

THE NAVY AND MARINE CORPS SAFETY INVESTIGATION AND REPORTING GUIDE



Causal Factor Analysis

**MISHAP
INVESTIGATION
PROCESS**

+MORE

Accessing RMI

AND AVAILABLE ROLES

*Safety Officer's Roles and Responsibilities
Criteria to Suspend Mishap Investigations*

Pre-Mishap Plan

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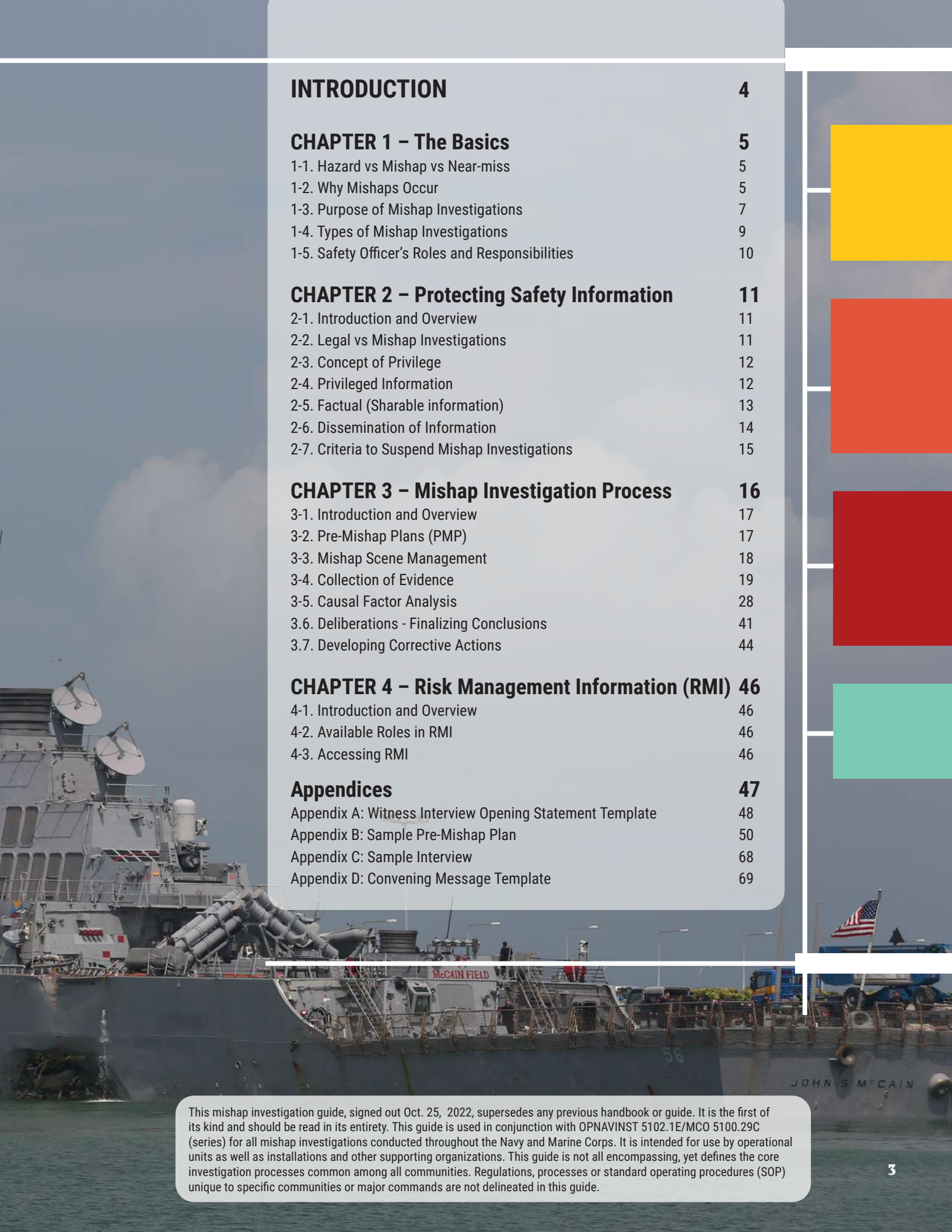
COLLECTION OF EVIDENCE

**IMMEDIATE
ACTION
CHECKLIST**

Cover: The Arleigh Burke-class guided-missile destroyer USS Fitzgerald (DDG 62) sits in Dry Dock 4 at Fleet Activities (FLEACT) Yokosuka to continue repairs and assess damage sustained from its June 17, 2017 collision with a merchant vessel. U.S. Navy photo by MCI Leonard Adams

Inside Cover: Tugboats from Singapore assist the Guided-missile destroyer USS John S. McCain (DDG 56) as it steers towards Changi Naval Base, Republic of Singapore following a collision with the merchant vessel Alnic MC while underway east of the Straits of Malacca and Singapore, Aug. 21, 2017. Significant damage to the hull resulted in flooding to nearby compartments, including crew berthing, machinery, and communications rooms. U.S. Navy photo by MC3 Madailein Abbott





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This mishap investigation guide, signed out Oct. 25, 2022, supersedes any previous handbook or guide. It is the first of its kind and should be read in its entirety. This guide is used in conjunction with OPNAVINST 5102.1E/MCO 5100.29C (series) for all mishap investigations conducted throughout the Navy and Marine Corps. It is intended for use by operational units as well as installations and other supporting organizations. This guide is not all encompassing, yet defines the core investigation processes common among all communities. Regulations, processes or standard operating procedures (SOP) unique to specific communities or major commands are not delineated in this guide.

INTRODUCTION



PURPOSE

To provide concise, standardized instructions and procedures to assist Navy and Marine Corps safety personnel in conducting a single investigating officer or formal board-level investigation of mishaps and near-mishaps. This guide supplements DoDI 6055.07, OPNAVINST 5102.1 (series)/MCO 5100.9 (series) as a daily use guide the techniques, procedures and best practices (i.e., the how) for safety investigations and reporting on procedures for mishap and near-mishap investigations.

APPLICABILITY

This manual is intended for use by personnel who have completed a mishap investigation course (CIN: A-493-0078) facilitated by either the Naval Safety Command's NAVSAFENVTRACEN or Commandant of the Marine Corps Safety Division (CMC (SD)) and formally appointed as:

- a. Full-time safety personnel or,
- b. Collateral / additional duty safety personnel or,
- c. Civilian Safety and Occupational Health Manager (GS-0018) or
- d. Appointed as a member of a naval Safety Investigation Board (SIB)

Contents herein are intended for mishaps within all communities and mission types. Unless otherwise stated, information pertains to all mishap types. Where necessary, differences have been delineated. Additionally, this guide does not cover all circumstances. Contact the Naval Safety Command at (757) 444-3520 ext.7890, DSN: (564) for instructions concerning situations and circumstances not covered in this guide, or email us at:

NAVSAFECOM_CODE90_MISHAP_INVESTIGATIONS@navy.mil

For a digital copy of this guide and additional information for use during a mishap investigation, type "Naval Safety Command" or "CMC Safety Division" into a Web search engine. Each website will have a downloadable copy under their respective "Mishap Investigation and Reporting Toolbox." The point of contact for mishap investigations and this guide is:

Naval Safety Command, Mishap Investigations Directorate, commercial: (757) 444-3520 ext.7890; DSN: (564), or you can email us at: NAVSAFECOM_CODE90_MISHAP_INVESTIGATIONS@navy.mil



1-1. HAZARD vs. MISHAP vs. NEAR-MISHAP

a. Hazard. OPNAVINST 3500.39 and MCO 3500.27 (series) define a **hazard** as, “Any real or potential condition that can cause injury, illness, or death to personnel; damage to or loss of equipment or property; degradation of mission capability or impact to mission accomplishment; or damage to the environment.” (Note: Regarding tactical planning, a hazard is synonymous with the term “threat”). When assessing either pre-mission hazards or post-mishap hazards, the three general hazard categories of concern are:

- **Environmental Hazards:** Exposure to environmental conditions that create unsafe situations such as heat, cold, rain/ice/snow, moving water, particulates, low oxygen, gases, illumination, etc.
- **Physical Hazards:** Exposure to hazards in the operating environment that may create unsafe situations such as objects, terrain, energy sources, equipment conditions or equipment design, etc.
- **Human Hazards:** Conditions of individuals within a team/unit/command and/or conditions of non-team members that may create unsafe situations.

NOTE: (See Chapter 3.8) The DoD Human Factors Classification and Analysis System (DoD HFACS) provides a taxonomy to help leaders and mishap investigators analyze the relationship of these hazards between human-to-human and human-to-operating environment interface.

b. Mishap. DoD and DoN define a **mishap** as, “An unplanned event or series of events that results in damage to DoD property;

occupational illness to DoD personnel; injury to on- or off-duty DoD military personnel; injury to on-duty DoD civilian personnel; or damage to public or private property, or injury or illness to non-DoD personnel caused by DoD activities.”

c. Near-mishap/Near-miss. DoD defines a **near-miss** as, “An undesired event that, under slightly different circumstances, would have resulted in personnel harm, property damage, or an undesired loss of resources.” In other words – “An unplanned, unintended, unwanted, and unexpected, but controllable event which disrupts the work process and has the potential to cause material loss or damage, death, injury or occupational illness but was avoided merely by chance.”

NOTE: If the hazards are left uncorrected, they will become a mishap with an unknown injury severity.

1-2. WHY MISHAPS OCCUR

a. Overview

Mishaps are rarely simple and likely never result from a single cause, or by the actions of a single individual. Rather, mishaps are caused by a series of events deriving from multiple latent failures and/or hazardous conditions that provide the opportunities for an active failure to occur resulting in either a near-miss or a mishap. This remains true as many of the on-duty mishaps (Class E up to A) that occur during military or industrial type activities are usually caused by multiple, interrelated causal factors and should be investigated by a multi-disciplinary team. These interrelated latent failures/conditions include such things as unrecognized hazards, ineffectively assessed hazards, errors, oversights, omissions, unanticipated process changes, program deficiencies, failure to enforce standards, ineffective procedural documents, or possibly ineffective material design.

These deeper-rooted latent failures often influence other latent and active failures. Mishap investigations often reveal other causes such as ineffective learning, a lack of communication, situational awareness, knowledge, assertiveness, teamwork and resources, in addition to ineffective planning and deliberate risk management. The same latent failures influence other common causes such as an abundance of fatigue, pressure to meet mission, distractions, ineffective supervision and/or unsafe culture and/or climate which perpetuate unnecessary high risk taking.

This is because the human factor is the greatest influence to contributing and root causes. Various studies prove human error is the leading cause of mishaps. According to studies conducted within the DoD and DON, greater than 85% of all mishaps are caused by human error. While mishaps involving mechanical factors have been greatly reduced over the years, those attributable to human error continue to plague the DoD.

Think about this - every hand that operates or fixes military equipment, or is involved in the writing of policies, SOPs, LOIs, risk assessments, or operational plans has an opportunity to introduce human error which can easily result in a cascading effect of errors, omissions, or deviations from standard that influence the occurrence of a near-miss or mishap.

More often than not, the mishap is a predictable and preventable event. It is critical that military and supporting civilian personnel first understand that in the on-duty environment, active failures of individuals and latent conditions are interrelated.

Once this is understood, mishap investigators can more effectively identify the obscured causes to proceed toward more effective solutions to reduce hazards.

b. The Human Factor

Drawing from James Reason's model (1990) along with Dr. Scott Shappell's and Dr. Douglas Wiegmann's 2003 concept of active and latent failures, human factors are broken down into four major tiers. Reason proposed what is referred to as the "Swiss Cheese Model" of system failure. Every step in a process has the potential for failure to varying degrees. The ideal system is analogous to a stack of slices of Swiss cheese.

Consider the holes as opportunities for a process to fail and each of the slices as "defensive layers" in the process. An error may allow a problem to pass through a hole in one layer, but in the next layer the holes are in different places, and the problem should be identified and corrected. For a mishap



to occur, the holes need to align for each step in the process allowing all defenses to be defeated and resulting in an unsafe act. If the layers are set up with all the holes lined up, this is an inherently flawed system that will allow a problem to progress all the way through to cause a near-miss or mishap. Each slice of cheese is an opportunity to stop an error. The more defenses you put up, the better. Also the fewer the holes and the smaller the holes, the more likely you are to catch/stop risky conditions. DoD Risk Management (RM) and planning is quite simply a proactive approach to preventing events that are detrimental to a commander's operational readiness.

Regardless of technology and enhancements to industrial processes, the "near-miss" in each case has the potential to become a mishap with more serious consequences. Each of these "near-miss" events indicate a failure of barriers or controls. Often, it is only by inches or seconds or the quick reaction of a team member, that a near-miss does not become a tragic event.

The “near-misses” at the base of the mishap triangle (Figure 1) provide numerous opportunities to learn and implement corrections. If more scrutiny is taken at the level of unsafe acts, the near-miss and minor mishaps, leaders can significantly reduce the chances of more serious events that damage operational readiness.

Remember - All mishaps, regardless of cause, have the same result – they degrade combat power or mission effectiveness. The near-miss may be your one and ONLY warning to potential tragedy if not corrected.

