NFPA 402-T-1947

Suggested Standard Operating Procedures,

AIRCRAFT RESCUE AND FIRE FIGHTING

Prepared by the
NFPA Committee on Aviation
and Airport Fire Protection
Tentatively Adopted by the NFPA.

1947

Twenty-five Cents

NATIONAL FIRE PROTECTION ASSOCIATION
International
60 Batterymarch St., Boston 10, Mass.

2M-6-47 Printed in U.S.A.

National Fire Protection Association

INTERNATIONAL

Executive Office: 60 Batterymarch St., Boston 10, Mass.

The National Fire Protection Association was organized in 1896 to promote the science and improve the methods of fire protection and prevention, to obtain and circulate information on these subjects and to secure the co-operation of its members in establishing proper safeguards against loss of life and property by fire. Its membership now includes 150 national and regional societies and associations and twelve thousand individuals, corporations, and organizations.

Membership in the National Fire Protection Association is open to any society, corporation, firm or individual interested in the protection of life or property against loss by fire. All the valuable engineering and popular literature issued by the Association is sent, as issued, to every member. The Association is the clearing house for all the authoritative information on fire protection and prevention and members are privileged to submit to it their individual problems for solution. The Association is always glad to send samples of its publications to prospective members.

This pamphlet is one of a large number of publications on fire safety issued by the Association. The standards, prepared by the technical committees of the National Fire Protection Association and adopted in the conventions of the Association, are intended to prescribe reasonable measures for minimizing fire losses. All interests concerned have opportunity through the National Fire Protection Association to participate in the development of the standards and to secure impartial consideration of matters affecting them.

The following text, "Suggested Standard Operating Procedures, Aircraft Rescue and Fire Fighting," tentatively adopted at the 1947 annual meeting of the National Fire Protection Association, comprises the first report of the new N.F.P.A. Committee on Aviation and Airport Fire Protection. Reorganized in 1946, this committee combines the activities of the N.F.P.A. Committees on Aviation and on Aircraft Fire Fighting. Its present scope is to "develop aeronautical fire protection, including the elimination of fire hazards in aircraft design and operation, the installation of fire protective equipment in aircraft, the control of fire hazards in aircraft maintenance and storage, fire protection for airports, and aircraft crash fire rescue and extinguishment."

These standard operating procedures are designed to secure maximum utilization of rescue equipment which might be available. By their tentative adoption the committee recognizes that experience may dictate changes but based on present-day aircraft operations and airport conditions, the procedures outlined are the most effective so far developed.

Suggested Standard Operating Procedures, Aircraft Rescue and Fire Fighting.

Introduction

The basic premise upon which these suggested Standard Operating Procedures are predicated is rescue of personnel involved in aircraft accidents. Extinguishment of fire incident to expedious rescue is a necessary corollary but final extinction of fire is considered secondary to the rescue operations. Speed in response and rescue is the primary requisite. (See Appendix A for Responsibility Statement.)

The following breakdown of conditions liable to be encountered is adopted to aid in practical application of the Standards:

CONDITION A—On the Aerodrome—On Land.

Situation 1: Anticipated crash landing.

Situation 2: Potential crash during take-off.

Situation 3: Unexpected crashes and features common to all aerodrome crashes.

CONDITION B—Off the Aerodrome—On Land.

Situation 4: Normally within radius of one to five miles or within reasonably accessible distances.

Situation 5: Beyond radius described above (Situation 4).

CONDITION C—On or off the Aerodrome—In the Water.

Additional Standard Operating Procedures are given to cover the following:

LOCAL PUBLIC FIRE DEPARTMENT COOPERATION.

AIRCRAFT CREW TRAINING AND DISCIPLINE.

AMBULANCE AND MEDICAL SERVICES.

It will be noted that no differentiation is made in these suggested Standard Operating Procedures between the various types of aircraft liable to be involved in crashes although this obviously will have a marked effect upon the type and quantity of crash units required to handle any fire which might result. (See Appendix B.)

