

UNITED STATES AIR FORCE
AIRCRAFT ACCIDENT INVESTIGATION
BOARD REPORT



HH-60G PAVEHAWK, T/N 92-26467

**210TH RESCUE SQUADRON
176TH WING**

JOINT BASE ELMENDORF-RICHARDSON, ALASKA



LOCATION: COPPER MOUNTAIN, LAKE CLARK, ALASKA

DATE OF ACCIDENT: 31 AUGUST 2014

BOARD PRESIDENT: COLONEL WILLIAM P. MAZZENO

Conducted IAW Air Force Instruction 51-503



DEPARTMENT OF THE AIR FORCE
PACIFIC AIR FORCES

MAY 25 2016

ACTION OF THE CONVENING AUTHORITY

The report of the accident investigation board, conducted under the provisions of AFI 51-503, *Aerospace Accident Investigations*, 26 May 2010, that investigated the 31 August 2014 mishap near Copper Mountain, Lake Clark Alaska, involving HH-60, T/N 92-26467, assigned to the 210th Rescue Squadron, 176th Wing, Joint Base Elmendorf-Richardson, Alaska, complies with the applicable regulatory and statutory guidance. Accordingly, the report is approved.

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DEPARTMENT OF THE AIR FORCE
PACIFIC AIR FORCES

JUN 14 2016

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SIGNED

, Colonel, USAF
Staff Judge Advocate

**EXECUTIVE SUMMARY
UNITED STATES AIR FORCE
AIRCRAFT ACCIDENT INVESTIGATION**

**HH-60G, T/N 92-26467
COPPER MOUNTAIN, LAKE CLARK ALASKA
31 AUGUST 2014**

On Sunday, 31 August 2014, at approximately 2004 hours local time (L), an Alaska Air National Guard (AKANG) HH-60G Pavehawk, tail number 92-26467, the mishap aircraft (MA), assigned to the 210th Rescue Squadron, and pararescue jumpers (PJ) from the 212th Rescue Squadron, both from the 176th Wing, Joint Base Elmendorf-Richardson, Alaska were requested by the National Park Service (NPS) through Alaska Rescue Coordination Center to rescue a civilian hiker with a severe laceration and fractured wrist. The injured hiker, Mishap Hiker 1 (MH1), and three other civilian hikers were located downslope from one of the steep and rocky ridgelines on Copper Mountain in the Lake Clark National Park and Preserve. All AKANG personnel were in Title 10 military active duty status for the rescue operation.

At approximately 2315L, while the MA was hovering to rescue MH1, a rock dislodged from the ridge above the mishap site and struck Mishap Hiker 2 (MH2) in the forehead. The mishap crew (MC) successfully lifted MH1, MH2, and the two uninjured hikers. MC provided medical treatment according to protocol and expedited delivery of MH1 and MH2 to a higher level of care at Providence Hospital in Anchorage.

The Accident Investigation Board (AIB) president found, by clear and convincing evidence, the cause of this mishap is that, while the MA was in a hover over the rescue site, the MA rotor downwash dislodged a rock upslope from MH2's position, striking him in the forehead, rendering MH2 unconscious and placing him in critical condition. Additionally, the AIB president found, by a preponderance of the evidence, the following factors substantially contributed to the mishap:

- (1) The injury to the right hand and forearm of MH1, combined with the extreme steep and rocky terrain, prevented moving MH1.
- (2) The geography of the rescue location, wind conditions, operational requirements of the MA (i.e. hoist orientation and length), nature of MH1's injury, and the location of the hikers restricted where MA could perform the rescue.
- (3) MH2 exposed his head to injury while the rescue crew was hoisting MH1 into the MA.

Under 10 U.S.C. § 2254(d) the opinion of the accident investigator as to the cause of, or the factors contributing to, the accident set forth in the accident investigation report, if any, may not be considered as evidence in any civil or criminal proceeding arising from the accident, nor may such information be considered an admission of liability of the United States or by any person referred to in those conclusions or statements.

SUMMARY OF FACTS AND STATEMENT OF OPINION
HH-60G, T/N 92-26467
31 August 2014

TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS..... iii

SUMMARY OF FACTS 1

1. **AUTHORITY AND PURPOSE.....1**

 a. Authority1

 b. Purpose.....1

2. **ACCIDENT SUMMARY1**

3. **BACKGROUND2**

 a. Pacific Air Forces (PACAF)2

 b. Air National Guard (ANG)3

 c. 176th Wing (176 WG)3

 d. 210th Rescue Squadron (210 RQS)4

 e. 211th Rescue Squadron (211 RQS)4

 f. 212th Rescue Squadron (212 RQS).....4

 g. HH-60G Pavehawk5

 h. HC-130P/N Hercules “King”5

4. **SEQUENCE OF EVENTS6**

 a. Mission.....6

 b. Planning6

 c. Preflight.....6

 d. Summary of Accident6

 e. Impact.....14

 f. Egress and Aircrew Flight Equipment (AFE)14

 g. Extraction Equipment Used14

 h. Search and Rescue (SAR).....15

 i. Recovery of Remains.....15

5. **MAINTENANCE15**

6. **AIRFRAME SYSTEMS.....15**

7. **WEATHER.....16**

 a. Forecast Weather.....16

 b. Observed Weather.....16

 c. Space Environment16

 d. Operations.....16

8. **CREW QUALIFICATIONS.....16**

9. **MEDICAL17**

 a. Qualifications17

 b. Health.....17

 c. Pathology.....17

 d. Lifestyle17

 e. Crew Rest and Crew Duty Time17

10. OPERATIONS AND SUPERVISION	17
a. Operations	17
b. Supervision	18
11. HUMAN FACTORS ANALYSIS.....	18
12. GOVERNING DIRECTIVES AND PUBLICATIONS.....	18
a. Publicly Available Directives and Publications Relevant to the Mishap.....	18
b. Other Directives and Publications Relevant to the Mishap	19
c. Known or Suspected Deviations from Directives or Publications.....	19
13. ADDITIONAL AREAS OF CONCERN	19
STATEMENT OF OPINION	20
INDEX OF TABS.....	24

ACRONYMS AND ABBREVIATIONS

ADO	Assistant Director of Operations	Evac	Evacuation
AF	Air Force	Exfil	Exfiltrate
AF IMT	Air Force Information Management Tool	FA	Flight Authorization
AFBAir Base	Air Force	FAE	Function Area Expert
AFE	Aircrew Flight Equipment	FE	Flight Engineer
AFI	Air Force Instruction	FLIR	Forward Looking Infrared
AFPAM	Air Force Pamphlet	Front Enders	Pilot or Co-Pilot
Aft	Rear of Aircraft	ft	Feet or Foot
AFTO	Air Force Technical Order	GPS	Global Positioning System
AGR	Active Guard Reserve	HAAR	Helicopter Air to Air Refueling
AIB	Accident Investigation Board	Helo	Helicopter
AIMWTS	Aeromedical Information Management Waiver Tracking System	Herc	HC-130 Hercules
AK	Alaska	HFA	Human Factors Analysis
AKANG	Alaska Air National Guard	HFACS	Human Factors Analysis and Classification System
AKRCC	Alaska Rescue Coordination Center	Hypo Bag	Hypothermia Bag
ANG	Air National Guard	IAW	In accordance With
ANGI	Air National Guard Instruction	ICS	Intercom System
AOR	Area of Responsibility	Illume	Illumination
ARCC	Alaska Rescue Coordination Center	Infill	Infiltrate
ARMS	Aircrew Mission Flight Data Document	IR Light	Infrared Light
Aux Tanks	Auxiliary Tanks	IV	Intravenous
AWT	Alaska Wildlife Trooper	JBER	Joint Base Elmendorf-Richardson
Back Enders	Special Missions Aviator	Jolly	HH-60 Call Sign
Bagging	Manual Ventilation	Js	Pararescueman
Barrelman	Harness Hoist Set-Up	King	HC-130 Call Sign
Bd Pres.	AIB Board President	King LT	Blind Insertion Airway
BP	Blood Pressure	L	Local Time
BVM	Bag Valve Mask	LA	AIB Legal Advisor
Capt	Captain	LMR	Land Mobile Radio
CC	Commander	Low Lux	Low Millilux
CMSgt	Chief Master Sergeant	Lt Col	Lieutenant Colonel
Col	Colonel	LUU-4	Illumination Flare
Comm	Communication	MA	Mishap Aircraft
CRM	Crew Resource Management	Maj	Major
CRO	Combat Rescue Officer	MAJCOM	Major Command
CSM	Circulation, Motion, Sensation	MARMT	Modified Alaska Rescue
c-spine	Cervical Spine	MC	Mission Tracker
Cub	Piper Cub Civilian Light Aircraft	MCP	Mishap Crew
DMVA	Department of Military & Veterans Affairs	Med Evac	Medical Evacuation
DO	Director of Operations	Med Ruck	Medical Rucksack
DoD	Department of Defense	MFR	Memorandum for Record
Ear Pro	Ear Protection	MH1	Mishap Hiker 1
EMT	Emergency Medical Technician	MH2	Mishap Hiker 2
ER	Emergency Room	MH3	Mishap Hiker 3
ET	Endotracheal Tube	MH4	Mishap Hiker 4
ETA	Estimated Time of Arrival	MOA	Memorandum of Agreement
		MP	Mishap Pilot
		MPJ1	Mishap Pararescue Jumper 1
		MPJ2	Mishap Pararescue Jumper 2

