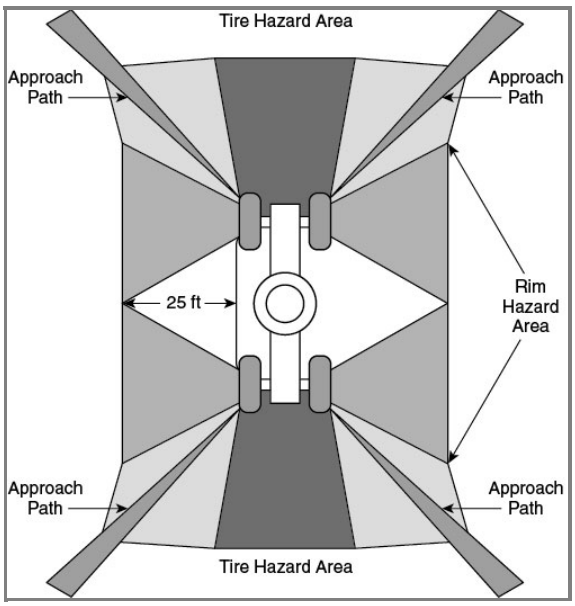
Resolution: FR-13-NFPA 440-2021
Statement: Provides additional direction and consideration to ARFF operators with regards to best positioning of apparatus and places all related text in the same section.

Public Input No. 6-NFPA 440-2020 [Section No. 7.5.5]

7.5.5

An aircraft undercarriage fire creates a potential for aircraft collapse or explosive disintegration of affected components from wheel assemblies. Personnel should not cross the possible fragmentation area, which covers a 45-degree angle from the side of the wheel assemblies to a distance of at least 90 m (289 ft), as shown in Figure 7.5.5.

Figure 7.5.5 Wheel Fragmentation Area.



Statement of Problem and Substantiation for Public Input

Definition change, makes it clear you are talking about an aircraft.

Submitter Information Verification

Submitter Full Name: Stephen Listerman
Organization: Cincinnati/Northern Kentucky I
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 04 10:21:37 EDT 2020
Committee: AIR-AAA

Committee Statement

Resolution: FR-50-NFPA 440-2021
Statement: This change is being made to provide further clarification as undercarriage could mean vehicles or aircraft, defines this as it is related to an aircraft undercarriage.

Public Input No. 22-NFPA 440-2020 [Section No. 7.5.11.1]

7.5.11.1

A size-up ~~(risk assessment)~~ of whether or not composite materials are involved with the accident/incident should be undertaken, and the appropriate level of personnel protection for site management should be 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) Whether there is a fire or immediate risk of fire

Statement of Problem and Substantiation for Public Input

Removes the term "(risk assessment)", but retains the term "size-up". Size-up is the common terminology used by the fire service to convey what is intended in this code. Risk assessment is more broad and could imply a number of assessment type of tools. Additionally, it is not necessary to include multiple terms for the same function.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 21-NFPA 440-2020 [Section No. 10.5]	same substantiation for proposal

Submitter Information Verification

Submitter Full Name: Aaron Johnson
Organization: Rural/Metro Corporation
Affiliation: NFPA 440 Task Group
Street Address:
City:
State:
Zip:
Submittal Date: Mon Nov 09 13:34:01 EST 2020
Committee: AIR-AAA

Committee Statement

Resolution: FR-15-NFPA 440-2021

Statement: Removes the term "(risk assessment)", but retains the term "size-up". Size-up is the common terminology used by the fire service to convey what is intended in this code. Risk assessment is more broad and could imply a number of assessment type of tools. Additionally, it is not necessary to include multiple terms for the same function.

Public Input No. 36-NFPA 440-2020 [New Section after 7.5.11.6.3]

7.5.11.6.4 Suppression tactics.

Water is considered the preferred agent for suppressing lithium-ion battery ?fires. Water has superior cooling capacity, is plentiful (in many areas), and is easy to transport to the seat of the ?re. While water might be the agent of choice, the module/cabinet configuration could make penetration of water difficult for cooling the area of origin, but might still be effective for containment. Water spray has been deemed safe as an agent for use on high-voltage systems. The possibility of current leakage back to the nozzle, and ultimately the firefi?ghter, is insigni?ficant based on testing data published in the Fire Protection Research Foundation report *Best Practices for Emergency Response to Incidents Involving Electric Vehicles Battery Hazards: A Report on Full-Scale Testing Results* . Fire-fi?ghting foams are not considered to be effective for these chemistries because they lack the ability to cool sufficiently and can conduct electricity. There is also some evidence that foams might actually encourage thermal runaway progression by insulating the burning materials and exacerbating heat rise.

Fire-?fighting dry chemical powders can eliminate visible ?flame. However, they also lack the ability to cool burning battery components. Quite often, even if visible ?flame is removed, the thermal runaway inside the battery will continue resulting in reignition. Carbon dioxide and inert gas suppressing agents will also eliminate visible ?flame but will likely not provide sufficient cooling to interrupt the thermal runaway process. ESS with clean agent suppression systems installed have ventilation systems that are tied in with the ?re detection and control panel so that the HVAC shuts down and dampers close to ensure the agents have sufficient hold times at the proper concentration levels to be effective suppressants. In some fi?re suppression systems, the HVAC recirculates and does not shut down and provides a means of dispersing the clean agents. Responders must ensure adequate hold time has occurred prior to accessing battery room/container. Manufacturer recommended times should be made clear. These agents might also reduce ?flammability by suppressing oxygen levels, but data has identified that ?flammable gases will continue to be produced due to the continued heating and could create an environment ripe for ?flashover or backdraft when oxygen is reintroduced into the system. [855:C5.1]

Statement of Problem and Substantiation for Public Input

Provides specific direction and instruction on suppression of lithium-ion battery fires. This is quoted directly from NFPA 855:C5.1.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 37-NFPA 440-2020 [Section No. 2.2]	

Submitter Information Verification

Submitter Full Name: Aaron Johnson
Organization: Rural/Metro Corporation
Affiliation: NFPA 440 Task Group
Street Address:

City:
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Zip:
Submittal Date: Wed Nov 11 08:39:32 EST 2020
Committee: AIR-AAA

Committee Statement

Resolution: FR-16-NFPA 440-2021

Statement: Provides specific direction and instruction on suppression of lithium-ion battery fires. This is extracted directly from NFPA 855:C5.1.

Public Input No. 7-NFPA 440-2020 [Section No. 8.1.4]

8.1.4

The aircraft undercarriage normally consists of a nose wheel and two groups of wheels (or more) situated behind the center of gravity beneath the aircraft. The landing gear incorporates a mechanism to raise and lower the aircraft undercarriage. A shock-absorbing unit (oleo leg), wheels, and braking units are attached to the base of the oleo leg and supporting hydraulic pipe work. It is normal practice for wheels to incorporate a fusible plug that deflates the tire when excessive tire pressures develop. Hazards associated with the aircraft undercarriage are burst tires, hot brakes, ruptured hydraulic piping, and seals contained in the oleo leg rupturing and causing the oleo to drop. Braking units are not normally situated on the nose wheel.

Statement of Problem and Substantiation for Public Input

Definition change, makes it clear you are talking about an aircraft.

Submitter Information Verification

Submitter Full Name: Stephen Listerman
Organization: Cincinnati/Northern Kentucky I
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City:
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Submittal Date: Tue Aug 04 10:23:00 EDT 2020
Committee: AIR-AAA

Committee Statement

Resolution: FR-50-NFPA 440-2021
Statement: This change is being made to provide further clarification as undercarriage could mean vehicles or aircraft, defines this as it is related to an aircraft undercarriage.

Public Input No. 18-NFPA 440-2020 [Section No. 8.2.2]

8.2.2

~~Much of a modern aircraft structure is~~
Modern aircraft are primarily constructed of composite materials, however, many aircraft still in service were constructed of aluminum alloy.

~~It~~
Aluminum alloy is approximately 50 percent lighter than steel, and its normal appearance is light gray or a silvery surface when polished. It is used as sheets for aircraft skin surfaces, as channels for framework, and as plates and castings for bulkheads and fittings. This metal will not contribute to a fire to any significant degree. However, it will melt under the high-temperature conditions found in aircraft fires. As a rule, aluminum will buckle and distort at 400°C (778°F) and decompose, depending on thickness, at 600°C (1138°F).

Statement of Problem and Substantiation for Public Input

Today's modern aircraft are constructed of composite materials, with little to no aluminum alloy being used. This updates the language, removes the word "modern", and provides clarification on use of aircraft materials.

Submitter Information Verification

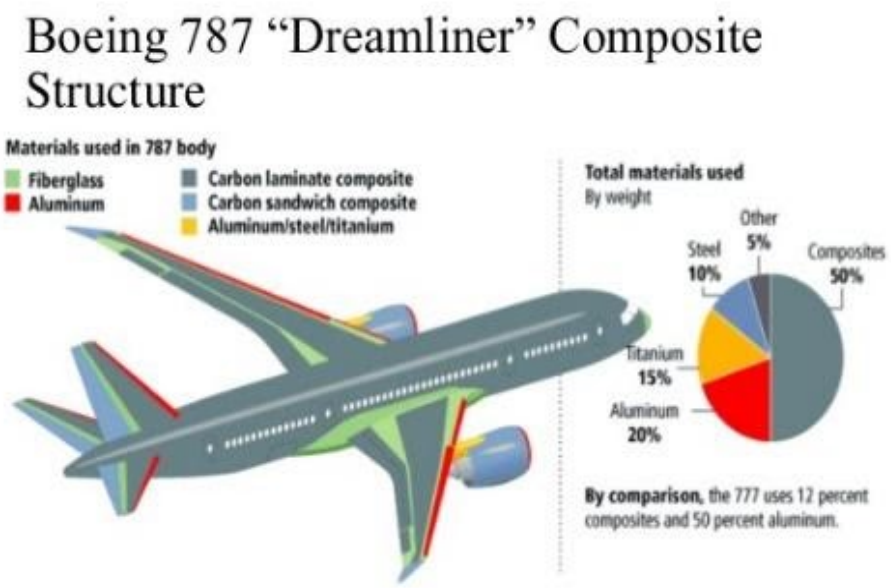
Submitter Full Name: Aaron Johnson
Organization: Rural/Metro Corporation
Affiliation: NFPA 440 Task Group
Street Address:
City:
State:
Zip:
Submittal Date: Mon Nov 09 13:08:28 EST 2020
Committee: AIR-AAA

Committee Statement

Resolution: FR-17-NFPA 440-2021
Statement: Today's modern aircraft are constructed of composite materials, with little to no aluminum alloy being used. This updates the language, removes the word "modern", and provides clarification on use of aircraft materials.

Public Input No. 19-NFPA 440-2020 [Section No. 8.2.6 [Excluding any Sub-Sections]]

To improve the payload/vehicle-weight ratio of aircraft without compromising structural strength, increasing use is being made of composite materials. They are made of small, fine fibers embedded in carbon/epoxy materials. The fibers are usually boron, fiberglass, aramid, or carbon in the form of graphite. Composite fiber plus plastic materials have replaced metal in many aircraft components, such as engine nacelles, flaps, floor panels, struts, undercarriage doors, wing structure, tail plane, and horizontal and vertical stabilizers. Temperature-resistant composites can also be found in engine, tire, and brake components. These materials do not present any unusual fire extinguishment problems. However, when cutting composite materials firefighters should have full body protection, including positive-pressure SCBA or a suitable full-face respirator, to prevent injections from fibers into the skin or ingestion into the respiratory system.



Statement of Problem and Substantiation for Public Input

Add this image, or similar, to demonstrate the use and location of composite materials in modern aircraft construction.

Submitter Information Verification

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Affiliation: NFPA 440 Task Group
Street Address:
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Submittal Date: Mon Nov 09 13:17:43 EST 2020

Committee: AIR-AAA

Committee Statement

Resolution: The committee agrees with including an image here but in order to have an image included there are certain permissions needed to ensure the NFPA has permission to use the submitted image. At the time of the meeting, we did not have that material but the submitter is a committee member and will work to get an image with permissions for submission as a public comment.

Public Input No. 20-NFPA 440-2020 [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.