The following Standard Operating Procedures are also predicated upon the provision of a full-time crash rescue and fire-fighting organization with adequate equipment (including radio facilities) and personnel under the managerial jurisdiction of the aerodrome manager. During a crash fire emergency the crash chief has absolute authority over operational phases of crash rescue and fire fighting.

All terminology used in this suggested standard has been adopted for international use by employing the Glossary of Definitions of the Provisional International Civil Aviation Organization. (See Appendix C.)

Condition A—Situation 1—On the Aerodrome, On Land, Anticipated Crash Landing.

1. The Aerodrome Control will give the crash chief as much of the following information as possible. If this information is not volunteered by the Aerodrome Control, the crash chief will request the information from this or other reliable source.

a. Type of aircraft.

b. Number of occupants.

c. Nature of trouble.
d. Runway to be used.

The following additional information (as applicable) should be provided by Aerodrome Control if time and conditions permit:

e. Position and injuries to occupants, or type of cargo.
f. Amount of fuel aboard at time of emergency, and location of tanks.
g. Presence or absence of fire in flight, time burning, action taken to combat fire, its apparent origin, and smoke conditions.
h. Condition of landing gear, brakes, wing flaps, etc., which might affect landing runs.
i. Power available and engines affected.
j. Pilot's visibility for landing.
k. Anticipated ground contact point and estimated run.
l. Position of control switches at time of landing:
   1. Ignition and battery switches.
   2. Fuel and oil cut-off switches.
   3. Throttle and propeller feathering controls.
   4. Fire extinguisher control switches.
m. Anticipated use of hatches and emergency escapes:
   1. Whether escapes are manned for immediate use.
   2. Whether escapes are jammed or blocked.
   3. Whether passengers are panicky.
   4. Distribution of occupants at exits.

2. Aerodrome Control will maintain continuous verbal or radio contact with the crash chief for last minute changes in the distressed aircraft's flight plan or emergency conditions existing. Mutual aid as may be needed to help fight the crash fire or accomplish rescue will be called by Aerodrome Control according to prearrangements completed by the crash chief. Where advisable, Aerodrome Control will also notify the pilot of the distressed aircraft of the emergency action being taken to receive the aircraft.

3. The crash chief will supervise placing crash units in position to facilitate response.

a. Major pieces of crash equipment will be spaced so that the runs will be the minimum necessary but back of the anticipated ground contact point of the aircraft in distress. A safe distance will be maintained to avoid collision with the aircraft.

b. Crash units will be distributed parallel to the runway or landing area to be used and grouped to afford maximum utilization.

4. The crash chief will place equipment "on the roll" immediately as landing is accomplished and clearance given by Aerodrome Control to enter the movement area even if no fire is visible and apparently a successful landing has been accomplished. The aircraft will be followed until it stops and fire prevention or fire-fighting operations will be conducted until the emergency is over. It is the crash chief's duty to notify Aerodrome Control when the fire emergency ends. Aerodrome Control has no authority to recall crash units until the crash chief pronounces the emergency terminated.

5. The possibility will not be overlooked that the aircraft might swerve suddenly because of faulty landing gear, improper brake action, tire failure, obscured vision of pilot, etc., or that the aircraft might overrun the landing area. Crash units should not have to retract appreciably in any such contingency. This calls for long range planning including analysis of topography, terrain conditions, fencing of the aerodrome, mobility of crash units and mutual aid facilities.

6. Aerodrome Control will be in charge of other field activities during the emergency and will be particularly alert for the possibility of simultaneous rescue or fire emergencies. Aerodrome Control will keep the crash chief fully advised by radio.

(See also Situation 3)

Condition A—Situation 2—On the Aerodrome, on Land, Potential Crash during Take-off.

7. Immediately upon notification or observance of potential crash, the crash chief will order crash units placed "on the roll" toward the scene keeping in radio contact with Aerodrome Control for clearance to enter movement area.

8. Great care will be exercised in this response to avoid going out of position until the crash location is defined to a given area. Remember that while the aircraft is airborne, unexpected attitudes might suddenly change the course of flight and consequently the crash site.

