

**UNITED STATES AIR FORCE**  
**GROUND ACCIDENT INVESTIGATION**  
**BOARD REPORT**



**TYPE OF ACCIDENT: On-Duty Fatality**

**LOCATION: Joint Base Pearl Harbor-Hickam, Hawaii**

**DATE OF ACCIDENT: 8 January 2013**

**BOARD PRESIDENT: Colonel Hugh J. Hanlon, USAF**

**Conducted IAW Air Force Instruction 51-507**

# **United States Air Force Ground Accident Investigation Board Report**

On-Duty Fatality, Joint Base Pearl Harbor-Hickam, Hawaii

8 January 2013

## **EXECUTIVE SUMMARY**

On 8 January 2013, at approximately 1500 Hawaii Standard Time (H), Mishap Airman First Class (MA) fell through a skylight while conducting repairs on the roof of building 3245, Joint Base Pearl Harbor-Hickam (JBPH-H), Hawaii. MA fell approximately 18 feet directly onto the concrete floor below. His head struck the floor, causing traumatic brain injury. MA was treated by emergency responders at the scene and transported to The Queen's Medical Center (TQMC), Honolulu, Hawaii. MA remained under the care of TQMC for 18 days. Despite all efforts to reverse his condition, MA was pronounced dead at 1144H, 25 January 2013.

MA and his coworker, Mishap Staff Sergeant (MS), were United States Air Force (USAF) Active Duty members. Both were assigned to the 647th Civil Engineer Squadron, 647th Air Base Group, 15th Wing, JBPH-H. MA was a Structural Apprentice and MS was a Structural Journeyman. Although both were assigned to the same Air Force unit, they filled joint base billets in the base's Structures Shop. This shop falls under the Operational Direction of Naval Facilities and Engineering Command, Hawaii.

At the time of the mishap, MA and MS were repairing a partially missing skylight panel on building 3245. Building 3245 is an equipment storage facility with a corrugated metal roof sloping at a 3.5 inch vertical rise per 12 inch horizontal run. The roof is inlaid with corrugated fiberglass skylight panels on both halves of the roof. The building is located south of the westernmost JBPH-H aircraft parking ramp.

MS decided to temporarily secure the damaged roof with plastic sheeting and sandbags until a replacement panel could be ordered and delivered. Immediately prior to the mishap, both Airmen were on the roof adjusting the plastic sheeting and sandbags. MA was positioned at the peak of the roof while MS was positioned near the base. MS was in the process of descending the ladder to retrieve a knife to trim the plastic when he heard a crack followed by a scream. MS looked back towards the roof peak but did not see MA. MS last observed MA facing manipulating the plastic sheeting at or near the roof peak.

A fiberglass skylight panel, directly behind the panel being repaired, was damaged in MA's fall.

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## TABLE OF CONTENTS

TABLE OF CONTENTS.....	i
ACRONYMS AND ABBREVIATIONS.....	iii
SUMMARY OF FACTS.....	1
1. AUTHORITY AND PURPOSE.....	1
2. ACCIDENT SUMMARY.....	1
3. BACKGROUND.....	2
a. Organizations.....	2
b. Mission.....	5
c. Task Planning and Preparation.....	6
d. People.....	6
4. SEQUENCE OF EVENTS.....	7
a. Pre-Accident.....	7
b. Day of Accident, 8 January 2013.....	7
c. Hospital Care.....	11
5. MAINTENANCE.....	11
6. EQUIPMENT, VEHICLES, FACILITIES, AND SYSTEMS.....	11
a. Building.....	11
b. Repair, Equipment and Materials.....	15
7. ENVIRONMENTAL CONDITIONS.....	15
a. Forecast Weather.....	15
b. Observed Weather.....	15
c. Environmental Factors.....	16
d. Restrictions, Warnings And Procedures.....	16
8. PERSONNEL QUALIFICATIONS.....	16
a. Mishap Airman First Class.....	16
b. Mishap Staff Sergeant.....	16
c. Additional Training Materials and Job-Related Information.....	17
9. MEDICAL FACTORS.....	17
a. Medical Records Availability.....	17
b. Qualifications.....	17
c. Vision.....	17
d. Other Medical Conditions.....	18
e. Injuries And Pathology.....	18
f. Lifestyle.....	19
10. OPERATIONS AND SUPERVISION.....	19
a. Operations Tempo.....	19
b. Experience Level.....	19
c. Oversight.....	19

11. HUMAN FACTORS ANALYSIS..... 20  
    a. Introduction.....20  
    b. Applicable Factors.....20  
12. GOVERNING DIRECTIVES AND PUBLICATIONS.....21  
    a. Air Force Regulations.....21  
    b. Navy Regulations.....23  
    c. Known or Suspected Deviations.....24  
13. SIGNATURE AND DATE..... 25  
14. INDEX OF TABS..... 26

## ACRONYMS AND ABBREVIATIONS

A1C	Airman First Class	MDG	Medical Group
ABG	Air Base Group	MOA	Memorandum of Agreement
ABU	Airman Battle Uniform	MOC	Maintenance Operations Center
ADCON	Administrative Control	MS	Mishap Sergeant
AF	Air Force	MSgt	Master Sergeant
AFB	Air Force Base	NAVFAC	Naval Facilities and Engineering Command
AFI	Air Force Instruction	NCOIC	Non-Commissioned Officer in Charge
AFQTP	Air Force Qualification Training Package	NS	NAVFAC Safety
AFSC	Air Force Specialty Code	OP	Optometrist
Amn	Airman	OPCON	Operational Control
AMS	Air Mobility Squadron	OPDIR	Operational Direction
Capt	Captain	OPNAVINST	Chief of Naval Operations Instruction
CC	Commander	ORM	Operational Risk Management
CDC	Career Development Course	OSH	Occupational Safety and Health
CES	Civil Engineer Squadron	OSHA	Occupational Safety and Health Administration
CE	Civil Engineer	PACAF	Pacific Air Forces
Ch.	Chapter	Para.	Paragraph
CMSgt	Chief Master Sergeant	PM	Paramedic
DoD	Department of Defense	PPE	Personal Protective Equipment
EMS	Emergency Medical Services	SIB	Safety Investigation Board
Fig.	Figure	SM	Safety Manager
FR1	Friend 1	SMSgt	Senior Master Sergeant
FR2	Friend 2	SP	Superintendent
FR3	Friend 3	SQ/CC	Squadron Commander
FR4	Friend 4	SrA	Senior Airman
Ft	Feet	SRL	Self-Retracting Lanyard
GAIB	Ground Accident Investigation Board	SS1	Staff Sergeant 1
H	Hawaii Standard Time	SS2	Staff Sergeant 2
HI	Hawaii	SS3	Staff Sergeant 3
ICU	Intensive Care Unit	SS4	Staff Sergeant 4
In	Inches	SS5	Staff Sergeant 5
JB4	Joint Base 4	SSgt	Staff Sergeant
JBPH-H	Joint Base Pearl Harbor-Hickam	TA	Transient Alert
JBSCFS	Joint Base Supported Component Force Structure	TACON	Tactical Control
JQS	Job Qualification Standards	TDY	Temporary Duty
JSTO	Job Safety Training Outline	TQMC	The Queen's Medical Center
LRS	Logistics Readiness Squadron	TSgt	Technical Sergeant
Lt Col	Lieutenant Colonel	US	United States
MA	Mishap Airman	USAF	United States Air Force
Maj	Major		
MAJCOM	Major Command		

UTM  
WG

Unit Training Manager  
Wing

NOTE: The above list was compiled from the Executive Summary, Summary of Facts, Index of Tabs, and Witness Testimony and Statements.

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## SUMMARY OF FACTS

### 1. AUTHORITY AND PURPOSE

a. The authority for this investigation is Air Force Instruction (AFI) 51-507, *Ground Accident Investigations*, dated 28 May 2010. The Convening Authority, Commander, Pacific Air Forces (PACAF), General Herbert J. Carlisle, convened this Board on 6 February 2013, and appointed Colonel Hugh J. Hanlon as Board President and Captain (Capt) Legal Advisor (Tab X-1.1). On behalf of the Convening Authority, the PACAF Staff Judge Advocate, appointed Capt Medical Advisor, Chief Master Sergeant (CMSgt) Facilities Advisor and Technical Sergeant (TSgt) Recorder (Tab X-2.1). The Ground Accident Investigation Board (GAIB) hereby known as "The Board" conducted the investigation from 11 February 2013 to 15 March 2013.

b. The purpose of the investigation is to inquire into the facts surrounding the ground 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

a. On 5 January 2013, Government contract personnel working at the base Transient Alert facility submitted a work order requesting repair of a partially missing skylight on the roof of building 3245, Joint Base Pearl Harbor-Hickam (JBPH-H) (Tab U-4.1). The building is used to store temporary duty (TDY) personnel equipment (Tab V-15.1). Transient Alert is responsible for securing arriving transient aircraft and providing maintenance service prior to the aircraft's next mission (Tab BB-6.1).

b. At approximately 1100 Hawaii Standard Time (H), 8 January 2013, Mishap Staff Sergeant (MS), a 647th Civil Engineer Squadron (CES) Structural Journeyman, surveyed the damaged building and returned to the 647 CES Structures Shop (Structures Shop) to discuss repair options with co-workers (Tab V-3.19 to V-3.20). MS determined plastic covering secured by sandbags was the appropriate mitigation action until a replacement fiberglass skylight could be ordered and received (Tab V-3.20). Staff Sergeant 1 (SS1) assigned Mishap Airman First Class (MA), a 647 CES Structural Apprentice, to assist MS with the job (Tab V-4.3). Upon arrival at building 3245, MS and MA conducted a visual inspection of the job site and discussed the task of covering the damaged skylight (Tab V-3.26 to V-3.27).