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	AVTUR	JP-8	37.8°C	246.1°C	0.7–5.3		
	Jet A1	-	-			(100°F)	(475°F)	-
Kerosene (high flash)	JP-5	AVCAT	JP-5	60°C	246.1°C	0.7–5.3		
				-	-	-	(140°F)	(475°F
Kerosene and gasoline mixture	Jet B	AVTAG	JP-4	–23.3°C	248.9°C	1.2–7.6		
				-	-	-	(–10°F)	(480°F
Aviation gasoline	AVGAS	AVGAS	AVGAS	–45.6°C	448.9°C	1.4–7.6		
				-	-	-	(–50°F)	(840°F
Motor gasoline	MOGAS	MOGAS	MOGAS	–45.6°C	448.9°C	1.4–7.6		
				-	-	-	(–50°F)	(840°F

Note: Biofuels are currently being ~~developed for use~~ used in commercial aviation and are generally blended with other fuels. ~~Limited information was available during time of publication~~ See, DOT/FAA/TC-14/22, *Impact of Alternative Fuels Present in Airports on Aircraft Rescue and Firefighting Response* .

Statement of Problem and Substantiation for Public Input

Biofuels are currently being used within the aviation industry. This note points the user to further documentation and research on how ARFF personnel can best respond. Here is a link to the report referenced, https://www.airporttech.tc.faa.gov/Products/Airport-Safety-Papers-Publications/Airport-Safety-Detail/ArtMID/3682/ArticleID/39/Impact-of-Alternative-Fuels-present-in-Airports-on-Aircraft-Rescue-and-Firefighting-Response

Submitter Information Verification

Submitter Full Name: Aaron Johnson
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Submittal Date: Mon Nov 09 13:19:52 EST 2020
Committee: AIR-AAA

Committee Statement

Resolution: FR-18-NFPA 440-2021

Statement: Biofuels are currently being used within the aviation industry. This note points the user to further documentation and research on how ARFF personnel can best respond.

Public Input No. 21-NFPA 440-2020 [Section No. 10.5]

10.5 Size-Up ~~(Risk Assessment)~~ .

10.5.1

The size-~~up (risk assessment) process~~ up process is initiated by first responding ARFF personnel and is carried on throughout the duration of the incident in varying degrees of depth and scope.

10.5.2

The size-~~up (risk assessment) process~~ up process is initiated by the 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.

10.5.3

When an aircraft accident occurs, some size-~~up (risk assessment) information~~ up information in the form of established facts should be immediately known as the result of training, pre-incident planning, knowledge of available resources, and interpretation of alarm information. Additional facts become known through observation during response and upon arrival at the scene.

10.5.4

Vital operational decisions based upon initial size-~~up (risk assessment) information~~ up information should be made without delay. Realistic objectives are critical, and consideration should be given to the capabilities of resources that are immediately available.

10.5.5

Initial assignments of tasks based on the size-~~up (risk assessment) are~~ up are generally not fixed and tend to be modified as the incident develops. The size-~~up (risk assessment) process~~ up process should continue throughout the duration of the incident, and any changes in strategy or objective that develop should be communicated to key personnel involved in the operation.

Statement of Problem and Substantiation for Public Input

Removes the term "(risk assessment)", but retains the term "size-up". Size-up is the common terminology used by the fire service to convey what is intended in this code. Risk assessment is more broad and could imply a number of assessment type of tools. Additionally, it is not necessary to include multiple terms for the same function.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 22-NFPA 440-2020 [Section No. 7.5.11.1]	

Submitter Information Verification

Submitter Full Name: Aaron Johnson
Organization: Rural/Metro Corporation
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Submittal Date: Mon Nov 09 13:29:45 EST 2020
Committee: AIR-AAA

Committee Statement

Resolution: FR-8-NFPA 440-2021

Statement: Removes the term "(risk assessment)", but retains the term "size-up". Size-up is the common terminology used by the fire service to convey what is intended in this code. Risk assessment is more broad and could imply a number of assessment type of tools. Additionally, it is not necessary to include multiple terms for the same function.

Public Input No. 23-NFPA 440-2020 [Section No. 11.2.3]

11.2.3

~~Portable~~ In accordance with NFPA 408, portable fire extinguishers are required to be mounted at specific locations in the cabin of passenger aircraft, and flight deck crews receive periodic training in their use. The extinguishers are designed to handle incipient fires in accessible areas. However, fires can and do originate in locations not readily accessible from the cabin while the aircraft is in flight. If the area involved in fire is isolated and is not equipped with a fixed extinguishing system, a serious fire can develop and spread rapidly.

Statement of Problem and Substantiation for Public Input

Points the user to the related standard. Provides a resource for application. This standard enhances crew and users safety by specifying requirements for the type and size of portable fire extinguishers for all types of aircraft. It also provides requirements for training flight-crew members on extinguishers use in the event of a fire onboard an aircraft.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 40-NFPA 440-2020 [Section No. 2.2]	

Submitter Information Verification

Submitter Full Name: Aaron Johnson
Organization: Rural/Metro Corporation
Affiliation: NFPA 440 Task Group
Street Address:
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Zip:
Submittal Date: Mon Nov 09 13:36:02 EST 2020
Committee: AIR-AAA

Committee Statement

Resolution: FR-19-NFPA 440-2021

Statement: Points the user to the related standard. Provides a resource for application. This standard enhances crew and users safety by specifying requirements for the type and size of portable fire extinguishers for all types of aircraft. It also provides requirements for training flight-crew members on extinguishers use in the event of a fire onboard an aircraft.

Public Input No. 41-NFPA 440-2020 [Section No. 15.3.1]

15.3.1*

The primary responsibility of ARFF personnel is to save lives. Property endangered by aircraft incidents and accidents occurring on or near the airport should be preserved as far as is practical. To achieve this objective, fire control normally is defined as “securing” the area to prevent any re-ignitions. However, there can be aircraft accidents where fire does not occur or where the fire is rapidly extinguished. In every case each action taken is aimed at providing the most immediate attention possible to survivors of the accident, with special emphasis on the initial care, decontamination, and timely transportation of the immediate care (Priority I) victims to the appropriate ~~trauma center~~ hospital facility based upon the local EMS and hospital disaster plans .

Statement of Problem and Substantiation for Public Input

The current verbiage provides unnecessarily and possibly unrealistic guidance on transport destination for victims of an aircraft emergency. Trauma centers are a scarce resource and may not be available nearby or in a timely fashion for many airports, especially those away from urban areas. In addition, in areas that have a trauma center available, it likely cannot accommodate all patients from an aircraft incident, nor is it necessarily medically appropriate for all patients to go to a trauma center. The revised texts puts the emphasis on following the existing EMS/hospital plans for destination decision, which is likely to be different at each airport based upon EMS level of care available, and availability of hospital and trauma resources.

Submitter Information Verification

Submitter Full Name: Christopher Wanka
Organization: Mwaa Fire Rescue Dept
Street Address:
City:
State:
Zip:
Submittal Date: Wed Nov 11 16:45:42 EST 2020
Committee: AIR-AAA

Committee Statement

Resolution: FR-22-NFPA 440-2021

Statement: The current verbiage provides unnecessarily and possibly unrealistic guidance on transport destination for victims of an aircraft emergency. Trauma centers are a scarce resource and may not be available nearby or in a timely fashion for many airports, especially those away from urban areas. In addition, in areas that have a trauma center available, it likely cannot accommodate all patients from an aircraft incident, nor is it necessarily medically appropriate for all patients to go to a trauma center. The revised texts puts the emphasis on following the existing EMS/hospital plans for destination decision, which is likely to be different at each airport based upon EMS level of care available, and availability of hospital and trauma resources.

Public Input No. 42-NFPA 440-2020 [Section No. 15.6.1]

15.6.1

The purpose of medical services is to provide triage, medical care, decontamination, and transportation for accident victims. The optimal goal should be decontamination and transportation of the immediate (Priority I) victim to the appropriate ~~trauma center~~ hospital facility based upon the local EMS and hospital disaster plans .

Statement of Problem and Substantiation for Public Input

The current verbiage provides unnecessarily and possibly unrealistic guidance on transport destination for victims of an aircraft emergency. Trauma centers are a scarce resource and may not be available nearby or in a timely fashion for many airports, especially those away from urban areas. In addition, in areas that have a trauma center available, it likely cannot accommodate all patients from an aircraft incident, nor is it necessarily medically appropriate for all patients to go to a trauma center. The revised texts puts the emphasis on following the existing EMS/hospital plans for destination decision, which is likely to be different at each airport based upon EMS level of care available, and availability of hospital and trauma resources, and local EMS system triage/transportation protocols.

Submitter Information Verification

Submitter Full Name: Christopher Wanka
Organization: Mwaa Fire Rescue Dept
Street Address:
City:
State:
Zip:
Submittal Date: Wed Nov 11 16:50:21 EST 2020
Committee: AIR-AAA

Committee Statement

Resolution: FR-20-NFPA 440-2021

Statement: The current verbiage provides unnecessarily and possibly unrealistic guidance on transport destination for victims of an aircraft emergency. Trauma centers are a scarce resource and may not be available nearby or in a timely fashion for many airports, especially those away from urban areas. In addition, in areas that have a trauma center available, it likely cannot accommodate all patients from an aircraft incident, nor is it necessarily medically appropriate for all patients to go to a trauma center. The revised texts puts the emphasis on following the existing EMS/hospital plans for destination decision, which is likely to be different at each airport based upon EMS level of care available, and availability of hospital and trauma resources, and local EMS system triage/transportation protocols. (Changes made to 15.6.1)

The hospitals that will receive medical patients from an airport emergency should be considered as part of the medical planning process. (Changes made to 15.6.2)

Nothing currently addresses the need to have a plan post-incident for ensuring that the ARFF services can return to their required minimum level of operations after the incident. Equipment and staffing are just two of the many considerations that an ARFF department

needs to consider as part of returning the airport back to one that is protected to their required levels of ARFF service. (New text for 15.6.4)

Many major airports throughout the country (DCA, FLL, LGA, SFO, JFK, BOS, and others) are located near or bordering bodies of water. Many of these airports have already experienced aircraft emergencies involving these bodies of water. It is prudent to require the ARFF department to have the necessary plans and use their own resources and/or coordinate with mutual aid resources to respond to these emergencies and have such plans as a portion of the AEP. (New text for 15.6.5)

Public Input No. 43-NFPA 440-2020 [Section No. 15.6.2]

15.6.2

It is essential that the medical aspects of the AEP be integrated with other local community emergency plans and agreements, and the local hospital facilities .

Statement of Problem and Substantiation for Public Input

The hospitals that will receive medical patients from an airport emergency should be considered as part of the medical planning process

Submitter Information Verification

Submitter Full Name: Christopher Wanka
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Street Address:
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Submittal Date: Wed Nov 11 16:55:41 EST 2020
Committee: AIR-AAA

Committee Statement

Resolution: FR-20-NFPA 440-2021

Statement: The current verbiage provides unnecessarily and possibly unrealistic guidance on transport destination for victims of an aircraft emergency. Trauma centers are a scarce resource and may not be available nearby or in a timely fashion for many airports, especially those away from urban areas. In addition, in areas that have a trauma center available, it likely cannot accommodate all patients from an aircraft incident, nor is it necessarily medically appropriate for all patients to go to a trauma center. The revised texts puts the emphasis on following the existing EMS/hospital plans for destination decision, which is likely to be different at each airport based upon EMS level of care available, and availability of hospital and trauma resources, and local EMS system triage/transportation protocols. (Changes made to 15.6.1)

The hospitals that will receive medical patients from an airport emergency should be considered as part of the medical planning process. (Changes made to 15.6.2)

Nothing currently addresses the need to have a plan post-incident for ensuring that the ARFF services can return to their required minimum level of operations after the incident. Equipment and staffing are just two of the many considerations that an ARFF department needs to consider as part of returning the airport back to one that is protected to their required levels of ARFF service. (New text for 15.6.4)

Many major airports throughout the country (DCA, FLL, LGA, SFO, JFK, BOS, and others) are located near or bordering bodies of water. Many of these airports have already experienced aircraft emergencies involving these bodies of water. It is prudent to require the ARFF department to have the necessary plans and use their own resources and/or coordinate with mutual aid resources to respond to these emergencies and have

such plans as a portion of the AEP. (New text for 15.6.5)

Public Input No. 44-NFPA 440-2020 [New Section after 15.6.3]

TITLE OF NEW CONTENT

ARFF services should have established plans to return to normal level of operations after an on-airport incident. Such plans should address resupply of extinguishing agent, ensuring adequate staffing, and availability for secondary ARFF incidents.

