NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Washington, DC

Injury Factual Report

February 20, 2018

Mary Pat McKay, MD, MPH
Chief Medical Officer

A. ACCIDENT: WPR16FA040; Superior, AZ

On December 15, 2015, about 1723 mountain standard time, an Airbus helicopter, AS350B3, N74317, was substantially damaged when it impacted terrain while maneuvering near Superior, Arizona. The helicopter air ambulance (HAA) was registered to Air Methods corporation and was doing business as Native Air Ambulance, under the provisions of Title 14 *Code of Federal Regulations Part* 135. The commercial pilot, and flight nurse sustained fatal injuries and the flight paramedic sustained serious injuries. Visual meteorological conditions prevailed and a company visual flight rules (VFR) flight plan was filed for the flight. The cross-country positioning flight originated from the Phoenix-Mesa Gateway Airport (IWA), Mesa, Arizona, at 1705 with an intended destination of Globe, Arizona.

B. GROUP IDENTIFICATION:

No group was formed for the development of this report.

C. DETAILS OF INVESTIGATION

Purpose

This investigation was performed to document the injuries to the flight nurse who initially survived the crash in order to evaluate whether improved communication regarding the timing and location of the crash, such as through a functioning ELT, could have allowed him to survive.

Methods

The 38 year old male flight nurse's autopsy report was reviewed. Injuries 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. [1,2] Review of the coding was performed by an AIS Certified Coder.

Injury AIS Coding

Flight Nurse Injuries			
Body Region	**Injury**	**AIS Code**	**AIS Severity Score**
External	Right jaw contusion 4" by 2"	210402	1
	Right jaw abrasion 1 ½"	210202	1
	Forehead abrasions	210202	1
	Subgaleal hemorrhages	110402	1
	Chest wall contusion	410202	1
	Abrasions (2) left lower abdominal wall	510202	1
	Abrasions, anterior right thigh, shin, and knee	810202	1
	Abrasions, anterior left thigh and shin	810202	1
	Contusion left upper thigh, 2 ½"	810402	1
	Contusion, left foot	810402	1
Chest	Multiple Rib fractures [posterior right ribs 1-4; posterior lateral right ribs 3-7]	450203	3
	Flail Chest [fractures of left lateral left ribs 3-8; and posterior left ribs 6-10]	450212	3
	Right hemothorax (500 cc)	442200	3
	Left hemothorax (100 cc)	442200	3
Abdomen / Pelvis	Mesenteric laceration, 10 cm	542024	3
	Two 3 cm lacerations of the splenic capsule	544224	3
Extremities or pelvic girdle	Multiple fractures, right clavicle	750671	2

The Injury Severity Score (ISS) predicts the likelihood of survival among traumatically injured and can be used to compare the severity of injury among individuals. In order to calculate the ISS, the squares of the maximum AIS (MAIS) scores for each of the three highest scoring body

[1] 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.)
[2] Gennarelli T, Wodzin E, editors. AIS 2005 Update 2008. Association for the Advancement of Automotive Medicine, B., IL 2008.

regions are added together (ISS = $(MAIS_{regionA})^2 + (MAIS_{regionB})^2 + (MAIS_{regionC})^2$). The maximum survivable score is 75.[3] Injuries coded to a severity of 9, unknown severity, preclude the determination of an ISS. Injury severity scores are routinely divided into four groups: minor (ISS 1-8), moderate (ISS 9-15), severe (ISS 16-24), and very severe (ISS >25).[4] The flight nurse's ISS was 22.

[3] Baker SP, O.N.B., Haddon W, et al., The Injury Severity Score: a method for describing patients with multiple injuries and evaluating emergency care. J Trauma 1974;14:187-196.
[4] 3American College of Surgeons. National Trauma Data Bank 2013 Annual Report. Accessed 2/3/2017. Available from: http://www.facs.org/trauma/ntdb/pdf/ntdb-annual-report-2013.pdf.