MS	Mishap Sortie	Padlock	Eyes on Site
MSA	Mishap Support Aircraft	PCP	Phencyclidine
MSC	Mishap Support Aircrew	PCR	Patient Care Record
MSCP	Mishap Support Aircraft Copilot	PHA	Public Health Assessment
MSFE	Mishap Support Aircraft Flight Engineer	PJ	Pararescue Jumpers or Pararescueman
MSL	Mishap Special Mission Aviator Left	PLN	Planning
MSLM	Mishap Support Aircraft Load Master	PM	AIB Pilot Member
MSN	Mishap Support Aircraft Navigator	Prov	Providence Hospital
MSP	Mishap Support Aircraft Pilot	Pull 100%	Pulling Maximum Power
MSPJ1	Mishap Support Aircraft Pararescue Jumper 1	Pulse Ox	Pulse Oximetry
MSPJ2	Mishap Support Aircraft Pararescue Jumper 2	Purcell	Hoist Equipment
MSR	Mishap Special Mission Aviator Right	RADALT	Radar Altimeter
MSRO	Mishap Support Aircraft Radio Operator	RCC	Rescue Coordination Center
NASA	National Aeronautics and Space Administration	Rec	AIB Recorder
Neuro	Neurologist	Robinson	Civilian Helicopter
NOTAMS	Notice to Airman	RQS	Rescue Squadron
NPA	Nasopharyngeal Airway	RTB	Return to Base
NPS	National Park Service	SA	Situational Awareness
NPS-CR	National Park Service – Chief Ranger	SAR	Search and Rescue
NPS-D	National Park Service – Dispatch	SARDO	Search and Rescue Duty Officer
NPS-MS	National Park Service – Maintenance Supervisor	SATCOM	Satellite Communications
NPS-PR	National Park Service – Park Ranger	SERE	Survival Evasion Resistance and Escape
NVG	Night Vision Goggle	SIB	Safety Investigation Board
O2	Oxygen	SMA	Special Mission Aviator
OG	Operations Group	SMSgt	Senior Master Sergeant
OGE	Outer Ground Effect	SSgt	Staff Sergeant
Ops	Operations	Stokes	Litters
Ops Tempo	Operations Tempo	Strop	Type of Harness
ORM	Operational Risk Management	T/N	Tail Number
PA	Public Affairs	Title 10	Active Duty
PACAF	Pacific Air Force	Title 32	National Guard Duty
		TL	Team Lead
		TOLD	Take-off and Landing Data
		Trans Load	Patient Transfer to HC-130
		TSgt	Technical Sergeant
		USC	United States Code
		VFR	Visual Flight Rules
		VHF	Very High Frequency
		WFR	Wilderness First Responder
		WG	Wing

The above list was compiled from the Summary of Facts, the Statement of Opinion, the Index of Tabs, and Witness Testimony (Tab V).

SUMMARY OF FACTS

1. AUTHORITY AND PURPOSE

a. Authority

On 7 April 2015, General Lori J. Robinson, Commander, Pacific Air Forces (PACAF), appointed Colonel William P. Mazzeno to conduct an aircraft accident investigation of a mishap that occurred on 31 August 2014 involving an HH-60G Pavehawk aircraft near Copper Mountain, Lake Clark, Alaska (Tab Y-2). The aircraft accident investigation was conducted in accordance with Air Force Instruction (AFI) 51-503, *Aerospace and Accident Investigations*, at Joint Base Elmendorf-Richardson (JBER), Alaska, from 13 April 2015 through 2 June 2015. Board members were a Legal Advisor Major, a Pilot Member Major, and a Recorder Staff Sergeant. Functional Area Experts were a Human Factors Captain and a Pararescueman Chief Master Sergeant (Tab Y-4 through Y-7). On 11 September 2015, General Robinson reconvened the board to address legal concerns and administrative deficiencies. The Board completed its revisions on 28 April 2016.

b. Purpose

This is a legal investigation convened to inquire into the facts surrounding the aircraft or aerospace accident, to prepare a publicly-releasable report, and to gather and preserve all available evidence for use in litigation, claims, disciplinary actions, administrative proceedings, and for other purposes.

2. ACCIDENT SUMMARY ¹

On Sunday, 31 August 2014, at approximately 2004 hours local time (L), an Alaska Air National Guard (AKANG) HH-60G Pavehawk, tail number 92-26467, the mishap aircraft (MA), assigned to the 210th Rescue Squadron (RQS), and pararescue jumpers (PJ) from the 212 RQS, both from the 176th Wing (WG), JBER, Alaska were requested by the National Park Service (NPS) through Alaska Rescue Coordination Center (AKRCC) to rescue a civilian hiker with a severe laceration and fractured wrist (Tabs CC-9 and CC-41). The injured hiker, Mishap Hiker 1 (MH1), and three other civilian hikers were located downslope from one of the steep and rocky ridgelines on Copper Mountain in the Lake Clark National Park and Preserve (Tabs V-1.4, V-2.8, V-3.3, V-6.12, CC-8, and CC-26). An AKANG HC-130P/N Hercules, tail number 93-2106, the mishap support aircraft (MSA), assigned to the 211 RQS and also from the 176 WG, JBER, Alaska, assisted by providing overhead support and communications (Tabs V-16 through V-23, and CC-40). All AKANG personnel on the MA and the accompanying MSA were in Title 10 military active duty status for the rescue operation (Tab BB-4).

¹ All report citations to Tab V witness testimony will be to the major sub-tab document for that witness and then its page. For example, Tab V-1.1, MH1 Testimony to the AIB, refers to related citations on page 1 of the first major sub-tab of Tab V.

At approximately 2315L, while the MA was in a hover performing the rescue of MH1, a rock dislodged from the rock-strewn ridge above the rescue site and struck Mishap Hiker 2 (MH2) in the forehead, rendering him unconscious and placing him in critical condition (Tabs V-2.1 and V-3.3 through V-4.13). The MA and mishap crew (MC) successfully lifted both injured hikers and the two uninjured hikers. (Tabs V-1.3, V-1.13, V-1.14, V-2.16, V-3.13, V-4.13, V-4.14, V-4.15, V-14.16, V-14.25, V-14.27, V-15.4, and V-15.11). The MA delivered MH1 and MH2 to a higher level of care at Providence Hospital in Anchorage, Alaska (Tabs V-14.33, V-14.34, V-15.22, and V-15.23). At the same time, the MA delivered the two uninjured hikers to NPS authorities in Anchorage (Tabs V-3.14, V-4.24, V-7.4, and V-14.34). The MA was not damaged (Tab V-16.5 and CC-37). There was no damage to private property (Tab V-1.1 and V-5.1). There was limited media interest in Alaska and MH2's hometown (Tabs EE-1 through EE-7).

3. BACKGROUND

The MC was assigned to 210 RQS and 212 RQS. The MA belonged to the 210 RQS. The mishap support aircrew (MSC) were assigned to both the 211 RQS and the 212 RQS. The MSA was assigned to the 211 RQS. All units involved belong to the 176 WG, AKANG, stationed at JBER, Alaska. (Tabs DD-2 through DD-11)

a. Pacific Air Forces (PACAF)

PACAF's primary mission is to deliver rapid and precise air, space and cyberspace capabilities to protect and defend the United States (U.S.), its territories and our allies and partners; provide integrated air and missile warning and defense; promote interoperability throughout the Area of Responsibility; maintain strategic access and freedom of movement across all domains; and posture to respond across the full spectrum of military contingencies in order to restore regional security.



PACAF's area of responsibility extends from the west coast of the U.S. to the east coast of Africa and from the Arctic to the Antarctic, covering more than 100 million square miles. The area is home to 50 percent of the world's population in 36 nations and over one-third of the global economic output. The Pacific region's vast size and complexity distinguishes it from other regions. In addition to China, the world's most populous country, India, the most populous democracy, and Indonesia, a secular democracy with the world's largest Islamic population, the Asia-Pacific region contains sixty percent of the world's population, with more than 1,000 languages spoken in 36 nations spread across 52 percent of the Earth's surface and 16 time zones. The unique location of the Strategic Triangle (Hawaii-Guam-Alaska) gives our nation persistent presence and options to project U.S. airpower from sovereign territory. (Tab DD-2)

b. Air National Guard (ANG)

The ANG has both a federal and state mission. The dual mission, a provision of the U.S. Constitution, results in each guardsman holding membership in the National Guard of his or her state and in the National Guard of the U.S.



The ANG's federal mission is to maintain well-trained, well-equipped units available for prompt mobilization during war and provide assistance during national emergencies (such as natural disasters or civil disturbances). During peacetime, the combat-ready units and support units are assigned to most Air Force (AF) major commands to carry out missions compatible with training, mobilization readiness, humanitarian and contingency operations such as Operation Enduring Freedom in Afghanistan. ANG units may be activated in a number of ways as prescribed by public law. Most of the laws may be found in Title 10 of the U.S. Code.