Statement of Problem and Substantiation for Public Input

Nothing currently addresses the need to have a plan post-incident for ensuring that the ARFF services can return to their required minimum level of operations after the incident. Equipment and staffing are just two of the many considerations that an ARFF department needs to consider as part of returning the airport back to one that is protected to their required levels of ARFF service.

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Submittal Date: Wed Nov 11 17:02:53 EST 2020
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Committee Statement

Resolution: FR-20-NFPA 440-2021

Statement: The current verbiage provides unnecessarily and possibly unrealistic guidance on transport destination for victims of an aircraft emergency. Trauma centers are a scarce resource and may not be available nearby or in a timely fashion for many airports, especially those away from urban areas. In addition, in areas that have a trauma center available, it likely cannot accommodate all patients from an aircraft incident, nor is it necessarily medically appropriate for all patients to go to a trauma center. The revised texts puts the emphasis on following the existing EMS/hospital plans for destination decision, which is likely to be different at each airport based upon EMS level of care available, and availability of hospital and trauma resources, and local EMS system triage/transportation protocols. (Changes made to 15.6.1)

The hospitals that will receive medical patients from an airport emergency should be considered as part of the medical planning process. (Changes made to 15.6.2)

Nothing currently addresses the need to have a plan post-incident for ensuring that the ARFF services can return to their required minimum level of operations after the incident. Equipment and staffing are just two of the many considerations that an ARFF department needs to consider as part of returning the airport back to one that is protected to their required levels of ARFF service. (New text for 15.6.4)

Many major airports throughout the country (DCA, FLL, LGA, SFO, JFK, BOS, and others) are located near or bordering bodies of water. Many of these airports have

already experienced aircraft emergencies involving these bodies of water. It is prudent to require the ARFF department to have the necessary plans and use their own resources and/or coordinate with mutual aid resources to respond to these emergencies and have such plans as a portion of the AEP. (New text for 15.6.5)

Public Input No. 45-NFPA 440-2020 [New Section after 15.6.3]

TITLE OF NEW CONTENT

6.3.5

For airports located within close proximity of bodies of water such as oceans, lakes, and rivers, the ARFF agency shall have an appropriate plan and resources prepared for an aircraft incident which occurs in or near these bodies of water. The ARFF agency may choose to have their own water rescue resources, and/or utilize mutual aid resources coordinated through appropriately prepared section of the AEP.

Statement of Problem and Substantiation for Public Input

Many major airports throughout the country (DCA, FLL, LGA, SFO, JFK, BOS, and others) are located near or bordering bodies of water. Many of these airports have already experienced aircraft emergencies involving these bodies of water. It is prudent to require the ARFF department to have the necessary plans, and use their own resources and/or coordinate with mutual aid resources to respond to these emergencies, and have such plans as a portion of the AEP.

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Submittal Date: Wed Nov 11 17:04:26 EST 2020
Committee: AIR-AAA

Committee Statement

Resolution: FR-20-NFPA 440-2021

Statement: The current verbiage provides unnecessarily and possibly unrealistic guidance on transport destination for victims of an aircraft emergency. Trauma centers are a scarce resource and may not be available nearby or in a timely fashion for many airports, especially those away from urban areas. In addition, in areas that have a trauma center available, it likely cannot accommodate all patients from an aircraft incident, nor is it necessarily medically appropriate for all patients to go to a trauma center. The revised texts puts the emphasis on following the existing EMS/hospital plans for destination decision, which is likely to be different at each airport based upon EMS level of care available, and availability of hospital and trauma resources, and local EMS system triage/transportation protocols. (Changes made to 15.6.1)

The hospitals that will receive medical patients from an airport emergency should be considered as part of the medical planning process. (Changes made to 15.6.2)

Nothing currently addresses the need to have a plan post-incident for ensuring that the ARFF services can return to their required minimum level of operations after the incident. Equipment and staffing are just two of the many considerations that an ARFF department

needs to consider as part of returning the airport back to one that is protected to their required levels of ARFF service. (New text for 15.6.4)

Many major airports throughout the country (DCA, FLL, LGA, SFO, JFK, BOS, and others) are located near or bordering bodies of water. Many of these airports have already experienced aircraft emergencies involving these bodies of water. It is prudent to require the ARFF department to have the necessary plans and use their own resources and/or coordinate with mutual aid resources to respond to these emergencies and have such plans as a portion of the AEP. (New text for 15.6.5)

Public Input No. 25-NFPA 440-2020 [Section No. 15.14]

15.14 ~~Civil Defense~~ Emergency Management .

The AEP should be integrated with the local ~~community civil defense emergency~~ comprehensive emergency plan and with local search and rescue teams. Consideration should be given to the role the airport may have as a result of coordination with ~~civil defense~~ emergency management officials and in support of any ~~civil defense emergency plan~~ comprehensive or local emergency plan requirements.

Statement of Problem and Substantiation for Public Input

The terms "civil defense" and "civil defense emergency plan" are no longer widely used. The equivalent in US jurisdictions is an office of emergency management, with a comprehensive emergency plan. This proposal updates the language and terminology to reflect what is currently being used.

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Submittal Date: Mon Nov 09 13:48:07 EST 2020
Committee: AIR-AAA

Committee Statement

Resolution: FR-21-NFPA 440-2021
Statement: The terms "civil defense" and "civil defense emergency plan" are no longer widely used. The equivalent in US jurisdictions is an office of emergency management, with a comprehensive emergency plan. This proposal updates the language and terminology to reflect what is currently being used.

Public Input No. 27-NFPA 440-2020 [Section No. 16.2]

16.2 Action by ATC Services.

16.2.1

ATC services should initiate emergency response by using the alarm communications system. When an alarm is received from any source, or when an accident is observed or there is reason to consider that one is imminent, the Airport ARFF services should be immediately alerted.

16.2.2*

Information on the location of the accident, giving grid-map reference or identifying terrain or landmark features should be immediately provided by ATC services. Initial details should include the type of aircraft. Subsequent information should include details such as the occupants, fuel on board, aircraft operator (if known), and the presence or absence of any dangerous goods, including the type, quantity, and location.

16.2.3

ATC should initially restrict aircraft operations to the degree necessary to prevent expansion of the accident scenario and facilitate emergency response.

16.2.4 –

ATC should immediately establish restricted airspace over the immediate vicinity of the accident to facilitate evacuation of casualties by helicopter and preclude interference with emergency operations by nonemergency flights.

16.2.5

An appropriate NOTAM should be initiated by the airport; for example, “Airport ARFF protection reduced/unavailable until [insert time] or until further notice due to aircraft accident.” (Note that this notice may be automatic if so delineated in the AEP.)

16.2.5 – 6

ATC should confirm that the actions in 16.2.1 through 16.2.4 were completed, utilizing pre-established checklists, indicating notification time(s) and name of the person(s) completing action(s).

~~**16.2.6** –~~

~~ATC should immediately establish restricted airspace over the immediate vicinity of the accident to facilitate evacuation of casualties by helicopter and preclude interference with emergency operations by nonemergency flights.~~

Statement of Problem and Substantiation for Public Input

Adds clarifying language. Re-orders actions into a more logical flow path.

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Submittal Date: Mon Nov 09 14:04:14 EST 2020
Committee: AIR-AAA

Committee Statement

Resolution: FR-23-NFPA 440-2021
Statement: These changes add clarifying language. Re-orders actions into a more logical flow path.

Public Input No. 28-NFPA 440-2020 [Section No. 16.4]

16.4 Action by Police/Security Services.

16.4.1

Traffic flow and site security should be the primary responsibilities of police and security personnel.

16.4.1.1

Police or Security Officer shall send a representative to the ICP to part of the Unified Command Structure

16.4.2

The first security/police officer to arrive should coordinate with the IC and, to the extent possible, immediately establish free traffic lanes on ingress and egress roads for emergency vehicles, initiate security responsibility, and request reinforcements as needed. ~~Traffic flow and site security should be the primary responsibilities of police and security personnel. They~~

16.4.2.1

After consulting with the IC, police and security personnel should initiate traffic control measures in order to aid responding emergency vehicles.

16.4.2.2

Police and security personnel should notify the appropriate communications center of the location of the accident and available means of access and egress. ~~After consulting with the IC, police and security personnel should initiate traffic control measures in order to aid responding emergency vehicles.~~ **They should notify the airport security communications center or the IC (where appropriate) of the location of the accident; access, ingress, and egress roads available; and where responding security personnel should make initial response and recommendations for setting up roadblocks away from the accident site to aid responding emergency vehicles.** ~~Responding police~~

16.4.2.3

Traffic flow and site security should be the primary responsibilities of police and security personnel. Responding police vehicles should not proceed directly to the accident site, but set up appropriate roadblocks at least two to three blocks away, as directed by supervisory authority to prevent road congestion.

16.4.2

Security personnel and police should ~~handle traffic in the vicinity of the accident site,~~ admit only authorized emergency personnel to the scene, keep unauthorized persons away from the accident site, and be responsible for preservation of the accident scene.

16.4.3

~~All unnecessary traffic should be routed away from and around the accident site.~~

~~16.4.4~~

The accident site should be cordoned off as soon as possible to exclude intruders, media, sightseers, onlookers, and souvenir hunters. Appropriate markings should be prominently displayed to advise all persons of possible hazards that could cause serious injury should they encroach on the area.

16.4.~~5~~ 4

Communications between all security checkpoints and the ICP or emergency operations center or both should be established as soon as possible.

16.4.~~6~~ 5

Identifying armbands, site passes, ID tags, or other indication of empowerment should be issued by the authority having jurisdiction (AHJ) and monitored by the security services.

16.4.~~7~~ 6

Special security provisions should be instituted for the protection of the flight crew, flight data recorders and cockpit voice recorders, any official post involved, and any dangerous goods that could be present.

16.4.~~8~~ 7

Responding emergency units should meet with authorized persons at the staging area for escort to the accident site.

Statement of Problem and Substantiation for Public Input

Most of the original text is preserved. However, it has been rearranged to be more readable, and better able to follow, and eliminate redundancy in the language. It has also been positioned to more appropriately place emphasis on the responsibility of police/security to control traffic and scene access.

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Committee: AIR-AAA

Committee Statement

Resolution: FR-24-NFPA 440-2021
Statement: Most of the original text is preserved. However, it has been rearranged to be more readable, and better able to follow, and eliminate redundancy in the language. It has also been positioned to more appropriately place emphasis on the responsibility of police/security to control traffic and scene access.

Public Input No. 29-NFPA 440-2020 [Section No. 16.5]

16.5 Action by Airport Operator.

16.5.1

The airport operator representative should respond to the accident site and, as needed, set up an easily identifiable mobile command post. The mobile command post should be adequately staffed by senior representatives who are able to make decisions involving the following types of operations:

(1) Airport

(2) Security

(3) Medical

(4) Aircraft

(5) Aircraft recovery

(6) Aircraft fueling

16.5. 1.1

The Emergency Operations Command Post shall be established as needed. This post can be mobile, or a predesignated location based on the location of the incidents. Representatives from the following entities may include:

(1) **Airport Administration**

(2) **Airline involved**

(3) **ARFF**

(4) **Airfield Operations**

(5) **Police**

(6) **Terminal Operations**

(7) **Emergency Medical**

(8) **Emergency Management**

(9) **Environmental services**

(10) **Health and Safety**

(11) **Airport PIO**

(12) **TSA or equivalent**

(13) **ATC**

(14) **Political Leaders**

(15) **FBO**

(16) **Regional Political Authority.**

16.5.1. 2

The emergency operations center should remain open and operational throughout the duration of the incident, and until such time as determined by the airport operator.

16.5.2

The airport operator should commence pre-established checklist procedures that verify the following:

(1) The airport emergency operations center has been activated.

(2) Mutual aid police procedures have been initiated and secondary notification calls have been made.