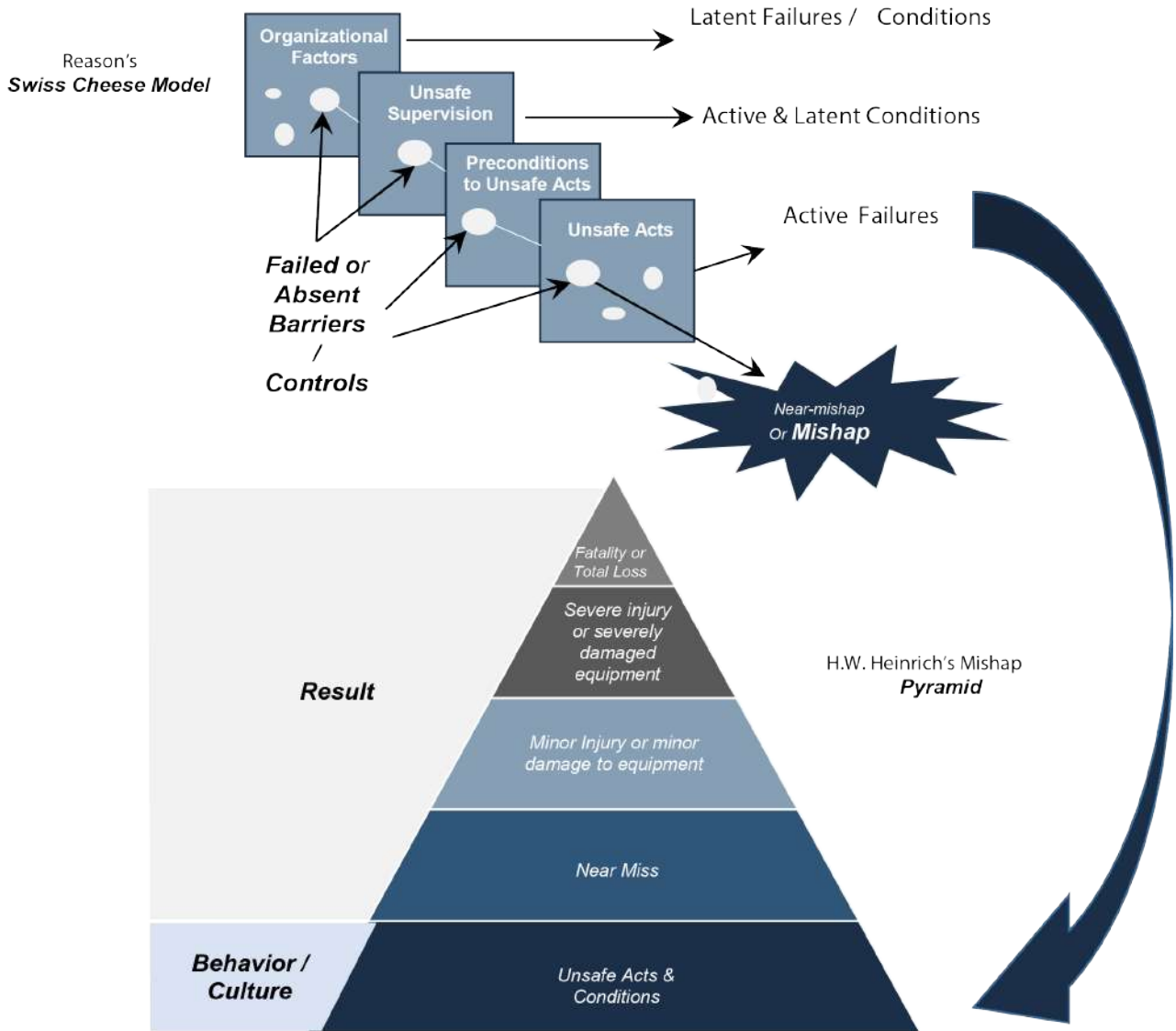


Figure 1

1-3. PURPOSE OF MISHAP INVESTIGATIONS

a. Overview

The primary objective of the Navy and Marine Corps safety risk management system is to enhance readiness by preserving human and material resources.

A proactive mishap prevention process identifies unsafe

acts and conditions and applies corrective measures before mishaps occur.

Prevention is accomplished through aggressive DELIBERATE RISK MANAGEMENT (DRM) during permission or event planning in which the planning team should capitalize on engineering, systems safety, education and training, personal protective equipment, and measures to enforce standards.



USS Bonhomme Richard (LHD 6), July 12, 2020

Effective causal factor analysis during the DRM / mission planning process will identify not just the known hazards, but the previously unknown hazardous conditions that were either ignored or ineffectively assessed.

b. Goal

The goal of a mishap investigation is to discover the multiple hazardous conditions and failures that collectively allow mishaps to occur.

Commanders and their staff must then incorporate more proactive actions into the risk assessment during the planning process to better manage risks and accomplish the mission.

There are three key reasons to investigate all near-misses and mishaps:

1) Identify Causal Factors: Before a commander can implement any effective corrective action to prevent

another mishap, safety must first identify the causal factors. Getting to the roots of an issue identifies how the roots affect the symptoms (risky behaviors and conditions) which cause the near-miss or mishap. We need to ensure we are exposing and communicating the deficiencies and lessons-learned.

2) Prevent future near-misses and mishaps: Expose deficiencies in processes, programs and/or equipment, eliminate or mitigate hazards to reduce injury and compensation costs.

3) Maintain accurate record-keeping: Monitor and analyze trends to measure prevention program effectiveness. Comply with Federal (OSHA), DoD and DON reporting requirements.

End State: Enhance risk assessment - prevent future near-misses and mishaps: Expose deficiencies in processes, programs and/or equipment, eliminate or mitigate hazards to reduce injury and compensation costs.



The systematic approach of risk management is the process to help military and civilian personnel identify hazards to which organizational leadership may apply more effective controls to prevent the “Swiss cheese holes” from aligning.

1-4. TYPES OF MISHAP INVESTIGATIONS

a. Single Investigating Officer (SIO) Investigations

The SIO investigation is required for all mishap classes A through E that do not require a formal mishap investigation board. Safety officers and civilian SOH specialists are required to conduct the vast majority of mishap investigations that do not require a SIB including:

- All off-duty, off-base mishaps (Class A, B, C, D, E, other reportable)

- All on-duty mishaps that do not require a SIB (Class B, C, D, E and other reportable)
- All on-duty federal-civilian mishaps that do not require a SIB. (Class B, C, D, E and other reportable)
- All on-duty contractor mishaps under DIRECT supervision of DoN personnel that do not require SIB. (Class B, C, D, E and other reportable)

b. Formal Investigation Boards

There are three types of formal investigation boards applicable to the Department of the Navy which include:

- Directed Mishap Investigations: CNO- or CMC SD-directed in special cases.
- Joint-Mishap Investigation Boards: Occurs when a mishap involves members or equipment from two or more services.

- Safety Investigation Board (SIB): A formally appointed investigating body required to investigate select mishaps as specified in OPNAVINST 5102.1/MCO 5100.29 (series). See **Appendix D** for examples of appointing and convening message.

1-5. SAFETY OFFICER'S ROLES AND RESPONSIBILITIES

a. Overview

The OPNAVINST 5100.23, OPNAVINST 5100.1/MCO 5100.29, OPNAVINST 3750.6, OPNAVINST 1500.75D, MCO 5100.29 (series), and NAVMC Dir. 5100.8 each outline the roles and responsibilities for “Safety officers, safety directors, safety managers, safety specialists and civilian supervisors” to investigate and report mishaps.

Only about 2% of mishaps that occur around the fleet require a formal SIB. This means the majority of mishaps in the Navy and Marine Corps require investigation and reporting by trained unit safety officers or civilian SOH specialists.

As indicated by the “mishap pyramid” in section 1-2, this means for every SIB, there are abundant opportunities to identify hazardous conditions and prevent needless loss. Proactive safety officers who place more emphasis and investigative vigor into root cause analysis of high potential near-mishaps and lower classification of mishaps can help their commanders enhance mission readiness and combat effectiveness.

b. Key Responsibilities

- Guide organizational planners and leaders in the development of pre-mishap plans for inclusion in duty binders, operational plans, instruction, etc.
- Ensure all mishaps and all near-mishaps are investigated and reported in the CNO- and CMC-approved mishap reporting tool, Risk Management Information (RMI).
- Use Table 2-9 of OPNAVINST 5102.1E to determine mishap cost. Do not delay reporting to determine an absolute exact cost. If the estimate is near a severity threshold then report the higher severity mishap and downgrade if necessary, rather than report a lower severity and upgrade later.
- Submit Hazard Reports (HAZREPS) as required for near-mishaps and/or hazardous conditions in RMI.
- Protect privileged safety information. (See chapter 2 of this guide).
- Develop a mishap investigation kit if needed.
- Provide training to key unit/command personnel in hazard identification and reporting, near-miss reporting, mishap reporting.
- Coordinate with safety officers from embarked units and detachments on the investigation, reporting, and correction of the causes of mishaps.
- Conduct trend analysis of mishaps for lessons' learned and your commander's readiness programs or mishap prevention programs.
- Ensure command-wide dissemination of lessons learned.
- Assist the commander, commanding officer, or officer-in-charge in conducting mishap investigations for all on-duty Class A mishaps until the SIB arrives.

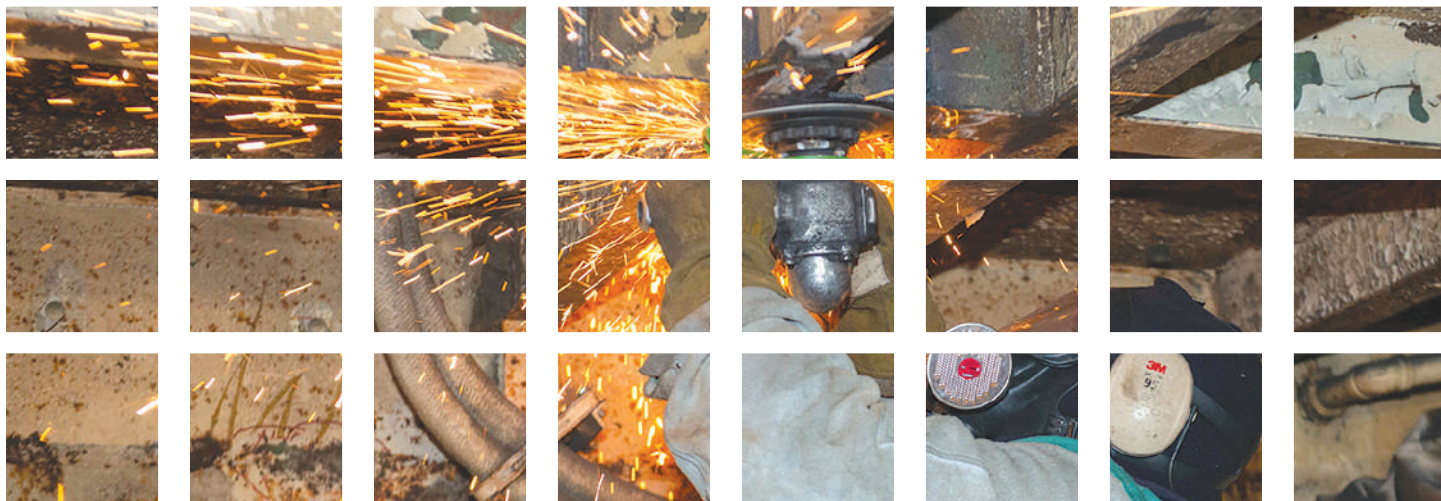
NOTE: Per DoDI 6055.07 and OPNAVINST 5102.1/MCO 5100.29 (series), personnel assigned to duties as a safety officer shall neither assist, nor be assigned to conduct or participate in any legal, i.e., Judge Advocate General Manual, or other type of investigation.



CHAPTER 2

PROTECTING SAFETY INFORMATION

(See DoDI 6055.07 and OPNAVINST 5102.1/MCO 5100.29 (series), Chapter 7)



2-1. INTRODUCTION AND OVERVIEW

a. Overview

Safety privilege is based on a national defense need for rapid and accurate assessment of the causes of mishaps to prevent a recurrence and maintain mission readiness. This privilege creates restrictions on handling and releasing information in mishap investigation reports. (See DoDI 6055.07)

b. Information

Commander, Naval Safety Command (COMNAVSAFECOM) is the Department of the Navy's (DoN) sole release authority for privileged safety information (PSI). This ensures commanders and safety officials can obtain accurate mishap information to promote safety and readiness.

c. Critical Need to Sustain Safety Credibility

Obtaining safety information is dependent upon protecting privileged information against use for other than safety purposes.

To continue the revelation, development, and submission of privileged information in mishap investigation reports and endorsements, all personnel in naval safety must keep faith with the promises we make while gathering evidence. See OPNAVINST 5102.1/MCO 5100.29 (series)

2-2. LEGAL vs MISHAP INVESTIGATIONS

a. Overview

Generally, there may be up to three types of investigations into a mishap (JAGMAN, Safety, and Naval Criminal Investigative Service.) Each is conducted independently from the other and all three investigative bodies provide the unit commander with information. Only the unit commander is privy to the information developed by each of the investigative bodies.

NOTE: DoD and Naval policies mandate legal investigations for all "on-duty" Class A mishaps. Also, NCIS is required to investigate all "on-base" fatalities to determine if foul play was a factor.

b. The Difference

Legal investigations of a mishap are used in litigation, claims against the government, and other administrative and disciplinary actions against individuals, whereas the mishap investigation is conducted solely to identify systemic failures for mishap prevention purposes.

Personnel designated as unit safety or participating in the mishap investigation will not participate in the conduct or formal review of a legal investigation of a mishap. (See *Figure 2-1 on Page 12*)

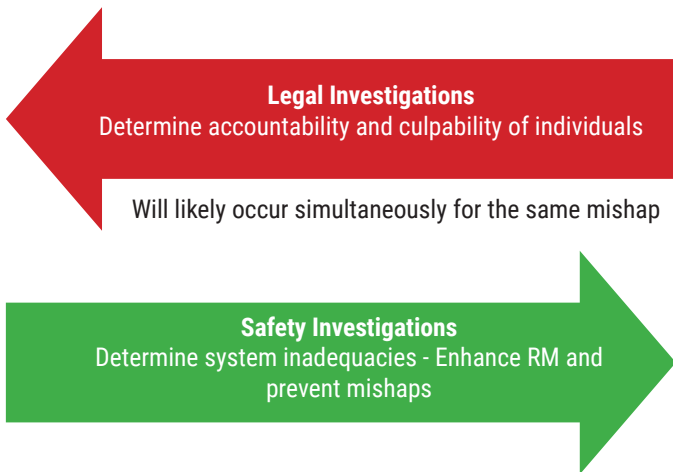


Figure 2-1

c. Relationships

A mishap involving naval activities may require an investigation pursuant to the JAGMAN in addition to the mishap investigation. Mishap investigations must be separate and distinct from all other investigations. To ensure the independence of the mishap investigation, the following applies:

- Commanders shall ensure personnel assigned to conduct unit or command mishap investigations, or assigned as a member of a SIB, or assigned to assist the SIB are excluded from assignment to a Judge Advocate General Manual (JAGMAN) investigation of the same incident conducted per JAGINST 5800.7 (series).
- Personnel assigned as the primary duty safety officer, shall neither assist nor be assigned to conduct any JAGMAN investigation.
- Safety Investigation Reports (SIR) are privileged information and shall not be made available, shared or included in any JAGMAN investigation. However, the safety investigator may review information gathered during the JAGMAN investigation.
- SIRs shall not be included in any JAGMAN investigations.
- A SIR shall not include witness statements from the JAGMAN or Naval Criminal Investigative Service (NCIS) investigation. The mishap investigator can summarize the witness statements for inclusion with the SIR.
- The Office of the Judge Advocate General (OJAG) and Staff Judge Advocates (SJA) shall not be addressee on any SIR messages or endorsements nor shall copies be provided to them.