The ANG provides tactical airlift, air refueling tankers, general purpose fighters, rescue and recovery capabilities, tactical air support, weather flights, strategic airlift, special operations capabilities and aeromedical evacuation units. The ANG has three rescue and recovery squadrons that fly HH-60 helicopters and HC-130 aircraft. These units provide important lifesaving capabilities and services to civilian and military agencies. (Tab DD-5)

c. 176th Wing (176 WG)

The 176 WG is one of the largest and most active ANG wings in the country: more than 1,400 men and women serving Alaska and the U.S. as pilots, navigators, mechanics, engineers, electricians, administrative support personnel, network programmers, air controllers, medical technicians, chaplains, photojournalists, firefighters and more. Many of these highly trained specialists work full-time for the wing. Most, however, are “traditional” members that is, citizen-airmen from all walks of life who work and train one weekend a month and about 15 other days throughout the year.



From 1954 to 2011, the wing operated out of Kulis ANG Base, adjacent to Ted Stevens International Airport in Anchorage. The base was among those recommended for closure by the 2005 Base Realignment and Closure Commission, and in 2011 the wing moved into a set of brand-new buildings on JBER, just north of Anchorage. (Tab DD-8)

d. 210th Rescue Squadron (210 RQS)

The 210 RQS proudly traces its lineage back to World War II to the 10th Emergency Boat Rescue Squadron of the 11th Army Air Force, which patrolled the Aleutian chain as well as Alaska coastal waters. Hence the name, Second Tenth Rescue Squadron, or 210th for short. The 210 RQS was activated in 1990. Since that time the squadron has conducted 24 hour 365 rescue alert for the citizens of Alaska and has saved in-excess of a thousand Alaskans from certain death. In addition to their peacetime mission, they also train for the wartime mission of combat search and rescue. They are an instrument of national power, recovering downed airman or isolated personnel from harms way is the right thing to do and supports the rescue motto, "that others may live." (Tab DD-9)



e. 211th Rescue Squadron (211 RQS)

The 211 RQS is one of three flying squadrons that work together to execute the 176 WG's search-and-rescue missions. Specifically, the 211 RQS operates four HC-130 "King" aircraft. The HC-130 is a version of the well-known C-130 "Hercules" tactical transport aircraft that has been specially modified and upgraded to perform search-and-rescue missions. One of its major upgrades is the ability to refuel other aircraft in mid-air; this allows the HH-60 Pavehawk helicopters of the 211th's sister squadron, the 210 RQS, to function over a greatly extended range. It is also equipped with a suite of components--radar and night-vision goggles, for example that allow it to function effectively at night and in poor weather. (Tab DD-10)



f. 212th Rescue Squadron (212 RQS)

The 212 RQS is the busiest rescue force in the Department of Defense. The 212 RQS provides elite pararescuemen (PJs), combat rescue officers (CROs), and Survival, Evasion, Resistance, and Escape (SERE) specialists to carry out the 176 WG's wartime and peacetime rescue missions.

PJs and CROs are the Air Force's equivalent of Army Special Forces and Navy Sea, Air, and Land: highly trained and motivated specialists who endure an incredibly grueling training process to earn the right to wear the distinctive flash on their hard earned beret.



SERE specialists provide effective, realistic training for the PJs and CROs; plan training missions; and serve as subject-matter experts for PJs, CROs, aircrew and other Department of Defense personnel for all personnel recovery missions. All these unit members are organized, trained and equipped to operate day or night in all geographic and environmental conditions, and in environments both friendly and hostile. (Tab DD-11)

g. HH-60G Pavehawk

The primary mission of the HH-60 Pavehawk helicopter is to conduct day or night personnel recovery operations into hostile environments to recover isolated personnel during war. The HH-60 is also tasked to perform military operations other than war, including civil search and rescue, medical evacuation, disaster response, humanitarian assistance, security cooperation/aviation advisory, National Aeronautics and Space Administration (NASA) space flight support, and rescue command and control.



The Pavehawk is a highly modified version of the Army Black Hawk helicopter which features an upgraded communications and navigation suite that includes integrated inertial navigation/global positioning/Doppler navigation systems, satellite communications, secure voice, and have quick communications. All HH-60s have an automatic flight control system, night vision goggles with lighting and forward looking infrared system that greatly enhances night low-level operations. Additionally, Pavehawks have color weather radar and an engine/rotor blade anti-ice system that gives the HH-60 an adverse weather capability. Pavehawk mission equipment includes a retractable in-flight refueling probe, internal auxiliary fuel tanks, two crew-served 7.62mm or .50 caliber machineguns, and an 8,000-pound capacity cargo hook. To improve air transportability and shipboard operations, all HH-60s have folding rotor blades. Pavehawk combat enhancements include a radar warning receiver, infrared jammer and a flare/chaff countermeasure dispensing system. HH-60 rescue equipment includes a hoist capable of lifting a 600-pound load from a hover height of 200 feet (ft), and a personnel locating system that is compatible with the PRC-112 survival radio and provides range and bearing information to a survivor's location. Pavehawks are equipped with an over-the-horizon tactical data receiver that is capable of receiving near real-time mission update information. (Tab DD-13)

h. HC-130P/N Hercules "King"

The HC-130 "King" is the only dedicated fixed-wing personnel recovery platform in the Air Force inventory. The HC-130 is an extended-range version of the C-130 Hercules transport. HC-130 crews provide expeditionary, all weather personnel recovery capabilities to our Combatant Commanders and Joint/Coalitions partners worldwide.



The mission of the HC-130 "King" is to rapidly deploy to austere airfields and denied territory in order to execute, all weather personnel recovery operations anytime...anywhere. "King" crews routinely perform high and low altitude personnel and equipment airdrops, infiltration/exfiltration of personnel, helicopter air-to-air refueling, and forward area refueling point missions. When tasked, the aircraft also conducts humanitarian assistance operations, disaster response, security cooperation/aviation advisory, emergency aeromedical evacuation, casualty evacuation, noncombatant evacuation operations, and, during the Space Shuttle program, space flight support for NASA. (Tab DD-16)

4. SEQUENCE OF EVENTS

a. Mission

At approximately 2004 local time (L) the AKRCC accepted a mission at the request of the NPS to rescue a hiker with a fractured right wrist and laceration to the right arm on Copper Mountain in the Lake Clark National Park and Preserve, Alaska (Tabs CC-9, CC-10, CC-29, and CC-41). The AKRCC, who accepted the mission, notified the Search and Rescue Duty Officer (SARDO) and the SARDO recalled aircrew on alert from the 210 RQS, 211 RQS, and 212 RQS (Tabs V-10.4, V-11.4, V-12.3, V-13.4, V-14.3, V-15.3, V-16.2, V-17.5, V-19.3, V-19.11, V-20.2, V-21.7, V-22.3, CC-2, and CC-40). The MA departed JBER at 2145L for the mishap site (Tabs U-1.4 and CC-2). The MC planned to extract MH1 and deliver him to the hospital (Tabs V-14.9, V-15.5, V-15.6, and V-15.12).

b. Planning

The MC conducted initial mission planning, checked the weather, reviewed Notices to Airmen, familiarized themselves with the reported location, performed fuel planning and completed required forms (Tabs V-10.3 and V-11.2). MC briefed the mission details at MA (Tabs V-10.13, V-11.8, V-12.3, V-13.3, V-14.5, V-15.4, and AA-2 through AA-5).

c. Preflight

The MC entered alert status at 1530L on Friday, 29 August 2014 (Tabs V-10.4, V-11.4, V-12.3, V-13.4, V-14.3, and V-15.3). The Mishap Special Mission Aviator Right (MSR) and the Mishap Special Mission Aviator Left (MSL) accomplished additional configuration and preflight checks (Tabs V-12.3 and V-13.4). Nothing of significance was noted during the preflight checks (Tabs V-12.3 and V-13.4). Engine start and the remainder of the preflight inspection were normal and the MC did not note any anomalies (Tabs V-10.4, V-11.4, V-12.3, and V-13.4).

d. Summary of Accident

On 31 August 2014, at approximately 1530L four hikers on a three-day weekend, end-of-summer trip, left their base camp and began ascending Copper Mountain (Tabs V-1.3, V-2.3, V-3.2, V-3.3, V-4.2, V-5.4, V-8.2, and CC-9). The hikers had backpacks, which to their recollection contained some additional clothing, rain gear, one flashlight and one headlamp, at least one cell phone (without reception in that area), a NPS radio, a standard first aid kit, a Wilderness First Responder first aid kit, and a Sam splint (Tabs V-1.11, V-2.4, V-3.4, V-3.5, V-4.3, V-4.5, and CC-28). Three of the four hikers had hiking boots, while the MH1 wore tennis shoes (Tabs V-1.11, V-3.5, and V-4.20). The hikers had no other safety or personal protective items (Tabs V-1.11, V-2.4, V-3.5, and V-4.20). The hike was challenging, at times requiring the use of hands and feet to advance, and at least once during the ascent the hikers collectively discussed turning back, but elected to press on (Tabs V-1.4, V-1.5, V-2.4, V-3.5, and V-4.7).