(3) Medical and ambulance services have been alerted and their arrivals verified at the designated rendezvous point or staging area.

(4) Mutual aid fire departments have been notified and escort has been provided for their access to the accident site.

(5) The affected aircraft operator has been notified and information obtained on any dangerous goods or hazardous materials on board the aircraft, such as explosive substances, flammable gases and liquids, combustible solids, oxidizing substances, poisonous substances, radioactive materials, or corrosives; and on the total number of occupants (passengers, crew, non-revenue-generating passengers, infants).

(6) Liaison has been established with ATC services concerning the closure of airport areas, designation of emergency response corridors, and issuing of voice advisories and NOTAM advising as to the status of airport ARFF protection.

(7) Government aircraft accident investigation authorities, such as the National Transportation Safety Board (NTSB), have been notified. (If military aircraft is involved, the appropriate military organization should be notified.)

(8) The meteorological department has been notified to make a special weather observation.

(9) Arrangements have been made for the affected runway to be surveyed immediately by the appropriate personnel to identify the location of crash debris and to ensure that the debris be secured pending release by investigating agencies.

(10) Airspace reservation coordination offices (Air Traffic Flow Control Office), if any, have been advised of airport capabilities.

(11) Medical Examiner's/Coroner's Office has been notified to assist with fatalities, if necessary.

(12) Mortuary annex facilities have been identified and designated.

16.5.3

In conjunction with mutual aid police, the airport operator should carry out the following:

(1) Designate rendezvous points and pre-established staging areas for the inner and outer perimeters

(2) Assign security personnel at the staging area or rendezvous point or both to escort vehicles to ensure the orderly flow of emergency personnel to the accident site, particularly the provision of escort for ambulances responding to the rendezvous point and from the staging area

(3) Assign parking areas for escort vehicles and ambulances, giving consideration to the need for rapid deployment when dispatched

(4) ~~Prophylactic (preventative) medical treatment for all personnel engaged in response, investigation, and recovery~~

(5) Protective clothing for those involved in investigation and recovery

16.5.4

The airport operator also should, to the extent possible, arrange to have available the following services as could be required:

(1) Portable emergency shelter for use by other than medical services

(2) Lavatories

(3) Drinking water

(4) Ropes, barriers, and so forth

(5) Food service

(6) Mobile or portable lighting

(7) Portable heating system

(8) Cones, stakes, flags, and signs

(9) Machinery, heavy equipment, and extraction tools

(10) Communications equipment such as megaphones, portable telephones, and so forth

(11) Fuel removal equipment

16.5.5

The airport operator should provide the initial briefing for their airport PIO. The airport operator should then coordinate, as appropriate, with the PIOs of all agencies involved to provide the following:

(1) A joint information center (JIC)

(2) Media releases for the various media officers from the agencies involved

(3) Briefings and statements that will be released to the media

16.5.6

Upon concurrence of the chief fire officer, police/security chief, and the medical group supervisor, the airport operator's IC should notify all participating mutual aid organizations of termination of the airport emergency. Note that this notification might not terminate all actions and responsibilities of participating agencies.

16.5.7

The aircraft operator representative should make arrangements for bus transportation from the accident site to the designated traumatized holding area. ~~Transportation of the walking wounded from the scene should be permitted only after consultation with the medical group supervisor.~~ Passengers should be under medical supervision while awaiting transportation, during transport, and at the receiving processing site.

Statement of Problem and Substantiation for Public Input

Adds additional information for airport operators responsibility to establish and maintain a functional EOC during an incident. Clarifies requirements, duties, and responsibilities of airport operator. Moves medical direction from airport operators responsibility to medical services responsibility.

Submitter Information Verification

Submitter Full Name: Aaron Johnson
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Submittal Date: Mon Nov 09 14:36:12 EST 2020
Committee: AIR-AAA

Committee Statement

Resolution: FR-25-NFPA 440-2021

Statement: These changes add additional information for airport operators responsibility to establish and maintain a functional EOC during an incident. Clarifies requirements, duties, and responsibilities of airport operator. Moves medical direction from airport operators responsibility to medical services responsibility.

Public Input No. 30-NFPA 440-2020 [Section No. 16.6]

16.6 Action by Emergency Medical Services.

The medical group supervisor should coordinate with the medical transportation officer and medical services to perform the following actions:

(1) Verify that mutual aid medical and ambulance services have been alerted and their subsequent arrival at the rendezvous point or staging area, and that a medical communication network is established

(2) EMS representative should be available at, or to, the emergency operations center or incident command post.

(3) **Prophylactic (preventative) medical treatment for all personnel engaged in response, investigation, and recovery**

(4) Determine the necessity for patient decontamination and set up a decon area if required

(5) Organize the necessary action for triage and treatment of the casualties and their eventual evacuation by appropriate means of transportation

(6) Provide control and dispatch of the casualties to the appropriate hospitals by land, sea, or air

(7) Maintain an accurate list of the casualties including names, as available, and their destination for treatment

(8) Coordinate with the airport operator and the aircraft operator concerning the transportation of the apparently uninjured to the designated holding area

(9) Arrange for the restocking of medical supplies, if necessary

(10) Provide medical analysis, and transportation, of the walking wounded or traumatized

Statement of Problem and Substantiation for Public Input

Language establishes need for EMS representation at the EOC or ICP. Adds, medical requirements to medical section, that was pulled from other sections of NFPA 424 (that were not applicable).

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Submittal Date: Mon Nov 09 14:47:45 EST 2020
Committee: AIR-AAA

Committee Statement

Resolution: FR-26-NFPA 440-2021

Statement: Language establishes need for EMS representation at the EOC or ICP. Adds, medical requirements to medical section, that was pulled from other sections of NFPA 424 (that were not applicable).

Public Input No. 31-NFPA 440-2020 [Section No. 16.8]

16.8 Action by Aircraft Operators.

16.8.1

An aircraft operator representative should report to the ICP ~~to~~ , and/or the EOC, to coordinate the aircraft operator activities with the IC.

16.8.2

The aircraft operator representative should provide information regarding occupants and dangerous goods or hazardous materials on the aircraft. These materials include explosive substances, flammable liquids or gases, combustible solids, oxidizing substances, poisonous substances, radioactive materials, and corrosives. Information of this nature should be relayed as soon as possible to the chief fire officer and the medical group supervisor to assist them in determining that the appropriate personal protective equipment (PPE) is utilized and that personnel decontamination assets are deployed if needed.

16.8.3

The aircraft operator staff should proceed to the designated uninjured holding area. The aircraft operator representative at the uninjured holding area should appoint a receptionist, registrars, and welfare coordinators from staff who have been previously trained in these functions.

16.8.4

The aircraft operator representative who is in command of the uninjured holding area should oversee the overall operations by making arrangements for commissary items, clothing, telephone facilities, and additional medical services if required. It may also be advisable to have an aircraft operator representative available to the hospital(s) where the injured are transported to.

16.8.5

The receptionist should meet the transportation vehicles as they arrive from the accident scene and direct the passengers to the registrars' tables where they will be processed. The receptionist also should explain where toilet facilities, telephones, and other amenities are located. However, migration outside the holding area should be prevented until each person transported to the holding area is identified and processed according to the AEP.

16.8.6

The registrar should record the passenger's name on the manifest and determine what reservation requirements are desired; that is, hotel accommodation, air transportation, or other modes of transportation, and so forth, and any persons to be notified of the passenger's physical or mental condition and potential plans. The registrar then should make out an ID tag or sticker and place it on the passenger. When their registration is completed, the registrars should direct passengers to the welfare coordinators.

16.8.7 Welfare Plan.

16.8.7.1

Welfare coordinators and mental health specialists trained in stress management should proceed with the following:

(1) Give support and comfort to relatives and friends of persons on board the aircraft involved with the incident

(2) Register relatives and friends waiting at the airport for information about persons on board

(3) Provide care, comfort, and assistance to the walking injured and uninjured survivors and responding personnel (if required)

(4) Assist in the provision and serving of refreshments to waiting relatives and friends

(5) **Assisting in providing critical incident stress management and care to all involved.**

16.8.7.2

The welfare plan should provide for a suitable location to carry out the functions as well as procedures for alerting and coordinating welfare organizations.

16.8.8

The aircraft operator should provide notification of the aircraft accident to the following:

(1) Health and welfare agencies

(2) Customs, where applicable

(3) Immigration, where applicable

(4) Post office

(5) Environmental protection agencies, where applicable

16.8.9

A senior aircraft operator official should be responsible for the initial notification of relatives and friends at the airport. The aircraft operator should work closely with the hospitals and/or coroner to make notification to friends and/or family on the status of persons involved with the incident.

16.8.10

News releases by aircraft operators should be prepared in conjunction with JIC.

16.8.11*

The aircraft operator is responsible for the removal of the wrecked or disabled aircraft as soon as authorized by the Accident Investigation Board or its designee.

Statement of Problem and Substantiation for Public Input

Added guidance on providing an aircraft operator representative to the EOC and to the receiving hospitals. Also, added consideration for critical incident stress management for first responders.

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Committee: AIR-AAA

Committee Statement

Resolution: FR-27-NFPA 440-2021

Statement: These changes provide added guidance on providing an aircraft operator representative to the EOC and to the receiving hospitals. Also, added consideration for critical incident stress management for first responders.

Public Input No. 26-NFPA 440-2020 [Section No. 16.8.10]

16.8.10

News releases by aircraft operators should be prepared in conjunction with the Joint Information Center (JIC) .

Statement of Problem and Substantiation for Public Input

Abbreviation may not be widely known. Inserts term for reference.

Submitter Information Verification

Submitter Full Name: Aaron Johnson
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Submittal Date: Mon Nov 09 13:57:30 EST 2020
Committee: AIR-AAA

Committee Statement

Resolution: FR-27-NFPA 440-2021
Statement: These changes provide added guidance on providing an aircraft operator representative to the EOC and to the receiving hospitals. Also, added consideration for critical incident stress management for first responders.

Public Input No. 32-NFPA 440-2020 [Section No. 16.9]

16.9 Action by Government Agencies.

The following government agencies could take appropriate action as indicated in their AEP:

(1) Accident Investigation Agency (e.g., NTSB, AAIB, TSB)
(2) National Aviation Administration (e.g., FAA and CAA)
(3) Health and welfare
(4) Post office
(5) Customs
(6) Immigration
(7) Agriculture
(8) National Transportation Security Agency
(9) Military
(10) Meterological agency

Statement of Problem and Substantiation for Public Input

Added consideration for weather and atmospheric expert.

Submitter Information Verification

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Submittal Date: Mon Nov 09 15:04:17 EST 2020
Committee: AIR-AAA

Committee Statement

Resolution: FR-28-NFPA 440-2021
Statement: These changes were made to ensure that the appropriate and applicable government agencies are identified in the AEP, and by removing the list it allows for possible international use since many of the agencies listed were US centric.

Public Input No. 33-NFPA 440-2020 [Section No. 16.10]

16.10 Action by the PIO.

16.10.1

In general, the official authority for news releases concerning an aircraft emergency should be one of the following:

(1) JIC

(2) A PIO designated by the airport operator

(3) A representative of the aircraft operator involved

(4) Upon assumption of jurisdiction, the lead investigative agency

16.10.2

All media personnel should be directed to a designated news media staging area for news media personnel authorized to cover an airport emergency. Selection of staging areas should take into consideration media needs for photography and video transmission. In this area, the following should be provided:

(1) Latest briefing

(2) Communications (telephones)

(3) Transportation service to and from the scene of the emergency, where permissible and where it will not interfere with rescue, medical treatment of casualties, and the accident investigation

16.10.2 – 3

Only members of the news media, freelance reporters, and photographers wearing valid press-news media credentials should be admitted to the briefing area, permitted in the designated news media staging area, or transported to the scene of the emergency.

16.10.3 –

~~In general, the official authority for news releases concerning an aircraft emergency should be one of the following:~~

(1) ~~JIC~~

(2) ~~A PIO designated by the airport operator~~

(3) ~~A representative of the aircraft operator involved~~

(4) ~~Upon assumption of jurisdiction, the lead investigative agency~~

~~16.10.~~ 4

Under no circumstances should the news media or any other personnel not involved in life-saving or firefighting operations be permitted inside security lines until all rescue operations have been completed and the area has been declared safe by the chief fire officer. When establishing security lines, the interests of news coverage should be taken into account insofar as rescue operations permit.