c. MS and MA set up an "A-Frame" ladder centered below the damaged skylight and immediately next to the external eastern wall of building 3245 (Tab V-3.26, Tab V-3.29, Tab V-3.62, Tab V-15.1, Tab V-15.5). MS and MA pre-positioned equipment at the base of the ladder and began transporting the materials onto the roof (Tab V-3.28, Tab V-3.30, Tab V-3.62). After

pre-positioning equipment on the roof, MS instructed MA to join him on the roof to help make adjustments (Tab V-3.31 to V-3.32, Tab V-3.63). MS assumed a position at the lower end of the damaged skylight while MA assumed a position at the peak of the roof (Tab V-3.31-32, Tab V-3.36, Tab V-3.63). MA helped MS adjust the plastic sheeting and sandbags (Tab V-3.34). MS last observed MA at the peak of the roof, facing East, adjusting the plastic (Tab V-3.33 to V-3.34, Tab V-3.63). MS then turned away and began descending the ladder to retrieve a knife to trim the plastic sheeting (Tab V-3.33, Tab V-3.37).

d. While descending the ladder, MS heard a crack followed by a scream approximately five seconds after last observing MA (Tab V-3.37-8). MS did not see MA on the roof when he looked up towards the roof peak (Tab V-3.38). MS immediately descended the ladder, entered building 3245, and observed MA lying motionless, flat on his back on the floor (Tab V-3.38-40, Tab V-3.64). MS then ran to building 3247, 18 feet from the mishap location, and notified Transient Alert personnel to call 911 (Tab V-3.40, Tab V-15.2, Tab Y-1, Tab Y-2, Tab Y-4). Transient Alert personnel followed MS to MA's position (Tab V-15.2). Transient Alert personnel called the Maintenance Operations Center (MOC) at approximately 1459H (Tab V-15.2, Tab T-5.1, Tab BB-3.4). At 1459H, paramedics from the Hawaii Federal Fire Department, located across the JBPH-H Airfield parking ramp from building 3245, were dispatched to the mishap location, and arrived on scene at 1502H (Tab T-5.1, Tab Y-1).

e. Upon arrival, paramedics observed MA lying flat on his back, conscious but unresponsive (Tab V-16.1). Paramedics found a single injury to the back of the head of MA (Tab V-16.1). Paramedics moved MA to the ambulance for transport to The Queen's Medical Center (TQMC) (Tab V-16.2). The ambulance departed building 3245 at 1520H and arrived at TQMC at 1535H (Tab T-5). A trauma team met MA in the emergency department (Tab V-16.2). MA remained under the care of TQMC for 18 days (Tab BB-7.1). Despite all efforts to reverse his condition, MA was pronounced dead at 1144H, 25 January 2013 (Tab T-14.1, Tab BB-7.1).

f. MA was the only fatality. No other individuals were injured.

g. A fiberglass skylight panel, directly behind the panel being repaired, was damaged during MA's fall. (Tab P-2).

### 3. BACKGROUND

#### a. Organizations.

##### (1) Pacific Air Forces (PACAF)

PACAF, headquartered on JBPH-H, Hawaii (HI), is the United States Air Force (USAF) Major Command under which Eleventh Air Force (11 AF) and 15th Wing (WG) are subordinate commands. PACAF's primary mission is to provide United States Pacific Command integrated expeditionary AF capabilities to defend the Homeland, promote stability, dissuade/deter aggression, and swiftly defeat enemies (Tab CC-3.1). PACAF Commander is the convening authority for this ground mishap investigation (Tab X-1.1).



(2) Eleventh Air Force (11 AF)

11 AF, headquartered on Joint Base Elmendorf-Richardson, Alaska, is the Numbered Air Force subordinate to PACAF. 11 AF plans, conducts, controls and coordinates air operations in accordance with the tasks assigned by Commander, PACAF, and is the force provider for Alaskan Command, Alaskan North American Aerospace Defense Command Region and other unified commanders (Tab CC-4.1).



(3) 15th Wing (15 WG)

15 WG, headquartered on JBPH-H, HI, is subordinate to 11 AF. The 15 WG mission is to develop and sustain combat-ready Airmen, in partnership with the total force, to provide global mobility, global reach, precision engagement, and agile combat support (Tab CC-5.1). 15 WG exercises Administrative Control (ADCON) over the 647 Air Base Group (ABG) (Tab AA-9.2 to AA-9.3). ADCON is the direction or exercise of authority over subordinate or other organizations with respect to administration and support including organization of service forces, control of resources and equipment, personnel management, unit logistics, individual and unit training, readiness, mobilization, demobilization, discipline, and other matters not included in the operational missions of the subordinate or other organizations. This is the authority necessary to fulfill Military Department statutory responsibilities for administration and support (Tab AA-2.3).



(4) 647th Air Base Group (647 ABG)

647 ABG, headquartered on JBPH-H, HI, is subordinate to the 15 WG for ADCON. 647 ABG's mission is to develop, protect, deploy and sustain combat-ready Airmen; deliver state of the art services; preserve and improve infrastructure, and enable world-class global mobility (Tab CC-6.1). The group possesses eight squadrons functionally aligned under corresponding JBPH-H functional areas (Tab AA-5.2). These squadrons include Force Support Squadron, Security Forces Squadron, Civil Engineer Squadron, Communications Squadron, Logistics Readiness Squadron, and Contracting Squadron (Tab AA-5.2). 647 ABG members fill Joint Base Supported Component Force Structure (JBSCFS) billets. Personnel in JBSCFS billets are service members provided by the supported commander, but under the authority and direction of the Joint Base Commander for installation support, but remain under the operational control (OPCON) of the supported service component (Tab AA-10.1 TO AA-10.2). OPCON is the authority to perform those functions of command over subordinate forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction necessary to accomplish the mission (AA-2.2). 647 ABG Commander (CC) serves as the Deputy JBPH-H/CC (Tab AA-5.2).



(5) 647th Civil Engineer Squadron (647 CES)

647 CES, headquartered on JBPH-H, HI, is subordinate to 647 ABG for ADCON (Tab AA-9.2 to AA-9.3). The mission of 647 CES is to develop, deploy, and sustain expeditionary Airmen engineers; protect, preserve and improve facilities and infrastructure; and deliver world-class emergency response services and



resource management (Tab CC-6.1). Despite a thorough search, the Board was unable to locate guidance or instructions specifically addressing OPCON or Tactical Control (TACON) authority relationships for JBPH-H. However, Joint Base commands are not operational commands, they are support commands (Tab AA-10.1 to AA-10.2). JBSCFS personnel are service members under the authority and direction of the joint base commander for installation support, but remain under OPCON of the supported service component (Tab AA-10.1 to AA-10.2). The Structures Shop possesses 29 personnel and falls under the Heavy Repair Section, which falls under the Operations Flight, which falls directly under 647 CES/CC (Tab CC-7.1 to CC-7.2). Regarding JBPH-H, 647 CES personnel fill JBSCFS billets aligned under Joint Base 4 (JB4), Facilities and Environment, JBPH-H, which is further aligned under Naval Facilities and Engineering Command (NAVFAC) HI (Tab AA-5.2 organizational chart, Figure (Fig.) 1). The 647 CES command construct does not exist under the JBPH-H/NAVFAC HI organizational construct (Tab AA-5.2 organizational chart, Fig.1). As it pertains to delivery of installation support at JBPH-H, supported Component personnel assigned to Joint Base Integrated or JBSCFS positions shall be subject to the authority and operational direction of the Joint Base Commander, or to the supporting Component Commander/Commanding Officers (Tab AA-5.3). The supporting Component Commander over JB4 is NAVFAC HI as identified in paragraph 4.b. of the United States (US) Navy/USAF Installation Support Memorandum of Agreement for JBPH-H (Tab AA-5.2). USAF members filling JBSCFS billets are under the Operational Direction (OPDIR) of JBPH-H (Tab AA-6.2). However, the 647 CES Structures Shop complies with the operational direction of NAVFAC HI through JB4 (Tab AA-5.2, Fig.1). OPDIR is the authority to designate objectives, assign tasks, and provide direction necessary to accomplish the mission or operation and ensure unity of effort. Authority for operational direction of one component member over members of another component is obtained by agreements between unit commanders whereby these component commanders issue orders to their subordinates to follow the operational direction of specified/designated senior members of the other component for the purpose of accomplishing their associated mission (Tab AA-6.2).