(See also Situation 3)

Condition A—Situation 3—On the Aerodrome, on Land, Unexpected Crashes and Features Common to all Aerodrome Crashes.

9. Constant observation will be maintained of flight activity from the crash fire station (advantageously located for this purpose) to supplement Aerodrome Control. This observation should be conducted by personnel familiar with aircraft, the aerodrome operating regulations, normal air traffic patterns, and accepted principles of safe ground operation of aircraft. They should be provided with every possible visual aid including binoculars, and should also have radio and telephone or loud speaker interphone communication facilities for prompt transmission of alarm and contact with Aerodrome Control. Proper location of the fire station to afford maximum visibility of movement area is essential.

10. Crash crew personnel will take turns on alert duty during all hours of flight activity. Observation duties should include the following visual checks:

a. Clearance of movement area for arriving and departing aircraft.

b. Continuity of power in aircraft engines in the air and at time of take-off.

c. Clearance of structures, trees, and other obstructions.

d. Taxiing operations, ground operations of engines, security of landing gears, and aircraft maintenance operations on the flight line (including fuel servicing).

11. When approaching an aircraft fire, crash units will be placed so as to facilitate rescue. The following conditions will be particularly noted:

a. Wind direction.
b. Location of fire and its extent at time of arrival.
c. Location of fire relative to personnel involved.
d. Relation between wind, fire, personnel and fuel tanks.
e. Terrain conditions and exposures.
f. Flammable liquid spillages.

Proper training of drivers of crash units is vital in this connection.

12. Rescue crews will be protected with appropriate agents when entering the fire zone to accomplish rescue and will wear protective clothing.

Protective clothing recommended includes:

a. Bunkin suit with wool sleeves added to present standard lining.

b. Protective gloves of chrome leather and wool knit insert.

c. Standard firemen boots with wool socks.

d. Standard firemen helmet with plastic face shield or similar face, head and neck protective gear.

13. All available lines will be charged for use on the fire after equipment is properly positioned irrespective of the extent of the fire at time of arrival. This will assure an immediate discharge available in case of a gasoline flash which would endanger crash crews and equipment at the scene as well as occupants of the aircraft. If no fire is visible, all equipment will be placed in immediate readiness for service with lines laid but not charged.

14. All spills of flammable liquids will be neutralized or blanketed with foam as quickly as possible taking into consideration the water requirements for the primary rescue mission and the total supply available.

15. Since a continuous water supply is essential and usually not available at all points on the aerodrome, pumpers will be immediately positioned at the time of alarm to relay water to the crash units and the lines charged upon direction of the crash chief. In addition, general purpose vehicles will be available on prearranged schedules to bring additional supplies of extinguishing agents and equipment to the scene. (If the airport maintenance equipment includes a ladder truck or portable emergency lighting equipment, it is important that prearrangements include the automatic response of such mobile facilities.)

16. Rescue operations will be accomplished through regular doors and hatches wherever possible but crash crews must be trained in forcible entry procedures and be provided with the necessary tools. Special items of accessory equipment desirable for crash operations include:

Axes, crash and hand.
Bolt cutter.
"Can-opener" (special design).
Crow bar, claw tool, Kelly tool.
Dzus fastener tool.
Flashlight, explosion-proof.
Knife, parachute (rounded tip).
Ladders, portable.
Pliers, vise and electrical.
Plugs, wood (for plugging tubing and tank leaks).
Saws, metal, hack, and wood.
Screwdrivers.
Shovels.
Tinner's snips.

Other special equipment desirable includes:

Grappling hook and cable with crane unit.
Jeep equipped with portable electric saw and other first-aid fire-fighting equipment.
Lighting plant for night operations (portable).
Public address system (portable).

17. Rescue of personnel involved in crashes will proceed with the greatest possible speed. While care will be necessary in the evacuation of injured occupants so as not to aggravate such injuries, removal from the fire threatened area is the primary requirement.

18. One fireman will be detailed to disconnect the battery and to check the ignition, fuel, and fire extinguisher cockpit control switches and firewall shut-off valves to limit the extent of fire whenever such action is made possible by the fire conditions existing.