- Do not append or include SIRs in JAG investigations.
- Do not include endorsements of SIRs in JAG investigations.
- SIR endorsements shall not refer to disciplinary or administrative action in connection with the mishap.

2-3. CONCEPT OF PRIVILEGE

a. Overview

Military and federal courts grant protection under executive privilege to the analysis, conclusions and recommendations of:

- Command safety investigators,
- Members of Safety Investigation Board,
- SIRs and endorsement of SIRs and
- SIR endorsers.

b. Purpose

The concept of privilege:

- Encourages mishap investigators and the endorsers of SIRs to provide complete, open, and forthright information, opinions, causes, and recommendations about a mishap.
- Overcomes any reluctance of an individual to reveal complete and candid information to an investigator about the events surrounding a mishap. They may believe the information could be embarrassing or detrimental to themselves, fellow service members, their command, employer, or others. They may also elect to withhold information by exercising their constitutional right to avoid self-incrimination. Individual members of the armed forces must be assured they may confide with the investigator for the mutual benefit of fellow service members without incurring personal jeopardy in the process.

NOTE: Rationale for designating mishap investigation information as privileged is more important than the rationale for encouraging witnesses. Every investigation involves command safety investigators, SIB members, or endorsers. Not every mishap has witnesses who would require an assurance of privilege as encouragement to make a statement.

2-4. PRIVILEGED SAFETY INFORMATION (PSI)

a. Overview

DoD Components protect PSI to ensure commanders quickly obtain accurate mishap information. For a mishap investigation, privileged safety information includes:

1) Safety personnel or assistants conducting mishap investigations. This includes both unit/command mishap investigations and SIBs. Mishap Investigators shall not, nor be asked, to divulge their opinion or any information gathered during the investigation.

2) Products of the deliberative processes of mishap investigators to include:

- Draft and final findings, evaluations, opinions, preliminary discussions, conclusions, mishap causes, recommendations, analyses, and other material that would reveal the deliberations of safety investigators.
- Draft and final diagrams and exhibits if they contain information that depicts the analysis of safety investigators (i.e., causal factor maps/diagrams).
- Photographs, films, and videotapes that are staged, reconstructed, or simulated reenactments of possible or probable scenarios developed by or for the analysis of the safety investigator.
- Life sciences material (i.e., Human Factors analysis) that contains analysis by a safety investigator.
- Notes taken by safety investigators in the course of their investigation, whether or not they are incorporated, either directly or by reference, in the final safety investigation report. Investigators' summaries of witness statements should be "the only written record notes be taken by the investigator."

3) Witness statements under the "Promise of Confidentiality"

4) The narrative, conclusions and recommendations from a SIR resulting from any safety investigation (unit, installation, or SIB).

5) All endorsements of SIRs are privileged against disclosure.

NOTE: The "Promise of Confidentiality" and "Advice to witness" are not authorized for unit level/installation level mishap investigations. They may only be used during a formal SIB"

2-5. FACTUAL INFORMATION

a. Overview

Factual information is information that clearly originated from non-privileged sources as defined by DoDI 6055.07 and may be segregated from privileged data so as to be meaningful to a reader. This information has not been altered or edited by the mishap investigator and does not have indicators of the investigator's deliberations, analysis, or opinions.

Some factual information may be shared with non-safety personnel investigating the same mishap while other factual information may only be approved for sharing or release by the COMNAVSAFECOM SJA under the Freedom of Information Act (FOIA).

b. Sharable Factual Information

The following information may be shared with a JAGMAN and NCIS investigator during an active mishap investigation:

- Physical evidence (pieces, parts, etc.)
- Unedited photographs with or without scale devices.
- Original or unedited copies of log books, police reports, casualty reports, flash reports, OPREP-3 reports, etc.
- A plain list of witness names.

c. Factual Information requiring NAVSAFECOM JAG Approval

The following information may ONLY be released to non-safety personnel upon the approval from the NAVSAFECOM JAG:

- Outlines and sketches drawn by witnesses (without investigator notes).
- Witnesses written statements (without names or investigator notes).
- The "what happened" section of a safety investigation report.
- HAZREPS.





2-6. DISSEMINATION OF INFORMATION

a. Overview

Safety information cannot be used for other than safety purposes. Unauthorized disclosure of safety information by military personnel is a criminal offense punishable under Article 92, Uniform Code of Military Justice (UCMJ).

Unauthorized disclosure of safety information by civilian personnel will subject them to disciplinary action under DoN Civilian Human Resources Manual, Subchapter 752.

b. Unauthorized Use of Privileged Information. Privileged information shall not be used:

- In making any determination affecting the interest of an individual making a statement under assurances of confidentiality or involved in a mishap.
- As evidence or to obtain evidence in determining the misconduct or line-of-duty status.
- As evidence to determine the responsibility of personnel for disciplinary or administrative action.

- As evidence to determine the responsibility of personnel for disciplinary or administrative action.
- As evidence to assert affirmative claims on behalf of the government.
- As evidence to determine the liability of the government for property damage caused by the mishap.
- As evidence before administrative bodies, such as officer or enlisted separation boards, JAGMAN investigations or inquiries, naval aviator or naval flight officer evaluation boards (USN) and field performance boards (USMC).
- In any other punitive or administrative action taken by the Department of the Navy.
- In any other investigation or report of the mishap.

c. Release of Safety Information

When appropriate, the COMNAVSAFECOM staff attorney may release reports. Organizations must request safety information from COMNAVSAFECOM per Federal Regulations as defined in DoDI 6055.07 and OPNAVINST 5102.1/MCO 5100.29 (series).



Individuals must request safety information under the FOIA. The DoDI 6055.07 and OPNAVINST 5102.1/MCO 5100.29 (series) defines the process and limitations for the request of safety information.

In general, ALL requests for safety information must be referred to the COMNAVSAFECOM staff attorney. This includes requests from individuals, private businesses, federal agencies not part of the DoD, law enforcement, members of Congress, and organizations within the DoD, including sister services (Army, Air Force, etc.) Safety Centers.

2-7. CRITERIA TO SUSPEND MISHAP INVESTIGATIONS

a. Overview

During your mishap investigation, you may determine the event might be or is the result of intent to commit a criminal act rather than human error. This may occur during a witness interview or during the analysis where you feel the DoD HFACS nano-code of AV 003 is applicable.

If this occurs, you may need to suspend the investigation and confer with the COMNAVSAFECOM staff attorney and your commander.

b. Evidence of Criminal Acts:

If during the course of the investigation, any investigator discovers a criminal act, the Safety Officer or the Senior Member of the SIB will:

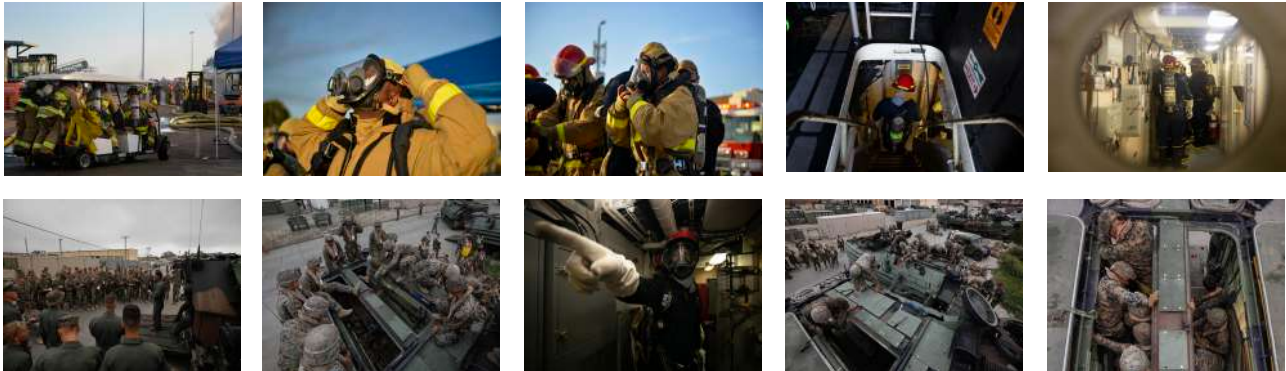
- Suspend the investigation
- The unit/command safety officer will seek guidance from his/her appointing authority (Commanding Officer).
- SIB Senior Member will seek guidance from the SIB's appointing authority and Controlling Command. The appointing authority will then confer with COMNAVSAFECOM staff attorney and advise NCIS or CMC SD (as appropriate).

When the safety investigation is suspended, the safety investigators will immediately contact the NAVSAFECOM staff attorney for further guidance and share only factual (non-privileged evidence) with the other investigators as requested.

CHAPTER 3

MISHAP INVESTIGATION PROCESS

See OPNAVINST 5102.1/MCO 5100.29 (series)



3-1. INTRODUCTION AND OVERVIEW

a. The Mishap Investigation Process. The mishap investigation process utilizes the “What Happened?”, “Why the mishap occurred?”, and “What to do about it” questions. (See *Figure 3-1* below) The circumstances surrounding mishaps are diverse. It is not possible to describe every circumstance under which specific kinds of evidence are collected during a mishap investigation.

Great reliance is placed on the single investigator or the members of the SIB.

The Mishap Investigation Process reveals adverse interactions of humans, machine and the operating environment which both caused and contributed to the mishap. A submitted RMI report is due within 30 days of the mishap.

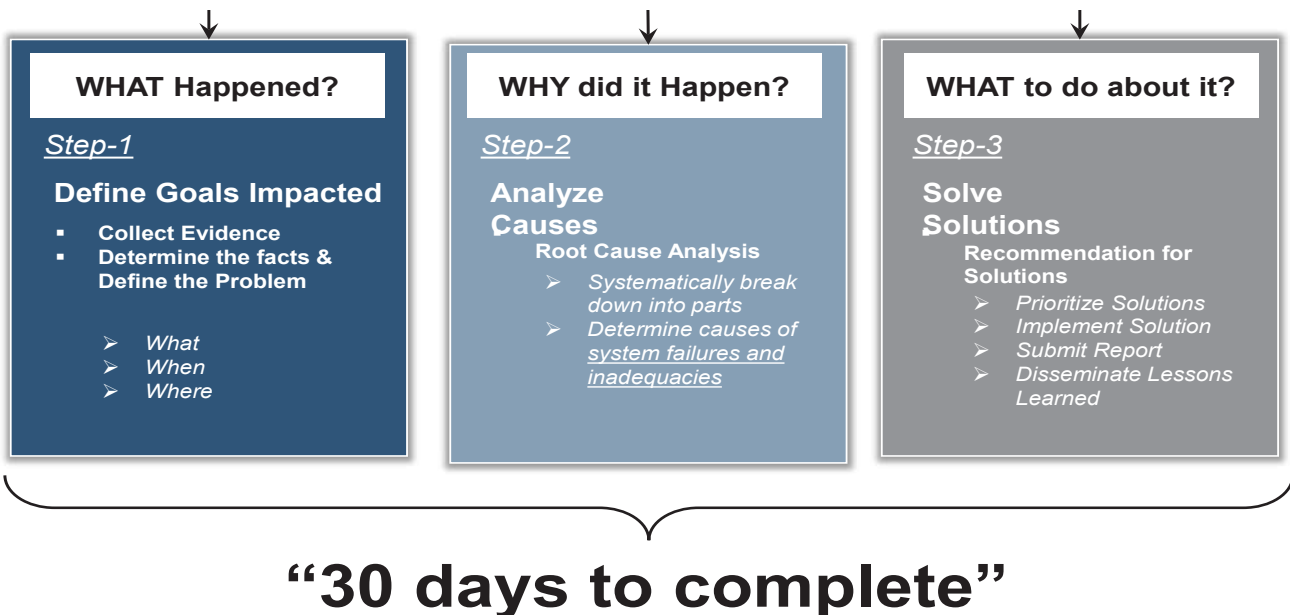


Figure 3-1

3-1. INTRODUCTION AND OVERVIEW

1) What happened (facts regarding human actions, machine or equipment status, and environmental conditions). The first step is to determine the facts or “what happened.” Collecting evidence to identify all the relevant facts of what actually happened enables the investigator to satisfy this requirement.

2) Why it happened (Causal Factors(s)/system inadequacies). From the standpoint of prevention, the most significant element is the WHY did the individual or team commit an unsafe act? Or WHY did the machine malfunction? This is the element that lends itself to solutions to prevent further mishaps. (See *Figure 5-2*)

Was it an error or violation on behalf of the individual? If so, did supervision, training, standard operating procedures and/or policies play a role in the individual’s decision making or lack thereof?

Was there a mechanical issue with the equipment involved? If so, how did its function or malfunction or design play a role in the mishap?

Your investigation should lead to identify the system inadequacies (aka: factors). The following factor types are adopted from OPNAVINST 5102.1E.

Factors: A factor is any action or condition, discovered in the course of an investigation, which in the investigator’s opinion, caused or contributed to the eventual outcome or severity of the mishap. Determining factors (i.e., and eliminating non-factors) enables investigators to focus the investigation from all the issues under examination to those specific areas that are significant in the event sequence.