Statement of Problem and Substantiation for Public Input

Rearrange's section into logical sequence. No text deleted, just moved.

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Committee: AIR-AAA

Committee Statement

Resolution: FR-29-NFPA 440-2021
Statement: Rearrange's section into logical sequence. No text deleted, just moved.

Public Input No. 46-NFPA 440-2020 [Chapter 23]

Chapter 23 Emergency Medical Care (NFPA 424)

23.1 Basis of Recommendations.

23.1.1

These recommendations are based on the existence of an established level of emergency medical service that can be expanded into a comprehensive emergency medical system at the scene of an aircraft accident with numerous casualties. *(See Annex J.)*

23.1.2

Responsibilities of the emergency medical system should include all aspects of medical care at the scene of an accident/incident such as triage, treatment, and transportation.

23.2 Emergency Medical Training of Airport Personnel.

23.2.1

ARFF personnel should be trained to the current emergency medical care standards as required by the AHJ.

23.2.2

At a minimum, the subjects that should be covered in a course of instruction to enable airport personnel to function effectively in providing emergency medical services are as follows:

(1) **Define the accepted method of infection control and universal blood and body fluid precautions as prescribed for public safety workers**

(2) ~~. **Demonstrate methods of decontamination, disinfection, and disposal of personal protective equipment (PPE) that has become contaminated .**~~

(3) ~~**Explain or demonstrate the accepted procedures for single-rescuer and two-rescuer cardiopulmonary resuscitation (CPR), including adult, child, and infant procedures**~~

(4) ~~. **Demonstrate management of an obstructed airway for a conscious and an unconscious adult, child, and infant**~~

~~Demonstrate the use of a resuscitation mask in the performance of single-rescuer and two-rescuer CPR~~

(5) ~~**. Strike 5 from the list**~~

(6) ~~**Demonstrate a primary survey for life-threatening injuries**~~

(7) ~~Identify three types of external bleeding and the characteristics of each~~

(8) ~~Demonstrate three approved methods to control external bleeding~~

(9) ~~According to severity, identify characteristics and demonstrate treatment of thermal and chemical burns~~

(10) ~~.~~

(11) ~~**Describe and demonstrate the techniques for managing the following:** -~~

(a) Head injuries

(b) Chest injuries

(c) Fractures

(d) Spinal injuries

(e) External Bleeding

(f) Internal Bleeding

(g) Moving Injured patients

(h) Triage Systems

(I) Treatment of fatalities

(J) Contacting Medical Control or Direction

(5) Describe the symptoms and demonstrate emergency treatment of the following:

(a) Shock

(b) Fainting

(c) Allergies

(d) Convulsions

(e) Heart attack

- ~~Stroke~~
- ~~Identify the symptoms and demonstrate emergency treatment for the following:~~

(1) ~~Ingested poisons~~

(2) ~~Drug overdose~~

- ~~Identify the method of contacting the poison control center that serves the airport~~
- ~~Demonstrate knowledge and skill in performing abdominal thrusts~~
- ~~Demonstrate the correct method of splinting~~
- ~~Demonstrate precautions and procedures for childbirth and care of the newborn~~
- ~~Demonstrate recognition of common medical conditions (e.g., diabetes, pacemaker) that affect medical treatment~~
- ~~Demonstrate approved measures for handling emotionally disturbed persons~~
- ~~Demonstrate techniques for moving the injured~~
- ~~Demonstrate an understanding of the concept of medical triage~~
- ~~Demonstrate an understanding of the treatment of fatalities~~
- ~~Be familiar with the parameters of a simple triage and rapid transport system~~

(f) Stroke

(g) Ingested poisons

(h) Drug overdose

(I) Diabetes

(J) Childbirth and Ob/Gyn

(K) Mental Health Emergencies

23.3 Airport Emergency Medical Supplies and Equipment.

23.3.1

Sufficient medical supplies to treat the capacity of the largest aircraft normally utilizing the airport should be available on or adjacent to the airport. Adequate supplies should be kept on hand to deal with routine medical ~~emergencies, such as, on-the-job injuries, cardiac arrest, and so forth~~ and trauma emergencies .

23.3.2

The type and quantity of such supplies should be determined by the principal medical authority for the airport. Recent incidents have demonstrated that the unique characteristics presented by any given location should be considered when deciding on the type and quantity of supplies to be kept available for major incidents. For instance, extremes in temperatures should be considered and appropriate supplies stockpiled. Geographical conditions, topographical conditions, or both also should be taken into consideration. The type and quantity of all medical supplies stockpiled should be determined by the agency responsible for providing emergency medical service to the airport.

23.3.3

Stretchers, blankets, cervical collars, backboards, and body bags should be located on the airport, preferably on a suitable vehicle (e.g., trailer) that can be transported to the accident site. Blankets are needed to alleviate the victims' exposure to shock and possible adverse weather conditions. The backboards and spine boards should be of a type designed to fit through access ways and aisles of commercial and business aircraft. They should have restraining straps available so the patient can be secured to the board. A cleat should be attached to the underside of the backboard to facilitate lifting by carrying personnel.

23.3.4

Sufficient resuscitation equipment should be available to treat ~~smoke inhalation victims~~ **the cardiac arrest patient . This** ~~equipment should not be used around fuel or fuel-soaked clothing~~ **should include an Automatic External Defibrillator (AED) .**

23.3.5

Consideration should be given to procurement and maintenance of an inventory of equipment used to decontaminate patients (when necessary) prior to transporting them to public medical facilities. Inventory should include showers, cleaning equipment, cleaning solutions, water, and containment for contaminated fluids.

23.4 Airport Medical Service.

23.4.1

Emergency

~~medical service should be readily available to an airport~~

Medical Service is an integral part of the airport services. The primary purpose of emergency medical services is to provide triage, stabilization, and transportation. If medical and ambulance services are not available at the airport, prearrangements with local agencies providing these services should be made .

23.4.1.1

Minimum considerations for level of service should include the following:

(1) Number of passengers served

(2) Number of persons employed at the airport

(3) Industrial activity on airport property

(4) Distance from adequate medical facilities

23.4.1.2

Ideally, each airport should have a properly staffed and equipped first aid room/medical facility on site and, in addition, should arrange for the emergency response of trained medical personnel with the capability to treat serious injuries and transport those injured to proper medical facilities.

23.4.2 –

The ~~primary purpose of emergency medical services is to provide triage, stabilization, and transportation.~~

~~23.4.3~~ –

~~The~~ delivery to the accident site of trained medical personnel capable of treating and transporting injured victims of an aircraft accident is a vital component of the AEP. The AEP should establish and make all necessary legal and financial arrangements, before the accident occurs, and determine who will provide this service. These arrangements include integration with local community plans, mutual agreements, or both.

23.4.4 –

~~Medical and ambulance services can be an integral part of the airport services, particularly the ambulance service that is, in many cases, part of the ARFF service. If medical and ambulance services are not available at the airport, prearrangements with local agencies providing these services should be made.~~

3 –

The AEP should ensure the dispatch of a satisfactory assignment of trauma-trained emergency service medical personnel, equipment, and medical supplies. The AEP should address the location of surrounding medical facilities and the level of service each facility provides.

23.4.5 – 4 –

The AEP should provide for the control of patient transport from the scene to the receiving medical facilities. The AEP's ICS should include a transportation control officer. The responsibilities of this position should include the following:

(1) Communications with medical facilities, the central communications point, or both, for local medical facilities

(2) Overseeing and ensuring effective priority casualty transportation to the appropriate medical facilities

(3) All other aspects of medical transportation

23.4.~~5~~ 4 .1

Patient transportation has proven to be a very demanding and labor-intensive responsibility that requires a minimum of three subordinate positions, including the following:

(1) Transportation control (for routing of ambulances to and from the scene)

(2) Transportation recorder (for documenting all patient movement)

(3) Medical communications (for all communications regarding medical transportation)

23.4.~~5~~ 4 .2

A fourth position, transportation team leader, also should be considered.

23.4.

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4.3

The AEP's ICS should include a transportation control officer. The responsibilities of this position should include the following:

(1) Communications with medical facilities, the central communications point, or both, for local medical facilities

(2) Overseeing and ensuring effective priority casualty transportation to the appropriate medical facilities to include routing of ambulances to and from the scene

(3) Transportation recorder (for documenting all patient movement)

(4) All other aspects of medical transportation

23.4.5

Participating hospitals should have contingency emergency plans to provide for mobilization of necessary medical teams. The availability of qualified personnel and adequate facilities at the hospitals to deal with airport emergency situations is vital. In this respect, it should be mandatory to establish in advance an accurate list of surrounding hospitals classified according to their effective receiving capacity and specialization, for example, neurosurgery or burn treatment.

23.4.~~7~~ 6

The hospital's distance from the airport and its ability to receive helicopters should be considered. Reliable two-way communications should be provided between hospitals and ambulances and helicopters. The alert of an aircraft accident should be made to a single communication controlling medical facility, which then alerts all other facilities according to the local medical communications network. Police escort vehicles and helicopters for medical staff should be provided for in the AEP.

23.5 Immediate Need for Care of Injured in Aircraft Accidents

23.5.1

In the aftermath of an aircraft accident/incident, many lives can be lost and many injuries aggravated if immediate medical attention is not provided by medically trained rescue personnel. Victims should be examined, given available emergency medical aid, and promptly transported to appropriate medical facilities.

23.5.2

Triage is the sorting and classification of casualties to determine the order of priority for treatment and transportation, which is shown in Figure 23.5.2. Triage identification equipment and treatment area tarps should be color coded to identify the severity of injury to victims. Casualties should be classified into the following four categories:

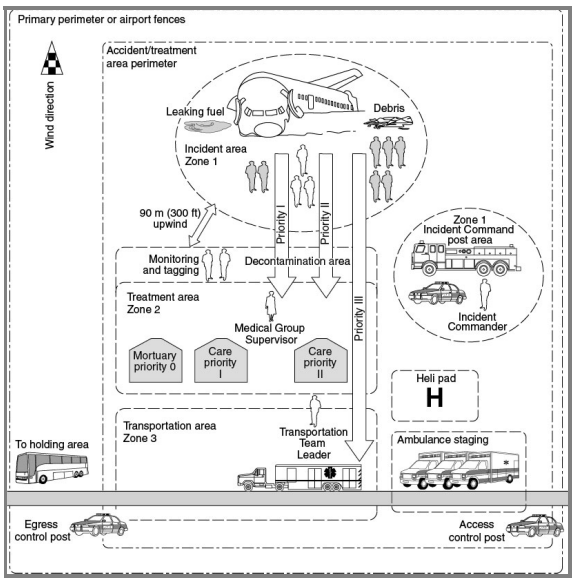
(1) Priority I, immediate care (RED)

(2) Priority II, delayed care (YELLOW)

(3) Priority III, minor care (GREEN)

(4) Priority 0, deceased (BLACK)

Figure 23.5.2 Triage and Medical Care at Aircraft Accident Site.



23.5.3

Triage should begin immediately. Qualified medical personnel should be assigned to this task. Victims are moved from the triage area to the appropriate treatment areas before definitive treatment is rendered. Casualties should be stabilized at the treatment areas and then transported to appropriate facilities. The use of colored tarps or other means to identify treatment areas should be used.

~~23.5.5~~

23.5.4

~~Every effort should be made to ensure that Priority I casualties are treated first and receive immediate ambulance transportation priority once they are stabilized. This procedure should be the responsibility of the immediate care leader.~~

Triage is most efficiently accomplished in place. However, the conditions of an accident scene and wind direction can demand the immediate movement of casualties before triage can be safely accomplished. In that case, the casualties should be moved the shortest distance possible, well away from fire-fighting operations, and upwind and uphill from the scene.

23.5.

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Triage of casualties should include the use of casualty ID tags to aid in the sorting and transportation of the injured to hospitals. This technique is especially suited to multilingual situations.