19. Broken fuel, hydraulic fluid (flammable type), alcohol and oil lines will be plugged or pinched to reduce the amount of spill and extent of fire.

20. If the source of heat cannot be removed and flames threaten, fuel tanks will be cooled by appropriate agents to prevent explosion.

21. Where immediate rescue entrance cannot be achieved, bayonet type nozzles might be employed to distribute water fog in the interior of the aircraft to reduce the hazard to life of those occupants trapped inside.

22. Laminated glass windows offer possible rescue and ventilation potentials. Where heat has caused softening and complicated breakage, sudden chilling with carbon dioxide will facilitate penetration.

23. Interior portions of the aircraft will be ventilated before removing plane after rescues have been accomplished and the fire extinguished. Runway and ground surfaces will be thoroughly flushed of all flammable liquid spills before moving aircraft or permitting normal traffic to resume. Gasoline tanks will be drained (approved methods followed for fire safety) prior to removing aircraft if conditions necessitate and permit. One crash unit will be retained at the site while this work is performed. If the aircraft or parts must be removed prior to completion of full investigation and safetying, a record should be made of the crash locations of all parts and care exercised to preserve the evidence available.

24. Assure that the "No Smoking" rule is enforced at the scene of the crash and in the immediate vicinity.

25. Where the use of grappling hooks or tow chains must be used to expedite rescue or to assist in controlling fires, exercise discretion lest such a procedure result in strains which might release quantities of fuel from partially damaged tanks or cause greater injuries to entrapped personnel.

26. Burning magnesium parts should be covered with dirt, sand, or special powder extinguishing agents to prevent reflashes.

Condition B—Situation 4—Off the Aerodrome, on Land, Normally Within Radius of One to Five Miles or Within Reasonably Accessible Distances.

27. Despite any delay in transmission of alarm, predesignated crash units will be dispatched by the crash chief to all crashes within the radius described or a similar radius where response is adjudged necessary because of factors surrounding the particular accident or life hazard presented.

28. Crash units held in reserve will be only auxiliaries capable of handling incipient ground fires. Aerodrome control will be immediately advised of the substandard fire defense facilities available and will be in constant radio contact with the crash units off the aerodrome.

29. All off-aerodrome areas within the radius described will be plotted on a grid or azimuth map and the exact location of the crash will be spotted by coordinates as soon as established. Copies of this map will be mounted in every piece of crash fire equipment and in the fire station, fire alarm headquarters, and aerodrome control. It is recommended that this

map also be circulated widely within the area with copies made available to such agencies as: local public fire departments and trucks, police stations and cruisers, hospitals and ambulance services, telephone exchanges, gasoline stations, and selected citizens. One or more local aircraft should also possess copies for possible use in spotting crash sites from the air. Prearrangements with all available fire protection agencies in the area are essential.

30. Response by crash units will be organized to avoid delays en route. Local police cooperation will be prearranged. Radio equipment will keep key crash units, fire headquarters, and Aerodrome Control within constant communication. Wherever possible, local fire departments will also be tied into this radio network.

31. Fastest, most mobile crash units will proceed independently of slower heavier units, but the former will direct the latter by radio, supplying route information wherever necessary.

32. Auxiliary water tank trucks and pumpers with auxiliary water tanks will be dispatched wherever there is an indication of their possible utilization and especially when the crash site is known to be beyond normal fire-protected zones (underground water mains and hydrants) or where water relays may be required.

33. Special crash tools will be arranged in a kit for manual transportation to crash sites when circumstances prevent close approach by motorized units (i.e. marshy land, heavily wooded areas, high structures, etc.).

34. Judicious utilization of agents supplied is particularly important in unprotected off-aerodrome locations and techniques of employment must be carefully selected to permit most advantageous use.

35. Prior surveys of off-aerodrome terrain and traffic conditions will be made to prevent delays at time of emergency. Such factors will be charted on the grid maps supplied crash units.

36. Prearrangements with police agencies will be made to handle crowds, to enforce "No Smoking" regulations, and to preserve evidence.