- **a) Causal Factors:** Factors which caused the mishap. If the factor was corrected, eliminated, or avoided, the mishap/hazard or incident would not have happened
- **b) Factors (Contributing):** Factors which were present but not necessarily causal.
- **c) Non-Factors Worthy of Discussion (NFWOD):**
 - i) Non-factors discovered during the course of a safety investigation and found not to be causal or contributory, but that have sufficient value to be stated and amplified. Other findings of significance are the basis for NFWODs and recommendations of significance.
 - ii) Factors that the SIO or SIB considered and rejected are also placed in this category.

NOTE: See section 3-6 for more information on Factors. Finding human fault is a function more appropriate for legal inquiries and can often be a distraction during the conduct of a mishap investigation. Identifying who is at fault does little or nothing in pointing out how to prevent a similar mishap in the future. Focus on all the reasons why, not who.

3) What to do about it (recommendations). A proactive mishap prevention process identifies unsafe acts and conditions and applies corrective measures before mishaps occur. Prevention is accomplished through engineering, systems safety, education and training, personal protective equipment, and enforcement of standards.

Safety mishap investigations will reveal previously unknown, ignored, and improperly corrected conditions or actions, and identify risks.

This is the phase to identify the recommended actions and identify the proponent activity or lowest level of command that is most responsible for taking action targeted at eliminating/correcting the system inadequacies/root causes (at the unit and, if applicable, Navy and Marine Corps levels).

It is important to provide the local commander with recommendations to address his/her local situation, but it is equally important to provide the Department of the Navy with recommendations to address common hazards across the Navy and/or Marine Corps. Recommendations are based on the circumstances as they existed at the time of the mishap.

Often units make immediate changes based on the early understandings of a mishap. While that is a unit commander’s prerogative and certainly appropriate it does not affect the resulting findings and recommendations. If the circumstances existed in this organization they most likely exist in other organizations and it is the responsibility of the CNO’s and CMC’s safety teams to ensure the widest dissemination of mishap prevention information.

Additionally, the appropriate activity responsible for correcting each identified system inadequacy is notified by either CMC(SD), COMNAVSAFECOM or the appropriate adjudicator as defined in the OPNAVINST 5102.1/MCO 5100.29 (series). This process is continually monitored to ensure recommendations have been adopted by the fleet and that appropriate measures are in place to ensure mishap prevention.

NOTE: Mishap Investigators have 30 days from time of mishap to complete the investigation and submit the mishap investigation report in the DoN mandated mishap reporting database.

3-2. PRE-MISHAP PLANS (PMP)

a. Overview. All command/units need a pre-mishap plan (PMP) and checklist to follow when a mishap occurs and ensure key personnel are familiar with the plan. Title 29 Code of Federal Regulations (CFR) and OPNAVINST 5102.1/MCO 5100.29 (series) define the requirements for all units/commands to have a Mishap Action Plan for various types of activities to include garrison functions, training and in the deployed setting.

The PMP is no different than anti-terrorism force protection plans, disaster preparedness plans, emergency evacuation plans, or active shooter plans. The development of these plans is taught during Navy and/or Marine Corps Safety Officer courses and templates are posted to both the Naval Safety Command and the CMC SD websites. For assistance, call the Naval Safety Command's Mishap Investigations team.

b. Purpose. Each PMP defines duties, responsibilities, immediate actions, and training requirements of the Command response to mishaps as well as interactions with other commands and civilian agencies. The PMP should be incorporated into the unit duty binder, letters of instruction (LOI), and annexes of OPLANs. A copy of the command/unit's mishap plan must be available to all investigators (Unit or SIB).

If your unit experiences a mishap which requires a SIB, the PMP is useful to ensure all board members understand the investigation concept and plan. The investigation plan is a systematic process that ensures continuity of effort from the preliminary examination of the mishap site to the submission of the final report. Each plan should complement all Naval and local policies and the mishap investigation process defined in this handbook.

3-3. MISHAP SCENE MANAGEMENT

a. Overview. Many immediate post-mishap activities are concurrent with emergency actions taken to save lives, limit loss and hazards. Emergency action considerations, particularly lifesaving and life-protecting activities always take first priority, even if property or evidence is destroyed, distorted, or broken in the process. The adverse effects of tradeoffs that must be made during emergency response can be minimized through advance preparation and planning to ensure proper coordination of emergency actions with initial investigative activities.

b. Securing and Preserving the Mishap Scene. The effectiveness of a mishap investigation depends on immediate preservation of the mishap scene and the physical, human, and documentary evidence related to the mishap. To ensure the unit/command safety officer, civilian SOH specialist, or members of a SIB can effectively conduct the mishap investigation, the following requirements from the OPNAVINST 5102.1/MCO 5100.29 (series) should be incorporated into Mishap Action Plans, which mandates that command duty officers, staff duty officers, officer of the day or the senior person at the scene of a mishap shall:

1) Ensure care and first aid is provided to injured personnel.

Emergency Medical Services (EMS) personnel may need to disturb or remove items of evidence to preserve life.

2) Eliminate or control hazards created by the mishap.

Operational requirements or damage control measures may require disturbing the scene of the mishap.

3) Inform proper authorities; e.g., unit commander (and responsible commander if other than unit commander), unit or installation safety officer or manager, Provost Marshal's Office (PMO) or local law enforcement, fire and rescue, and public affairs.

4) Secure the mishap site to protect the public, safeguard Navy and Marine Corps property, and prevent disturbance of the site. For on-duty high potential mishaps to include all explosive and live fire mishaps, assign personnel to:

- Make an accurate plot of the scene before moving or removing any wreckage or equipment.
- Take photographs or videotape recordings of the wreckage, its distribution, and the surrounding area.
- Photograph the mishap site from a minimum of eight points surrounding the site and all items of evidence before removal, when possible.
- Make a diagram of any damage. A sketch should accompany the items to depict "as found" location and condition.
- Collect all log books, maps, charts, overlays and other documents to prevent the loss of vital information.
- Make a list of witnesses and encourage them to develop personal notes concerning the mishap for them to refer to during witness interviews. Witnesses should write down their own observations and should not discuss the mishap with other witnesses.
- Lock doors and gates if required.
- Post security personnel to control access.

TIP: Securing a frequently used or public area may require additional efforts. Security personnel can be posted around the area to help secure the mishap scene long enough for the safety officer to complete a thorough walk-through and document the scene, if long-term access controls are not feasible. If the mishap occurs in an area that makes securing the mishap scene difficult, the walk-through may be the sole opportunity to collect and preserve important evidence.

c. Common Hazards of a Mishap Scene. The senior person on the scene and the safety officer should take every precaution to protect responders and various types of investigators from exposure to hazards associated with the mishap scene. Common hazards of an on-duty mishap scene are likely to include:

Ammunition and/or unexploded ordnance, energized equipment, Fire and/or toxic smoke, Terrain hazards, Sharps from jagged edges, Slip and trip hazards, Equipment movement during response and recovery, Blood-borne pathogens, Heat, Cold, Flora and Fauna, Low or high oxygen levels, and HAZMAT (i.e., POLs; Toxic Chemicals; Radioactive material such as Depleted Uranium or Thorium coated optical elements Lithium Batteries; Friable or burning Composite Materials, etc.)

3-4. COLLECTION OF EVIDENCE (What Happened)

a. Overview. Crucial to any investigation is the gathering of information/evidence. In the combat zone, the tactical situation dictates the level of detail evidence can be collected. The information/evidence collected during a mishap investigation becomes the very basis of the mishap investigator's (SIO or SIB) analysis and conclusions. Therefore, a thorough effort to collect all relevant data and evidence must be made.

b. Types of Evidence. Information/evidence collected during a mishap investigation should include:

- 1) Physical Evidence. Matter related to the mishap such as equipment, parts of equipment, machine guards, tools, debris, skid marks, cell phones, strike marks, gouges, PPE, clothing, chemicals, hardware, voice recorders, etc.
- 2) Documentary Evidence. Any evidence in paper or electronic form, excluding medical records. Includes photos, video, technical manuals, emergency action plan/mishap action plan, OPLAN, policies and regulations, SOPs, LOI, training records, maintenance records, safety data sheets, job hazard analysis sheets or risk assessment worksheets, safety committee minutes, weather reports, duty logs, past mishap reports, diagrams, charts, maps, mishap site diagrams, investigator notes, etc.
- 3) Medical Evidence. Medical information about the operator and/

or other team members that may provide insight to preconditions that contributed to the actions of the operator, team members and/or immediate supervisor. This includes medical records, lab results, pathological / autopsy reports and the 72-hour profile.

- 4) Witness Interviews. The importance of a witness varies with the mishap.

In some cases, witnesses are absolutely vital when there is no recoverable wreckage, no survivors or no recorded information. In other cases, there is plenty of factual information available and the witness's statements are merely corroborative. In these cases, it is interesting to note the differences between what the witnesses say and what the facts support.

c. Evidence Collection Priorities.

- 1) Step 1 – Photograph / Video record the scene and evidence: Photography is one of the best methodologies for securing and preserving transitory evidence. Photographs are perhaps the most valuable piece of evidence as it can assist witness with recall and help the investigator(s) corroborate other evidence and reconstruct the scene if needed. You must plan your shots to make the best use of limited time and capture all critical information. Video is also a valuable method of recording a mishap scene, but it is not a substitute for still photography. A video may show responders in action and movement and color; but it cannot be studied as well as a photo.

If an installation photographer is provided, the mishap investigator (unit safety officer or a SIB member) must supervise him/her.



Remember: It is always better to have too many photos than not enough. A recommended photographic checklist is shown below:

- Photograph perishable evidence first (i.e., fluids, positions of deceased, items that may switch positions during mishap's aftermath or a rescue in progress, tire or foot tracks, gauge readings, radio setting, and positions of switches on equipment.)
- If needed, an aerial view from four directions (N, S, E, W)
- Ground view from four directions (N, S, E, W)
- General overview of the scene/wreckage (beginning at the front of the aircraft or vehicle or machinery, circling site every 45 degrees.
- Photograph major components (control panels, parts, instrument panels, consoles, cockpit/cabin/cab areas, seats, restraining systems, canopy, turrets, roll cage, suspension, ladders, weapon system, etc.)
- Photograph of any scars/marks on the ground, other vehicle systems, bulkheads, trees, buildings, etc.
- Detailed photographs of suspected failed parts.
- Disassembly of parts/equipment (if done).
- Other photographs deemed necessary

2) Step 2 – Identify Witnesses: Be sure to obtain a list of witnesses. Priorities of witnesses includes participants, eyewitnesses (saw or heard), first responders, and background witnesses (someone who knows details about those involved or the equipment involved or the processes involved). Initial contact information should be provided to the unit investigator or the mishap investigation board president from the on-site designated representatives.

TIP: At-scene interviews (if possible)

- Identify yourself as the safety officer and explain the purpose of the interview.
- Obtain the name, address, phone number, and the background.
- Allow the witness to recount the event in their own words.
- If possible, have witness make a drawing and establish witness location in relation to the mishap.
- If recording, obtain permission to record the interview.

3) Step 3 – Diagram the Scene: BEFORE MOVING ANY ITEMS - prepare a site diagram. A sketch should accompany the items to depict "as found" location and condition. The advantage that a diagram has over a photograph is that it is less cluttered and helps capture information not captured in photos. A good diagram assists in reconstruction, inventory of components and corroborating witness testimony and/or other evidence.

A diagram can show movement, angles, position of humans in relation to key areas, positions of components or parts, and key distances. Drawn closely to scale, it can emphasize certain aspects of a photograph to clarify a point. Sketches may be the

only evidence you have from a mishap scene if photographs were not available before evidence was moved.

Depending upon the location and type of mishap, investigators may need to use different versions of diagrams. (See *Figures 3-2 through 3-4*). Whichever diagram is most appropriate, use grid or graph paper to help draw to scale. Mark sketches or diagrams using magnetic north or place north in the upper left corner. You may also use Navy/Marine Corps terminology using forward and aft, port and starboard. Use key landmarks or features to orient your drawing. Mark key points, distances, and movement on a spare navigation chart or map. Key items to diagram and record include:

- Magnetic North.
- Environmental factors (*Terrain features, sun position, humidity, air temperature, water temperature, pressure, wind direction, wind speed, lunar illumination, glare, lighting, noise, vapors, oxygen levels, dust, fog, wet surfaces, road surfaces, IR crossover times for FLIR, electromagnetic effects, etc.*)

TIP: To obtain astronomical data (sun and moon) on any given day, use the Naval Observatory website:
<https://aa.usno.navy.mil/index.php>

- Machines and equipment affected.
- Defects or irregularities.
- Light source, direction of light, shadows, etc.
- Sources of possible distractions.
- Locations and height of signs (road, work areas, etc.)
- Geographical elevations that may have effected visual fields.
- Objects damaged (includes underwater).
- Gouges, scratches, dents, or paint smears.
- Areas of debris resulting from the mishap.
- Direction of weapons fire.
- Stains or fluids from POLs, body fluids, chemicals, etc.
- Path of travel to impact points.
- Skid distance of vehicles.
- Distance between vehicle tip/trip to impact points and final resting position.
- Length of yaw marks.
- Road or lane width, curve median, and chord of curve,
- Working space distances between dangerous equipment and other hazards.
- Proximity and positions of witnesses, injured or deceased to hazardous energy sources such as pressure valves, hydraulics, pneumatics, springs, electricity, explosives.
- Tracks or similar indications of movement.
- Movement of personnel, before, during, or after a mishap.

If it is vital to the sequence of events and the analysis to determine the speed in which an object (i.e., MV) was traveling at the time of the mishap, investigators should contact law enforcement (Military Police, State Troopers, County Sheriff, etc.) for assistance in calculating speeds in vehicle mishaps.

Keep in mind that trained experts will not be available in the operational environment or the tactical training environment. Therefore, it is highly recommended that unit and installation safety personnel receive training from law enforcement in crash dynamics to collect required information and calculate minimum speed for tactical MV mishaps.