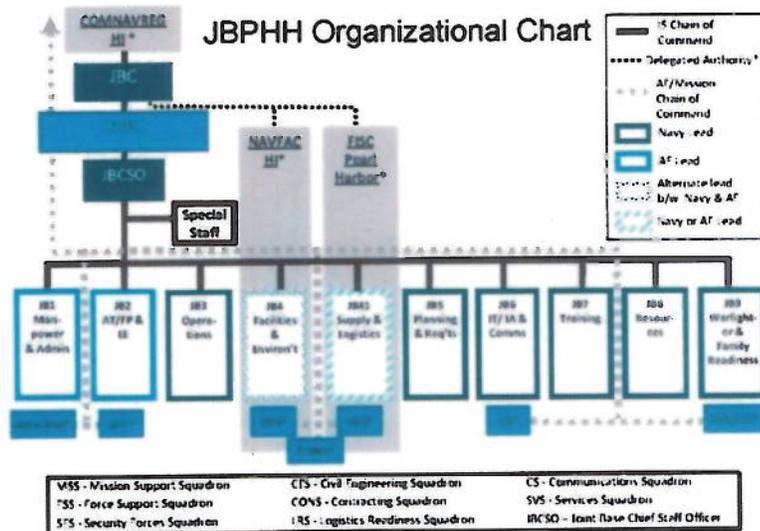


Figure 1 (Tab AA-5.2)

(6) Joint Base Pearl Harbor Hickam (JBPH-H)

JBPH-H, headquartered on JBPH-H, HI, is a support command primarily responsible for the consolidated installation support functions for former Naval Base Pearl Harbor and Hickam Air Force Base (AFB) (Tab AA-5.1, Tab AA-5.5, Tab AA-10.1 to AA-10.2). JBPH-H provides support to supported and tenant commands enabling their operational mission success while simultaneously providing the highest quality installation services, facilities support and quality of life programs (Tab CC-8.1). JBPH-H organizes these consolidated installation functions into 10 overarching functional areas. These areas are labeled JB1 through JB4, JB41, and JB5 through JB9 (Tab AA-5.2, Fig.1). JB4, titled Facilities and Environment, includes JBSCFS personnel from 647 CES (Tab CC-4.1). Even though Air Force personnel are imbedded in JBPH-H, Air Force Structure Shop teams predominantly accomplish work orders on the USAF Hickam side (Tab V-3.9 to V-3.10). Although JB4 is an organization in the JBPH-H organizational structure, JB4 is subordinate to NAVFAC, HI (Tab AA-5.2 Organizational Chart, Fig.1).



(7) Naval Facilities and Engineer Command Hawaii (NAVFAC HI)

NAVFAC, headquartered in Washington DC, is the US Navy Systems Command that builds and maintains sustainable facilities, delivers utilities and services, and provides Navy expeditionary combat force capabilities. NAVFAC Pacific is a subordinate organization to NAVFAC. NAVFAC HI is a subordinate organization to NAVFAC Pacific. JB4, a JBPH-H organization, is subordinate to NAVFAC HI. Regarding installation safety, NAVFAC HI responsibilities include providing:



(a) "Safety training to educate personnel in safety techniques. Concepts and principles to maintain a healthy work environment and conduct operations (on and off duty, occupational and operational support) in a safe and healthful manner. Includes developing safety courses, scheduling students, delivering training, evaluating training effectiveness for each student, maintaining currency and quality of course, documenting course completion, and monitoring student completion for all safety courses" (Tab AA-5. 4).

(b) "Inspections, evaluations and technical consultations to identify and assess risks to people, facilities and equipment and communicate findings and recommendations and provide technical consultations to responsible authorities in support of Department of Defense operations including annual inspections, high-interest inspections, spot inspections, work place/site/operation inspections, program evaluations, staff assistance visits, and specialty inspections" (Tab AA-5.4).

(c) "Safety Awareness Programs that provide current, relevant, user-friendly information to promote safety. Information shall address risks in: traffic safety, sports and recreational programs, seasonal safety, workplace/Occupational Safety and Health Administration (OSHA) safety, and safety stand downs" (Tab AA-5. 4).

b. Mission. On the day of the mishap, MS and MA's assigned mission was to evaluate and repair the broken skylight on the roof of building 3245 (Tab U-4.1, Tab V-3.16 to V-3.20).

c. Task Planning and Preparation. At approximately 1130H, 8 January 2013, MS surveyed the damaged building and returned to the 647 CES Structures Shop (Structures Shop) to discuss repair options with co-workers (Tab V-3.19 to V-3.20). MS determined plastic covering secured by sandbags was the appropriate mitigation action until a replacement fiberglass skylight could be ordered and received (Tab V-3.18, V-3.20). SS1 assigned MA to assist MS with the job (Tab V-3.20, Tab V-4.3). MS and MA gathered required materials and departed for building 3245 (Tab V-3.21). Upon arrival MS and MA conducted a visual inspection of the job site, discussed the task of covering the damaged skylight, and reviewed associated job site safety hazards (Tab V-3.26). MS cautioned MA on the brittleness of the skylight (Tab V-3.27). No checklists or pre-job briefing guides were referenced during the planning and preparation phase of the job (Tab V-3.26 to V-3.27).

d. People.

(1) Mishap Airman First Class (MA). MA was a 647 CES Structural Apprentice fatally injured in the mishap. He entered USAF active duty in May 2011 and reported to JBPH-H in December 2011 (Tab T-6).

(2) Mishap Staff Sergeant (MS). MS was a 647 CES Structural Journeyman and led the building 3245 work order repair team on the day of the mishap (Tab V-3.16 to, Tab V-3.17).

(3) Staff Sergeant 1 (SS1). SS1 was a 647 CES Structural Craftsman and Structures Shop Safety Monitor (Tab V-4.1). He was MA's supervisor (Tab V-4.2).

(4) Staff Sergeant 2 (SS2). SS2 was a 647 CES Structural Craftsman and controller for 647 CES Structures Shop at the time of the mishap (Tab V-5.1).

(5) Staff Sergeant 3 (SS3). SS3 was a 647 CES Structural Craftsman and Structures Shop Aerial Lift Program Manager (Tab V-6.1).

(6) Staff Sergeant 4 (SS4). SS4 was a 647 CES Structural Craftsman and Structures Shop Fall Protection Monitor (Tab V-7.1).

(7) Staff Sergeant 5 (SS5). SS5 was the 647 CES Unit Training Manager and Alternate Ground Safety Program Manager (Tab V-13.1).

(8) Ground Safety Manager (SM). SM was the 647 CES Primary Ground Safety Manager responsible for submitting mishap reports and providing unit safety briefings (Tab V-12.1).

(9) 647 CES Commander (SQ/CC). SQ/CC was the Squadron Commander of MA (Tab V-14.2).

(10) Non-Commissioned Officer In Charge (NCOIC). NCOIC was the 647 CES Structures NCOIC (Tab V-2.1).

(11) Superintendent (SP). SP was the 647 CES Operations Flight Superintendent and provided oversight of 647 Public Works department, which included the Structures Shop (Tab V-1.1).

(12) Friend 1 (FR1). FR1 was a 647 Logistics Readiness Squadron Combat Mobility Flight member. FR1 was a close friend of MA and resided in the same dormitory as MA (Tab V-11.1).

(13) Friend 2 (FR2). FR2 was a 735 Air Mobility Squadron (AMS) Air Transportation Fleet Apprentice. FR2 was a close friend of MA and resided in the same dormitory as MA (Tab V-8.1).

(14) Friend 3 (FR3). FR3 was a 735 AMS Air Transportation Fleet Apprentice. FR3 was a close friend of MA and resided in the same dormitory as MA (Tab V-10.1).

(15) Friend 4 (FR4). FR4 was a 15 WG Command Post Emergency Action Controller. FR4 was a friend and dormitory suite-mate of MA (Tab V-9.1).

(16) Transient Alert (TA). TA was a Transient Alert contract employee. TA worked in building 3247 adjacent to building 3245 and was working the day of the mishap (Tab V-15.1).

(17) Optometrist (OP). OP was a 15 Medical Group Optometry Flight Commander. OP provided the Board expertise related to MA's optometry records (Tab V-17.1).

(18) Paramedic (PM). PM was a Hawaii Federal Fire Department Paramedic. PM observed and treated MA (Tab V-16.1).

(19) NAVFAC Safety (NS). NS was an Occupational Safety and Health Specialist, employed by US Navy at NAVFAC HI (Tab V-18.2). He provided safety feedback and instruction to Structures Shop personnel (Tab V-18.3).

#### 4. SEQUENCE OF EVENTS

a. Pre-Accident. 5 January 2013: Personnel at the JBPH-H Transient Alert facility, building 3247, submitted a work order for repairs to the Transient Alert Maintenance Storage Facility, Building 3245 (Tab U-4.1).

b. Day of Accident, 8 January 2013.

(1) Pre-Mishap Timeline.

0715H: MA failed to report on time to the Structures Shop and missed the morning meeting (Tab V-4.2, Tab V-3.15). At the morning meeting, MS was assigned work orders for the day, including the repair of building 3245 (Tab V-3.16).

0725H: SSI contacted MA by phone. MA reported sleeping through his alarm (Tab V-4.2, Tab V-5.2). SSI instructed him to report directly to building 725 to perform a job assessment (Tab V-4.2).

0800H: MA called SSI from building 725 to report his arrival (Tab V-4.2).

0840H: SSI returned to the shop from a job. MA was present, having returned from building 725 (Tab V-4.3).

0840H – 0915H: SSI and MA went to buildings 725 and 925 to perform job assessments, then returned to the shop to collect equipment needed to complete their work orders (Tab V-4.3).

0915H – 1100H: SSI and MA completed a work order at building 725 (Tab V-4.2 to V-4.3).

1100H – 1130H: SSI and MA returned to the shop and prepared materials to perform another job in building 925 after lunch (Tab V-4.3). MS conducted an initial assessment of building 3245 (Tab V-3.19).

1130H – 1230H: MA left the shop to go to lunch (Tab V-4.3). MS went to lunch separately (Tab V-3.20).

