



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Washington, DC

Injury Factual Report

August 15, 2016

Nicholas Webster, MD, MPH
Medical Officer

A. ACCIDENT: CEN15MA290 Frisco, Colorado

On July 3, 2015, at 1:39 p.m. mountain daylight time, an Airbus Helicopter Inc. (formerly American Eurocopter) AS350B3e helicopter, N390LG, impacted the upper west parking lot 360 feet southwest of the Summit Medical Center helipad (91CO), Frisco, Colorado. A post-impact fire ensued. Visual meteorological conditions prevailed at the time of the accident. The helicopter was registered to and operated by Air Methods Corp and the flight was conducted under the provisions of 14 *Code of Federal Regulations* Part 135 on a company flight plan. The airline transport pilot was fatally injured and two flight nurses were seriously injured.

B. GROUP IDENTIFICATION:

Nicholas Webster, MD, MPH
Group Chairman
National Transportation Safety Board

Kristin Poland, PhD
National Transportation Safety Board

Mary Pat McKay, MD., MPH
National Transportation Safety Board

C. DETAILS OF INVESTIGATION

Purpose

This investigation was performed to document the injuries sustained by the pilot and the two flight nurses.

Methods

The pilot's emergency treatment records and autopsy report, and portions of the two flight nurses' hospital treatment records were reviewed. Injuries for each crewmember were coded using the abbreviated injury scale (AIS) system which applies a severity score of 1 (minimal) to 6 (maximal) to each injury; these are grouped into nine body regions.^{a,b}

Because the pilot went into cardiac arrest very soon after arriving in the emergency department and although resuscitation was attempted, it was unsuccessful, the emergency treatment records for the pilot were limited. Only a single chest X-ray was performed, but no other radiology. In addition, there were some discrepancies between injury descriptions provided by treating physicians and the autopsy report. For instance, although the hospital record included a diagnosis of third degree burns to the entire face, the autopsy reported normal facial hair, including the color and length. For each of these, the group discussed the discrepancy and used the most specific information to ascertain the AIS code. AIS codes for the pilot were confirmed with a trained AIS coder on contract to the FAA. For the pilot and one flight nurse, AIS injury codes were separated into blunt force injuries and thermal injuries in order to distinguish the effects of the postcrash fire. Because the 32-year-old flight nurse had no thermal injuries, only injuries due to blunt force trauma were coded.

Injury AIS Coding

64-year-old Pilot Blunt Force Injuries			
Body Region	Injury	AIS Code	AIS Severity Score
External	Forehead contusion 5½" by 3"	210402	1
	Nasal abrasion	210202	1
	Chin abrasions	210202	1
	Left neck abrasion, 4"	310202	1
	Abrasion, anterior chest, 4½" by ¾"	410202	1
	Abrasions on the lateral aspect of the left wrist	710202	1
	Two abrasions on the posterior aspect of the left elbow	710202	1
	Contusion involving the medial surface of the right upper forearm, 2½"	710402	1
	Contusion left upper thigh, 2 ½"	810402	1
	Puncture laceration anterior aspect of the right lower leg ½"	810602	1
	Large contusion, right lower quadrant extending to right thigh	510402 and 810402	1

^a The likelihood of surviving an injury is related to the injury severity level. On average, if a person has a single AIS 1 injury, their likelihood of survival is 99.3% while if they have a single AIS 6 injury, their likelihood of survival is 21%. (The survival risk ratio for a single injury, which is the number of survivors with an AIS level injury divided by the total number of people with that level injury, ranges from 0.993 for AIS 1 to 0.210 for AIS 6.)

^b Gennarelli T, Wodzin E, editors. AIS 2005 Update 2008. Association for the Advancement of Automotive Medicine, B., IL 2008.

64-year-old Pilot Blunt Force Injuries (continued)			
Body Region	Injury	AIS Code	AIS Severity Score
Chest	Rib fractures [right anterolateral 1-8 ribs and all left ribs adjacent to the sternum (flail chest)]	450214	5
	Right hemothorax (30 cc at autopsy, chest tubes in place)	442200	3
	Left hemothorax (10 cc at autopsy, chest tubes in place)	442200	3
	Pulmonary contusions (NFS) ^c	441402	3
	Laceration-transection of the intercostal arteries with hemomediastinum	442208	2
	Sternal fracture, diagonal, distal	450804	2
Abdomen / Pelvis	Retroperitoneal hemorrhage “extensive” (NFS)	543800	2
	Liver lacerations (right lobe) with 300 cc hemoperitoneum (liver laceration NFS)	541820	2
Extremities or pelvic girdle	Pelvic fractures, left and anterior (pelvic ring fracture NFS)	856100	2
	Fibula fracture, left (NFS)	854441	2
	Tibia fracture, left (NFS)	854000	2
	Fibula fracture, right (NFS)	854441	2
	Tibia fracture, right (NFS)	854000	2

64-year-old Pilot Thermal Injuries			
Body Region	Injury	AIS Code	AIS Severity Score
Chest	Thermal changes extending from the mainstem bronchus to the intra-alveolar spaces including sloughing of the respiratory mucosa	419208	6
External	Second degree burns to the back and multiple areas of second degree burns to extremities -burns 2 nd or 3 rd degree; partial or full thickness 10-19%	912012	2

^c NFS = not further specified. This is used when not enough information is provided to better describe an injury.

45-year-old Flight Nurse Blunt Force Injuries			
Body Region	Injury	AIS Code	AIS Severity Score
Chest	Rib fracture single, 12 th rib, left	450201	1
Spine	L1 - transverse process fracture, left	650620	2
	L2 - transverse process fracture, left	650620	2
	L3 - transverse process fracture, left	650620	2
	L4 - transverse process fracture, left	650620	2

45-year-old Flight Nurse Thermal Injuries			
Body Region	Injury	AIS Code	AIS Severity Score
External	90% total body burns with at least 80% full thickness - burns 2 nd or 3 rd degree; partial or full thickness greater than or equal to 90%	912032	6

32-year-old Flight Nurse Blunt Force Injuries			
Body Region	Injury	AIS Code	AIS Severity Score
Spine	Incomplete cauda equina syndrome with L1 burst fracture	630624	3
	L1 severe comminuted burst fracture	650634	3
	T12- transverse process fracture, left	650420	2
	L1- transverse process fracture, left	650620	2
	L3- transverse process fracture, left	650620	2

D. SUMMARY OF FINDINGS

The 64-year-old pilot suffered multiple bilateral rib fractures, a sternal fracture, pelvic ring fractures, bilateral ankle fractures, laceration to the right lobe of the liver, bilateral retroperitoneal and intraperitoneal hemorrhages, 2nd and 3rd degree skin burns, and thermal lung injuries. His maximum AIS severity score from blunt injury was 5 for his flail chest. His maximum thermal injury AIS severity score was 6 for the thermal lung injuries.

The 45-year-old flight nurse suffered blunt force injuries to the spine and 90% total body area partial and full thickness burns. His maximum blunt injury AIS severity score due to lumbar transverse process fractures was 2. His maximum thermal injury AIS severity score due to 90% total body burns was 6.

The 32-year-old flight nurse suffered blunt force spinal injuries but no thermal injuries. His maximum AIS severity score due to incomplete cauda equina syndrome with first lumbar vertebra burst fracture was 3.