37. Damaged aircraft will be tethered for protection against wind damage wherever possible and necessary to preserve evidence as investigations may be prolonged. Souvenir collection will be prohibited and firemen will be instructed in restricting unnecessary damage to the aircraft.

(See also Situation 3)

Condition B—Situation 5—Off the Aerodrome, on Land, Beyond Radius Described in Situation 4.

38. Only one unit of crash equipment will normally respond to crashes over five miles from the aerodrome. This unit will be the most mobile and self-contained available, possessing a combination of agents and equipment for employment as the individual situation warrants. The aerodrome protection will not be unjustly jeopardized by prolonged absence of crash units unless the aerodrome can be closed to air traffic during the period of the emergency.

39. Response to these distant crashes will be in cognizance of the danger that, in some crashes, ignition is a delayed result of impact, that only trained crash crews are capable of safetying damaged aircraft to

eliminate potential fire hazards, and that removal of any trapped occupants from the danger zone may require special equipment.

40. Aimless wandering to fix exact location of the crash will be forestalled as much as possible by coordination of effort between local police, fire department, and spotter aircraft. Radio communication is essential in this regard.

(See also Situation 3 and 4)

Condition C—On or Off the Aerodrome, in the Water.

41. All available crash and rescue boats will be immediately dispatched, equipped with standard facilities and adequate crews.

42. Coast Guard, Naval, and municipal or similar fire and rescue units (as might be available) will be immediately notified and requested to assist in the emergency. This request will normally be made irrespective of the apparent seriousness of the accident and according to prearrangements.

43. Normally, sweeping fire away from the aircraft with hose streams is the best practice in water crash fires, but ample foam and water fog should be available for suppression purposes and rescue entry in case of extensive flammable liquid spills which might cover wide areas. Land crash units will be mobilized to bring additional supplies of required agents to the nearest docking facilities.

44. Immediate attention must be given to occupants injured or trapped inside the aircraft particularly when fire is involved or the buoyancy of the damaged aircraft is in question. Those who have escaped unassisted and can swim in fire-free areas should be encouraged to help themselves until trapped persons and non-swimmers can be removed to safety by rescue forces. Life preservers should be standard equipment on rescue launches. Any apparent flammable liquid spills which have not been ignited should be swept away from the danger zone with hose streams as quickly as possible. The aircraft battery should be disconnected promptly. Ignition switches, fuel switches and firewall fluid shut-off valves should be closed. Motor launch backfires should be prevented.

Local Public Fire Department Cooperation.

45. Local public fire departments will be periodically included in the aerodrome crash crew training activities by participating in drills, tests, and aircraft familiarization programs. Such activities will be specifically pointed toward increasing the utility of local fire defense personnel in handling off-aerodrome crashes and assisting in a mutual aid capacity for serious aerodrome accidents.

46. Confidence in handling aircraft fires can only result from actual crash fire experience or training in realistic simulated crashes. Local fire department crews which arrive at the scene of a crash first will be instructed to proceed with the rescue and fire suppression work. Upon arrival of aerodrome crash units, the crash chief will consult with the public fire department chief on what rescue efforts have not been successfully completed and will direct the combined crews to assist in the furtherance of this aspect of the crash. After rescues are completed, both agencies will concentrate on final extinguishment, the division of responsibilities being a matter for individual determination by those in charge in accordance with previous arrangements.

47. Local public fire departments will be tied in closely with the aerodrome crash alarm service, preferably by radio or direct line telephone. They will be supplied with grid maps used for spotting crash locations. They will be encouraged to carry special equipment for crash fire suppression purposes (not uncommon to equipment which might be carried for gasoline tank truck or other flammable liquid fire suppression work).

48. Local public fire departments will be offered schooling in aircraft fire hazards and physical structures of the types commonly operating out of the aerodrome involved.

Aircraft Crew Training and Discipline.