1230H – 1330H: MA returned from lunch. MA talked to SS3 and appeared to be in an upbeat mood (Tab V-6.2). During the same time period, MS returned from lunch and attempted to locate a replacement panel for building 3245 but was unable to find the panel locally (Tab V-3.20). After discussing the problem with co-workers, he decided to cover the hole with plastic sheeting secured by sandbags as a temporary fix until a new panel could be ordered and delivered (Tab V-3.20). SSI directed MA to accompany MS since two people are required for jobs involving roof work (Tab V-3.20).

1330H – 1430H: MS and MA loaded six sandbags, a roll of plastic sheeting, and a ladder into a shop truck (Tab V-3.20 to V-3.21). MS and MA engaged in casual conversation during the drive to building 3245 (Tab V-3.21 to V-3.22). MA and MS arrived at building 3245 (Tab V-15.1, Tab V-3.22). According to MS, both he and MA were wearing safety vests and hard hats upon arriving at building 3245 (Tab V-3.23). Neither wore Airman Battle Uniform (ABU) blouses (Tab V-3.23, Tab V-15.1).

## (2) Accident.

1400H – 1430H: MS walked MA through the anticipated project and showed MA the open skylight from the interior of the building (Tab V-3.26, Fig. 1). MS stated that he specifically

warned MA to be wary of the “brittle” skylights, and told him not to come onto the roof until “the last minute” for safety purposes (Tab V-3.27).

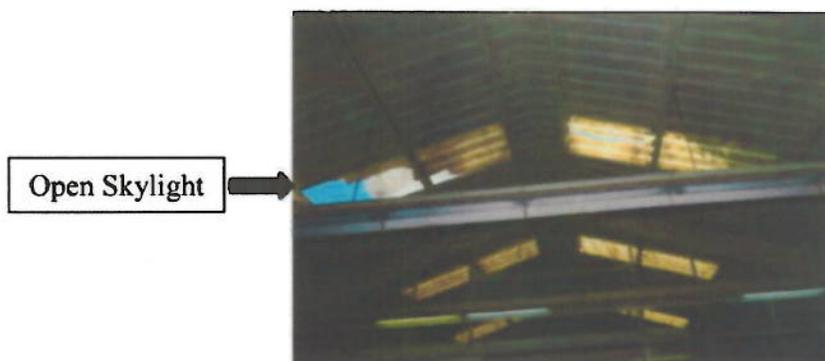


Figure 1 (Tab Y-24)

1430H: MS entered Transient Alert building 3247, adjacent to building 3245, and informed TA that he intended to place plastic sheeting over the missing skylight. He estimated the job should take 45 minutes to 1 hour (Tab V-3.27, Tab V-15.1). The primary Transient Alert facility, Building 3247, is located 18 feet (ft) east of building 3245 (Tab Y-4, Fig. 6).

1430H – 1445H: MS and MA erected an A-Frame ladder to access the roof. The ladder was positioned directly below the open skylight immediately next to the outside East wall of the building (V-3.29, Tab V-3.62, Tab V-15.1, Tab V-15.5, Fig. 2). MS and MA staged the plastic sheeting and sandbags at the base of the ladder (Tab V-3.28 to V-3.30, Tab V-3.61). MA remained on the ground and handed the equipment to MS to carry up the ladder and onto the roof (Tab V-3.30). MS staged the equipment on the roof (Tab V-3.29 to V-3.31).

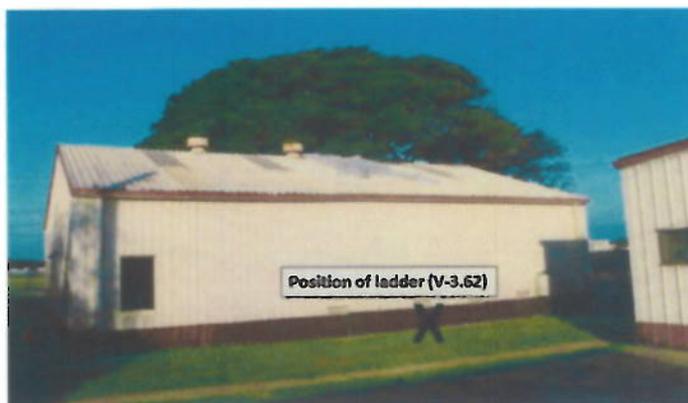


Figure 2 (Tab Y-17)

1445H – 1450H: TA left building 3247 and sat on a bench in between buildings 3247 and 3245 (Tab V-15.1). TA saw MS on the roof laying down plastic sheeting and MA

maneuvering sandbags on the ground next to the ladder (Tab V-15.1). TA stated neither MA nor MS were wearing hard hats (Tab V-15.1). As TA returned to work in building 3247, he heard MS instruct MA to join him on the roof (Tab V-15.1).

1445H – 1455H: MS stretched out pre-cut plastic sheeting and directed MA to join him on the roof to help place the plastic sheeting under the sandbags (Tab V-3.31). MA climbed up the ladder and walked to the roof peak above the damaged skylight (Tab V-3.31 to V-3.32, Tab V-3.63, Fig. 3). From this position, MS estimated that MA was likely standing on the 2 foot, 9 inch wide portion of roof between the open skylight being covered and the intact skylight directly behind him (Tab V-3.36, Tab V-3.63, Tab Y-5, Fig. 3). MA and MS secured the plastic sheeting beneath the sandbags (Tab V-3.33). MS determined the plastic sheeting needed trimming (Tab V-3.33). MS began to descend the ladder to retrieve a knife from their truck to cut the plastic. As MS looked away, MA was on the ridge continuing to work with the plastic sheeting (Tab V-3.34). MS stated “I don’t know if he was straightening it out or like trying to push it out, but he was doing something with it” (Tab V-3.34). MS could not recall whether MA was kneeling or crouching (Tab V-3.34) or if MA was wearing a hard hat while on the roof (Tab V-3.42 to V-3.43). Approximately five seconds after looking away from MA, as MS began to descend the ladder, he heard a crack followed by a scream (Tab V-3.37 to V-3.38). MS looked up, did not see MA on the roof, and rushed down the ladder (Tab V-3.37). MS ran inside the building and found MA on the floor, lying on his back (Tab V-3.38). MA was lying underneath the skylight that was directly behind him when he worked on the plastic sheeting (Tab V-3.43, Tab V-3.64). The skylight above him, previously undamaged, was cracked (Tab V-3.49 to V-3.50).

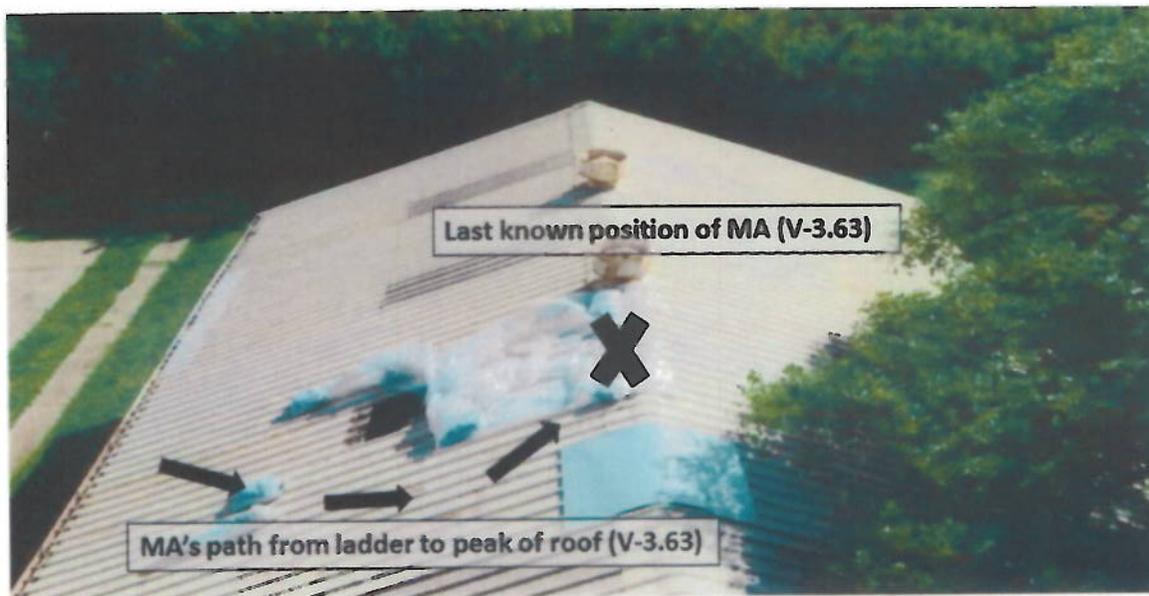


Figure 3 (Tab Y-8)

1455H – 1500H: MS instructed MA not to move but did not notice a response from MA (Tab V-3.40). MS then ran next door to building 3247 (Tab V-3.40). MS instructed TA and his co-worker to call 911, then ran back to MA (Tab V-3.40, Tab V-15.2). TA and his co-worker followed MS to building 3245 (Tab V-15.2). TA saw MA on the ground and called the MOC and requested medical help at approximately 1459H (Tab T-2.1, Tab V-15.2, Tab BB-3.4). MA was bleeding from the back of his head, and appeared to be non-responsive (Tab V-3.41, Tab V-15.2). TA stated that “I didn’t see any helmet or other equipment inside the building that wasn’t there previously.” (Tab V-15.2).