Figure 1 - Picture of Mishap Terrain (Tab Z-15)



Figure 2 - Picture of Mishap Terrain (Tab Z-16)

At approximately 1925L, while climbing along the ridge near one of the Copper Mountain peaks, but following a different path than the other three hikers, the rock MHI was standing on collapsed beneath him and he fell approximately 50-100 ft into a steep scree field (Tabs V-1.3, V-3.3, V-3.8,

V-4.2, and CC-26). Mishap Hiker 4 (MH4) described the rocks along the ridgeline as loose and crumbly and the hikers collectively described the rocks in the scree field below as loose, large, and sharp (Tabs V-1.5, V-2.6, V-3.6, and V-4.9). The hikers, and later the MC, assessed the steep angle to be 40-45 degrees of slope or steeper (Tabs V-1.8, V-2.6, V-14.7, and V-14.37). MH1 fractured his right wrist and suffered a severe laceration to his right forearm (Tabs V-1.3, V-3.3, V-3.8, and V-4.2). MH2, Mishap Hiker 3 (MH3), and MH4 made their way down to MH1's location and immediately began administering first aid (Tabs V-1.6, V-1.7, V-2.9, V-3.12, and V-4.4). At 1927L, MH2 contacted the NPS using a NPS radio to request helicopter rescue by hoist and professional medical attention because of the severity of MH1's injury and their inability to safely remove MH1, or for MH1 to remove himself, from the scree field and mountain (Tabs V-1.6, V-2.11, V-3.3, CC-25, and CC-26). The hikers maintained radio contact with the NPS ranger station at Port Alsworth throughout the rescue, with calls alternately made by MH2 and MH3 (Tabs V-1 through V-4, and CC-8 through CC-13).

At 2004L the NPS made a formal request for assistance to the AKRCC for an injured hiker who had fallen and suffered a broken wrist and lacerated right arm (Tabs CC-9 and CC-41). The hiker was part of a group of four hiking Copper Mountain in the Lake Clark National Park and Preserve, Alaska (Tab V-1.3, V-2.3, V-3.2, and V-4.2). The AKRCC accepted the mission and alerted the 210 RQS, 211 RQS, and 212 RQS of the mission at 2030L (Tabs CC-2 and CC-41). AKRCC passed initial information received from NPS to the SARDO (Tabs CC-2 and CC-41).

At 2045L, the NPS radioed to the hikers that AKRCC alerted rescue forces and rescuers were on the way (Tabs V-5.5, CC-10, and CC-29). The NPS informed the hikers that the rescue forces would extract MH1 and MH2, MH3, and MH4 would remain overnight on the mountain (Tabs V-3.3, V-4.5, V-5.5, CC-18, CC-10, and CC-29). The NPS staff in Port Alsworth began collecting supplies for an overnight stay, including additional clothing for cold weather, sleeping bags, supplies for a makeshift shelter, lights, and an aviation radio (Tabs V-5.5, V-6.6, V-9.4, CC-15, and CC-10). The NPS coordinated to airdrop those supplies by an Alaska Wildlife Trooper (AWT) fixed-wing aircraft for MH2, MH3, and MH4 (Tab V-9.2). Sunset occurred at 2112L (Tab W-2).

At approximately 2155L, the AWT fixed-wing aircraft informed the NPS that the aircraft would not be able to safely airdrop supplies due to the steepness of the terrain (Tabs V-5.6, V-6.7, V-7.4, CC-11, CC-18, and CC-33). After some difficulty locating their position, the AWT fixed-wing aircraft flew over the hikers position, acquired Global Positioning System (GPS) coordinates (Tabs V-5.6, V-6.3, V-9.6, CC-11, and CC-23), and passed the coordinates to NPS. In turn, NPS passed the coordinates to AKRCC, who passed them to the MC and MSA (Tabs V-5.6, V-11.3, and CC-40).

The MSA departed JBER at 2200L and arrived at the mishap site at 2243L (Tabs V-19.11 and CC-2). The MA departed JBER at 2145L and arrived at the mishap site at 2253L (Tabs V-19.11 and CC-3).

At approximately 2258L, the MSA began dropping illumination flares at the MA's request to illuminate the environment and continued to drop flares at regular intervals until the rescue was complete (Tabs V-1.7, V-2.5, V-3.5, V-4.8, V-10.11, V-10.12, V-11.7, V-12.14, V-19.11, V-21.3, V-21.7, and CC-35). The MC flew several passes by and established an offset hover to observe

the mishap site, which gave them information to develop a plan to insert the two PJs on board the MA (Tabs V-10.8, V-10.9, V-10.15, V-11.8, V-11.9, V-12.6, V-14.12, V-15.5, V-15.8, V-19.11, and V-21.7). The MC elected to approach the site from the north to south, with the MA parallel to the ridgeline, and keeping the ridgeline to the left side of the MA and directly deploy the PJs to the hikers by an approximately 60-80 ft high hoist off the right side of the MA (Tabs V-10.9, V-11.6 through V-11.12, V-13.7, V-14.12, and V-15.9). MC considered and balanced several factors when making their plan:

- Reported severity of the injury
- Prevailing winds
- Steepness of the terrain
- Distance of the hikers from the top of the ridge
- Lack of alternate drop zones or landing sites
- Clearance of the rotors and aircraft from the ridge
- Hoist location and length
- Nighttime operations requiring night vision goggles
- Safety of the PJs, and
- Maximizing aircraft escape avenues in the event of the winds shifting, a mechanical issue, or other situation preventing their hover

(Tabs V-10.7, V-10.8, V-10.15, V-11.7 through V-11.9, V-12.6, V-14.12, V-15.5, V-15.8, and V-19.11)

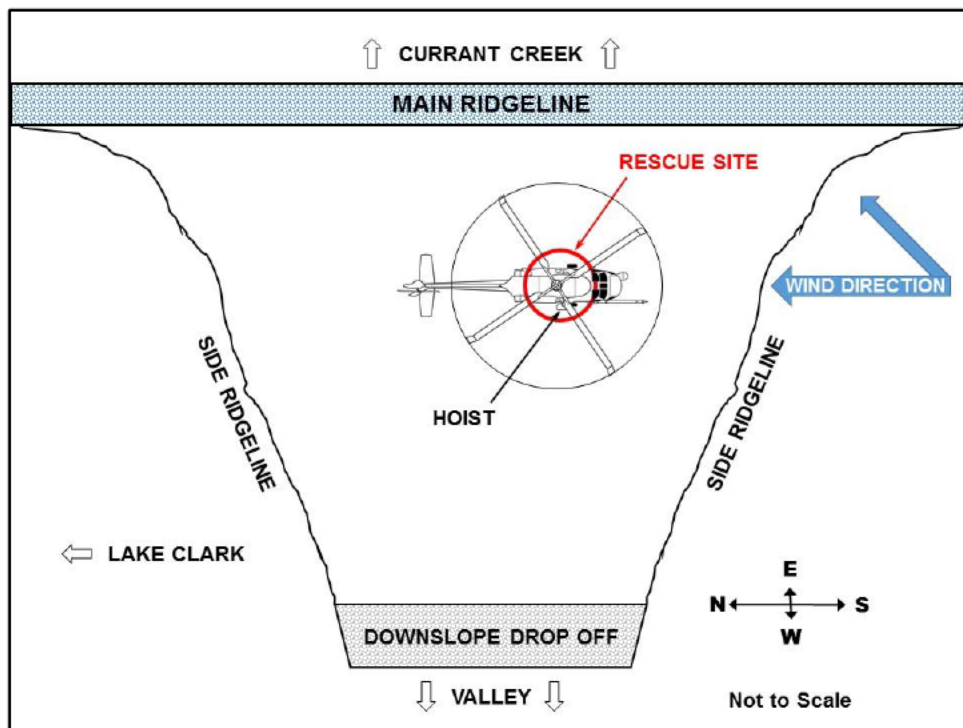
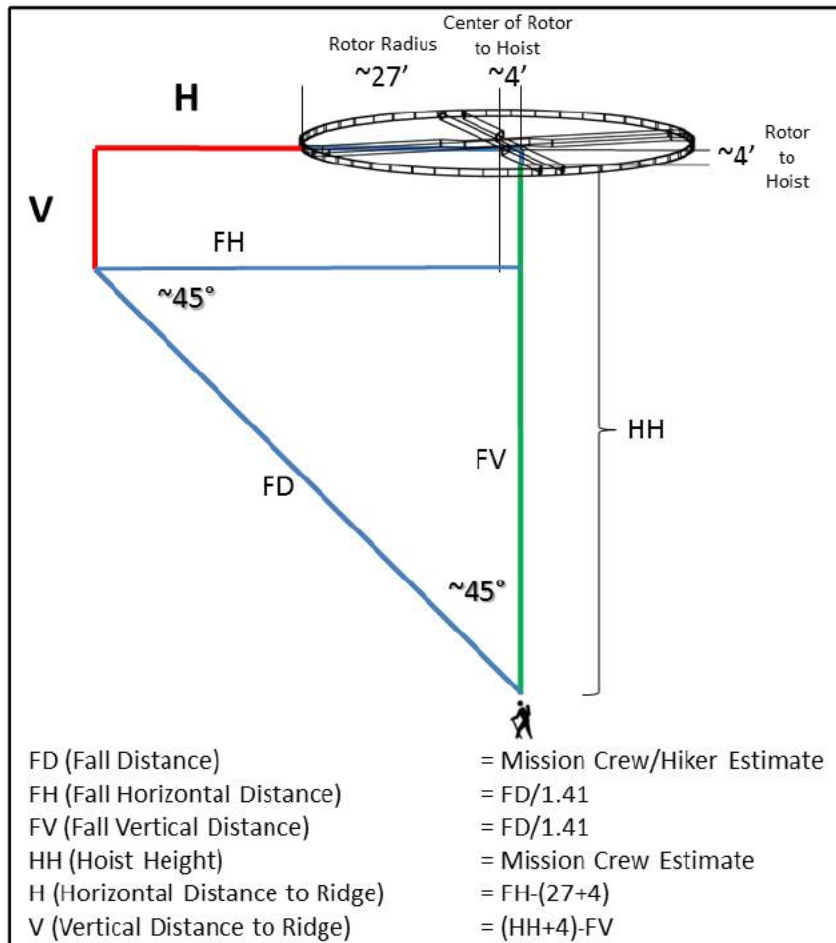


