HQ-650

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DATE: 4/15/69

ADVISORY CIRCULAR

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

SUBJECT: RESPONSE TO AIRCRAFT EMERGENCIES

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1. PURPOSE. This circular informs airport operators and others of an existing need for reducing aircraft firefighting response time, and outlines a uniform response time goal of two minutes within aircraft operational areas on airports.

2. REFERENCES. The following advisory circulars and additional copies of this circular may be obtained from the Department of Transportation, Distribution Unit, TAD-484.3, Washington, D. C. 20590:

   a. AC 150/5200-10, Airport Emergency Operations Planning.
   b. AC 150/5210-7, Aircraft Fire and Rescue Communications.
   c. AC 150/5210-9, Airport Fire Department Operating Procedures During Periods of Low Visibility.

3. BACKGROUND.

   a. Data on survivable aircraft accidents and fire tests emphasize the urgency for arriving at accident scenes in the shortest possible time. Tests and experience data show that occupant escape time can be extended by prompt fire suppression operations. Experience gained from a recent aircraft accident also indicates that all crew positions on aircraft firefighting and rescue vehicles should be fully manned even to the point of substitutions, where positions are vacant through illness, etc.

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b. For a proper evaluation of total response time, it is necessary to account for transmission of messages, crew reaction in manning trucks, and actual vehicle response to a point on the scene where fire suppression equipment is actuated.

c. The wide variation in the size of airports makes it impractical to consider response to any place within airport boundaries in a similar time period. For example, Sky Harbor Municipal at Phoenix has 1500 acres and a runway complex similar to that of Tucson International, which has 2200 acres; Baer Field at Fort Wayne has 1000 acres and runways quite similar to Sioux City Municipal, which has 2500 acres.

d. For response time planning purposes, it is considered practical to establish a primary zone to encompass aircraft operational areas on airports. This would include runway vicinity, taxiways, aprons, aircraft storage, and terminal ramp areas. Also, in the interest of attaining a realistic goal, airports should plan around a system of resources for response to the aircraft operational areas within two minutes. The time required to respond to other areas on or off airport property would, of course, be longer in proportion to distance, access and terrain, but these factors cannot be similarly related to permit a uniform response time.

4. GENERAL.

a. Predicted emergency landings usually permit a more gradual response to runway standby positions. Our major response problem involves aircraft accidents which are not anticipated (where emergencies have not been declared, or where requests have not been made for aircraft firefighting and rescue equipment standby). Aircraft firefighting and rescue assets can be used to greater advantage through prompt notification of aircraft emergencies, followed by immediate response with aircraft firefighting and rescue trucks.

b. During routine duty hours, full-time personnel should maintain a posture in airport fire stations which will permit immediate manning of trucks for response. During late nighttime periods, when flying operations normally decrease, keep at least one truck crew awake and in a position to respond. (This applies to 24-hour shift personnel who have a typical 8-hour sleep period during each tour of duty.) However, neither of these arrangements preclude local prerogative for vehicle standby adjacent to runways, where considered necessary.

c. Where various airport employees are appointed as auxiliary firefighters, detailed plans and special arrangements are required to minimize delays in response. These arrangements should include emergency signals as outlined in AC 150/5210-7, and, where possible, the plans should include personnel assignments from work areas in close proximity to the fire station or having suitable transportation available.

d. Figure 1 shows speed, distance, and time relationships of typical aircraft firefighting and rescue vehicles operating under ideal conditions.

TYPE OF TRUCK	ACCELERATION PHASE			SUSTAINED CRUISE AND DECELERATION PHASES			
	Time In Seconds To Reach 50 MPH	Distance to Reach Peak Design Acceleration		Distance Reached In			
				Two Minutes		Three Minutes	
		Feet	Miles*	Feet	Miles	Feet	Miles
Light Rescue	25	917	0.2	7,733	1.46	12,133	2.30
Combination	45	1,650	0.3	7,410	1.40	11,370	2.15
Water/Foam and Water Tank Types	60	2,200	0.4	6,433	1.22	10,820	2.05
			*To the nearest tenth				

FIGURE 1. SPEED, DISTANCE, AND RESPONSE TIME

The distance factors also imply the limitations of vehicles in response under other than ideal conditions, and illustrate a need for trial runs, to determine practical response capabilities at individual airports. (The information in Figure 1 is based on attaining peak design acceleration within the time periods indicated and maintaining a sustained cruise speed of 50 miles per hour to the point of deceleration. Distance figures were arrived at by computing vehicle velocity during acceleration, sustained cruise phase, and deceleration.)

5. PLANS AND TRAINING.

a. Detailed planning and training will aid in determining items that are fixed and those that are variable which affect reponse time. As an example, the location of fire stations in relation to runways would probably have more influence on response time than the relative acceleration characteristics between different types of aircraft firefighting and rescue trucks. However, crew reaction time can be reduced by efficient arrangement of personal equipment and good communication procedures and practice. In addition to the background and general information (paragraphs 3 and 4), consider the following in developing plans to attain minimum response time.

(1) Prompt transmission of messages and dispatch of aircraft firefighting and rescue forces, and furnishing all available information to assist in location of accident scenes. (The use of aircraft-to-ground control radio frequency monitors can serve as an advantage in anticipating response or movement of trucks to runway standby positions, where desirable.)

(2) Training truck operators to select primary and alternate routes to all areas on the airport, means of access within areas adjacent to the airport, and the local highway system.

(3) Prepositioning aircraft firefighting and rescue trucks during periods of low visibility, as outlined in AC 150/5210-9.

(4) Crew efficiency in manning and starting trucks and getting underway. Crew reaction proficiency can be maintained by conducting scramble tests on the movements which normally occur between the time response signals are given and the time trucks are actually manned, or started. For example, if the crews' quarters are forty feet from the trucks, check the time that it takes for crews to reach the trucks and get underway.

(5) Maintaining vehicle control during all phases of operation, i.e., acceleration, cruise, approach to the scene, and actuation of firefighting subsystems.

(6) Maintaining clear access routes to aircraft operational areas.

(7) Maintaining aircraft firefighting and rescue trucks at maximum operating efficiency. Maintain the power systems, which operate the brakes and throttle, at full operating pressure to avoid any delay in getting underway. This will also insure against moving vehicles in an unsafe condition. Periodic checks of the power systems are recommended.

(8) Training in truck operation and driving to obtain maximum acceleration and speed, commensurate with existing conditions.

(9) Use of grid maps to pinpoint accident scenes indicating airport fence openings or knock-down sections, and areas that are impassable to vehicles, especially those that may be seasonably impassable.

b. With reference to general provisions for reduction in response time, place emphasis on prompt notification of aircraft emergencies and airport fire department plans and training to cope with anticipated or unanticipated aircraft emergencies.

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