23. 5.6 **Medical Care of Ambulatory Survivors.** The aircraft operator (where involved), the airport operator, or other predesignated agency selected for the purpose should be available to perform the following:

(1) Select from among the predesignated passenger holding areas designated in the AEP the most suitable area for the particular emergency.

(2) Provide for the transportation of uninjured passengers from the accident site to the designated holding area.

(3) Arrange for emergency medical personnel to examine and treat apparently uninjured passengers.

(4) Interview uninjured passengers and record their names, addresses, and phone numbers, and where they can be reached for the next 72 hours.

(5) Notify relatives or next of kin where deemed necessary.

(6) Coordinate efforts with the designated welfare agency (Red Cross, etc.).

(7) Provide security from unauthorized interference by persons not officially connected with the rescue operation in progress

23.5. 6 .1

Prearrangements should be made for immediate transportation by bus or by other suitable means of the walking wounded and uninjured from the accident site to the designated holding area. This transportation should be implemented automatically following notification of the emergency. Emergency medical personnel should accompany these survivors to the designated holding area. Each and every passenger should be examined for shock and smoke inhalation. Cold or inclement weather can require additional provisions for the passengers' protection and comfort.

23.5.6.2

Occupants evacuating an aircraft might have been barefoot when evacuation slides were used and also might be without proper wearing apparel. Prior planning should recognize this potentiality, and emergency footwear, eyeglasses, clothing, and blankets should be available to remedy this situation. If the aircraft accident occurred in water or in a marshy area, survivors will be wet and uncomfortable. If such a potential exists, it might be necessary to establish a special designated staging area where survivors can be stabilized prior to transporting them to the normal holding area and to preplan provision for blankets and temporary protective clothing to prevent hypothermia.

23.7 Standardized Casualty ID Tags.

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7 .1 _ Need for Standardized Tags.

Casualty identification tags should be standardized through color coding and symbols to make the tags as simple as possible. Tags can help to expedite the treatment of mass casualties in a triage situation and thus permit more rapid evacuation of the injured to medical facilities.

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7 .2 _ Tag Design.

Standardized tags require only minimal information, are usable under adverse weather conditions, and are water resistant. On these tags, numerals and symbols indicating medical priority classify casualties as follows:

(1) *Priority I (Immediate Care).* RED-colored tag; roman numeral I; rabbit symbol

(2) *Priority II (Delayed Care).* YELLOW-colored tag; roman numeral II; turtle symbol

(3) *Priority III (Minor Care).* GREEN-colored tag; roman numeral III; ambulance with X symbol

(4) *Priority 0 (Deceased).* BLACK-colored tag; spaded cross symbol

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7 .3 _

If tags are unavailable, casualties can be classified using **a different method. Red, Yellow, Green, Black ribbon may be used. The ribbon will be secured to the patient. Another method involves using a roman numerals on adhesive tape or by markings made directly on the forehead or on another exposed skin area to indicate priority and treatment needs. If marking pens are unavailable, lipstick can be used. Felt-tipped pens are not advisable as they can smear in rain, snow, and under other climatic and body conditions.**

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8 _ Care Principles.

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8 .1 _

Stabilization of the seriously injured should be accomplished at the accident scene. The immediate transportation of the seriously injured before stabilization should be avoided.

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8 .2 _

In accidents occurring on or adjacent to the airport, ARFF personnel are generally the first emergency personnel on the scene. It is imperative that seriously injured casualties be located and stabilized as quickly as possible. In cases where fire control or prevention does not require the efforts of all ARFF personnel, casualty stabilization should be commenced immediately under the direction of the most qualified trauma-trained individual(s) on the scene. First response rescue vehicles should carry initial supplies of victim-care equipment.

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8 .3

~~The first few minutes of medical treatment usually are aimed at stabilizing the casualties until more qualified medical care is available. When specialized trauma teams arrive, medical care should be more sophisticated.~~

~~23.7.4~~

~~The~~

The triage procedure and subsequent medical care should be placed under the command of one authority, the designated medical group supervisor, upon arrival. Prior to arrival, the command of triage should be assumed by the designee of the IC until relieved by the predesignated medical group supervisor. **The triage procedure should be based on the standard for the region the AHJ is operating in.**

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The medical group supervisor should report directly to the IC and be responsible for all medical aspects of the incident. The primary function should be administrative and to oversee the treatment and transport personnel, and not as a participant of the medical group treating the injured.

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For distinctive and easy identification, the medical group supervisor should wear a standard distinctive uniform. In addition, the AEP should provide for a highly visible vest, or other apparel, with reflective lettering, front and back, that reads, “MEDICAL GROUP SUPERVISOR,” or other appropriate lettering, given the terminology used in the AEP.

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~~7 Care of Priority I~~

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Patient care priority should be administered based on the Triage decision. Priority One or Red Tags should be the first priority. The next priority would be the Priority II or Yellow tags. Priority III or Green tags are cared for after the Red and Yellow patients have been cared for. Patients who are deceased or who have suffered injuries not compatible with life will be Black Tagged. Care of casualties sustaining injuries that do not need emergency medical treatment to sustain life can be delayed until Priority I casualties are stabilized. Transportation of Priority II casualties should be performed following appropriate care given on site.

23.8.7 Care of Priority I "Immediate" (Red) Casualties.

This type of casualty includes, but is not necessarily limited to, the following:

(1) Major hemorrhages

(2) Severe smoke inhalation

(3) Asphyxiating thoracic and cervico-maxillo-facial injuries

(4) Cranial trauma with coma and rapidly progressive shock

(5) Open fractures and compound fractures

(6) Extensive burns (more than 30 percent)

(7) Crush injuries including internal organs

(8) Any type of shock

(9) Spinal cord injuries

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8 .8 _ Care of Priority II "Delayed" (Yellow) Casualties.

This type of casualty includes, but is not necessarily limited to, the following:

(1) Nonasphyxiating thoracic trauma

(2) Closed fractures of the extremities

(3) Limited burns (less than 30 percent)

(4) Cranial trauma without coma or shock

(5) Injuries to soft parts

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Care of casualties sustaining injuries that do not need emergency medical treatment to sustain life can be delayed until Priority I casualties are stabilized. Transportation of Priority II casualties should be performed following appropriate care given on site.

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8 .10 _ Care of Priority III “Minor” (Green) Casualties.

This type of casualty involves minor injuries only. Certain accidents/incidents will occur where passengers have either minor injuries or no injuries, or where they appear to be uninjured. Because this type of casualty can interfere with other priorities and operations, it is important that these passengers be transported away from the accident/incident site to the designated holding area where they can be re-examined.

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~~It is important that provisions be made for Priority III casualty care, comfort, and identification. This service should be provided through the aircraft operator, where involved, airport operations, or international relief organizations (Red Cross, etc.).~~

Specific treatment areas such as an empty hangar, a designated area in a passenger terminal, a fire station, or other available sites of adequate size (hotel, school, etc.) should be predesignated for this purpose. Any such area selected should be equipped with heating or cooling systems, electric light and power, water, and toilet facilities. Adequate telephones should also be available. A number of such preselected sites should be chosen so that when an accident occurs, the most convenient site in regard to travel distance and space needs (number of casualties involved) can be selected. All aircraft operator personnel and airport tenants should know the location of such designated facilities.

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9 _ Control of the Flow of the Injured.

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9 .1 _

The injured should pass through five areas that should be carefully located and easily identified *(see Figure 23.5.2)* . The five areas are as follows:

(1) *Collection Area.* The location where initial collection of the seriously injured from the aircraft or debris is accomplished. The need for the establishment of this area will depend on the type of accident and the circumstances surrounding the accident site. Custody of casualties is normally transferred from fire rescue personnel to medical services at this point.

(2) *Triage Areas.* The triage areas should be located at least 90 m (300 ft) upwind of the accident site if fire and smoke is imminent. If necessary, more than one triage area should be established.

(3) *Decontamination Area* . A location where patients will be processed to remove chemical, etiological, biological, or radioactive matter to prevent contamination of modes of transportation or medical treatment facilities. This process should be conducted by a specifically identified team in a separate area away and downwind from the care area.

(4) *Care Area.* Initially, this will be a single care area only. Subsequently, the care area should be subdivided into three subareas according to the three categories of injured; that is, immediate care (Priority I), delayed care (Priority II), and minor care (Priority III). Care areas can be identified by colored traffic cones, bicycle flags, or colored blankets (red to denote “Immediate”; yellow, “Delayed”; and green, “Minor”).

(5) *Transportation Area.* A transportation area for the recording, dispatching, and evacuation of survivors should be located between the care area and the egress road. Only one transportation area is normally required; however, if there is more than one transportation area it is essential to have communication between them.

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9 .2 _

In remote areas, where transportation to appropriate medical facilities will be delayed, or where climatic conditions dictate, consideration should be given to the provision of mobile quarters for the stabilization and medical treatment of immediate care and delayed care casualties. Ideally, these quarters should be operational upon arrival or in less than one half hour. The design should therefore permit rapid response to the site and rapid activation to receive casualties. *[See 3.3.81 Mobile Emergency Hospital (MEH).]*

23.9

~~Medical Care of Ambulatory Survivors~~

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~~**23.9.1** –~~

~~The aircraft operator (where involved), the airport operator, or other predesignated agency selected for the purpose should be available to perform the following:~~

(1) ~~Select from among the predesignated passenger holding areas designated in the AEP the most suitable area for the particular emergency.~~

(2) ~~Provide for the transportation of uninjured passengers from the accident site to the designated holding area.~~

(3) ~~Arrange for emergency medical personnel to examine and treat apparently uninjured passengers.~~

(4) ~~Interview uninjured passengers and record their names, addresses, and phone numbers, and where they can be reached for the next 72 hours.~~

(5) ~~Notify relatives or next of kin where deemed necessary.~~

(6) ~~Coordinate efforts with the designated welfare agency (Red Cross, etc.).~~

(7) ~~Provide security from unauthorized interference by persons not officially connected with the rescue operation in progress.~~

~~**23.9.2** –~~

~~Prearrangements should be made for immediate transportation by bus or by other suitable means of the walking wounded and uninjured from the accident site to the designated holding area. This transportation should be implemented automatically following notification of the emergency. Emergency medical personnel should accompany these survivors to the designated holding area. Each and every passenger should be examined for shock and smoke inhalation. Cold or inclement weather can require additional provisions for the passengers' protection and comfort.~~

~~**23.9.3** –~~

~~Occupants evacuating an aircraft might have been barefoot when evacuation slides were used and also might be without proper wearing apparel. Prior planning should recognize this potentiality, and emergency footwear, eyeglasses, clothing, and blankets should be available to remedy this situation. If the aircraft accident occurred in water or in a marshy area, survivors will be wet and uncomfortable. If such a potential exists, it might be necessary to establish a special designated staging area where survivors can be stabilized prior to transporting them to the normal holding area and to preplan provision for blankets and temporary protective clothing to prevent hypothermia.~~

3

All areas should be clearly marked and visible to First Responders. This shall be accomplished by the approved standards of the region the AHJ is operating in.

Statement of Problem and Substantiation for Public Input

Rearranges chapter items and sections for better flow and to eliminate redundant language.

Submitter Information Verification

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Submittal Date: Thu Nov 12 11:02:43 EST 2020

Committee: AIR-AAA

Committee Statement

Resolution: FR-30-NFPA 440-2021

Statement: The changes made to this chapter represent changes or updates in commonly accepted and used terms and practices in the United States and internationally.

Public Input No. 5-NFPA 440-2020 [Section No. 23.8.1]

23.8.1

The injured should pass through five areas that should be carefully located and easily identified *(see Figure 23.5.2)*. The five areas are as follows:

(1) *Casualty Collection Area.* The location where initial collection of the seriously injured from the aircraft or debris is accomplished. The need for the establishment of this area will depend on the type of accident and the circumstances surrounding the accident site. Custody of casualties is normally transferred from fire rescue personnel to medical services at this point.

(2) *Triage Areas.* The triage areas should be located at least 90 m (300 ft) upwind of the accident site if fire and smoke is imminent. If necessary, more than one triage area should be established.

(3) *Decontamination Area*. A location where patients will be processed to remove chemical, etiological, biological, or radioactive matter to prevent contamination of modes of transportation or medical treatment facilities. This process should be conducted by a specifically identified team in a separate area away and downwind from the care area.