### (3) Emergency Response.

1502H – 1520H: Emergency medical personnel arrived and attempted to stabilize MA for transport to TQMC (Tab V-16.1). Emergency medical personnel were from the Hawaii Federal Fire Department, stationed on the JBPH-H Airfield, less than 1 mile away (Tab Y-1, Tab V-16.1). PM stated that less than three minutes elapsed from call reception to arrival at the mishap location (Tab V-16.1). Upon arrival, paramedics observed MA lying flat on his back, conscious but unresponsive (Tab V-16.1). Paramedics found an injury in the back of MA’s head (Tab V-16.1). Paramedics examined MA but did not find additional injuries (Tab V-16.2). Paramedics moved MA to the ambulance for transport to TQMC (Tab V-16.2).

1520H: Emergency personnel and MA departed building 3245 for TQMC (Tab T-2.1).

1535H: MA arrived at TQMC (Tab T-2.1). A TQMC trauma team met MA in the trauma room of the emergency department (Tab V-16.2).

c. Hospital Care. 8 January – 25 January 2013: MA remained under the care of TQMC for 18 days (Tab BB-7.1) before his passing on 25 January 2013 (Tab BB-7.1).

**5. MAINTENANCE** Building 3245 Repair History: On 5 January 2013, Transient Alert personnel placed the work order for skylight repair that MS and MA responded to on 8 January 2013 (Tab U-4.1). No additional relevant maintenance records exist (Tab BB-5.1).

## **6. EQUIPMENT, VEHICLES, FACILITIES, AND SYSTEMS**

### a. Building.

(1) Building 3245 is located on Kamikahi Road, JBPH-H, HI, on the west end of the Honolulu International Airport (Tab Y-1, Tab Y-2, Fig. 4). The building was constructed in January 1966 (Tab U-2.1). It is a Transient Alert warehouse used for storing visiting personnel equipment (Tab V-15.1).

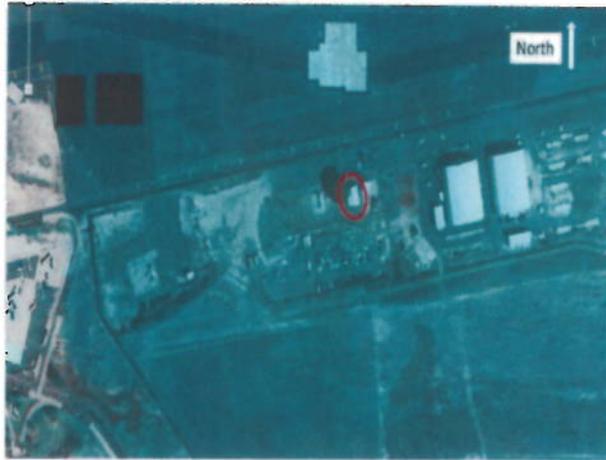


Figure 4: (Tab Y-2)

(2) Plans and building construction information for Building 3245 were unavailable, however, the Board conducted a survey of the building (Tab BB-5.1). Building 3245 is a single story building with a sloped gable roof (Tab BB-5.1, Tab Y-3, Tab Y-4). The building has main-entry sliding doors constructed of steel frame tubing and ribbed metal sheeting (Tab BB-5.1, Tab Y-3, Fig. 5). The current sliding door operating width was only six feet due to the right door stuck in a closed position (Tab BB-5.1, Tab Y-3). The building consists of metal frame construction on a concrete slab on grade (Tab BB-5.1, Tab Y-3). The roof is sloped at a 3.5 inches (in):12in ratio pitch (3.5in rise for 12in run) (Tab BB-5.1, Tab Y-3, Fig.5). The wall height on both sides of the building is 12ft (Tab Y-4, Fig.6). The highest point from floor to ridge is 18ft 6in (Tab BB-5.1, Tab Y-4, Fig. 6). The building is open beam construction and has no false ceiling (Tab Y-23, Fig.7). The building contains steel frame shelving units with plywood shelves (Tab Y-23, Fig.7).

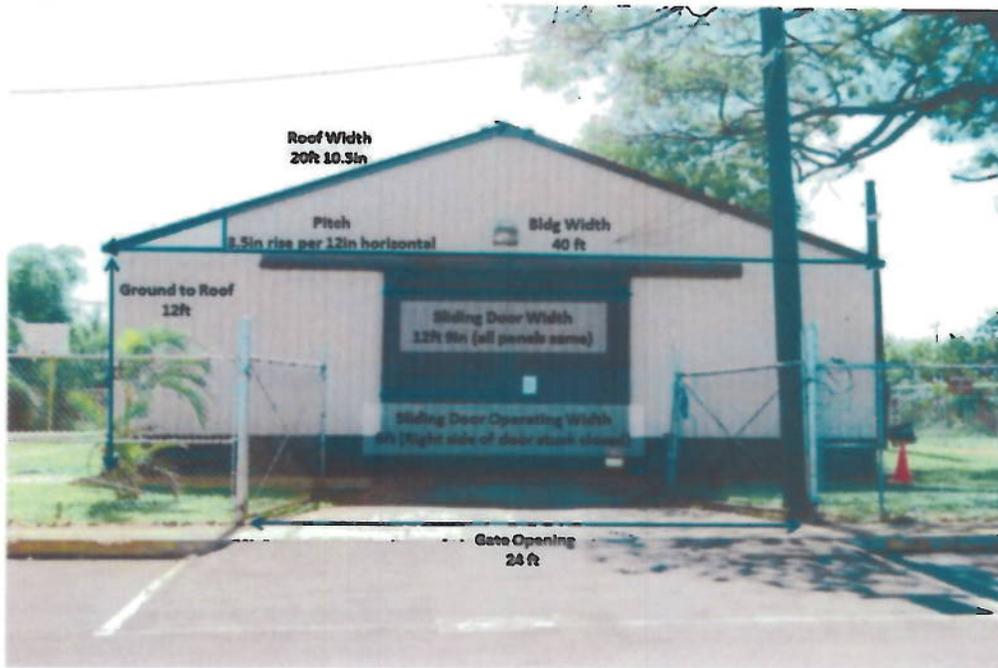


Figure 5 (Tab Y-3)

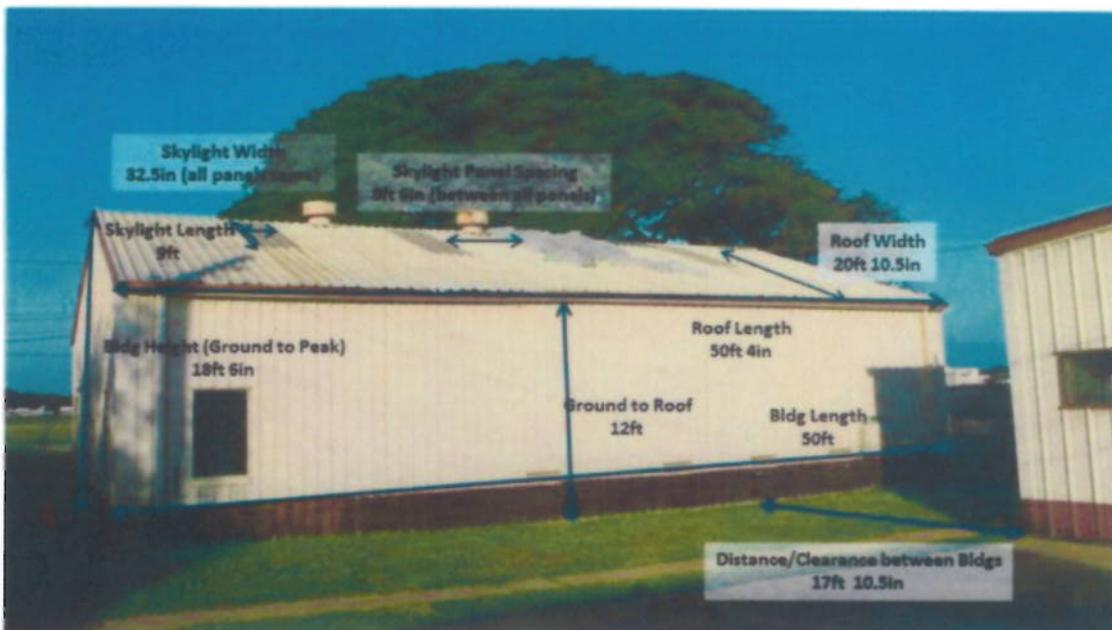


Figure 6 (Tab Y-4)



Figure 7 (Tab Y-23)

(3) The roof construction consists of ribbed metal roof sheeting and a metal ridge cap approximately 2ft 9in wide (Tab BB-5.1, Tab Y-5, Fig. 8). There are eight ribbed fiberglass skylight panels, four on each side of the roof (Tab BB-5.1, Tab Y-5, Fig.8). The panels are spaced 8ft 6in apart from each other and are inlayed in the roof (Tab BB-5.1, Tab Y-5, Fig.8). The exposed portion of the fiberglass skylight panels are 32.5in wide by 9ft long with the starting point beginning at the edge of the building ridge cap (Tab BB-5.1, Tab Y-5, Fig. 8). The fiberglass skylight panels appear thin and brittle (Tab Y-12).



Figure 8 (Tab Y-5)

(4) The fiberglass skylight panels are easily visible from inside building 3245 during daylight hours (Tab Y-23). From above the building, the skylights appear similar in color and texture to the building roof (Tab Y-9, Fig. 9).



Figure 9 (Tab Y-9)

b. Repair, Equipment and Materials. Equipment and materials used in the repair include six sandbags, one roll of plastic sheeting and one step ladder (Tab V-3.21, V-3.26). Each sandbag weighed approximately 66 pounds and was approximately 22in long by 13in wide by 7in high. The plastic sheeting measured 14ft 8in long by 10ft 2in wide (Tab BB-5.1). One Little Giant A-frame ladder, Model 26 type 1A, measuring 27in wide by 6ft 7in tall was used (Tab BB-4.2 to BB-4.3).