If not trained, investigators should collect measurements, vehicle specifications, road surface type and the MV braking efficiency before you request assistance from local enforcement (Military, City, County or State Police) to determine speed.

- Movement of machines/equipment or vehicles before, during and after a mishap.
- Size of operator's compartment and proximity to hazards, switches, buttons, etc.
- Storage areas (to identify appropriate or inappropriate maneuverability of humans and/or machines).
- Shoot house (potential hazardous components, target distances, etc.)
- Height of workstations (regarding maneuverability, visual field, etc.)
- Location of safety devices, safety barriers, and safety equipment (PPE)

NOTE: Vehicle Speed Calculation. It may be necessary to calculate speeds and distances for analysis.

TIP: In the event of a mishap on a public roadway and the scene has been cleared away; investigators should maximize local resources such as state, local, or military police reports and site diagrams.

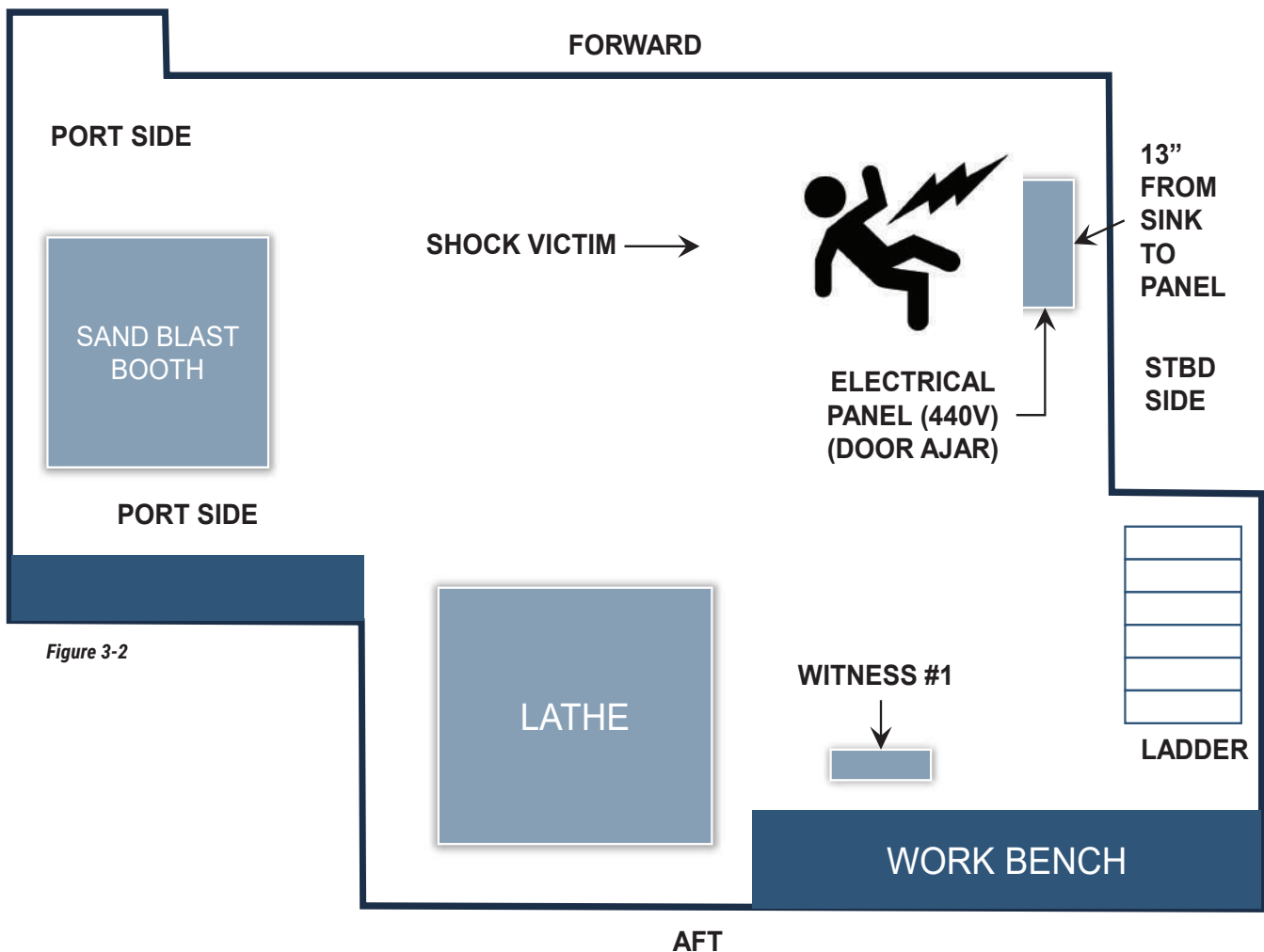
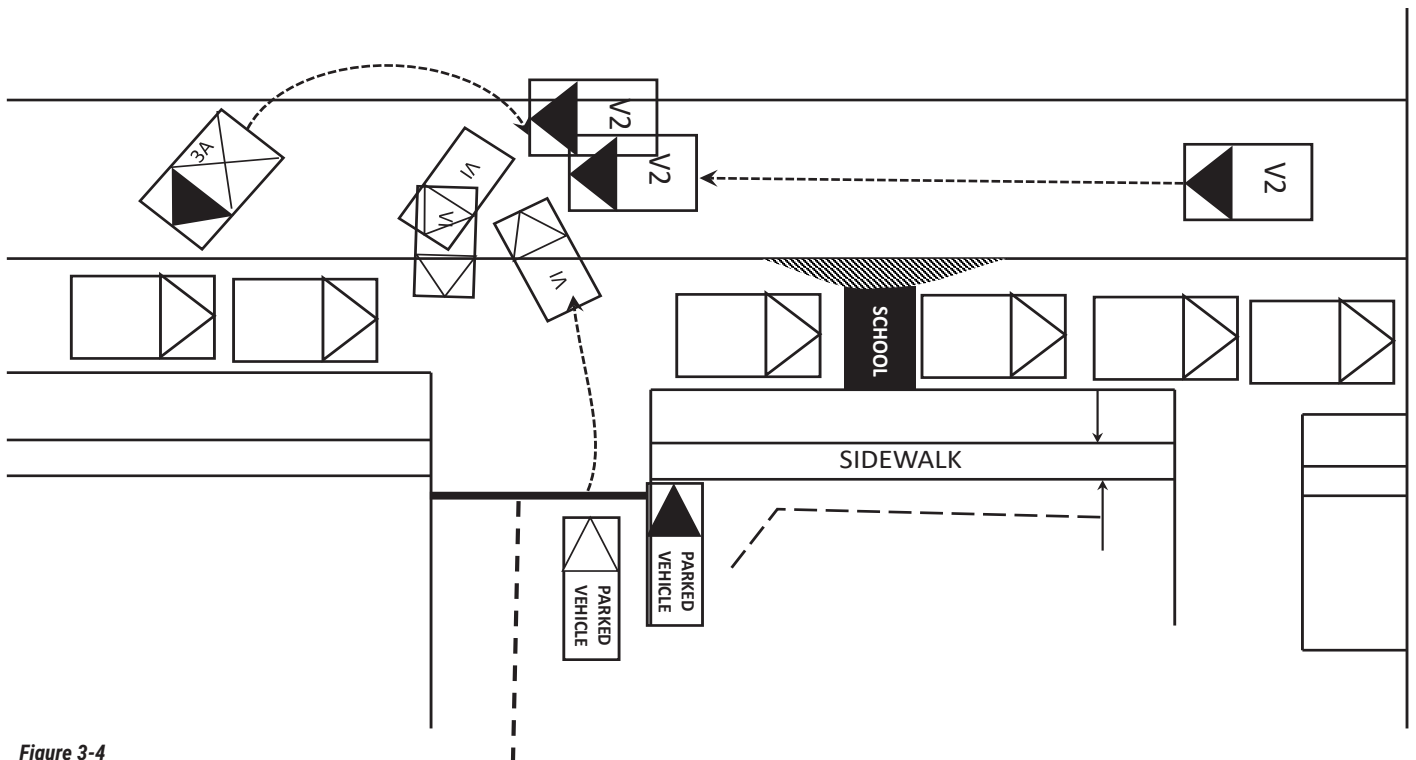
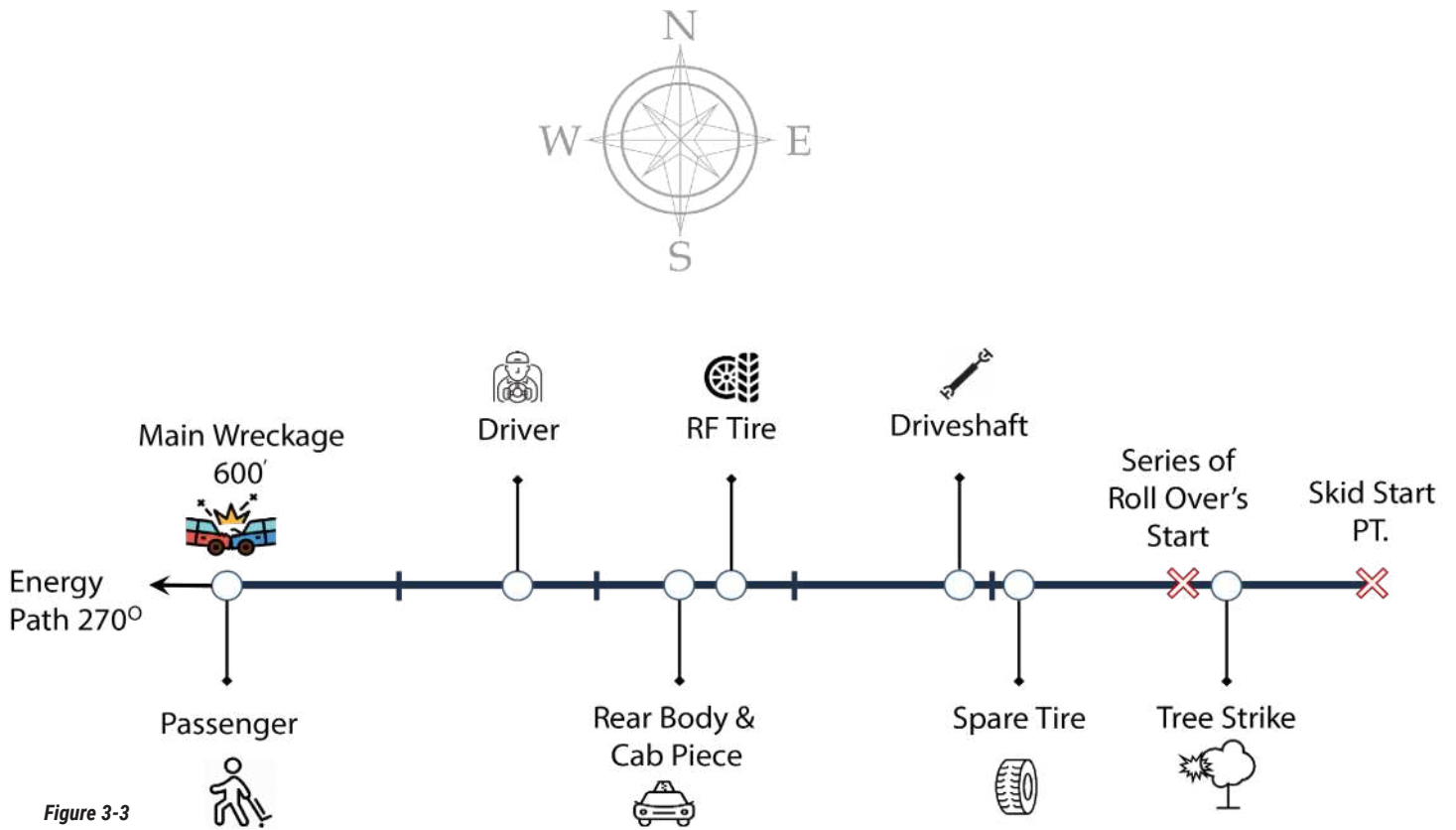


Figure 3-2

Linear Diagram

(Good for long debris fields of vehicle or aviation crash sites)



4) Step 4 – Collect Physical Evidence: If it is important to collect physical evidence to further examine later, carefully wrap them in protective material or place them in paper, glass, or plastic containers. Accurately label each item with the following types of information:

- Who gathered the item (You may want to question the person later about the position or location in which it was found).
- The description / identification of the item.
- The time and date it was gathered.
- The original location of the item when removed.

TIP: When labeling evidence, make sure you do not put any information on the label that might be privileged such as the source leading to your findings on the item or any deliberative comments. Remember, physical evidence may need to be shared with non-safety agencies.

NOTE: It is critical to preserve digital source data from aircraft or vehicle recording devices.

TIP 1: Physical evidence is NEVER wrong. Only human interpretation or manipulation makes it wrong.

TIP 2: If the mishap requires NCIS or law enforcement to investigate, allow them to take custody as they each are experts at chain of custody.

TIP 3: Ensure you have clear guidance in your unit's Mishap Action Plan regarding the need to take custody of certain physical evidence (i.e., weapons, parts of tactical vehicles, etc.) needed for an Engineering Investigation (EI).

An EI can provide an in-depth analysis of equipment function or malfunction. When the investigator desires an EI, submit a request to the appointing authority. EIs are to be conducted at the local installation whenever possible or contact the COMNAVSAFECOM for the closest appropriate facility.

Marine Corps units should contact MARCORSYSCOM and CMC (SD) for assistance. The investigator or representative may accompany the part(s) in question and may be present during all examinations.

The request will include the material for the EI description of the physical circumstances of the mishap, and description of the parts as found in the wreckage or damaged configuration. Do not include privileged information.

Do not tamper with, adjust, remove parts from, or clean the material subject to the EI. The EIs are an important source of factual information not only for the SIR but other reports as well and maybe required by other directives.