Figure 3 - Orientation of the MA Relative to the Rescue Site, Ridgeline, and Winds (Tabs V-10.7, V-10.8, V-10.14, V-10.15, V-11.7 through V-11.11, V-12.5 through V-12.10, V-13.15, V-14.6, V-14.37, and V-15.11)



Fall Distance (feet)				Vertical Distance to Ridge (V) (feet)			Horizontal Distance to Ridge (H) (feet)
				Hoist Height (feet)			
	FD	FH	FV	60	80	100	
50	36	36	25	45	65	5	
75	53	53	7	29	47	44	
100	71	71	-11	10	30	69	

Note 1: All numbers rounded to the nearest whole number, calculated using diagram above

Note 2: Closest scenario to MC and hiker estimates in bold and highlighted green

Note 3: Fall distance of 100 ft and hoist height of 60 ft requires MA to be below ridgeline

Figure 4 - Approximate Proximity of the Mishap Aircraft to the Hikers and Mountain (Tabs V-1.3, V-3.3, V-3.8, V-4.2, V-5.6, V-6.7, V-7.4, V-10.15, V-11.7 through V-11.9, V-12.6, V-14.12, V-14.37, V-15.5, V-15.8, V-19.11, and CC-26)

After completing the offset hover, the MA executed an approach to the mishap site, approaching upwind from north to south with the left side of the MA parallel to and facing the ridgeline, to deliver the two PJs to the mishap site (Tabs V-10.8, V-10.16, and V-11.6 through V-11.12). Based on the MA orientation and estimated hoist height, along with the ground terrain and location of

the hikers relative to the ridgeline, the MA was estimated to only be about 44 ft horizontally away from and 7 ft to 29 ft vertically above the ridgeline (see Figure 4 above) (Tabs V-1.3, V-3.3, V-3.8, V-4.2, V-5.6, V-6.7, V-7.4, V-10.15, V-11.7 through V-11.9, V-12.6, V-14.12, V-14.37, V-15.5, V-15.8, V-19.11, and CC-26). While the MA was on approach and transitioning to a hover, rocks started falling (Tabs V-1.10, V-2.11, V-3.9, V-4.12, and CC-36). MH2 radioed the NPS that the hikers were being hit by rocks at 2305L (Tabs V-1.10, V-2.11, V-3.9, V-4.12, V-5.7, V-18.5, V-19.7, V-19.11, CC-36, and CC-39). In turn, NPS contacted the MSA at approximately 2307L, who relayed the situation to the MA (see Figure 5 below) (Tabs V-10.16, V-17.6, V-19.11, CC-12, CC-36, and CC-39). The MA left this first hover because of the rocks falling and did not insert their two PJs (Tab V-10.16). The MA transitioned from a hover to flying forward and circled near the mishap site (Tab V-10.16). At approximately 2309L, the MA requested the MSA inform the NPS to tell the hikers that the MA must hover over the mishap site to deploy their two PJs (Tabs V-19.7, V-19.11, and CC-12). At 2310L, the NPS notified the hikers of this plan and requested the hikers use their backpacks to protect themselves (Tabs V-2.11, V-3.3, V-5.8, CC-12, and CC-36). None of the hikers sustained significant injuries resulting from the rocks falling during this first hover (Tabs V-1.10, V-2.13, V-3.9, V-4.12, V-5.10, and CC-36).

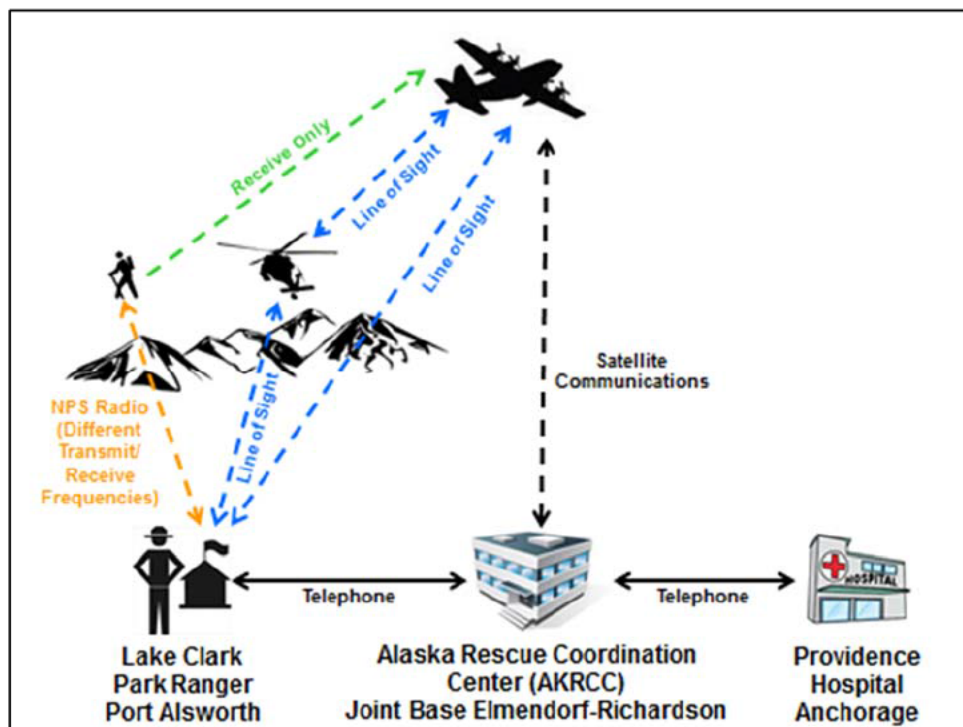


Figure 5 - Communications for the Mishap
(Tabs V-2 through V-6, V-10 through V-23, CC-3, CC-5, and CC-6)

MA aircraft approached the rescue site and established a second hover for a 60-80 ft hoist (Tabs V-10.20, V-11.12, V-12.14, V-13.9, and V-15.9). The hikers remained in the location of MH1's fall (Tabs V-1 through V-4, V-14.15, and V-15.10). The hikers huddled close together with the three uninjured hikers generally surrounding and sheltering MH1 from the cold and falling rocks, with MH2's pack under MH1 to keep him from sliding and to insulate MH1 from the cold (Tabs V-1.16, V-2.11, V-3.11, V-3.12, and V-4.16). MH3 was to MH1's left, MH4 was just above MH1, and MH2 was generally to MH1's right, although still able to reach MH3 (Tabs V-1.16, V-2.11,

V-2.16, V-3.11, V-3.12, and V-4.16). All four hikers were oriented with their heads upslope and feet downslope (Tabs V-1.16, V-2.11, V-3.11, and V-4.16). As the MA entered the hover and rocks began to fall again, MH1, MH3, and MH4 protected their heads with their backpacks (Tabs V-2.14, V-3.11, V-3.12, and V-4.13). MH1 was in a reclining position and MH3 and MH4 were in a seated position (Tabs V-2.14, V-3.11, V-3.12, and V-4.13). MH2 was on his side, facing MH3 with his arms around her, his head down in MH3's abdomen to protect his head, and her arm over his head (Tabs V-2.15, V-2.16, V-3.11, and V-3.12).

MSR lowered the PJs, Mishap Pararescue Jumper 1 (MPJ1) and Mishap Pararescue Jumper 2 (MPJ2), together face-to-face ("barrelman" style) by hoist directly to the hikers (Tabs V-1.12, V-14.13, and V-15.9). Both PJs lowered down to the site with a rescue strop (also known as a quick strop) to hoist up MH1 (see Figures 6 and 7 below) (Tabs V-14.13 and V-15.9). MPJ1 disconnected from the hoist to assess MH1 while MPJ2 remained attached to the hoist cable (Tabs V-14.15 and V-15.11). MPJ1 quickly assessed MH1's injured arm and determined there was no active bleeding coming from the injury (Tabs V-14.14 and V-15.14). The PJs secured the quick strop and safety strap around MH1 and secured MH1 to the hoist hook (Tabs V-1.13, V-4.13, V-14.15, and V-15.13). At 2315L, MSR hoisted MPJ2 and MH1 together into the MA (Tabs V-10.17, V-12.8, V-12.11, V-14.15, V-15.13, and V-19.11). During the hoist of MPJ2 and MH1, MH2 lifted his head to watch MH1 being hoisted into the MA (Tabs R-7, V-2.17, V-3.11, V-3.12, V-4.17, and V-4.23). While lifting his head, a rock struck MH2 in the right forehead (Tabs R-7, V-3.3, V-4.17, and V-4.18). MH4 witnessed the rock coming from above him, tumbling past his left side, and striking MH2 on the right side of his forehead, just above the hairline (Tabs V-4.13, V-4.18, and V-4.21). MH3 and MH4 signaled MPJ1 that MH2 was injured (Tabs V-3.4, V-4.13, and V-14.21). MPJ1 directed the MA to move away from the rescue site to allow him to communicate with the remaining hikers and assess MH2's condition (Tabs V-4.13, V-10.17, V-11.10, and V-14.24). While the MA again transitioned from a hover to forward flight, MPJ2 assessed and re-bandaged MH1's injury aboard the MA and validated that there was no active bleeding (Tabs V-1.14, and V-15.14). The MA departed the immediate area, leaving MPJ1 on the ground with MH2, MH3, and MH4 (Tabs V-4.13, V-10.17, V-11.10, V-14.24, and V-15.14).