## 7. ENVIRONMENTAL CONDITIONS

a. Forecast Weather. JBPH-H was subject to a wind advisory from 0500H, 7 January 2013 to 1000H, 8 January 2013. Winds were forecasted to be 25-35 knots during the wind advisory period. Wind gusts of 25 knots were observed in the morning but gradually weakened (Tab F-1 to F-10).

b. Observed Weather. There was no rain reported at the mishap site on 8 January from 1240H to the time of the mishap (Tab F-9, Tab V-15.2). Additionally, TA testified that the area surrounding the job site was dry at 1240H when he arrived and skies remained clear throughout his work period (Tab V-15.2). The weather report recorded conditions of 19 knots, gusting to 26 knots, from 080 degrees (east to west) at 1453H (Tab F-9). From the last known position of MA on the peak of the roof, this places the wind at his face. TA reported wind levels at the mishap site were normal for JBPH-H, and that the wind was consistent with a “normal trade wind day” (Tab V-15.2 to V-15.3). MS reported the wind “picked up” while he was on the roof (Tab V-3.24) and that if “you held some plastic in your hand or something, the wind would pitch it,

make it difficult for you to let it fly, that's all" (Tab V-3.26). MS recalled that "nothing stuck out" regarding the wind at the exact time of the mishap (Tab V-3.38). No wind alerts or warnings were in effect at the time of the mishap (Tab F-9).

c. Environmental Factors. No other relevant environmental conditions were reported.

d. Restrictions, Warnings and Procedures. No restrictions, warnings or procedures were in effect at the time of the mishap (Tab F-2 to F-9).

## 8. PERSONNEL QUALIFICATIONS

### a. Mishap Airman First Class (MA).

(1) Formal Training. MA graduated from Structural Apprentice Technical Training School, a 12-week course based at Naval Construction Battalion Center, Gulfport, Mississippi, on 21 December 2011 and was awarded his 3-skill level qualification (Tab T-13.1, T-13.4). Graduates complete three courses back-to-back and receive training in various structural career field trades, including carpentry, masonry, sheet metal fabrication, welding, painting, and roofing (Tab T-7.1 to T-7.3). On 19 September 2012, MA completed the roofing portion of his 5-skill level journeyman upgrade training (Tab T-12.1).

(2) Recurring Training. On 27 December 2011, MA completed Operational Risk Management (ORM) Level One and Level Two training, Aerial Lift Program training and received training in accordance with the Structures Shop Job Safety Training Outline (Tab T-11). MA completed annual Fall Protection Training on 26 January 2012 (Tab T-11). Specifically, MA was present at a briefing by NAVFAC Safety personnel titled NAVFAC Fall Protection Harness Awareness (Tab T-10.1). Nearly a year later, MA again completed his annual Fall Protection and Aerial Lift training requirement by attending a Structures Shop fall protection safety brief on 7 December 2012 (Tab U-3.1). SS1 testified that this training included discussion of ladder safety and harness use (Tab V-4.1).

(3) On the Job Training. Structures Shop members testified that much of the training in their career field is gained "on the job" (Tab V-4.2, Tab V-5.1), and that each Airman First Class (A1C) in the shop is qualified to engage in roof work under the supervision of more experienced personnel (Tab V-1.1, Tab V-5.1). Prior to the mishap, MA had worked on at least 10-15 roofing jobs (Tab V-4.2, Tab V-5.2, Tab V-3.13).

### b. Mishap Staff Sergeant (MS).

(1) Formal Training. MS graduated from Structural Apprentice Technical Training School on 3 May 2008 (Tab T-9.2) and was a 5-skill level Structural Journeyman at the time of the mishap (Tab T-6.1). Prior to joining the Structures Shop in May 2012, MS was a member of 819th Rapid Engineer Deployable Heavy Operational Repair Squadron, Engineer unit, Malmstrom AFB, Montana (Tab T-6.1).

(2) Recurring Training. MS completed ORM Level One and Level Two training on 4 April 2012, and last completed Aerial Lift and Fall Protection training on 7 December 2012 (Tab T-3.1).

c. Additional Training Materials and Job-Related Information.

(1) Fall Protection Binder. The Structures Shop Fall Protection Binder is located in the Structures Shop library for all shop personnel to access for reference or safety education purposes (Tab V-4.1, Tab V-7.2). Tab D, Paragraph (Para) 2 of the Fall Protection Binder, titled "647 CES/CEORS Shop Fall Protection Program," explicitly states that fall protection must be used when working six feet or higher above the ground. The document also states that employees may work without fall protection if on a low slope roof for inspection or observation purposes only (Tab V-7.3). A low slope roof is defined as a roof having less a slope less than a 4in:12in ratio (Tab AA-3.16). Building 3245 roof slope is 3.5in:12in and is thus a low slope roof (Tab Y-3).

(2) Multi-Service Training. NAVFAC HI is responsible for providing safety training, including mandatory fall protection training, to JBPH-H personnel (Tab AA-5.4). Witnesses testified that NAVFAC HI fall protection training was being conducted at JBPH-H prior to 8 January 2012, but that 647 CES personnel had not attended this training (Tab V-14.14). SQ/CC testified that "we" requested this training in November 2012 but the training was never provided (Tab V-14.14). SS1 stated that he did not know the training existed (Tab V-4.2). SS4 testified he completed NAVFAC training a year or more prior to the mishap, but did not realize it was "mandatory" training (Tab V-7.2). NS testified that the requested training was made available (Tab V-18.8). However, NS would not discuss how the Structures Shop was informed of the existence of this training (Tab V-18.9). NS declined to give examples of occasions prior to the mishap wherein he specifically discussed mandatory fall protection training with Structures Shop personnel, citing conflict with his involvement in the Safety Investigation Board (Tab V-18.8 to V-18.9). The NAVFAC HI Safety Office Director provided the Board a copy of a safety presentation given to new employees and military members newly assigned to JBPH-H (Tab BB-8.1 to BB-8.5). The brief contains one slide related to fall protection requirements (Tab BB-8.2). This slide does not address the conditions when fall protection must be used (Tab BB-8.2).

## 9. MEDICAL FACTORS

a. Medical Records Availability. The complete military medical records of MA were available to the Board. Citing legal concerns, TQMC released only partial records relating to MA's hospitalization post-mishap (Tab BB-7.1).

b. Qualifications. MA was medically qualified to perform work duties at the time of the mishap (Tab BB-7.3).

c. Vision. MA was diagnosed with nearsightedness and reported a history of wearing contact lenses prior to entering the military (Tab BB-7.2). The most recent eye exam referenced in MA's medical records occurred during Basic Military Training in May 2011 (Tab BB-7.2). This

exam determined that MA required a prescription of Right Eye -1.25-0.75x092, Left Eye -1.25-0.50x073 (Tab BB-7.2). During this exam, MA was prescribed glasses and three sets were ordered (Tab V-17.2). At the time of the mishap, MA was not wearing glasses and there is no evidence that he was wearing contact lenses based on witness testimony, ophthalmology consult notes and post-mishap inventory of his belongings (Tab V-3.4, V-3.21, Tab V-16.2, Tab BB-7.2). Friends and co-workers reported they had never seen MA or had knowledge of MA wearing glasses or contact lenses (Tab V-3.21, Tab V-4.2, Tab V-5.2, Tab V-8.1, Tab V-9.1, Tab V-11.1). The lead paramedic responding to the mishap scene testified he did not notice any contact lenses while examining MA (Tab V-16.2). There is no evidence that MA received corrective eye surgery during the period between his last vision exam and the mishap (Tab V-17.2, Tab BB-7.2). As nearsightedness does not improve over time, MA would have required corrective lenses on the day of the mishap (Tab V-17.2). Without correction, his vision would have been below the standards required for the 3E3X1 Civil Engineer Air Force Specialty Code (Tab BB-1.1 to BB-1.3, Tab BB-1.8, Tab V-17.2). It is unclear whether MA was wearing corrective lenses or how his vision may have been impaired on the day of the mishap. The fiberglass skylight panel through which MA fell is similar in shape and color to the corrugated metal of building 3245's roof (Tab Y-8). If MA was not wearing corrective lenses at the time of the mishap, he would have had some degree of blurred vision and decreased visual acuity at low contrast (Tab V-17.2). As there were no witnesses to the exact moment of the fall, it is not known if or to what degree MA's vision played a role in the mishap.

d. Other medical conditions. There are no other medical conditions relevant to the mishap (Tab BB-7.2).

e. Injuries and Pathology.

(1) Post-fall. MS found MA on his back with his eyes open but not moving, or responding to verbal commands (Tab V-3.39, V-3.41, V-3.45). MS momentarily left MA, notified Transient Alert personnel of the mishap and returned to MA (Tab V-3.40). MS testified that the MA's legs had moved from an open position to a crossed position (Tab V-3.39 to V-3.40). Arriving paramedics found MA unresponsive, lying flat on his back, feet extended and not crossed, with a fracture to the left posterior skull (Tab V-16.1, V-16.3). The position of MA's legs observed by PM differed from that observed by MS (Tab V-3.39, Tab V-16.1 to V-16.3). The paramedics moved him into the ambulance after taking precautions to protect his spine. Paramedics examined MA but did not detect other injuries (Tab V-16.2). Paramedics noted signs of a severe and progressively worsening head injury while en-route to TQMC (Tab V-16.2). Paramedics observed MA having difficulty breathing and performed an endotracheal intubation prior to arriving at TQMC (Tab V-16.2).