49. Since many emergency landings are caused by fires sustained in flight, it is vitally important that crew members be well trained and disciplined in fire prevention and what to do in such an emergency. Knowledge of proper operation of installed fire protection systems is the first essential. Important points for engine fires are:

a. Warn other crew members.

b. Close throttle to affected power plant.

c. Feather propeller, affected power plant.

d. Turn off fuel to affected power plant.

e. Close firewall fluid shut-off valves (fuel, oil, hydraulic fluid) of affected power plant.

f. Switch off ignition to affected power plant.

g. Check position of cowl flaps, affected power plant.

h. Select extinguisher position and activate control.

This procedure presupposes sufficient altitude to avoid ground collision from loss of power. Crew members will also be familiar with hand fire extinguishers on board the aircraft and how they are properly operated. Cabin and cargo section fires must be promptly and effectively blanketed to avoid danger of asphyxiation of crew and passengers.

50. Crew members will be instructed in the air flow configurations and methods which can be taken to prevent spread of fire and smoke throughout the aircraft. The dangers of opening doors and windows will be thoroughly understood.

51. Radio notification of emergency landings from the pilot will include information on:

d. Runway to be used.

c. Nature of trouble.

b. Number of occupants.

a. Type of aircraft.

See No. 1 for possible supplementary information which might be volunteered if time and conditions permit.

52. The crew can also be of great assistance to the ground fire crews by taking as many of the following steps as possible to prevent or limit the amount of fire:

a. Switch off ignition and battery.

b. Stop flow of fuel and oil by operating cut-off switches.

c. Activate the installed fire protection systems at time of ground impact (if not done for control of fire in flight) even if no fire exists.

d. Open emergency hatches just before landing to prevent entrapment caused by jamming of escapes by impact stresses. (This is not recommended where an airborne fire is in progress affecting cabin or crew compartments or where flames might enter cabins from powerplant fires through such openings.)

e. In some cases, especially with wing fires, it is possible to shift the position of the aircraft after landing and braking in such a manner that the wind will carry flames away from the fuselage and main fuel cells.

f. When circumstances permit, bring aircraft to rest on paved surfaces to permit easy approach by crash units.

g. Maintain as much discipline as possible among passengers to prevent panic. Organize escape routes to prevent "bottlenecks" at certain exits. Enforce the use of safety belts during the landing.

h. Provide technical information to the crash chief but do not attempt to direct crash crews in the performance of their duties.

Ambulance and Medical Services.

53. Ambulance and medical services, like rescue and fire-fighting services, will be provided to administer aid to those involved and in need of medical assistance. Response of ambulances to the emergency will be automatic regardless of whether or not it is apparent that medical services are required.

54. Ambulance and medical services may be an integral part of the rescue and fire-fighting organization and this is recommended. A specialized attendant will be available during all operating periods to perform the dual function of ambulance driver and first-aid practitioner. Where operations are of such nature that a permanent ambulance service is not feasible, prearrangements with local, private or public services will result in prompt dispatch of a satisfactory assignment of ambulance and medical services. Where the latter arrangement is relied upon, it is of special importance that crash crew personnel be trained in first-aid practices.

55. Doctors will be on immediate call for all emergencies and will be notified of such emergencies by Aerodrome Control according to prearranged schedules and procedures.

APPENDIX A.

The following RESPONSIBILITY STATEMENT is presented as an Appendix to this Standard Operating Procedure as a matter of information and possible guidance.

Aircraft Rescue and Fire Fighting on the Aerodrome is the primary responsibility of the aerodrome manager, whether he represents a governmental agency, a private corporation, or an individual, and irrespective of how such activities are financed and/or administered. A prearranged high degree of mutual aid is recommended between such aerodrome rescue and fire-fighting facilities provided (in view of this primary responsibility) and local protection agencies serving the immediate vicinity. The aerodrome manager also has primary responsibility for aircraft rescue and fire fighting within the reasonably accessible environs of the aerodrome where there is no conflict with the primary responsibility of other suitably organized and equipped public protective agencies. An "area" fire defense psychology must replace the artificial barriers of state, city, or similar geographical

border lines. Aerodrome managers are expected to encourage and counsel public protective agencies on the special problems and techniques of aircraft rescue and fire fighting.