MPJ1 then radioed the MA of MH2's injury and requested the MA and the MSA to go around and give him additional time to assess MH2's condition (Tabs V-4.13, V-10.17, V-11.10, V-14.24, and V-19.11). MPJ1 assessed MH2 to be unconscious, unresponsive, eyes rolled back in his head, and showing signs of posturing that would indicate a head injury (Tab V-14.24). MPJ1 and MH3 observed a depression on MH2's head, and MH4 observed that MH2's head had a noticeable dent in the same location where the rock struck MH2 (Tabs V-3.15, V-4.21, and V-14.24). MPJ1 requested MH4 assist with cervical spine (c-spine) precautions by stabilizing MH2's head and neck (Tabs V-3.13, V-4.13, and V-14.24). MPJ1 stabilized MH2 and had MH4 and MH3 maintain c-spine precautions while he scouted out a safer location for MH3 and MH4 to take cover during MH2's extraction (Tabs V-3.10, V-4.13, and V-14.25). Upon returning to the hikers, MPJ1 directed MH3 and MH4 to a more sheltered position 25 ft or more above and to the left of the injury site, and closer to the ridgeline (Tabs V-3.10, V-4.13, V-4.14, and V-14.25). MPJ1 then requested the MA to return and hoist up MH2 (Tabs V-10.18, V-11.11, and V-14.25).

The MA approached the rescue site and established a third hover (Tabs V-4.14, V-10.18, and V-11.11). At approximately 2327L, MSR lowered MPJ2 by the hoist down to MPJ1's and MH2's

location (Tabs V-4.14, V-12.8, and V-14.27). MPJ1 and MPJ2 secured MH2 with the quick strop and safety strap, then MSR hoisted MPJ2 and MH2 together into the MA at 2330L (Tabs V-1.14, V-14.25, V-15.16, and V-15.17). MPJ2 placed MH2 on a vital signs monitoring device to assess and capture initial vital signs (Tab V-15.18). Rocks continued to fall during the entire third hover over the rescue site (Tabs V-3.10, V-4.13, and V-4.14). The MA then departed the immediate area of the rescue site to allow MPJ1 to prepare MH3 and MH4 for extraction and allow easier communication on the ground (Tabs V-3.13 and V-14.27). MPJ2 continued to assess MH2's condition and determined MH2 had an obvious deformity on his head, compromised breathing, and low systolic blood pressure (Tabs V-3.15, V-4.21 through V-14.24, V-14.30, V-14.31, V-15.18, and V-15.19). MPJ2 established an intravenous line and provided rescue breaths and oxygen via the Bag Valve Mask (BVM) (Tabs V-14.31 and V-15.19).

MPJ1 moved to MH3's and MH4's location to prepare them for a hoist extraction (Tabs V-3.14, V-4.14, and V-14.27). MPJ1 called and cleared the MA back in to the immediate area and MSR hoisted MPJ1 and MH3 together into the MA (Tabs V-3.14, V-4.15, and V-14.27). MPJ1 remained connected to the hoist cable, secured MH3 inside MA's cabin, and MSR lowered MPJ1 to retrieve MH4 (Tabs V-3.13, V-4.15, and V-14.27). On the fourth and final hoist, MSR hoisted MPJ1 and MH4 together into the MA and both were secured in the MA (Tabs V-3.13, V-4.15, and V-14.27).

At no time during the rescue did the hikers request any additional safety gear from the MC (Tabs V-1.11, V-2.14, V-3.5, V-4.20, V-12.10, V-13.11, and V-14.29). The MA did not carry any additional safety gear for the MC to offer to the hikers, other than hearing protection onboard the MA (Tabs V-14.29 and V-15.21). All equipment, rescue devices, and crew on board MA were in accordance with AFI 11-2HH60, Volume 3 (Tabs V-14.29 and V-15.21).

At approximately 2350L, the MA departed Copper Mountain for Providence Hospital (Tabs V-19.12 and CC-39). The MSA refueled the MA in route because the MA lacked sufficient fuel to return to Anchorage without refueling due to the time spent operating over the mishap site distance travelled to and from the mishap site (Tabs V-10.24, V-11.14, V-13.12, V-16.5, V-19.8, and V-19.12). At the request of the MA, the MSA coordinated expedited transit through Anchorage airspace to the landing pad at Providence Hospital (Tabs V-10.24 and V-11.14). MPJ1 and MPJ2 transferred and secured MH2 into a Stokes litter onboard the MA (see Figures 8 and 9 below) (Tab V-14.29 and V-15.18). The MA continued to assess and relay MH1's and MH2's vitals to the MSA and requested a neurologist be on stand-by at the hospital because of the apparent head injury (Tabs V-19.8, V-19.12, and CC-39). In turn, the MSA relayed the vitals and request to the AKRCC and Providence Hospital (Tabs V-19.12 and CC-38).

During the flight to Providence Hospital, MH2 started to show signs and symptoms of a traumatic brain injury (Tabs O-3, V-14.23, and V-15.17). MPJ1 and MPJ2 inserted two Nasopharyngeal Airway tubes (NPA) into MH2's airway and provided oxygen through a BVM, intravenous fluid, and constant monitoring (Tabs V-14.30, V-14.31, V-15.19, and CC-39). After landing at Providence Hospital, the two PJs transferred MH1 and MH2 to a higher level of care (Tabs V-1.15, V-3.4, V-3.14, V-4.24, V-7.9, V-14.33, and V-15.23).

e. Impact

Not applicable.

f. Egress and Aircrew Flight Equipment (AFE)

Not applicable.

g. Extraction Equipment Used

The MA had two primary options for hoisting personnel in and out, a rescue strop (also known as a quick strop) and a Stokes litter (Tabs V-14.5, V-14.15, V-15.3, and V-15.13). Due to the loose rock and steep slope, the PJs opted to use the rescue strop and not the Stokes litter to remove the hikers (Tabs V-14.9 and V-15.16).

The MC extracted all the hikers using a rescue strop (see Figures 6 and 7 below) (Tabs V-1.3, V-3.13, V-4.13, V-14.13 through V-14.16, V-14.25, V-14.27, V-15.4, V-15.11, and CC-4). MPJ1 and MPJ2 looped the strop under the hikers' armpits, one at a time for each hoist, and secured the safety strap for the injured hikers by passing it between their legs and hooking the safety strap to the front of the strop (Tabs V-14.16, V-14.25, V-14.27, V-15.4, and V-15.11). MSR hoisted each hiker with either MPJ1 or MPJ2 (Tab V-12.10).



Figure 6 - Rescue Strop with Safety Strap



Figure 7 - Rescue Strop with Safety Strap

On board the MA, MPJ2 secured MH2 in a Stokes litter (see Figures 8 and 9 below) for transport to the hospital and support treatment while en route (Tabs V-14.29 and V-15.18).



Figure 8 - Stokes Litter



Figure 9 - Stokes Litter

h. Search and Rescue (SAR)

The MA and MC were not lost in the mishap, therefore there was no SAR for them. This section is reserved for SAR actions taken to find and rescue a MA or MC.

i. Recovery of Remains

Not applicable.

5. MAINTENANCE

The MC noted that the MA was operating in normal state throughout the mishap sortie (MS) (Tabs V-10.4, V-11.4, V-12.3, and V-13.4). There is no evidence to suggest that maintenance was a factor in this mishap and the board did not collect any MA maintenance records other than the Air Force Technical Orders (AFTO) Form 781, *ARMS Aircrew/Mission Flight Data Document* (Tab K-2).

6. AIRFRAME SYSTEMS

There is no evidence to suggest that the airframe systems were a factor in this mishap.

7. WEATHER

a. Forecast Weather

The weather for the area of the mishap site called for few clouds at 7,000 ft and scattered at 20,000 ft (Tab W-2). Winds were forecasted out of the Southwest at 10 knots gusting to 15 knots (Tab W-2). The sun set at 2112L (Tab W-2). The moon rose at 1431L and set at 2215L (Tab W-2).

b. Observed Weather

On 31 August 2014, the Mishap Pilot (MP) reported the area of the mishap site as being very dark with heavy, but steady, winds out of the West at approximately 20-30 knots (Tab V-10.7 and V-10.8).

c. Space Environment

Not applicable.

d. Operations

Observed weather, cloud ceilings, and visibility were well above the minimums required by AFI 11-202, Volume 3 to conduct the MS (Tab V-11.7). The MC conducted the MS within its prescribed operational weather limitations (Tabs V-11.7 and W-2).

8. CREW QUALIFICATIONS

The MC was qualified for their crew position (Tabs T-2 through T-7). At the time of the mishap, all necessary flight currencies and required training were up to date (Tabs T-2, T-3, and T-8). MP performed his last mission evaluation on 30 April 2014 (Tab T-11). Mishap Copilot (MCP) performed his last mission evaluation on 27 January 2014 (Tab T-13). MSR performed his last mission evaluation on 22 April 2014 (Tab T-15). MSL performed his last mission evaluation on 13 June 2014 (Tab T-19). MPJ1 completed his task evaluation on 9 September 2013 (Tab G-14). MPJ2 completed his task evaluation on 23 April 2014 (Tab G-17). In all evaluations, there were no discrepancies noted.