(2) Arrival at TQMC. Upon arrival at the hospital, MA was evaluated and treated in the emergency department by an Emergency Physician and a Trauma Physician (Tab BB-7.1). MA underwent multiple tests and imaging studies, including a computed tomography scan of the brain (Tab BB-7.1). Clinical exams and the computed tomography scan showed evidence of a critical brain injury (Tab BB-7.1). MA was treated to reduce brain swelling and examined by a neurosurgeon (Tab BB-7.1). MA was transferred to the neurosurgical intensive care in critical condition on 8 January 2013 (Tab BB-7.1).

(3). Hospitalization. During his 18-day hospitalization, MA's condition did not show improvement (Tab BB-7.1). MA did not recover from his head injury and subsequently passed away at TQMC at 1144H, 25 January 2013 (Tab BB-7.1).

f. Lifestyle. There is no evidence to suggest that lifestyle factors were relevant to this mishap.

## 10. OPERATIONS AND SUPERVISION

a. Operations Tempo. MS reported arriving at work at 0700H on the day of the mishap (Tab V-3.15). MS was assigned four work orders to complete and had finished two of them prior to lunch at 1130H (Tab V-3.16). There is no indication that the amount or type of jobs assigned to MS were atypical, or that he faced extreme time pressure to complete these tasks. Similarly, there is no indication MA faced time pressure to complete assigned tasks. MA arrived at work at 0800H and visited two worksites prior to taking a one-hour lunch (Tab V-4.3). The mishap occurred seven hours into MA's duty day at approximately 1500H (Tab V-15.2, Tab BB-3.4). Additionally, MA returned from leave on 4 January and was described as being relaxed (Tab V-4.2, Tab V-8.1, Tab V-9.1, Tab V-10.1, Tab V-11.1). There is no evidence to suggest that the unit's operations tempo was relevant to the mishap.

b. Experience Level. Although a fully qualified 5-level Structural Journeyman, MS assumed the rank of Staff Sergeant (SSgt) in December 2012 and was the most junior SSgt in the Structures Shop (Tab V-4.2, Tab V-3.2). His co-workers generally described his experience level and judgment as average to above average (Tab V-2.3, Tab V-4.2, Tab V-6.1). MA was among the most junior members of the Structures Shop and had been working in the Structures Shop for approximately a year at the time of the mishap (Tab T-5.1). Prior to the mishap, MA had worked on at least 10-15 roofing jobs (Tab V-3.13, Tab V-4.2, Tab V-5.2).

c. Oversight.

(1) Shop Level. No individual above the rank of SSgt was involved in the decision making process for the work order that led to the mishap. This appears to be typical of work orders submitted to the Structures Shop for completion. Individual work orders generated from the Public Works department customer service desk are sent by computer to a civilian shop foreman, who assigns them to individual team leads (Tab V-14.8). Tasks are assigned based on work order priority and the availability of personnel (Tab V-5.1). Team leads are predominantly SSgts (Tab V-2.1). All SSgts are considered qualified to lead roofing projects (Tab V-5.1). All A1Cs are considered qualified to perform roofing jobs if accompanied by a SSgt (Tab V-5.1). On the day of the mishap, SS2 was responsible for assigning work orders in the Structures Shop (Tab V-5.1). SS2 assigned the building 3245 work order to MS (Tab V-4.3). Structures Shop members testified that team leads are primarily responsible for making safety-related decisions (Tab V-2.1, Tab V-5.1).

(2) NAVFAC HI. NAVFAC HI is responsible for providing safety training and inspections to Structures Shop members (Tab AA-5.4). NS, the NAVFAC HI Occupational Safety and Health Specialist tasked with performing safety inspections for Structures Shop personnel

and other JBPH-H organizations, testified that he made contact with the Structures Shop approximately three times a week (Tab V-18.6). NS stated he tries to observe shop personnel in their work situations if he knows where they are located but admitted that he often does not know where the job sites are (Tab V-18.4). NCOIC testified that he engaged with or observed NS in the Structures Shop approximately once a week (Tab V-2.2). NS testified that he attempted to correct safety problems as he observed them, and brought significant safety issues or trends to the shop NCOIC (Tab V-18.6 to V-18.7). NS testified that he would typically bring those concerns to a NAVFAC civilian supervisor responsible for Facilities Sustainment in JBPH-H (Tab V-18.7 to V-18.8, Tab CC-1.2). NCOIC testified that NS was his point of contact for safety guidance outside of the Structures Shop (Tab V-2.2). Structures Shop personnel testified to confusion regarding fall protection rules and regulations, as discussed in paragraphs 11b(2)(a) and 11b(2)(b) of this report.

## 11. HUMAN FACTORS ANALYSIS

a. Introduction. The Board referenced the Department of Defense Human Factors Analysis and Classification System found in AFI 91-204, attachment 5, to evaluate human factors applicable to the mishap (Tab AA-4.2 to AA-4.30).

b. Applicable Factors.

(1) Organizational Training Issues/Programs.

(a) Organizational Training Issues/Programs are a factor when one time or initial training programs, upgrade programs, transition programs or other training that is conducted outside the local unit is inadequate or unavailable and this creates an unsafe situation (Tab AA-4.30). The Board identified confusion and inconsistent understanding of fall protection regulations and usage requirements within the Structures Shop. Despite having completed fall protection training, multiple Structural Shop members could not identify the applicable Air Force or Navy safety regulations regarding fall protection, working on roofs, or working near skylights (Tab U-3.1, Tab V-1.2, Tab V-2.2, Tab V-3.15, Tab V-4.1). Regulations require fall protection equipment when working at a height of six feet or greater above the ground (Tab AA-3.4, Tab AA-7.5, Tab AA-8.4). Additionally, regulations require precautions be taken when working near skylights (Tab AA-3.2, Tab AA-8.2). MS testified he believed he and MA were following all appropriate safety regulations at the time of the mishap (Tab V-3.54). MS stated he had not received any training regarding safety while working near skylights since arrival at JBPH-H (Tab V-3.54). NCOIC testified he believed MS and MA "Did what I would have done" (Tab V-2.2). Additionally, NCOIC believed fall protection was not required on "low slope" roofs with a pitch below 4in:12in (Tab V-2.2).

(b) NAVFAC HI is the organization responsible for providing fall protection training to JBPH-H Structures Shop personnel (Tab AA-5.2, AA-5.4). NS stated that he understood NAVFAC HI fall protection training to be mandatory for Structures Shop personnel (Tab V-18.13). NAVFAC provided a briefing on "Fall Protection Harness Awareness" to Structures Shop personnel on 26 January 2012 (Tab T-10.1). SQ/CC testified that the squadron requested fall protection training in late November 2012, but the training was not provided by NAVFAC HI (Tab V-14.14). On 7 December 2012, SSI provided annual fall protection training during

the weekly Structures Shop safety brief (Tab U-3.1, Tab V-4.1). Both MS and MA attended this briefing (Tab U-3.1). SS1 testified that ladder safety and harness use were addressed during this briefing (Tab V-4.1).

(c) MS testified that no checklists were used during the pre-job safety check of building 3245 (V-3.26 to V-3.27). SQ/CC testified that Structure Shop members are trained to follow Navy ORM procedures (Tab V-14.16). NCOIC testified that ORM is the responsibility of the team lead, with input from the work crew, and that an ORM checklist is not used by the Structures Shop “because every job is different” (Tab V-2.1).

(d) Structures Shop members testified to organizational confusion regarding whether Air Force or Navy regulations governed their safety requirements (Tab V-1.2, Tab V-4.1 to V-4.2, Tab V-12.1), and where Navy regulations could be found (Tab V-4.1). NS referred members to a Navy website and told members to follow whichever regulation was more stringent (Tab V-14.12, Tab V-18.14 to V-18.15). Regardless of confusion as to which guidance to follow, both the Air Force and Navy regulations require fall protection to be used at or above six feet above the ground (Tab AA-3.4, Tab AA-7.5).

(2) Pre-Existing Physical Illness/Injury/Deficit. Pre-existing physical illness/injury/deficit is a factor when a physical illness, injury, or deficit, existing at the time the individual began the mission/task, causes an unsafe situation (Tab AA-4.16 to AA-4.17). MA had a documented history of nearsightedness requiring corrective lenses. Available evidence suggests the vision of MA was uncorrected at the time of the mishap. Friends and coworkers interviewed had no knowledge of MA ever wearing glasses or contact lenses (Tab V-3.21, V-4.2, Tab V-5.2, V-8.1, Tab V-9.1, Tab V-11.1). MA was not wearing glasses at the time of the mishap (Tab V-3.4). There is no evidence suggesting that the MA had corrective surgery or wore contact lenses. Without corrective lenses, his vision would have fallen below the requirements for his career field (Tab V-17.2, Tab BB-1.1 to BB-1.3).

## 12. GOVERNING DIRECTIVES AND PUBLICATIONS

### a. Air Force Regulations.

(1) The following documents were used as references by the Board, but are not included in the report or not included in its entirety.