5) Step 5 – Collect Documentary Evidence: Any evidence in paper or electronic form, excluding medical records. (Includes photos, video, drug and/or alcohol testing, technical manuals, emergency action plan/mishap action plan, OPLANS, regulations, SOPs, LOI, training records, maintenance records, safety data sheets, job hazard analysis sheets or RM worksheets, safety committee minutes, weather reports, duty logs, past mishap reports, diagrams, charts, maps, mishap site diagrams, investigator notes, etc.)

6) Step 6 – Collect Medical Evidence. Medical information about the operator and/or other team members that may provide insight to preconditions that contributed to the actions of the operator, team members and/or immediate supervisor. This includes medical records, lab results (blood or urine samples), pathological / autopsy reports and the 72-hour profile.

- **72-hour Profile:** A 72-hour profile traces the chronological actions and activities of individuals directly involved in the mishap. The information may be valuable to investigators to help determine preconditions that may have affected mental awareness, physical problems, mental problems, sensory misperceptions and/or the state of mind. The following information is important in the development of the profile:
 - Hours continuous awake prior to the mishap:
 - Hours continuous duty prior to the mishap:
 - Hours between the last meal and the mishap:
 - Hours slept in last 24 hours:
 - Hours slept in last 48 hours:
 - Hours slept in last 72 hours:
 - Hours worked in last 24 hours:
 - Hours worked in last 48 hours:
 - Hours worked in last 72 hours:
 - Duration of last sleep period:
 - Type of last sleep (broken or continuous):
 - Distance in miles driven: (For MV operators)
 - Duration (hours) of time driving:

NOTE: See Title 45 CFR 164.512. (Uses and disclosures for which an authorization or opportunity to agree or object is not required). This Code of Federal Regulation provides conditions to overcome potential HIPPA concerns during mishap investigations.

TIP: The following information is important in developing the 72-hour profile:

- Leave and liberty status;
- Work schedule,
- Work performed;
- Periods of rest and sleep;
- Medications prescribed;
- Alcohol and other drugs ingested (prescription, nonprescription, and illegal);
- Behavioral changes (i.e., general physical condition, including illnesses, viral infections, physical anomalies, recent chronic fatigue, hypertension, diabetes, elevated cholesterol, or other medical problems);
- Individual's mental, emotional, and physical state; Behavior changes and activities based on interviews with supervisor, co-workers, and friends;
- Any adverse administrative or punitive action or any other behavior infractions;
- Distances and times for travel;

For personnel involved in a Physical Training or Physical Fitness Testing, include the following:

- Height, weight, and percent body fat;
- Time from start or end of activity to onset of first symptom(s);

Have any physical conditions or on any physical conditioning program before injury or death:

- Meal times, food and liquids, type of and quantity consumed two hours before the mishap;
- Smoking or drinking habits (alcohol) if any;
- Weather conditions;
- Wet Bulb Globe Temperature (WBGT) readings for heat-related casualties.

7) Step 7 – Conduct Detailed Witness Interviews. The importance of a witness varies with the mishap. In some cases, witnesses are absolutely vital when there is no recoverable wreckage, no survivors or no recorded information. In other cases, there is plenty of factual information available and the witnesses statements are merely corroborative. In these cases, it is interesting to note the differences between what the witnesses say and what the facts support. Although witness interviews provide insightful information, witness recollection rapidly deteriorates and can be inadvertently tainted through media exposure and from comparing stories with other witnesses. Statements taken from witnesses located immediately after the mishap are more reliable.

To ensure witness statements are accurate, detailed and as authentic as possible, witness interviews are given a high priority.

Often personnel not experienced in conducting “safety/mishap” interviews tend to be technicians and struggle without any particular background or training in interviewing techniques. The challenge for personnel not experienced in conducting a cognitive witness interview is they tend to conduct an interview in an accusatory manner “as seen on TV” or in a manner that is adversarial vs cooperative. People in some professions (clergy, medicine, psychiatry, etc.) tend to develop good interviewing skills because they use them often. Also, those same professions typically attract people who are naturally empathetic to other people.

Consider this: The witness must translate what he/she saw or heard into words which, we hope, have the same meaning to him/her that they do to us. The witness must use words as they have meaning to him/her. We must use those same words as they have meaning to us and come up with the same image. The witness had only a fleeting glimpse of the mishap or he/she really wasn't in the right place to see what we wish he/she may have seen. Frequently, the witness really didn't see the mishap; he or she saw the results of it (i.e., the crash) which is not what we need. Determining what a witness saw is significantly more difficult than determining what he or she did. Whatever the reason, we should do what we can to improve our own techniques and increase the amount of information recovered. Seasoned investigators (law enforcement, safety, etc.) identify there are two important truths about witness memory; 1) It is fallible and 2) confidence has little correlation with accuracy.

d. Barriers that Affect Memory Recall. There are two types of memory retrieval that eyewitnesses perform. First there is “Recall Memory” which is providing details of a previously witnessed event or person. Second there is “Recognition Memory” where the witness is trying to confirm what he/she is currently viewing or hearing is the same as that previously witnessed. For various reasons, not all memories pass successfully through these stages. In the past, a great deal of credibility was given to eyewitness testimony. However, studies show that memories and individual perceptions are unreliable, biased, and can be manipulated. All investigators (safety or law enforcement) must keep in mind there are key barriers to accurate memory recall which include:

1) Perceptual Factors. Human memory does not exist so that an observer may accurately report previously seen events. Each witness perceives the event somewhat differently; therefore, each witness extracts an interpretation that is meaningful in terms of his/her own beliefs, experiences and needs.

Once the interpretation occurs, the events themselves become relatively unimportant. Moreover, since each person interprets the events in terms of his/her own world view, different eyewitnesses observing the same event may have different interpretations and different memories. (Marc Green Ph.D, 2014) To put it succinctly: "We do not see what we sense. We see what we think we sense." (Norretranders, 1999).

2) **Environmental Factors / Event Characteristics:**

Are factors that interfere with a witness's ability to get a clear view of the event—like time of day, weather, viewing obstructions, etc., can all lead to false recollections.

3) **Time (Duration viewing the event and time from the event):**

One factor that influences the encoding of memory is the duration of the event being witnessed. Scientific studies suggest that recall is better for events that last longer. Additionally, the accuracy of eyewitness memory degrades swiftly after initial encoding. Scientists have documented that memory begins to drop off sharply within 20 minutes following initial encoding, and begins to level off around the second day at a dramatically reduced level of accuracy. Unsurprisingly, research has consistently found that the longer the delay between encoding and recall, the worse the recall will be. There have been numerous experiments that support this claim. Malpass and Devine (1981) compared the accuracy of witness identifications after three days (short retention period) and five months (long retention period). The study found no false identifications after the three-day period, but after five months, 35% of identifications were false.

4) External Factors: There are a wide number of external influences to memory and memory recall such as introducing false facts by a third-party (news media, friends, social media, co-workers, etc.).

TIP: Keep witnesses separated while waiting to interview them. That way they can't confer with other witnesses and mentally fill in parts of their observations based on what someone else may have seen or heard.

5) Interviewer Questioning Techniques: Research has consistently shown that even very subtle changes in the wording of a question can influence memory. Questions whose wording might bias the responder toward one answer over another are referred to as leading questions. Also, if the interviewer provides a presence of being "in charge" or judgmental, intimidating, or dominating, the witnesses desire and ability to recall information will be greatly diminished.

6) Age: Human memory does not exist so that an observer may accurately report previously seen events. Each witness perceives the event somewhat differently; therefore, each witness extracts an interpretation that is meaningful in terms of his/her own beliefs, experiences and needs.

7) Personality Barriers: Naval Safety Command NAVSAFECOM and Commandant of the Marine Corps (CMC) Safety Division (SD) mishap investigators often attend a "Cognitive Witness Interviewing" course conducted by Dr. Ronald P. Fisher who has a great influence in the communities of safety and law enforcement. Fisher identifies three key personality barriers and techniques to overcome those barriers which include:

- **Motivational Barrier:** The underlying problem with this type of witness is that he or she thinks only about his/her personal problem and does not go beyond personal influence to larger implications. This is often exacerbated by television, attorneys and/or advisors. This person does not believe you can reasonably identify with his/her problem. This may also include the person who is in "self-preservation" mode or trying to protect someone else from disciplinary action.
- **Cognitive Barrier:** This is the witness who has no prior experience with an interview process. His/her only relevant experience may likely derive from TV or social media which is completely inappropriate. Also, when we see Event A, we apply our experiences and we expect it to result in Event B, because that is normally what happens or what makes sense after Event A. Witnesses can experience temporal time distortion where time seems to stand still and the mishap seems to happen in slow motion. Because of this misperception, witnesses will consistently tend to overestimate time. In addition, the witness' attention just naturally follows the most dramatic part of the mishap; the biggest piece or the one that is burning. He/she may not even notice that a wheel was loose or a tire went flat. The human mind is programmed to relate order of occurrence with order of perception. If we saw or heard it first, it must have happened first, because of the difference in the speed of light and the speed of sound, this is not necessarily true. Even though you know what's happening, your brain will still tell you that the events are occurring in the wrong order. Lastly, we are influenced by everything we hear and read about the event after it happened. There is another phenomena called "Retroactive Amnesia." When we witness a very dramatic event, a crash for example, there is a tendency for the details immediately preceding the event to be blotted out of our memory. The longer the time from the event and the more external influences we see and hear, the less likely we are able to recall accurate details.
- **Emotional Barrier:** The emotional tone of the event can have an impact: for instance, if the event was traumatic, exciting, or just physiologically activating, it will increase adrenaline and other neurochemicals that can damage the accuracy of memory recall.

Nervousness, or fear can also affect a person's memory. Some people feel pressured when everyone else in the room is counting on them. This might lead them into saying something that is wrong or inaccurate. Often-times, emotions get the best of us. When that happens, people might remember things or events differently. They might not be able to accurately recall the sequence of events or crucial details that will help prevent future events.

For some people, giving an official statement is an unpleasant experience. They feel intimidated by the surroundings or the person(s) conducting the interview. If you want to get the best statement, you should remove as many of these intimidating influences as possible.

A witness is likely to be more at ease and comfortable in his own surroundings. This witness may also be in fear of reprisal. You cannot expect a witness to tell you things that are likely to result in some inappropriate action.

e. Cognitive Witness Interview Techniques to Promote Active Witness Participation. The goal of the cognitive witness interview is to elicit the witness's active participation to help solve the problem and prevent future mishaps. The following are best practices to meet that goal.

1) Build Rapport. Develop rapport and actively listen. (Interviewers do not spend enough time developing rapport. This is exacerbated by panel of interviewers.)

- Present yourself as a person and develop a personal rapport with the witness.
- Chat with the witness for a few minutes. (**NOTE:** For the "Motivational Barrier" witness be sure to identify with the witness's problem. If the witness is focused only on his/her problem with the mishap, then make it about him/her. Develop a rapport with understanding and self-disclosure.)
- Find something in common with witness. (Sports, recreational activities, units/commands served, deployments, home states or towns, entertainment, etc.)
- Give the witness a chance to relax. Ask some routine questions for basic information such as the correct spelling of their name, their current job and a brief job description. Also ask if there were any previous jobs having a bearing on the mishap. (**NOTE:** These type of questions can also provide you valuable information on the validity of their statement.)

2) Supportive Interviewer Behavior. Provide a non-judgmental, non-threatening, empathetic, and cooperative environment.

➤ Completely explain who you are and the purpose of a mishap investigation versus a legal/collateral investigation. Display an attitude of concern over finding the mishap causes and preventing it from happening again.

➤ Encourage the witness to provide specifics about what s/he is thinking. If the interviewee appears to be having difficulty thinking aloud, use such prompts as: "Tell me what you're thinking?" or "What are you thinking about right now?"

➤ Do not interrupt but provide non-verbal reinforcement to let the interviewee know that you are listening. (i.e., nodding your head, saying 'mm hmm,' or saying 'okay,' or 'I understand.')

3) Transfer Control. Resolving any apparent conflict is crucial for a successful interview. Therefore, after developing rapport, the interviewer will in effect transfer control of the interview to the witness.

Explicitly instruct witness of his/her role. The interviewer will openly acknowledge that s/he was not at the scene and that the witness must play an active role in the interview, "I was not there when this happened, so I will be relying on you to do most of the work here."

This clarifies for the witness the role that s/he will be playing during the interview, and that s/he should not wait for the interviewer to ask questions which dictates that:

- The witness is the central character in the interview, because he/she has event-related information.
- The interview process revolves around the witness's knowledge.
- The witness should play an active role in the interview.
- The witness, not the interviewer, should do most of the mental work.

TIP: As the investigator/interviewer:

- Make regular direct eye contact

DO NOT ...

- Suggest answers
- Dominate the witness
- Make promises you can't keep
- Omit questions
- Rush the witness
- Interrupt or cut the witness off
- Judge or blame the witness
- Use a negative attitude, intimidate or threaten.
- Use inflammatory words (killed, lied, stupid, failure, etc.)
- Re-teach witness what they should have done.

f. Techniques to Maximize Recall:

1) Warm-up question. A technique used by some seasoned interviewers is to ask a “warm-up” question. The purpose is to help the witness better understand the process and the level of detail you expect. An example question is to have the witness describe in great detail the layout of their residence or the route they drive to work.

