

Medical Service

MEDICAL INVESTIGATION OF AIRCRAFT MISHAP FATALITIES

This regulation describes the policies, procedures, and practices set up by the Surgeon General and the Armed Forces Institute of Pathology (AFIP), for the medical investigation of aircraft mishap fatalities. It applies to all senior Air Force medical officers of organizations and units assigned these duties.

1. Purpose of the Reports. Complete medical reports of aircraft mishaps are needed so that data on the causes of the accident, injuries, and deaths can be cataloged for analysis. The results give the Air Force better insight on how to prevent similar accidents. Medical investigations conducted under this regulation are for safety purposes and AFR 127-4 controls their use.

2. Mishap Investigation. The Medical Facility Commander (MFC) of the organization or unit conducting the investigation of an aircraft mishap must carry out the provisions of this regulation. The MFC asks for the services of a pathologist from the AFIP or the consultant center immediately. The MFC may delegate responsibility to the medical member of the Safety Investigation Board. Responsibilities of the investigating medical officer are outlined in AFR 127-4; and autopsy provisions, including the permit, are outlined in AFR 160-55 and AFM 160-19.

a. The pathological investigation can be accomplished by any of the following methods:

(1) The preferred method is to request a team of aerospace pathologists and photographers from AFIP. They serve as consultants to the Safety Investigation Board. Depending on the circumstances of the aircraft mishap, the requested AFIP team may be able to participate in the investigation process before anything at the mishap site has been disturbed. The team can then participate directly in aiding the Safety Investigation Board in determining such things as: pre-impact condition of the aircrew, pre-impact position of the crewmembers, who was controlling the aircraft at impact, pattern of impact, and possibly the cause of the mishap. Problems with egress and personnel protec-

tive equipment, including restraints and impact attenuation mechanism, can also be identified and addressed. When the situation precludes AFIP representatives from participating until after evidence at the scene has been disturbed, they can still be called in to assist in analyzing the information provided to them. In either case, the flight surgeon assigned to the Safety Investigation Board is encouraged to call the Division of Aerospace Pathology at AFIP or to coordinate a request for their assistance directly through the Life Sciences Division of the USAF Inspection and Safety Center. The Division of Aerospace Pathology at AFIP can be reached via telephone at anytime through AUTOVON 291-3232 or commercial (202) 576-3232.

(2) Another method is to have a pathologist from an Air Force histopathology center team up with the flight surgeon and base photographer. Telephone consultation with the AFIP Aerospace Pathology Division is strongly encouraged. The toxicologic specimens must be promptly sent to AFIP, which also serves as a repository for the autopsy protocol, x rays, photographs, mishap report, wet tissue, blocks and slides of these cases. The AFIP issues a consultation report on each case.

(3) If a military pathologist is not available or if the local coroner or medical examiner retains jurisdiction, a nonmilitary pathologist may team up with the flight surgeon and base photographer. The same recommendations regarding AFIP telecon, toxicology specimens, and repository items in (1) and (2) above apply.

b. The medical investigation includes the following:

(1) The flight surgeon documents and photographs the position in which bodies are found, measures exact deceleration distances of the aircraft when possible, and describes all personal equipment found alone or with each body, such as parachute, oxygen mask, ejection seat, etc.

(2) The flight surgeon and pathologist visit the mishap scene in order to coordinate the aircraft wreckage with the autopsy findings. The mishap scene is photographed according to paragraph 5.

(3) The flight surgeon and pathologist should

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view an intact aircraft similar in configuration to the one that crashed if possible. This allows them to become familiar with instrument and control placement and often suggests structures which may have caused injuries. Photographic documentation must be obtained according to paragraph 5.

(4) Autopsies are performed on aircrew members according to paragraph 3.

c. When human factors are involved or suspected in the mishap, additional expertise is available for conducting psychological autopsy and addressing other human factors aspects. This assistance can be obtained by calling the Aerospace Research Branch of the USAF School of Aerospace Medicine, Crew Technology Division (USAFSAM/VNB), Brooks AFB TX 78235-5300, at AUTOVON 240-3561 or commercial (512) 536-3561.