(4) ~~*Care*~~ *Treatment Area.* Initially, this will be a single care area only. Subsequently, the care area should be subdivided into three subareas according to the three categories of injured; that is, immediate care (Priority I), delayed care (Priority II), and minor care (Priority III). Care areas can be identified by colored traffic cones, bicycle flags, or colored blankets (red to denote “Immediate”; yellow, “Delayed”; and green, “Minor”).

(5) *Transportation Area.* A transportation area for the recording, dispatching, and evacuation of survivors should be located between the care area and the egress road. Only one transportation area is normally required; however, if there is more than one transportation area it is essential to have communication between them.

Statement of Problem and Substantiation for Public Input

More in line with current terms

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Committee: AIR-AAA

Committee Statement

Resolution: FR-30-NFPA 440-2021
Statement: The changes made to this chapter represent changes or updates in commonly accepted and used terms and practices in the United States and internationally.

Public Input No. 34-NFPA 440-2020 [Chapter J]

Annex J Airport Medical Services (NFPA 424)

This annex is not a part of the recommendations of this NFPA document but is included for informational purposes only.

J.1

Medical services and supplies should be available to an airport. Generally, provisions of medical services should not present great difficulties at large airports or airports near a large city, as the personnel and material normally will be available. It is necessary to have coordination between the airport and the emergency medical system in the community.

Provision of medical services can present some difficulties at small airports not located near populated areas. These airports should arrange to have available emergency medical services to provide medical care in the event of an aircraft accident/incident, taking into account the largest aircraft using the airport.

Portable shelters such as mobile hospitals, tents, and recreation vehicles can be used where extremes in climate or weather can affect patient survivability. Consider the use of adjacent buildings such as aircraft hangars, gymnasiums, auditoriums, warehouses, and so forth, if distance and transportation resources are favorable.

ARFF personnel should have the ability to treat injured victims. At least two full-time ARFF members on duty at the airport or other on-airport personnel should be trained to an emergency medical treatment level as determined by the AHJ. They should also have sufficient medical equipment at their immediate disposal to initiate stabilization until transportation of casualties to adequate medical facilities is provided.

As many airport personnel as practicable also should be trained in CPR/AED as taught by the appropriate medical authority. Periodic exercises and drills in CPR/AED techniques are necessary to maintain proficiency.

All rescue, fire-fighting, and medical personnel should be trained to protect themselves from the spread of communicable diseases in the event they become exposed to blood or other body fluids during rescue or emergency medical care activities.

The everyday medical problems at large airports can serve to promote an increased proficiency in emergency medical techniques of airport-based emergency personnel. It should be noted, however, that proficiency in emergency medical techniques can be maintained only through constant practical application. Unless operations include providing advanced life support on a day-to-day basis, proficiency will decline or disappear.

Airports are encouraged to include volunteer on-airport personnel other than ARFF personnel, to provide an auxiliary response to assist casualties resulting from emergencies. Volunteers should be trained by accredited agencies in first aid or rescue response duties. In case of an emergency they should respond to a designated staging area for assignment. The question of liability is a matter for each appropriate authority.

Due to the varying national and international standards, medical personnel should follow the requirements adopted by the AHJ.

J.2 Emergency Medical Supplies and Equipment.

The airport operator should arrange to have available on or in the vicinity of the airport sufficient medical supplies to treat the passenger capacity of the largest aircraft normally using the airport. Experience has shown, however, that more than one aircraft can be involved in an aircraft accident, and, consequently, medical supplies to handle this possibility should be considered. The type and quantity of such supplies should be determined by the principal medical operator for the airport, using the statistical information given in Table J.2(a).

The figures in Table J.2(a) are based on the assumption that the maximum number of surviving casualties at an aircraft accident occurring on or in the vicinity of an airport is estimated to be no more than 25 percent of the aircraft occupants.

To cope with an emergency involving a large aircraft, it is recommended that the general emergency medical supplies and equipment included in Table J.2(b) be available at the airport or otherwise be available from outside sources. Table J.2(b) has been prepared to cope with an emergency involving the largest types of aircraft currently being used for commercial air transport operations, that is, the B747, the DC-10, and the Airbus. If, at any airport, only smaller aircraft will be handled during the foreseeable future, the suggested medical supplies and equipment should be adjusted to the largest aircraft expected to operate at the airport.

Stretchers, blankets, and backboards or immobilizing mattresses, or both, should be available for use, preferably on a suitable vehicle (e.g., trailer) that can be transported to the accident site. Blankets are needed to alleviate the casualty's exposure to shock and possible adverse weather conditions. Trauma victims in an aircraft accident sometimes sustain severe spinal injuries, so backboards should be used in removing such casualties from the aircraft in order to minimize the possibility of further spinal injury. The backboards should be of a type designed to fit through access ways and narrow aisles of commercial and business aircraft.

The items listed in Table J.2(b) are described in J.2.1 through J.2.3.

Table J.2(a) Estimated Maximum Number of Casualties in an Aircraft Accident at an Airport

Aircraft Occupants	Number of Casualties	20 Percent Casualties, Immediate Care Priority I	30 Percent Casualties, Delayed Care Priority II	50 Percent Casualties, Minor Care Priority III
500	124	24	38	62
450	112	22	34	56
400	100	20	30	50
350	87	17	26	44
300	75	15	23	37
250	62	12	19	31
200	50	10	15	25
150	38	8	11	19
100	25	5	8	12
50	12	2	4	6

Table J.2(b) General Emergency Supplies and Equipment

Supplies and Equipment	Quantity
Stretchers adaptable to the most commonly used ambulances	100
Immobilizing mattresses for backbone fractures	10
Backboards for backbone fractures	10
Splints, either conventional or inflatable, for various types of fractures	50
First aid kits, each containing a set of 10 tags, hemostatic pads, tourniquets, respiratory tube, scissors, dressings	50
Resuscitation chests containing material for on-site intubation, infusion, and oxygenation for about 20 casualties	20

Supplies and Equipment	Quantity
Manual or mechanical respirators	2 or 3
Suction devices	2 or 3
Plastic bags for the deceased	300 to 500

J.2.1 Immobilizing Mattress.

This apparatus consists of a plastic bag designed like a mattress and filled with a lot of very small balls. An aspirator (mechanical or other) is used to take out the air so that the mattress is crushed by the atmospheric pressure and becomes as rigid as plaster. A human body, partly enveloped before the mattress is compressed, is completely wrapped and head, limbs, and backbone become immobilized, allowing any type of transportation, through the use of lateral rope loops. The apparatus is permeable to X-rays. Although the dimensions are variable, its length is generally between 1.80 m (71 in.) and 1.90 m (74 in.), and its width is between 0.80 m (31 in.) and 0.90 m (36 in.).

J.2.2 Miscellaneous Items.

Miscellaneous items could include the following:

(1) Inflatable tents should have adequate heating and lighting where possible. A large tent can normally accommodate about 10 serious cases and can be carried on a large all-purpose vehicle along with the other necessary medical equipment.

(2) Mobile emergency hospitals or inflatable tents, if available, or shelters can be used for on-site treatment of Immediate Care (Priority I, Red) and Delayed Care (Priority II, Yellow) casualties. These units should be readily available for rapid response. Planning should also include the assignment of personnel who can operate/assemble this equipment. A cardiac care ambulance unit can be used as an ideal shelter for Immediate Care (Priority I, Red) casualties.

J.3 Emergency Medical Communication System.

Communication is a primary requisite of an AEP. The medical service communication system should ensure adequate communication during emergencies to disseminate warning information and obtain support operations. Without communication, the hospital cannot know the number and type of casualties it will be receiving, ambulances cannot be directed to the facilities most capable of rendering the needed care, supplies available from outside sources cannot be called for, and medical personnel cannot be directed to the point where they are needed most.

The participating hospitals should have the capability of communicating with one another by means of a two-way radio communication network. Ideally, each hospital should have the capability of either calling other individual hospitals or, if the occasion arises, calling all other hospitals simultaneously. This capability is invaluable for hospitals experiencing an emergency such as a need for a certain blood type or an item of equipment in short supply. It is also recommended that the medical group supervisor be able to communicate with participating hospitals directly.

J.4 Emergency Medical Transportation Facilities.

The dispatch of casualties to hospitals from the accident site should take into consideration the hospital(s) medical personnel on staff, medical specialties, and beds readily available. Ideally, each airport should have available at least one on-call ambulance for routine medical emergencies. Written agreements with off-airport-based ambulances should be prepared to provide for emergency transportation services.

In major emergency situations, other means of transportation can be substituted for ambulances. Vans, transportation vehicles, automobiles, station wagons, or other suitable airport vehicles can be used. Provision for immediate transportation should be available to transport the uninjured or apparently uninjured to a designated holding area.

An area grid map (with date of latest revision) of the airport's surrounding area should be carried by all rescue vehicles. All medical facilities should be depicted prominently on the grid map. *(See Figure A.16.2.2.)*

J.5 Assessment of Airport Medical Care Facilities' Needs (Medical Clinic, First Aid Room, or Both).

J.5.1 General Factors Influencing Need.

There are many general factors that influence the need for an airport first aid room or an airport medical clinic. Factors to take into consideration include the following:

(1) The number of passengers served annually and the number of employees based on the airport

(2) The industrial activity on the airport property and in the surrounding community

(3) The distance from the airport to adequate medical facilities

(4) Mutual aid medical services agreements

Generally, it is recommended that an airport medical clinic be available when the airport employees number 3000 or more and that a first aid room be available at every airport. The airport medical care or first aid room personnel and facilities should be integrated into the AEP.

The airport medical clinic, in addition to providing emergency medical care to the airport population, can extend emergency care to communities surrounding the airport, if these communities have no emergency facilities of their own.

The airport medical clinic can be included in the community emergency services organization and planning. In the event of a large-scale nonairport local emergency, the airport medical clinic can function as the coordination site for direction of incoming medical personnel assistance as well as medical supplies and equipment.

J.5.2 Location of Airport Medical Care Facilities.

The facilities should be readily accessible to the airport terminal building, to the general public, and to emergency transportation equipment (ambulances, helicopters, etc.). Site selection should avoid the problem of needing to move injured persons through congested areas of the airport terminal building, while providing access to the facility by emergency vehicles. The medical care facility should be located to allow access from the air side of the airport terminal building, as this provides control over unauthorized vehicles interfering with emergency equipment.

J.5.3 Airport Medical Care Facility Personnel.

The number of trained personnel and degree of expertise needed by each individual will depend on the particular airport's requirements. The staff of the airport medical clinic should form the nucleus of the medical services planning for the AEP (and be responsible for implementation of the medical portion of the AEP). It is recommended that the airport first aid room at least be staffed with highly qualified first aid personnel.

In general, it is recommended that during the principal hours of airport activity, at least one person trained to deal with the following be available within 3 to 5 minutes:

(1) CPR/AED

(2) Abdominal thrusts (choking)

(3) Bleeding from a traumatic source

(4) ~~Abdominal thrusts (choking)~~ Assess patients blood pressure, heart rate, respiratory rate, pulse oximetry and blood sugar

(5) Fractures and splinting

(6) Burns

(7) Shock

(8) Emergency childbirth and immediate care of newborns, including premature infants

(9) Common medical conditions that can influence the outcome of injury (allergies, high blood pressure, diabetes, pacemaker, etc.)

(10) Basic measures for treatment and protection subsequent to spills or leaks of radioactive materials or toxic or poisonous substances

(11) Treatment of emotionally disturbed persons and mental health emergencies

(12) Recognition of, and first aid for, poisons, bites, and anaphylactic shock

(13) Transportation techniques for injured persons

(14) Communicable diseases recognition and proper PPE selection

(15) Triage and mass casualty incident (MCI) skills

(16) Treatment of common medical emergencies (Heart attack, Diabetic , Strokes, Respiratory)

The person responsible should have authority to order hospitalization if necessary and to arrange any needed transportation.

The airport operator should obtain the advice and direction of a consulting emergency medical care physician as to the allotment and design of equipment for the first aid room commensurate with the anticipated needs of the particular airport.

The equipment and the medical supply inventory of the airport medical clinic should be established by the staff in charge of the clinic.