The MC flight time during the 90 days before the mishap was as follows:

	Last 30 Days		Last 60 Days		Last 90 Days	
	Hours	Sorties	Hours	Sorties	Hours	Sorties
MP	11.2	4	15.5	6	18.4	9
MCP	37.6	20	39.8	24	77.4	42
MSR	11.4	8	26.4	15	39.9	22
MSL	29.4	16	39.1	22	41.7	23
MPJ1	0.8	2	4.8	4	19.3	12
MPJ2	9.2	9	18.7	16	33.6	24

(Tabs G-4 and T-27 through T-38)

There is no evidence to suggest crew qualifications were a factor in this mishap.

9. MEDICAL

a. Qualifications

At the time of the mishap, all MC who had direct contact with the hikers were medically qualified for flying duties (Tabs G-13, G-16, and T-21 through T-26). After review of both the electronic medical records and the paper hard charts, all parties involved in this mishap were fully qualified for flying duties at the time of the mishap in accordance with AFI 48-123, *Medical Examinations and Standards*. All MC had current Preventative Health Assessments (PHA), with no variance in their baseline health, and a review of the Aeromedical Information Management Waiver Tracking System was uneventful and did not show any permanent waivers.

b. Health

All medical records of the MC were reviewed. Toxicology reports of the MC were reviewed and all were negative for ethanol, amphetamines, barbiturates, benzodiazepines, cocaine, cannabinoids, opiates, and phencyclidine (PCP) (Tab T-39). There is no evidence to suggest MC health was a factor in this mishap.

c. Pathology

Not applicable.

d. Lifestyle

No lifestyle factors for the MC were found to be relevant to the mishap.

e. Crew Rest and Crew Duty Time

There is no evidence to indicate crew rest was a factor in the mishap and the MC was in compliance with AFI 11-202, Volume 3. The MC were placed on alert at 1530L Friday, 29 August 2014 and were scheduled to be released from alert status at 0400L Monday, 1 September 2014 (Tabs V-10.4, V-11.4, V-12.3, V-13.4, V-14.3, and V-15.3). The MC had adequate crew rest the day of the mishap (Tabs V-10.4, V-11.4, V-12.3, V-13.4, V-14.3, and V-15.3).

10. OPERATIONS AND SUPERVISION

There is no evidence to suggest operations and supervision was a factor in this mishap.

a. Operations

The 210 RQS, 211 RQS, and 212 RQS have alert crews on duty 24 hours a day, 7 days a week, on every day of the year (Tabs BB-2 and BB-4). On the date of the mishap, the MC were holding weekend alert over the 3-day weekend (Tabs V-10.4, V-11.4, V-12.3, V-13.4, V-14.3, and

V-15.3). Alert began at approximately 1530L on Friday and ended at approximately 0400L Monday (Tabs V-10.4, V-11.4, V-12.3, V-13.4, V-14.3, V-15.3, V-22.3, and V-23.3).

b. Supervision

210 RQS and 212 RQS ensured all flight members were current and qualified for alert and the mission (Tabs T-4 through T-6). The SARDO gave and relayed mission details to the MC (Tabs V-10.5, V-14.4, CC-2, and CC-40).

11. HUMAN FACTORS ANALYSIS

Human Factors describe how our interaction with tools, tasks, working environments, and other people influence human performance. This report includes an analysis of the human performance variables that contributed to this mishap. Interviews with personnel involved in the rescue mission, including the MC, all four hikers, and other individuals, and the Department of Defense (DoD) Human Factors Analysis and Classification System (HFACS) model were used to present a systematic, multidimensional approach to mishap analysis.

The following human factor is directly relevant to this mishap:

Physical Illness/Injury (DoD HFACS PC305)

Physical illness or injury is a factor when a physical illness, injury, deficit, or diminished physical capability causes an unsafe situation. While ascending along the ridge, the rocks MH1 were standing on collapsed and he fell (Tabs V-1.3, V-2.8, V-3.3, V-3.7, and V-4.2). During the fall, MH1 injured his right wrist and severely lacerated his right forearm (Tabs V-1.5, V-1.21, V-2.9, V-3.3, V-4.4, and V-7.10). The other hikers were unable to safely remove MH1 from the scree field or move down the mountain to a safer location because of the severity of MH1's injuries (Tabs V-1.7, V-2.9, V-3.13, V-4.4, and CC-26). So as not to leave MH1 alone, the other hikers remained with MH1 in the scree field (Tabs V-2.14, V-3.13, V-4.5, and CC-26).

12. GOVERNING DIRECTIVES AND PUBLICATIONS

a. Publically Available Directives and Publications Relevant to the Mishap

- (1) AFI 10-3502, Volume 1, *Pararescue and Combat Rescue Officer Training*, 16 February 2011
- (2) AFI 10-3502, Volume 2, *Pararescue and Combat Rescue Officer Standardization & Evaluation Program*, 30 April 2012
- (3) AFI 11-2 HH-60, Volume 3, *HH-60--Operations Procedures*, 5 January 2011
- (4) AFI 11-202, Volume 3, *General Flight Rules*, 22 October 2010
- (5) AFI 11-202, Volume 3, *General Flight Rules*, Pacific Air Forces Supplement, 11 July 2011
- (6) AFI 48-123, *Medical Examinations and Standards*, 5 November 2013
- (7) ANGI 10-203, *Air National Guard (ANG) Alert Resource Management*, 22 February 2012

- (8) 11 AFI 36-2001, *Personnel Status For National Guard Members During Rescue Missions*, 11 September 2003 (Certified current on 27 January 2014)
- (9) AFI 51-503, *Aerospace Accident Investigations*, 26 May 2010 (Version of the AFI at the time this board convened)

NOTICE: All directives and publications listed above are available digitally on the Air Force Departmental Publishing Office website at: <http://www.e-publishing.af.mil>.

b. Other Directives and Publications Relevant to the Mishap

- (1) Operations Handbook, 5th Edition, AFTTP 3-3.Guardian Angel, 19 October 2009
- (2) Pararescue Medication and Procedure Handbook, 5th Edition, February 2011
- (3) *Memorandum of Agreement between Alaska National Guard and Eleventh Air Force (PACAF) concerning Search and Rescue*, dated 25 July 2011

c. Known or Suspected Deviations from Directives or Publications

There were no known deviations from the directives and publications listed above by the MC or others involved in the mission.

13. ADDITIONAL AREAS OF CONCERN

Not applicable.

28 April 2016



WILLIAM P. MAZZENO, Colonel, USAF
President, Accident Investigation Board

STATEMENT OF OPINION

HH-60G, T/N 92-26467 COPPER MOUNTAIN, LAKE CLARK, ALASKA 31 AUGUST 2014

Under 10 U.S.C. § 2254(d) the opinion of the accident investigator as to the cause of, or the factors contributing to, the accident set forth in the accident investigation report, if any, may not be considered as evidence in any civil or criminal proceeding arising from the accident, nor may such information be considered an admission of liability of the United States or by any person referred to in those conclusions or statements.

1. OPINION SUMMARY

On Sunday, 31 August 2014, at approximately 2004 hours local time (L), an Alaska Air National Guard (AKANG) HH-60G Pavehawk, tail number 92-26467, the mishap aircraft (MA), assigned to the 210th Rescue Squadron, and pararescue jumpers (PJ) from the 212th Rescue Squadron, both from the 176th Wing, Joint Base Elmendorf-Richardson, Alaska were requested by the National Park Service (NPS) through Alaska Rescue Coordination Center to rescue a civilian hiker with a severe laceration and fractured wrist. The injured hiker, mishap hiker1 (MH1), and three other civilian hikers were located downslope from one of the steep and rocky ridgelines on Copper Mountain in the Lake Clark National Park and Preserve. An AKANG HC-130P/N Hercules, tail number 93-2106, assigned to the 211th Rescue Squadron, also from the 176th Wing, Joint Base Elmendorf-Richardson, Alaska, assisted by providing overhead support and communications. All AKANG personnel on the MA and the accompanying HC-130 were in Title 10 military active duty status for the rescue operation.

At approximately 2315L, while the MA was in a hover performing the rescue of MH1, a rock dislodged from the rock-strewn ridge above the rescue site and struck mishap hiker 2 (MH2) in the forehead, rendering him unconscious and placing him in critical condition. The MA and mishap crew (MC) successfully lifted both injured hikers and the two uninjured hikers. The MC provided medical treatment according to protocol and expedited delivery of the injured hikers to a higher level of care at Providence Hospital in Anchorage, Alaska. At the same time, the MA delivered the two uninjured hikers to NPS authorities in Anchorage. There was limited local media interest in Alaska and the hometown of the hiker injured by the rock.

I find, by clear and convincing evidence, the cause of this mishap is that, while the MA was in a hover over the rescue site, the MA rotor downwash dislodged a rock upslope from MH2's position, striking him in the forehead, rendering him unconscious, and placing him in critical condition. Additionally, I find, by a preponderance of the evidence, the following factors substantially contributed to the mishap:

- (1) The injury to the right hand and forearm of MH1, combined with the extreme steep and rocky terrain, prevented moving MH1.