APPENDIX B.

The following MINIMUM STANDARDS for aircraft rescue and fire-fighting equipment have been promulgated by the N.F.P.A. Committee on Aviation and Airport Fire Protection, Sub-Committee on Aircraft Rescue and Fire Fighting and is made an Appendix to this Standard Operating Procedure as a matter of information and possible guidance.

The following properly manned aircraft rescue and fire-fighting equipment is considered minimum for aerodromes operating the types of aircraft indicated. The minimum equipment standards specified herein presumes the existence of water supply facilities (mobile or otherwise) sufficient to make possible continuing rescue and fire-fighting operations for a reasonable period of time after initial discharge of agents carried on the crash equipment specified.

Aerodromes Operations Involving:	Minimum Rescue and Fire Equipment:
Multi-engine aircraft, 4 or more engines	2 Major rescue and fire control units; 1 Small rescue and fire control unit; 2 Ambulances available*
Multi-engine aircraft, 2 or 3 engines or aircraft under 60,000 lbs.†	1 Major rescue and fire control unit; 2 Small rescue and fire control units; 1 Ambulance available*
Single engine over 3,500 lbs.†	2 Small rescue and fire control units; 1 Ambulance available*
Single engine under 3,500 lbs.†	1 Small rescue and fire control unit; 1 Ambulance available*

*Ambulance services may be aerodrome owned and operated or secured from local authorities providing they are immediately available for crash emergencies.
†Certificated gross weight.

Notes Relative to Minimum Standard Specifications:

1. Climatic conditions and topography (particularly existence of swampy land or bodies of water) might require special equipment over and above minimum specified.

2. Frequency of flight will govern the need for multiple crew assignments for more than one shift and amount of the reserve equipment provided.

3. Prearranged mutual aid will effect secondary support (viz. pumpers, auxiliary water supplies, additional extinguishing agents) to permit maximum utility of rescue and fire-fighting equipment.

APPENDIX C.

The following is extracted from the GLOSSARY OF DEFINITIONS issued by the Provisional International Civil Aviation Organization (AN/166; 3/12/46).

AERODROME — A defined area on land or water, including any buildings and installations, normally used for the take-off and landing (alighting) of aircraft.

AERODROME CONTROL — A service established to provide air traffic control for aerodromes.

AIRCRAFT — All air-supported vehicles.

AIR TRAFFIC — Aircraft in operation anywhere in the air-space and on the movement area of an aerodrome.

CREW — Includes any person having duties on board in connection with the flying or the safety of the flight of the aircraft or employed on board, in any way, in the service of the aircraft, passengers, cargo, or stores.

LANDING AREA — The part of the movement area primarily intended for landing or take-off of aircraft.

MOVEMENT AREA — The area at aerodrome specially prepared for the movement of aircraft upon it (see landing area).

The following definitions are added to clarify the foregoing text. These definitions are promulgated by the N.F.P.A. Committee.

AERODROME MANAGER — The individual having managerial responsibility for the operation and safety of the aerodrome whether he represents a governmental agency, a private corporation, or an individual. As affects aircraft rescue and fire-fighting services, the aerodrome manager is responsible for the proper provision of equipment, manpower and organization. He has no authority over operational matters at the time of emergency, said responsibility being that of the duly appointed crash chief.

ANTICIPATED CRASH — A situation where previous knowledge of an impending accident is communicated to the crash chief from Aerodrome Control or other authoritative source.

CRASH CHIEF — The individual having operational control over the equipment and manpower specifically made available for rescue and fire-fighting activity on the aerodrome, or his designated assistant. He has both the authority and responsibility for decisions affecting rescue and fire-fighting activity and is in sole command of such operations at time of emergency.

CRASH CREW — Personnel under the operational jurisdiction of the crash chief assigned permanently or semi-permanently to crash rescue and fire fighting activities.

CRASH FIRE FIGHTING — The control or extinguishment of aircraft fires following ground accidents incident to crash rescue and thereafter. Crash fire fighting does not include the control or extinguishment of airborne fires in aircraft.