2) Ask open-ended questions (Questionless Interview). The “open-ended” question is the primary tool to solicit the best response. The goal is to conduct an interview without asking questions. The most successful interviewers ask the fewest questions as asking questions place heavy demands on the interviewer and disrupts the witness’s thought process. Additionally, idiosyncratic information cannot be generated from questions, but only from active witnesses. (See Figure 3-5)



Examples of open-ended questions:

- What was the first thing that attracted your attention?
- What can you tell me about ...? or what do you think about ...?
- Describe what you remember about the area and the people just before the mishap?
- Can you describe everything you remember about your day leading up to the mishap?”
- What is the normal process for ...?
- Tell me exactly what happened and how you handled it.
- What types of things have made you angry? How did you react to those situations?
- In your experience, tell me about a time when you stuck to command policy to solve a problem when it might have been easier or more immediately effective not to.
- Give me an example of a time when communicating with a fellow worker was difficult and give me an example of how you handled it.
- Tell me about a time when an upper-level decision or a policy change held up your work.
- Have you ever had to make a sticky decision when no policy existed to cover it? Tell me what you did.
- Describe a time when you communicated unpleasant news or feelings to a supervisor. What happened?
- What has been your experience in dealing with poor performance of subordinates? Give me an example.
- In your current (or most recent) position, what types of decisions do you make without consulting your boss / supervisor?
- Give me an example of a time when you got really motivated at work.
- What have been major obstacles which you have had to overcome on your most recent (or current) job. How did you deal with them?
- Describe a situation in your last (or current) job where you could structure your own work schedule. What did you do?
- Describe for me a time when you made a mistake that illustrates your need for improvement in a certain area.
- You have heard the expression, “being able to roll with the punches.” Describe a time when you had to do that.
- Why do you think this mishap occurred?
- If you could be the “Boss”, “Commandant / CNO” or “Sgt. Maj. / MCPON” for a day, what changes would you make to prevent this mishap from happening again?

Figure 3-5

3) Closed eyes recall method. Encourage the witness to close their eyes, ask to place themselves in that time and space, and re-tell the story. This will promote a focused concentration.

4) Drawing diagrams. Provide the witness an opportunity to draw the scene and narrate. This too promotes focused concentration.

5) Power of the Pause: For the interviewer a pause is a passive yet excellent tool for eliciting more information. After a subject answers a question or finishes recalling his/her version of a sequence of events, try waiting a few seconds before you respond. As this silence naturally presents an awkward moment, your pause can give the witness the impression that you may know more than they realize and you expect them to be forthcoming.

g. Interview Wrap-Up:

1) Summarize / Rephrase: Once you and the witness feels he/she has provided all information, a good technique is to read back what you have written. This gives the witness another opportunity to fill any gaps and to ensure you (the interviewer) interpreted all information correctly.

2) Ask closed-ended questions: The use of “closed questions” should be strategic and only used at the end of an interview to help fill in the gaps or solicit specific responses. The interviewer should have a list of well-prepared closed questions to ask if needed. Navy and Marine Corps requires specific information for analysis and for the SIR. (i.e., the 72-hour profile).

3) Share contact Information: Interviewers should use the fact that personnel involved will continue to think about the mishap even after the interview has terminated—and thereby recall new details. A best practice is to contact the witness after the interview and ask if he/she has any new recollections. Such a post-interview follow-up should help to reassure personnel of the interviewer’s concern about the witness as a person and not merely as a “fact generator”. These post-interview contacts are particularly important to the public relations component of safety. Also ask if there are any other witnesses that may be able to help.

h. Post-Interview Actions:

1) Write a summary: Store your notes/summaries in a safe or lockable file cabinet. Nothing can destroy your credibility or effectiveness as a safety investigator more quickly than for word to spread safety is giving information to people after you promised the witness you would not.



Witness Interview Key Points: Per OPNAVINST 5102.1E/MCO 5100.29 (series) (Appendix A and C) and OPNAVINST 3750.6S.

- A witness shall not testify under oath.
- A witness shall not give a sworn statement.
- Witnesses shall provide personal opinions and speculations.
- Interviewers shall use investigator (safety officer) notes as the only written record.
- Interviewers shall not include witness names in notes.
- Interviewers shall not have witnesses sign a summary.
- Once the investigation is complete, the interviewer shall destroy all notes, recordings and witness written notes.

3-5. CAUSAL FACTOR ANALYSIS (Why Did it Happen?)

a. Overview. On-duty mishaps (Class E up to Class A) that occur in the operational or industrial environment are predominantly caused by multiple, interrelated causal factors. The reasons people make errors, materiel fails, environmental factors contribute, or injuries occur in a mishap are the keys to mishap prevention. Identifying contributing active and latent failures by individuals, supervisors and/or the organization can be particularly challenging.

Analyzing causal factors is a process that allows the investigator(s) (unit/command or a board) to probe, discover and ponder through use of facts to test presumptions and scenarios to determine mishap causes. The systemic analysis of data collected during the investigation allows investigators to deduce causes and develop recommendations for corrective actions. With few exceptions (e.g., insufficient data/evidence to make conclusive findings), the conclusions and recommendations are directly supported by the analysis of data. Formal analysis begins when the unit/command investigator or the board president determines sufficient data has been collected to pursue analysis.

The objective of the causal factor analysis process is for the DoN safety community to identify the facts, reconstruct and sequence the true course of events (“what” happened), then use a detailed and methodical process to identify the multiple and interrelated causes (“Why” did it happen).

b. Preparation. The facility used to conduct the analysis and deliberations should be secure, free from distractions, and allow for complete privacy.

The investigator(s) (i.e., Unit/Command or members of a SIB/AMB) must be able to facilitate and record the analysis and deliberations. It is important for privacy and ability to protect all evidence and investigator analysis products. Mishap unit commanders must allow his/her safety team or a SIB/AMB to operate in an area that ensures accuracy and completeness of analysis as well as safeguarding of privileged safety information.

c. Methodology – Analysis Tools. Caution must be taken in applying analytic methods. First, no single method will provide all the analyses required to completely determine the multiple causal factors of a mishap. A structured and meticulous analysis of the data provides the best opportunity for the investigators to reach accurate conclusions. Analysis can be accomplished in many ways. A number of mishap analysis methods are used by seasoned Navy and Marine Corps safety personnel to determine causes of the mishap (see *Figure 3-6* below and *Figure 3-10* at the end of this chapter). Each method has different areas of application and the investigator should be prepared to use several in a comprehensive mishap investigation. This section provides an understanding of how to utilize some important, recognized, and commonly used methods for investigations of mishaps or near-mishaps.

The following are standard methods used during analysis:

NOTE: These tools best apply to “High Potential” on-duty mishaps (HIPOM) that require more level of scrutiny. These type of mishaps meet the DoD and DoN criteria of first-aid injury, class C, D, or E injury or damage. Unlike some

reportable mishaps such as off-duty/recreational mishaps or the twisted ankle during PT, a HIPOM is an on-duty mishap which has the potential to result in a more severe loss or significantly degrade mission capability and readiness.

d. Causal Factors Mapping (CFaM). CFaM is the PRIMARY root cause analysis tool used by investigators of CMC (SD) and NAVSAFECOM. The CFaM (see *Figure 3-7*) is easy to develop and provides a clear depiction of the data. Investigators use either “post-it” notes, MS Excel or a mapping software to provide a graphical depiction of the mishap’s sequence of events (what) and the layers of conditions (why) that allowed significant events to occur. Keeping the map up-to-date helps ensure the investigation proceeds smoothly and investigators have a clear representation of the cause and effect relationships. Key benefits of the CFaM:

- Provides a structured method for organizing and integrating the collected evidence;
- Graphically depicts the triggering conditions to events necessary and sufficient for the mishap to occur;
- Identifies information gaps to collect additional data for analysis;
- Identifies hazardous trends of systemic deficiencies and oversights;
- Links facts to organizational issues and/or management systems that trigger a chain of conditions and events;
- Identifies relationships between organizational influences that had a cascading effect to individual actions;
- Provides the investigator with an effective visual aid when writing the mishap investigation report;
- Provides a visual representation of accurate information to aid in briefing commanders.

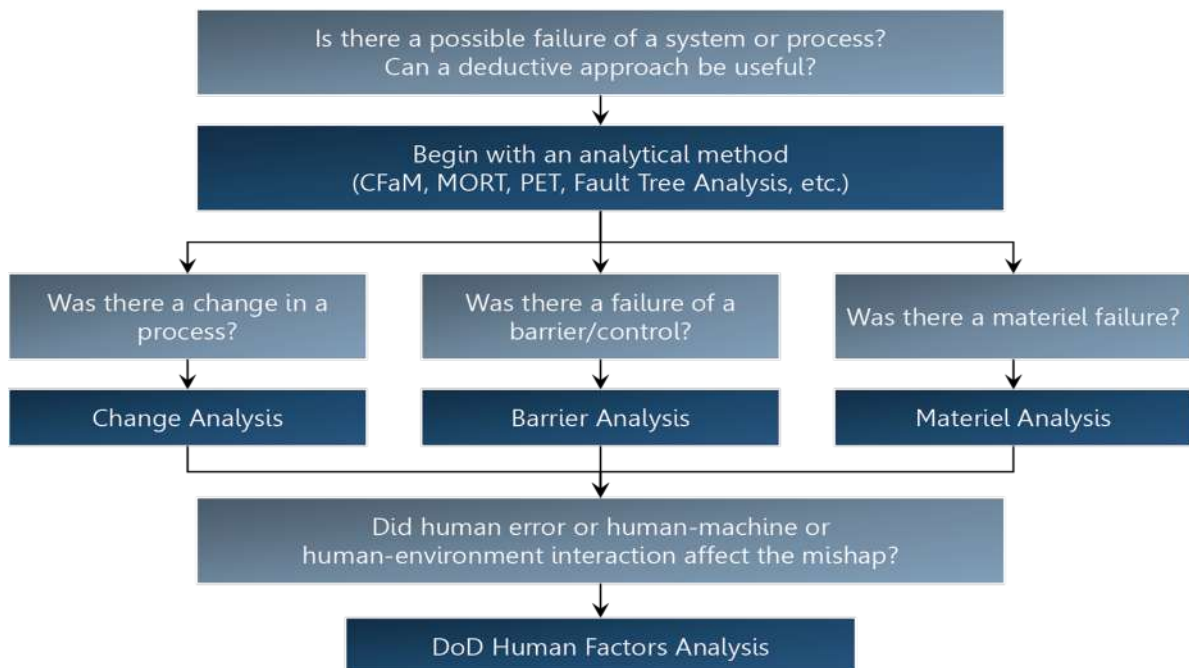


Figure 3-6

1) CFaM Process STEP 1 - Establish a Sequence of Events. List the chronological sequence of events (timeline) leading up to and through the mishap. The chain of events may have begun days, weeks, months or years before the mishap even occurred. (See *Figures 3-7* and *3-8*).

Working backward to weeks, months, years (macro timeline) helps identify significant events, unit milestones, unit SOPs, organizational vulnerabilities and other activities that could have allowed a cascading effect of latent conditions to exist thus leading to the mishap. These timelines allow the investigators to analyze policies and events in the proper context and weigh the role each may have played in the resulting mishap. Look as far back as needed to find a cause that could prevent recurrence. For example, maintenance done on a tactical vehicle six weeks ago could be a contributing cause to a crash. Disconnecting a backup warning bell on a fork truck last year may have contributed to a worker being run over last week.

- **Event:** A point in time defined by a specific action.
- **Primary Event Line:** The key sequence of occurrences that led to the mishap. The primary event line provides the basic nature of the event in a logical progression, but it does not provide all of the contributing causes. This line always contains the mishap, but it does not necessarily end with a mishap event. The primary event line can contain both primary events and conditions.
- **Secondary Event Lines:** The sequences of occurrences that lead to primary events or primary conditions. The secondary event lines expand the development of the primary event line to show all of the contributing causes for a mishap.

BEST PRACTICE TIP: By writing the date, time and sources of the information on the “Post-it” note, investigators will be able to better retrieve evidence to validate facts during the analysis and deliberation process.

Example 1: DD/MMM; 2130, Mishap driver began to back the mishap vehicle. Source: Mishap Driver interview and Witness #4 Interview.

Example 2: DD/MMM; 2131, Mishap ground guide tripped over the gripe. Source: eyewitness #3 interview and eyewitness #4 Interview.

2) STEP 2 - Determine which events were significant. Examine the first event that immediately precedes the mishap. Evaluate its significance in the mishap sequence by asking, “If this event had not occurred, would the mishap have occurred?”

If the answer is, “The mishap would have occurred with or without this event happening” (e.g., the individual reported for duty/work at 0700), then the event is not significant.

Proceed to the next event in the sequence, working backwards

from the mishap. If the answer to the evaluation question is, “The mishap would not have occurred without this event,” then determine whether or not the event represented normal activities with the expected consequences.

If the event was intended and had the expected outcomes, then it is not significant to the negative outcome. However, if the event deviated from what was intended or had unwanted consequences, then it is a significant event.

3) STEP 3 - Determine “why” each event existed. Using all collected evidence, carefully examine each significant event to assess what “condition(s)” existed for the event to occur. You may find that more than one condition either existed or had to exist for the event to occur.

NOTE: A Condition is a distinct state that facilitates the occurrence of an event or other conditions leading to the event, such as meteorological conditions, equipment conditions, conditions of humans (team members) and organizational conditions.

Presumed Conditions are conditions investigators believe affected the mishap sequence, but the effect could not be substantiated with hard evidence. However, for the event or other condition(s) to exist, the presumed condition is the most logical in the sequence of cause and effect. Often, presumed conditions require further collection of evidence in an attempt to provide reasonable proof of the existence of the condition.

Once the initial conditions are identified, then continue to assess each condition separately and identify each layer of conditions that allowed other conditions to exist until the evidence ends. This is achieved by asking a series of questions (See section e. The Five Whys, below and *Figure 3-8*).

One can frame their questions in several manners, such as:

- Why did this event happen / What condition or conditions existed to allow the event to occur?
- What other condition(s) allowed the first condition) to exist?
- Why did this condition exist or what other conditions allowed this condition to exist?
- Are there other conditions that allowed these conditions to exist?
- How did these conditions originate?
- Are there any relationships between what went wrong in this event chain and other events or conditions in the mishap sequence?
- Is the significant event linked to other events or conditions that may indicate a more general or larger deficiency at the organizational level?