The airport medical care facility should be equipped to handle cardiac arrest and other types of injuries and illnesses associated with industrial medicine. If drugs are maintained, provision should be made to ensure full security.

Emergency oxygen and respiratory equipment should be available to treat smoke inhalation victims.

Since the majority of non-accident-related medical emergencies at airports involve coronary problems, advanced life support systems, including oxygen, oxygen regulators, AED, and other elements for cardiopulmonary care, should be readily available. In addition, first aid kits (containing drugs, a wide selection of bandages and splints, blood transfusion equipment, and burn and maternity kits), chains, ropes, crowbars, and metal cutters should be available.

Statement of Problem and Substantiation for Public Input

Slight change to section J5.3. Provides more clarification to required knowledge, skills, and abilities of medical care personnel.

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Committee Statement

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Statement: Slight change to section J5.3. Provides more clarification to required knowledge, skills, and abilities of medical care personnel.

Public Input No. 35-NFPA 440-2020 [New Section after K.4]

Annex L - New Section

Proposed new section .pdf/doc attached.

Additional Proposed Changes

File Name	Description	Approved
NFPA_440_Proposal_New_Annex.docx	Annex L -New Section	
NFPA_440_Proposal_New_Annex.pdf	Annex L - New Section	

Statement of Problem and Substantiation for Public Input

Aviation technology is rapidly evolving. Modern and future aircraft that utilize new technology and alternative energy sources are currently in production and limited use. These inlcude electric and hydrogen based products. This annex section provides a starting point for guidance to ARFF personnel on the hazards and response considerations to these new technologies and their associated support facilities.

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Committee Statement

Resolution: FR-31-NFPA 440-2021

Statement: The committee is adding this new annex as aviation technology is rapidly evolving. Modern and future aircraft that utilize new technology and alternative energy sources are currently in production and limited use. These include electric and hydrogen based products. This annex section provides a starting point for guidance to ARFF personnel on the hazards and response considerations to these new technologies and their associated support facilities.

NFPA 440 _ Proposal _ New Annex
Emerging Technology and Alternative Fuels

_.1 Purpose. Rapid advances in technology are leading to rapid advancements in aviation. These advancements are most evident in the fuels and energy sources being utilized for new and modern aircraft. These new fuel sources include electric, hydrogen, and hybrid configurations. This section serves as guidance for ARFF personnel in preparing a response to these new technologies. The guidance here found, can also serve as a framework for future innovations, that may not yet have been identified, but may appear within your area of operations.

_.2 Electric Power and Energy Storage Systems (ESS). NFPA 855, *Standard for the Installation of Stationary Energy Storage Systems*, should be utilized and considered when preparing for emergencies involving electrically powered aircraft and their support and housing facilities.

_.2.1 Knowledge of facilities. ARFF personnel should be knowledgeable of the types of work and technology that are being utilized within their response area. NFPA 855 requires specific documents to be presented to the AHJ when these facilities are constructed. ARFF personnel should know that these exist and are available.

_.2.1.1 The plans and specifications associated with an ESS and its intended installation, replacement or renewal, commissioning, and use shall be submitted to the AHJ for approval and include the following:
(1) Location and layout diagram of the room or area in which the ESS is to be installed
(2) Details on hourly re-resistant-rated assemblies provided or relied upon in relation to the ESS
(3) The quantities and types of ESS units
(4) Manufacturer's specications, ratings, and listings of ESS
(5) Description of energy storage management systems and their operation
(6) Location and content of required signage
(7) Details on re suppression, smoke or re detection, gas detection, thermal management, ventilation, exhaust, and deagration venting systems, if provided
(8) Support arrangement associated with the installation, including any required seismic support [855:4.1.2.1.1]

_.2.1.2 When batteries are removed from aircraft and other vehicles, they must be properly stored, and their terminals protected. The storage requirements outlined in NFPA 855, Section 14.3, 14.4, and 14.5 should be followed to prevent fire and promote life safety.

_.2.2 Emergency planning and training. Fire response personnel and ESS facility managers and operators should coordinate to develop an emergency plan, and conduct training on that plan. The plan should effectively address hazards associated with on-site systems and how these can be mitigated.

_.2.2.1 The emergency operations plan shall include the following:
(1) Procedures for safe shutdown, de-energizing, or isolation of equipment and systems under emergency conditions to reduce the risk of re, electric shock, and personal inju- ries, and for safe start-up following cessation of emer- gency conditions
(2) Procedures for inspection and testing of associated alarms, interlocks, and controls
(3)* Procedures to be followed in response to notications from the energy storage management system (ESMS), when provided, that could signify potentially dangerous conditions, including shutting down equipment, summoning service and repair personnel, and providing agreed upon notication to re department personnel for off-normal potentially hazardous conditions
(4)* Emergency procedures to be followed in case of re, explosion, release of liquids or vapors, damage to critical moving parts, or other potentially dangerous conditions
(5) Response considerations similar to a safety data sheet (SDS) that will address response safety concerns and extinguishment when an SDS is not required
(6) Procedures for dealing with ESS equipment damaged in a re or other emergency event, including contact informa- tion for personnel qualied to safely remove damaged ESS equipment from the facility
(7) Other procedures as determined necessary by the AHJ to provide for the safety of occupants and emergency responders
(8) Procedures and schedules for conducting drills of these procedures [855:4.1.3.2.1.4]

_.2.2.2 Suppression tactics. ARFF personnel should be aware of the best practices for suppressing fires related to ESS. NFPA 855, Annex C provides guidance for firefighting operations.

_.2.2.2.1 As previously mentioned, battery components are often housed in cabinets or other congura- tions that can serve to protect the components and thus limit the ability of fire stream penetration. Firefighters should never use piercing nozzles and long penetrating irons. Mechanically damaged cells or puncturing unburned or undamaged cells can result in the immediate ignition of those cells. In addition, internal shorting within the cabinets could create an electrocution risk.

Movement of damaged cells might result in arcing or reignition if active material or cells remain in the modules. Modules should not be moved without consultation from qualified personnel.

Ventilation during suppression is critical. Research has shown that Li-ion batteries might continue to generate amma- ble gases during and after extinguishing. In addition, testing has shown that during sprinkler suppression, removal of combustion and flammable gases emitted from the battery significantly improves the effectiveness of the suppression.

Testing has shown that electrical current leakage back through hose streams will not be a shock hazard when appropriate streams are used and distances maintained. In cases where systems are thoroughly destroyed and electric potential is shown to be minimal, close range engagement with hoses for the purpose of drowning modules can be performed to provide more direct cooling.

During post-fire operations, SCBA should continue to be worn by all persons near the damaged ESS, especially when systems are in conned or poorly ventilated spaces or have not been sufficiently cooled yet. Gases, and in particular CO, should be monitored during this period, as dangerous buildups have been observed during post-re testing. If possible, batteries should be monitored for residual heat and temperature, as reignition is a possibility in cells that are not sufficiently cooled.

Care should be taken to secure the area the batteries are located in and ensure that the heat has been removed and that the batteries are not at risk of being electrically shorted or mechanically damaged. This should be done at the guidance of a qualified technician. At this point, the fire scene should be handed over to the owner, operator, or responsible party appointed by the site owner.

Though trace amounts of heavy metals such as nickel and cobalt can be deposited from combustion of the batteries, these elements are not expected to be present in large quantities or in quantities larger than any other similar re. In most instances, water exposed to the batteries shows very mild acidity, with an approximate pH of 6. Runoff water pH can be monitored during firefighting operations but should not pose a greater risk than normal firefighting run-off.

In unique cases where a system on fire poses little or no risk to the surrounding uninvolved equipment or the environment, it can be reasonable to assume a defensive posture and allow the system to burn itself out. Some typical steps for this approach include the following: local municipal firefighters responding to the scene to make sure that the ames do not spread beyond the property perimeter, having ESS operations personnel arriving at the scene to review the situation and conditions, and then allowing the re to burn out. This option should only be considered when no risks are posed to the environment and the risk to re-ghting operations is great or unknown. It is up to the site owner/operator to communicate with re services in the event of an emergency to relay vital system information to fire services. [855:C.7.3]

_.3 Hydrogen Technologies. NFPA 2, *Hydrogen Technologies Code,* should be utilized and considered when preparing for emergencies involving hydrogen powered aircraft and their support and housing facilities.

_.3.1 Knowledge of facilities. ARFF personnel should be knowledgeable of the types of work and technology that are being utilized within their response area. NFPA 2 outlines specific requirements for these facilities. ARFF personnel should be aware of these requirements and knowledgeable to the extent that they exist. Requirements for liquid hydrogen facilities are outlined in Chapter 8 and Chapter 11 of NFPA 2.

_.3.2 Emergency planning and training. Fire response personnel and hydrogen technology facility managers and operators should coordinate to develop an emergency plan, and conduct training on that plan. The plan should effectively address associated hazards and how these can be mitigated.

_.3.2.1 An emergency plan shall be prepared and updated wherever [GH2 or LH2] are produced, handled, stored, or used in amounts exceeding the maximum allowable quantity (MAQ) per control area or where required by the [AHJ]. [2:4.6.1]

_.3.2.2 The plan shall be available for inspection by the AHJ and shall include the following information:
(1) The type of emergency equipment available and its location
(2) A brief description of any testing or maintenance programs for the available emergency equipment
(3) An indication that hazard identication labeling is provided for each storage area
(4) The location of posted emergency procedures
(5) A safety data sheet (SDS) or equivalent for [GH2 or LH2] stored or used on the site
(6) A list of personnel who are designated and trained to be liaison personnel for the re department and who are responsible for the following:
    (a) Aiding the emergency responders in pre-emergency planning
    (b) Identifying the location of the [GH2 and LH2] stored or used
    (c) Accessing SDSs
    (d) Knowing the site emergency procedures
(7) A list of the types and quantities of [GH2 and LH2] found within the facility [2:4.6.2]

_.3.2.3 Control and Mitigation of Unauthorized Releases. Provisions shall be made for controlling and mitigating unauthorized releases. [2:4.10.2]

_.3.2.4 Fire protection for fueling facilities.

_.3.2.4.1 All hydrogen refueling station sites shall have a completed risk assessment prior to dispensing fuel. [2:11.2.1.1]

_.3.2.4.2 The risk assessment shall be updated when changes to the process affect operating limits or design specifications that were included as the basis for the original risk assessment.[2:11.2.1.2]

_.3.2.4.3 Security. LH2 dispensers shall be designed to be tamper resistant.[2:11.2.2]

_.3.2.4.4 Operating Instructions. Operating instructions identifying the location and operation of emergency controls shall be posted conspicuously in the facility area.[2:11.2.3]

_.3.2.4.5 Lighting. LH2 dispensing areas transferring LH2 during the night shall have permanent lighting at points of transfer and operation.[2:11.2.4]

_.3.2.4.6 The lighting shall be designed to provide illumination of the dispensing apparatus and dispensing area, such that all controls including emergency shutdown devices are visible to the operator.[2:11.2.4.1]

_.3.2.4.7 Personnel Protection. LH2 refueling sites utilizing or dispensing LH2 shall provide personnel protection barriers such as walls, cabinets, vacuum-jacketed pipe, and similar barriers to protect the fueling operator and the vehicle being fueled from contact with a release of LH2 . All facility piping other than the refueling line to the vehicle shall be behind the barrier, to deflect any LH2 that is released due to an equipment malfunction.[2:11.2.5]

_.3.2.4.8 Sources of Ignition. Smoking materials, including matches and lighters, shall not be used within [25 ft (7.6 m)] of areas used for fueling, servicing fuel systems of internal combustion engines, or receiving or dispensing of [LH2]. The motors of all equipment being fueled shall be shut off during the fueling operation except for emergency generators, pumps, [pagers], and so forth, where continuing operation is essential. [2:11.2.6]

_.3.2.4.9 Fire Extinguishers. Each motor fuel dispensing facility or repair garage shall be provided with fire extinguishers installed, inspected, and maintained as required by NFPA 10. Extinguishers for outside motor fuel dispensing areas shall be provided according to the extra (high) hazard requirements for Class B hazards, except that the maximum travel distance to a 80 B:C extinguisher shall be permitted to be 100 ft (30.48 m). [2:11.2.7]