- (a) AFI 51-507, *Ground Accident Investigations*, 28 May 2010.
- (b) AFI-33-332, *Privacy Act Program*, 16 May 2011.
- (c) AFI 91-203, *Air Force Consolidated Occupational Safety Instruction*, 15 June 2012
- (d) AFI 91-204, *Safety Investigations and Reports*, 24 September 2008.
- (e) Chief of Naval Operations Instruction (OPNAVINST) 5100.23G, *Navy Safety and Occupational Health Manual*, 21 July 2011.
- (f) *Department of the Navy Fall Protection Guide for Ashore Facilities*, 20 May 2003

**NOTICE:** All AF directives and publications listed above are available digitally on the AF Departmental Publishing Office internet site at: <http://www.e-publishing.af.mil>. Navy directives and publications are available digitally on the Department of the Navy Issuances internet site at: <http://doni.daps.dla.mil/allinstructions.aspx>.

(2) Chapter 13 of AFI 91-203, *Air Force Consolidated Occupational Safety Instruction*, 15 June 2012, governs Air Force fall protection requirements (Tab AA-3.1 to AA-3.16). The following portions are relevant to the mishap:

(a) AFI 91-203, 13.2. Specific Requirements. Fall protection is required for workers working in elevated locations on open-sided floors and platforms and near floor and wall openings (AA-3.3).

(b) AFI 91-203, 13.2.4. Construction Operations, mandates the "six foot rule," requiring that "Fall protection shall be provided when workers can fall six (6) feet or more. This six (6) foot rule applies to all walking and working surfaces, including scaffolding, roofs, open-sided floors and platforms, wall openings and window wall openings at a stairway landing, floor, platform or balcony with a drop of six (6) feet or more (AA-3.4).

"13.2.4.1. Fall protection is not required for inspections, investigations or assessments of workplace conditions prior to the actual start of construction work or after all construction work has been completed" (AA-3.4).

"13.2.4.2. Fall protection is not required on inspections or assessments of flat roofs. However, fall protection is required on inspections or assessments of sloped roofs. Additionally, if an inspection team turns into a working team, i.e., tightening a screw, making an adjustment on a lightning protection system, etc., the team will don fall protection equipment" (AA-3.4).

"13.2.4.3. If the inspection is within six (6) feet of the edge of the roof, fall protection will be required" (AA-3.4).

(c) AFI 91-203, 13.3.1 Types of Fall Protection: "The types of fall protection which may be used include passive fall protection "such as guardrails, work stands and platforms (aircraft maintenance stands, i.e., B-1, B-4, B-5, etc.), nets, ladder cages and other devices that can prevent a worker from falling, but are not directly connected to the worker" (Tab AA-3.4); and active fall protection "such as positioning and restraint systems, ladder climbing devices and PFAS [Personal Fall Arrest Systems], require the worker to wear a harness and attach himself/herself to an anchorage or lifeline" (Tab AA-3.4). When active and/or passive controls "are ineffective, would create a greater hazard or are not feasible," procedural controls may be used (Tab AA-3.4). The use of procedural controls require a detailed, written Job Safety Analysis prepared by a qualified person in coordination with the installation Ground Safety office and maintained at the work site work center (Tab AA-3.5).

(3) AFI 91-203, 7.2.1.7.2, discussing the requirements for guarding floor and wall openings, mandates that "Every covered opening in a surface, such as a skylight floor opening, shall be guarded by a skylight screen or standard railing with toe boards on all exposed sides. Skylight screen grillwork or slat work shall be capable of withstanding a load of at least 200 pounds applied at any area of the screen (Tab AA-3.2).

(4) AFI 91-203, Para 25.13.5 discusses hazards and requirements regarding roofing operations. AFI 91-203 para. 25.13.5.4, mandates that workers on low slope roofs, defined as “a roof having a slope less than or equal to 4 in 12 [vertical to horizontal] with unprotected sides and edges 4 feet or more above lower levels shall be protected from falling” by fall protection systems (Tab AA-3.13).

(5) AFI 91-203 Fig. 25.1, Personal Protective Equipment (PPE) for CE Operations, mandates that both fall protection and head protection be used during CE roofing operations (Tab AA-3.14). Head protection is defined as “A device worn to provide protection to workers when there is the potential for injury to the head from impact and penetration from flying, falling or stationary objects or limited electrical shock, heat or burn. Protection includes a suitable chinstrap and harness to secure the helmet to the head” (Tab AA-3.15).

b. Navy Regulations.

(1) Chapter 13 OPNAVINST 5100.23G, Navy Safety and Occupational Health Program Manual, governs Navy fall protection standards (Tab AA-7.1 to AA-7.14). The instruction provides general guidance regarding fall protection and refers readers to “Department of the Navy Fall Protection Guide for Ashore Facilities” for specific guidance.

(2) Department of the Navy Fall Protection Guide for Ashore Facilities, 20 May 2003, para. 1.5, mandates that construction workers use fall protection when six feet or more above the ground (Tab AA-8.4). This rule is also present in AFI 91-203 (Tab AA-3.4).

(3) Department of the Navy Fall Protection Guide, 20 May 2003, para. 5.2 “Roof Work” states that “On sloped [SIC] roofs: Use a full-body harness, SRL [Self-Retracting Lanyard], roof brackets/anchors for anchorage points (single or multiple connections designed for 5000 pounds per person). Also use slide guards; on flat roofs with no parapet or guardrails: When working 6 feet from the edge, use a full-body harness, restraining system, and or lanyard/SRL” (Tab AA-8.5).

(4) Department of the Navy Fall Protection Guide for Ashore Facilities, 20 May 2003, para. 5.2.9 lists skylight covers among fall protection options when working near holes (Tab AA-8.6).

(5) Department of the Navy Fall Protection Guide for Ashore Facilities, 20 May 2003, part II, Sec 1 contains a matrix for determining whether fall protection is required. Reference number 4 of this guide refers to skylights with other “holes” and states specifically that “If there is a danger of falling through a skylight opening, a standard guardrail system should be installed on all sides of the skylight” (Tab AA-8.2 to AA-8.3). This rule is also found in OSHA guidance 29 Code of Federal Regulations 1910.23, *Protection for floor openings*, (a)(4), “Every skylight floor opening and hole shall be guarded by a standard skylight screen or a fixed standard railing on all exposed sides” (AA-1.1).

c. Known or Suspected Deviations.

(1) Failure to utilize fall protection systems. The roof of building 3245 is 12 feet above the ground at its lowest point and 18ft 6in above the ground at the peak (Tab Y-4). Both relevant safety regulations, AFI 91-203 para. 13.2 and Department of the Navy Fall Protection Guide for Ashore Facilities, 20 May 2003, para. 1.5, as referred to in OPNAV Instruction 5100.23, Chapter 13, direct the use of fall protection equipment when performing construction work six feet or higher above the ground. MS and MA failed to utilize any form of fall protection equipment while performing repairs to building 3245, which was not in compliance with either Air Force or Navy regulations (Tab AA-3.3 to AA-3.12, Tab AA-7.2, Tab AA-8.4).

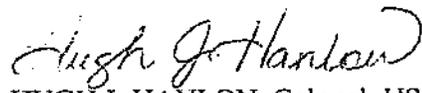
(2) Failure to secure skylights. Both Navy and Air Force regulations require that skylights be secured when roof workers are in proximity to them (Tab AA-3.2, Tab AA-8.2). No steps were taken to install guard rails or screens over the skylights immediately adjacent to the skylight being repaired which was not in compliance with either Air Force or Navy regulations.

(3) Failure to wear head protection. Evidence suggests that MA was not wearing a hard hat at the time of the mishap. MS testified that although he recalled MA wearing a hard hat when they left the shop, the hard hats that they wore did not have chin straps as required by AFI 91-203 Fig. 23.1 (Tab V-3.23, V-3.48, Tab AA-3.15). Further, MS stated he could not recall whether MA was wearing a hard hat at the time of the fall (Tab V-3.42 to V-3.43). TA testified that neither MA nor MS were wearing hard hats while performing work at building 3245 (Tab V-15.1). SS2 testified that, after the mishap, he observed at least one hard hat in the truck that MA and MS drove to the job site (Tab V-5.2). TA and PM reported that they did not see a hard hat on the floor inside building 3245 (Tab V-15.2, Tab V-16.1). MA and MS were issued MSA-brand V-Gard helmets (Tab T-16.1, Tab T-25). These helmets do not include chin straps and are designed primarily to protect against falling objects (Tab BB-2.1). MS testified that the helmets issued to him and MA did not have chinstraps (Tab V-3.48). The manual for MSA-brand V-Gard Type I helmet, no chin strap, specifies that "Although it may provide limited head protection in the event of a fall, this helmet is NOT designed for fall protection" (Tab BB-2.1).

(4) Confusion regarding governing regulations. Structures Shop members expressed confusion regarding whether Air Force or Navy regulations governed Structures Shop safety procedures (Tab V-1.2, Tab V-4.1 to V-4.2, Tab V-12.1). NCOIC testified that as he understood the regulations, fall protection was not required on low slope roofs (Tab V-2.2). He also testified that he was unaware of OSHA regulations requiring workers to stay away from skylights (Tab V-2.2). MS stated that to his knowledge, proper safety procedures were followed on the day of the mishap (Tab V-3.54). SQ/CC testified that the day after the mishap, NS assessed that building 3245 did not require fall protection because it was a "low slope roof" (Tab V-14.17 to V-14.18). NS's testimony differs from that of SQ/CC in that NS testified to telling SQ/CC "fall protection would not be required to check something up there but work would still require fall protection" (Tab V-18.11).

**13. SIGNATURE AND DATE**

Date: 29 APR 2013



HUGH J. HANLON, Colonel, USAF  
President, Ground Accident Investigation Board