3. When To Perform Autopsies:

a. Complete autopsies are performed on all aircrew members involved in actual operation of the aircraft (pilot, co-pilot, engineer, etc.), or engaged in essential flight activities (navigators, radio operators, boom operators, etc.). Autopsies are done on other personnel aboard the aircraft if the investigating flight surgeon and the pathologist think they would help to explain the mishap. If there are many deaths, as in a transport aircraft, external examination of passengers, with photographic documentation, may give valuable information on the sequence of aircraft deformation and post-crash environment. Complete autopsies on all passengers are often not indicated, but collection of tissue and blood from passengers for toxicological study may be of value in reconstructing the accident sequence.

b. If only parts of the body are found, they must be examined, identified, x rayed (if indicated), autopsied (if indicated), and cataloged. Findings are correlated with the mishap scenario and reported.

c. When body parts are found after the autopsy and are determined to be human tissue, the investigating flight surgeon sends them to the pathologist who performed the autopsy. The investigation is integrated and reports are consolidated.

d. The autopsy should always be done by a pathologist, preferably a military pathologist, either from AFIP, the nearest Class A laboratory, or from any Army or Navy support facility.

(1) The body should be identified using pre- and post-mortem dental chart comparison, fingerprints, or footprints. If identification is not possible by these means, presumptive identification may be based on visual recognition, flight records, personal effects, records of known illnesses, or a combination of factors which make the individual unique.

NOTE: Evidence of positive identification will be provided to the appropriate Mortuary Affairs Officer when the remains are released for burial.

(2) Usually permission for autopsy is obtained from the next of kin; however, since these cases are always of a forensic nature, the autopsy is ordered by the medical examiner or coroner with legal jurisdiction. In instances of exclusive federal jurisdiction, the base commander or representative orders the autopsy.

(3) DD Form 1322, Aircraft Accident Autopsy Report, is completed by the pathologist and flight surgeon within 24 hours of the autopsy and distributed as follows:

(a) Original to the flight surgeon of the Safety Investigation Board.

(b) One copy to AFIP, with frozen tissue for toxicological analysis.

(c) One copy to laboratory files.

e. Whole body x rays are taken with special emphasis (minimum of AP and lateral views) of the head, neck, hands, feet, and spine. X rays are sent to AFIP as soon as possible. The x rays are copied and the originals returned to the contributor. It is further requested that x rays of extremities revealing injuries consistent with control-surface contact be copied and forwarded to AFISC/SEL, Norton AFB CA 82409-5000.

NOTE: Because of the important implications involving egress equipment, fatal ejection neck or head-neck junction injuries need thorough evaluation. In fatal accidents, laminectomy to detect cervico-cranial ligament injury and block removal of upper cervical cord with brainstem to detect subtle injury, such as cord contusion opposite the odontoid process, may be needed. In head-neck junction injuries, a lateral view of occipital-first cervical (O-C1) junction is taken with the head under 25 pounds of traction. This view may be quite helpful for diagnosis. More information on head-neck injuries may be obtained through AFAMRL/BBD, AUTOVON 785-3243. Copies of x rays consistent with significant head-neck junction and cervical spine injuries due to ejection should be forwarded to AFISC/SEL, Norton AFB CA 92409-5000.

f. Because of the extensive medical evaluation of pilots, co-pilots, and other rated personnel, AFIP pathologists may ask for the collection of selected autopsy material for their examination.

g. The Mortuary Affairs Officer should be kept informed of the autopsy progress. Upon completion, the remains are released to the Mortuary Affairs Officer for proper burial.

4. Information Obtained From Autopsies:

a. Post-mortem examination of aircraft fatalities is

done to find the causes of death and injury. Injury patterns must be carefully recorded to aid reconstruction of the accident sequence.