- (2) The geography of the rescue location, wind conditions, operational requirements of the MA (i.e. hoist orientation and length), nature of MH1's injury, and the location of the hikers restricted where the MA could perform the rescue.
- (3) MH2 exposed his head to injury while the rescue crew was hoisting the first injured hiker into the MA.

2. CAUSE

While in a hover over the rescue site, the MA rotor downwash dislodged a rock upslope from MH2's position, striking him in the forehead, rendering him unconscious, and placing him in critical condition. I arrived at this conclusion based on testimony from MH4, who witnessed a large rock pass by his left side and strike MH2's forehead, just above the hairline, on the right side. Supporting testimony from MH3 stated, MH2 fell into her stomach and was unresponsive, and that immediately following a large rock landed in her lap. She further stated that it is her belief that the rock in her lap was the same rock that had struck MH2 in the head. Additionally, MPJ1, the PJ on the ground who provided the first care to MH2, and MH4 and MH3 stated they saw a noticeable dent in MH2's right, front forehead.

Using testimony from several witnesses and control center logs of events, I determined the second injury occurred while the MA was hovering over the rescue site. According to testimony from the MC and hikers, the MA was in its second hover over the rescue site at that time. According to the testimony of MH1, MH3, and MH4, I determined that rocks fell from upslope each time the MA entered a hover over the rescue site. Additionally, using that same testimony, I determined that rocks of varying sizes, in a regular stream (i.e. not intermittent), fell only while the MA was in a hover over the rescue site. Further, using testimony from the hikers, as well as from the two pararescuemen and photographs of the rescue site, I determined that rocks of sufficient size and quantity existed at and above the rescue site to cause serious injury. Finally, but for rocks being dislodged from the scree slope by the MA rotor downwash, MH2 would not have been struck by a rock in the forehead.

3. SUBSTANTIALLY CONTRIBUTING FACTORS

a. Arm Injury Prevented Moving

Witness testimony from the hikers, radio transcripts, and control center logs of event led me to determine that the injury to the right hand and forearm of MH1, combined with the extremely steep and rocky terrain, prevented moving him down the mountain on foot, to a flatter location for a helicopter pick-up, or to a less rocky location. The hikers testified, and the logs and radio transcripts indicated, that the hikers determined MH1 was incapable of assisting himself down the mountain, and the other three hikers could not assist him and safely get themselves down. The hikers did not want to leave MH1 alone due to his injury, and chose to remain with him, which more likely than not contributed to the injury occurring to MH2. As a result, they had to request a helicopter hoist recovery from the location where MH1 landed after his mishap.

b. Operating Restrictions

Using witness testimony from the MC, I determined that the geography of the rescue location, wind conditions, operational requirements of the MA (i.e. hoist orientation and length), nature of MH1's injury, and the location of the hikers more likely than not restricted where the MA could perform the rescue. The MC flew several passes by and established an offset hover to observe the mishap site, which the MC used to gather information and develop a plan.

Over the rescue site, the winds were coming generally from the south, running roughly parallel to the ridge and heading towards Lake Clark. With winds in this direction, the MA had to face in a southerly direction, with its nose into the wind and left side paralleling the mountain ridge, to maximize its power and stability. In addition, the MC had to orient the MA to allow an escape route in the event the winds shifted, the MA suffered a mechanical issue, or some other situation that prevented them to hover over the site. These safety considerations also prevented the MA from facing into the mountain.

From multiple testimonies, the hikers were located near the ridge top, as close as 50 feet (ft) and no further than 100 ft. At this short distance down from the ridge, with the steep angle assessed by MPJ1 on the ground to be 40-45 degrees of slope, and steeper in other testimony, the MA had to operate very close to the ridgeline above the mishap site. The MA hoist is on the right side, which puts the main rotor and tail closer to the ridgeline if the hoist is directly over the rescue site and the left side of the aircraft parallels the ridgeline. This close distance to the ridgeline meant facing the MA towards downslope would have put the tail close to or over the ridgeline, and not into the wind, which the MC considered unsafe.

The MC considered the optimum safe height for hoisting their patients. They opted to go for a high hoist (higher than the standard 40 ft) estimated to be between 60-80 ft, which allowed for safe operation of the MA near the ridge, increased likelihood of placing the PJs directly on their objective, and the quickest insert and removal of the PJs and patients from the scree field. A shorter hoist would have increased the already close proximity to the ridgeline and restricted the MA escape route, and a longer hoist would have been difficult to control in the high winds and rotor downwash and would have been less safe to both the PJs and patients in the rocky terrain.

In addition, the MC assessed the reported criticality and urgency of MH1's injury as requiring a quick extraction. Finally, the hikers' and MC testimony and photos of the rescue site make it clear that there was no nearby flat area to land the MA, and no alternate place to lower the PJs that would allow them safe and quick movement to the patients and return for extraction at night with night vision goggles (NVGs) across rocky and unstable terrain.

c. Exposed Head

Based on testimony about MH2's actions from MH4 and MH3, and based on testimony about MH2's injuries from MH4, MPJ1, and MPJ2, I concluded that MH2 lifted his head during the second hover, while the MC extracted MH1, and exposed his head to injury.

MH3 testified that MH2 had his head down in her abdomen, his arms wrapped around her, and her arm over his head, when the MA made its second hover. According to the hikers' and MPJ1's

testimony, the hikers were grouped and seated closely together with the feet pointing down slope and their heads oriented upslope. Based on MH4's testimony, an observer looking up the slope would have seen MH3 to the left, MH1 in the middle, MH2 to the right, and MH4 just above MH1, sheltering him from falling rocks. After the PJs retrieved MH1 from the huddle, MH4 and MH3 said they recall MH2 lifting his head to watch the MC hoist MH1 to the MA. MH4 testified that he saw a rock tumble past his left side and strike MH2 on the right side of his forehead. MH4, MH3, MPJ1, and MPJ2 testified that they saw a noticeable depression and obvious trauma on MH2's right forehead where the rock hit.

It is more likely than not that if MH2's head remained face down in MH3's stomach, the right side of his forehead would not have been exposed. He had to lift his head to both see the MA and be struck where he was struck. Finally, following the MA's first hover over the rescue site, when the hikers testified that rocks were first reported to be falling, multiple testimonies, logs, and reports state that the NPS instructed the hikers to put their packs over their heads and protect themselves from falling rocks prior to the second MA hover. By lifting his head from a more protective posture, contrary to instructions, MH2 increased his risk of injury from falling rocks.

4. CONCLUSION

I find, by clear and convincing evidence, the cause of this mishap is that, while the MA was in a hover over the rescue site, the MA rotor downwash dislodged a rock upslope from MH2's position, striking him in the forehead, rendering him unconscious, and placing him in critical condition. Additionally, I find, by a preponderance of the evidence, the following factors substantially contributed to the mishap:

- (1) The injury to the right hand and forearm of MH1, combined with the extreme steep and rocky terrain, prevented moving MH1.
- (2) The geography of the rescue location, wind conditions, operational requirements of the MA (i.e. hoist orientation and length), nature of MH1's injury, and the location of the hikers restricted where the MA could perform the rescue.
- (3) MH2 exposed his head to injury while the rescue crew was hoisting the first injured hiker into the MA.

28 April 2016



WILLIAM P. MAZZENO, Colonel, USAF
President, Accident Investigation Board

INDEX OF TABS

DISTRIBUTION MEMORANDUM AND SAFETY INVESTIGATOR INFORMATION	A
NOT USED	B
NOT USED	C
MAINTENANCE REPORT, RECORDS, AND DATA	D
NOT USED	E
WEATHER AND ENVIRONMENTAL RECORDS AND DATA	F
PERSONNEL RECORDS	G
EGRESS, IMPACT, AND CRASHWORTHY ANALYSIS	H
DEFICIENCY REPORTS	I
RELEASABLE TECHNICAL REPORTS AND ENGINEERING EVALUATIONS	J
MISSION RECORDS AND DATA	K
DATA FROM ON-BOARD RECORDERS	L
DATA FROM GROUND RADAR AND OTHER SOURCES	M
TRANSCRIPTS OF VOICE COMMUNICATIONS	N
ANY ADDITIONAL SUBSTANTIATING DATA AND REPORTS	O
DAMAGE AND INJURY SUMMARIES	P
AIB TRANSFER DOCUMENTS	Q
RELEASABLE WITNESS TESTIMONY	R
RELEASABLE PHOTOGRAPHS, VIDEOS, AND DIAGRAMS	S
INDIVIDUAL FLIGHT RECORDS AND ORDERS, NOT INCLUDED IN TAB G	T
AIRCRAFT MAINTENANCE RECORDS, NOT INCLUDED IN TAB D	U
WITNESS TESTIMONY AND STATEMENTS	V

WEATHER OBSERVATIONS, NOT INCLUDED IN TAB F.....	W
STATEMENTS OF INJURY OR DEATH	X
DOCUMENTS APPOINTING THE AIB MEMBERS.....	Y
PHOTOGRAPHS, NOT INCLUDED IN TAB S	Z
FLIGHT DOCUMENTS	AA
GOVERNMENT DOCUMENTS AND REGULATIONS.....	BB
MISSION REPORTS	CC
FACTSHEETS	DD
MEDIA COVERAGE.....	EE
SIB INTERVIEW TRANSCRIPTS	FF