(1) The pathologist doing the autopsy helps the members of the Safety Investigation Board obtain as much information as possible about the cause of the mishap. The flight surgeon member of the Safety Investigation Board attends the autopsy, if possible, and gives clinical and mishap data.

(2) The flight surgeon should seek evidence of physical, physiological, psychological, psychosocial, pharmacological, or pathological conditions which may have had a bearing on the mishap or the victim's injuries.

(3) Photographs and post-mortem x rays are used to support and augment written descriptions.

b. To properly evaluate the injury patterns observed at autopsy, the medical officer should have specific information about the mission, the machine, the human-machine interface, the environment, and the other human factors that existed before, during, and after the crash.

c. The autopsy findings must be correlated with the crash sequence and environmental and human factors as follows:

(1) It is especially important to determine whether the victim was alive, conscious, or in control of the aircraft at the time of mishap. Examination of the extremities for flight control surface injury patterns is important and should include bi-plane x rays of hands and wrists and feet and ankles. Detailed descriptions of injuries to phalanges, metacarpals, carpi, forearm bones, metatarsals, tarsals, calcanei, and lower leg bones are requested.

(2) It is not enough to state that more than half the body showed second and third degree burns. The exact areas burned and specific degree of tissue destruction in each area must be described and recorded in detail using photographs and drawings. Every effort must be made to find out if the burns occurred before or after death.

(3) It is not enough to state that the body was decapitated. The causative agent should be identified and its direction and force at the time of the injury determined, if possible. It should be determined whether decapitation was the cause of death or whether it occurred after death.

5. Photographic Documentation:

a. Photographs, preferably in color negative format, are taken of the following:

(1) Bodies at the mishap site before they are moved.

(2) Clothed bodies before autopsy

(3) Unclothed bodies before autopsy.

(4) Significant injuries observed during the course of the autopsy.

(5) Aerial views of the crash site.

(6) Ground views of the crash site and aircraft wreckage.

(7) Views of similar intact aircraft showing the placement of the occupants and instruments, and their relationship and distances to various body parts, accessibility of controls, etc.

(8) Personal protective and survival gear.

b. Photographs are sent to the Safety Investigation Board, with autopsy pictures directed to the medical member. Copies of photographs are sent to AFIP and USAF Inspection and Safety Center.

NOTE: On ejectees, photographs should be taken in harness with parachute risers attached to study riser-neck contact.

6. Toxicological Procedures:

a. Frozen specimens for toxicology are sent immediately to AFIP by commercial air freight, according to AFR 160-55 and AFM 160-28. Toxicological studies are done by the Toxicology Division of AFIP.

b. The AFIP toxicology laboratory, after receiving frozen tissues from aircraft mishaps, determines carboxyhemoglobin saturation, brain lactic acid content, and blood or tissue alcohol levels. A drug screen for drugs of use or abuse and an extraction for other acidic, basic, and neutral drugs is also done on submitted tissues and fluids.

c. Within 10 workdays of receipt of tissue and fluids, the AFIP Toxicology Division sends out reports to the following:

(1) Original report to the commander authorizing the examination.

(2) One copy to the Safety Investigation Board president.

(3) One copy to the USAF Inspection and Safety Center.

7. Specimen Collection and Shipment:

a. Prompt collection of fresh tissue is essential. Material for toxicological examination must be protected against chemical and mechanical change. Embalming fluids and other chemical preservatives must not be used, since they invalidate these tests. Freezing (usually with dry ice) is the prescribed method for preservation. Rapid transport is also essential. Frozen tissue must not be shipped in the same container with formalin-fixed tissue.

b. The pathologist doing the autopsy collects fluid and tissue specimens for toxicological analyses. Whenever possible, these specimens include blood, lung, liver, brain, kidney, skeletal muscle, urine,

stomach contents, bile, and subcutaneous fat. A thorough toxicological examination requires about 250 to 500 grams of as many of these organs as possible. Submit 20 milliliters (ml) of blood and all available urine and bile. If lesser amounts of tissue are available, these are submitted. Even limited quantities of red bone marrow help when blood is not available. Precautions must be taken to avoid accidental contamination of the specimens during the autopsy.

c. Individual tissue specimens are placed in separate sealed polyethylene bags.

d. Blood and body fluids are shipped in screw-cap polyethylene containers, enclosed in polyethylene or latex bags. The air is carefully expelled before closing the bags.

e. Each container must be labeled to show the contents, name and service number of the individual, and date the material was obtained.

f. A well-insulated box, packed with enough dry ice to keep tissue specimens frozen while in transit, is used for shipping. Label the box: FRAGILE, RUSH, FROZEN SPECIMEN FOR TOXICOLOGICAL EXAMINATION (AIRCRAFT MISHAP). It must be sent by the fastest means available to AFIP, ATTN: CPL-A, Building 54, 14th Street and Alaska Avenue, NW, Wash DC 20306-5000.

g. At the time of shipment, AFIP is told by telephone the name of the carrier, flight number, and air freight way bill or government freight bill number, as indicated.

8. Specific Responsibilities:

a. AFIP:

(1) Provides:

(a) Consultation on all aircraft mishaps.

(b) A safety investigation team as consultants to the board flight surgeon whenever indicated.

(c) Pathological consultation to any laboratory requesting such assistance in carrying out this regulation.

(2) Performs toxicological studies as indicated in paragraph 6.

(3) Reviews the case material after receiving a completed autopsy report, slides, fixed tissue, blocks, x ray, and final case summary, and distributes a consultation report to the following:

(a) Safety Investigation Board president.

(b) Life Sciences Division, USAF Inspection and Safety Center, Norton AFB CA 92409-5000.

(c) AFIP file copy.

b. Consultant Center Pathologist (AFR 160-51):

(1) Performs:

(a) Autopsies on aircraft mishap victims in the respective consultant center area when the AFIP is unable to provide support.

(b) Histopathologic studies on the autopsy tissues.

(2) Immediately sends frozen tissue for toxicology to AFIP by commercial air freight according to AFR 160-55 and AFM 160-28. Toxicological studies are done by the Toxicology Division of AFIP.

(3) Along with the Flight Surgeon, fills out DD Form 1322 within 24 hours of the autopsy and sends it out as follows:

(a) Original to the flight surgeon of the Safety Investigation Board.

(b) One copy to the AFIP, with frozen tissue for toxicological analysis.

(c) One copy to laboratory files.

(4) Within 10 workdays, sends one copy of gross and microscopic reports, a summary of the accident, x rays, and representative slides, blocks, and fixed tissues to AFIP.

c. At bases other than a consultant center, which have a pathologist capable of performing a competent forensic autopsy, the pathologist assigned may perform the duties in b above rather than requesting the service from the consultant center. Free communication with AFIP is strongly urged as a minimum in any event.

d. For Histopathology centers in the continental United States (CONUS), the geographical areas of support for Class A laboratories are:

(1) Wilford Hall USAF Medical Center, Lackland AFB TX, for the consultant centers at Lackland AFB, Carswell AFB, Sheppard AFB, the US Air Force Academy, and their areas.

(2) USAF Regional Hospital, Maxwell AFB AL, for consultant centers at Maxwell AFB, Keesler AFB, and their areas.

(3) David Grant USAF Medical Center, Travis AFB CA, for Travis AFB, March AFB, Fairchild AFB, Minot AFB, and their areas.

(4) USAF Medical Center, Wright-Patterson AFB OH, for consultant centers at Wright-Patterson AFB, Scott AFB, and their areas.

(5) Malcom Grow USAF Medical Center, Wash DC, for the Consultant Center at Andrews AFB and its area as well as Air Force facilities in Greenland, Iceland, Labrador, Newfoundland, and the Azores.

e. Histopathology centers overseas carry out those functions in a and c above.

BY ORDER OF THE SECRETARY OF THE AIR FORCE

OFFICIAL

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SUMMARY OF CHANGES
This revision updates the entire text.