Macro Timeline (Years, Months, Weeks prior)

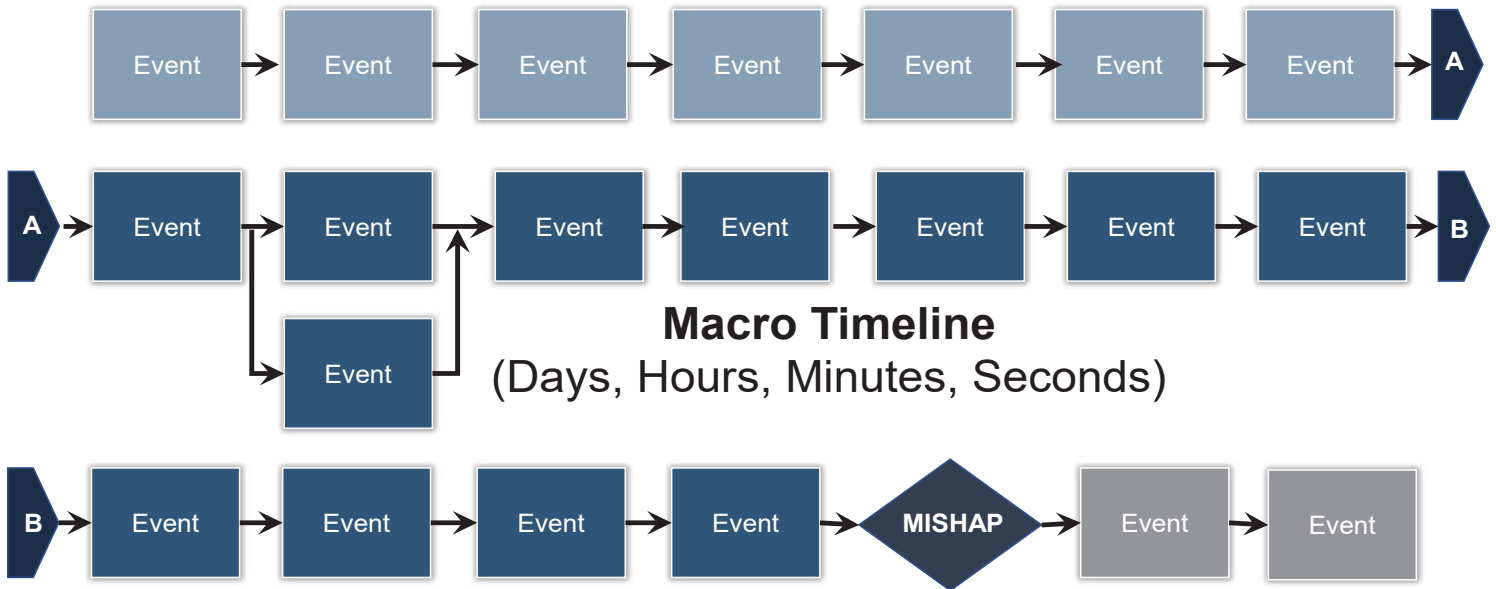


Figure 3-7 (Sequence of events)



Sequence of Events (i.e., Points in time defined by specific actions)

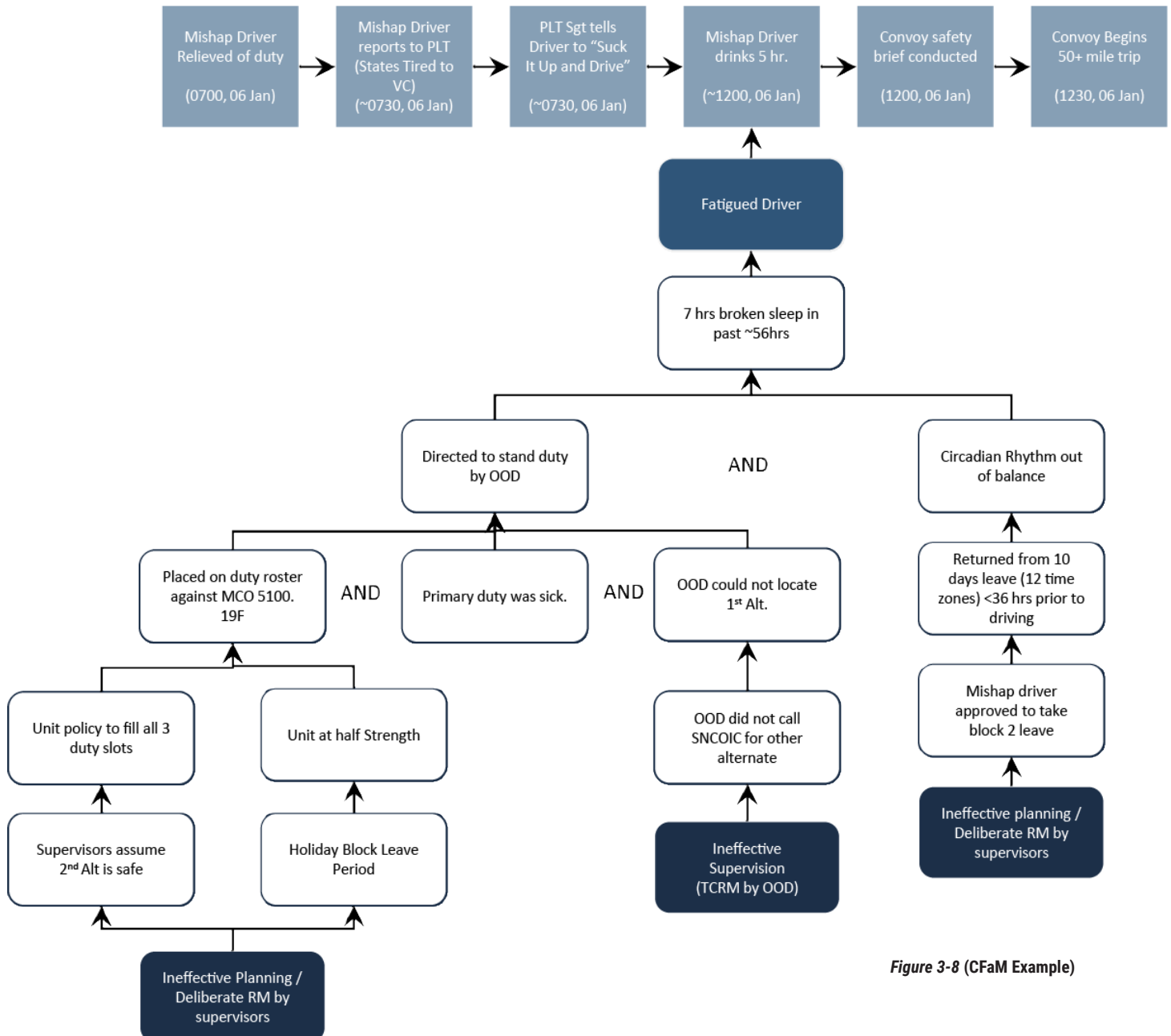


Figure 3-8 (CFaM Example)

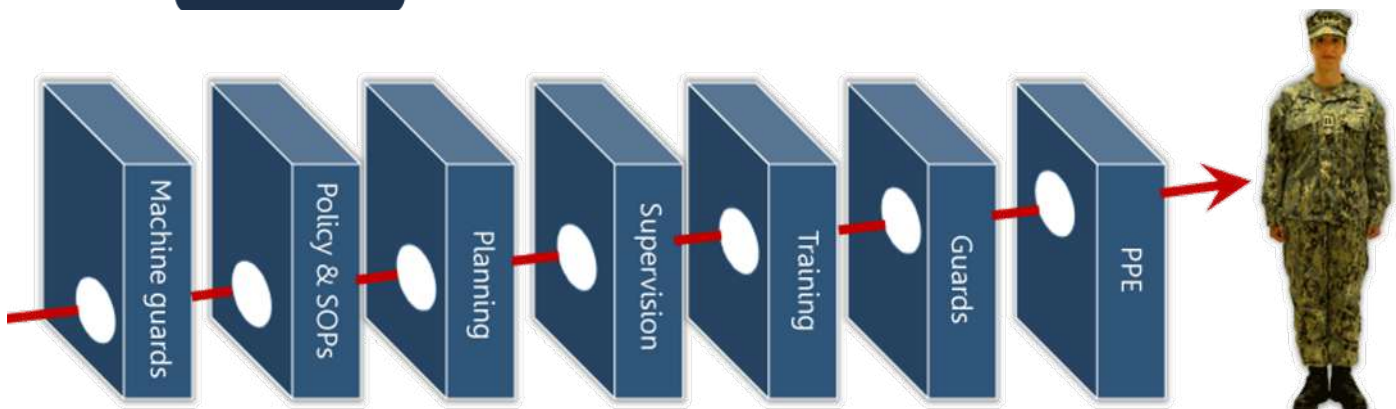


Figure 3-9

NOTE: Condition: a distinct state that facilitates the occurrence of an event or other conditions leading to the event. Such as meteorological conditions, equipment conditions, conditions of humans (team members) and organizational conditions.

Presumed Conditions. These are conditions the investigators believe affected the mishap sequence, but the effect could not be substantiated with hard evidence. However, for the event or other condition(s) to exist, these conditions are the most logical in the sequence of cause and effect. Often, presumed conditions require further collection of evidence in an attempt to provide reasonable proof of the existence of the condition.

4) STEP 4 – Use other analysis tools to refine causal factors. Once the CFaM is complete, apply the DoD HFACS taxonomy to analyze the pathways or (series) of human influence. Also, if warranted, investigators may choose to also use other tools (i.e., Change Analysis, Barrier Analysis, Materiel Analysis) to provide more details into specific factors and help discover more effective solutions.

e. The Five Whys: The “Five Whys” began at the Toyota Motor Company and became a component of Six Sigma. The five whys is one of the simplest of the causal analysis methodologies. This tool is used to explore the cause and effect relationships underlying a specific problem.

The Five Whys technique is a valuable tool when used in conjunction with other analytical tools (i.e., CFaM, Barrier Analysis, Change Analysis, etc.). The goal of applying the five whys method is to determine a root cause of a defect or problem. By asking a “why” question, it identifies conditions/causes that allowed certain events within a mishap to occur. Then continuing to ask “why” conditions were allowed to exist. Often the answer to the first “why” uncovers another reason and generates another “why.” Investigators will probably find that one will ask more or less than five whys in practice. Some root causes can be discovered after only three “Whys” while others may take asking “why” up to seven or eight times. On average, one will discover a root cause of a problem after five why questions.

The Five Whys process involves selecting one event associated within a mishap and asking “why did this event occur?” (See *Figure 3-8*) Once the condition(s) are identified that lead to the event, the investigator continues to follow each “condition” and ask “Why was this condition allowed to exist?” This produces the most direct path for each of the sub-events or conditions affected other conditions and/or events. Repeat the process for the other events associated with the mishap.

f. Barrier Analysis. This tool is based on the premise that hazards are associated with all mishaps. Barriers (aka control, defense, stop-gap, etc.) are developed and integrated into a

safety management system (SMS) or work process such as a job hazard analysis (JHA) or pre-mission deliberate risk assessment. The goal is to protect equipment and personnel from hazards and ensure a mishap free task, job, training event or mission. For a mishap to occur, there must be a hazard which comes into contact with a target, because one or more barriers (or controls) were unused or failed. (see *Figure 3-9*)

NOTE: Barriers are Engineering (materiel design), Administrative (regulations, policies, SOPs, LOIs, work practices, training, rehearsals, signs, briefings, etc), and Physical (Guards, covers, fencing, PPE)

1) Barrier Analysis Process. This tool is used in conjunction with the CFaM when an investigator desires to know why a barrier was either not used, failed or did not exist. The process is to use the evidence to develop a worksheet.

- List the barrier (on paper, dry erase board, etc.);
- State the barrier type (engineering, administrative or physical);
- Describe the purpose of the barrier (you may require a technical manual, user’s manual, SOP, etc.);
- Determine the performance of the barrier. (Did it Fail, was it Not Used, was it Not Used Properly, or did it Not Exist?);
- State the effect the performance (or lack of) had on the mishap;

NOTE: Erroneous instructions or discrepancies found in the content of technical publications that would jeopardize operation, maintenance, or performance of the item or equipment supported shall be reported per SECNAV M5210.1(series), OPNAV 5215.17 and MCO P5215.17.

TIP: Benefits of a Barrier Analysis helps investigators to determine if an Engineering Investigation (E/I) is required, or further support human factors analysis and ultimately helps develop more effective recommendations for corrective actions.

g. Change Analysis. Change analysis examines planned or unplanned changes that disturbed the “balance” of normal, safe operations and caused undesired outcomes. A change includes the source of deviations in operations.

Change can be planned, anticipated, desired, or it can be completely unintentional, unforeseen and unwanted. In a mishap investigation, this technique is used to examine a mishap by analyzing the differences between what has occurred before, or what was expected to occur and the actual sequence of events.

The investigator performing the change analysis identifies specific differences between the mishap free situation and the mishap scenario. These differences are evaluated to determine whether the differences caused or contributed to the mishap. For example, why would something that operates correctly 99 times out of 100 fail to operate as expected one time?

The benefits of this method are that it is particularly useful in identifying obscure contributing causes of mishaps; it is easy to use and apply with minimal resources and it works well in combination with other methods.

1) Change Analysis Process. This tool is used in conjunction with the CFaM when an investigator desires to know the differences between what has occurred before or what was expected to occur and the actual sequence of events. The process is to use evaluate three areas of PERSONNEL (staff, training qualifications, supervision, etc.); PLANT/HARDWARE (equipment, location of activities, etc.) and PROCEDURES and MANAGEMENT Controls (Policies, SOPs, training, etc.).

- List the area in need of analysis (Personnel, Plant/Hardware, or Procedure and Management) on paper, dry erase board, etc. State the mishap situation (E.g. Personnel conducting a task outside their expertise, only one trained crew, forced to use dead-lined equipment, unofficial change to training methods, etc.)
- State the mishap free or ideal situation. (E.g. Only use competent and trained personnel, have multiple trained crews, ensure plans are made to prevent use of dead-lined equipment, use only approved training methods, etc.):
- State the difference the change affected the mishap (Untrained personnel conducting high risk task, dead-lined equipment created unnecessarily greater risk of injury, unofficial SOP change created an unnecessarily high risk situation to students and instructors)
- State the effect or impact on the mishap: (Untrained personnel conducting high risk task increased the severity of injuries; use of dead-lined equipment caused loss of personnel; unofficial SOP change failed to consider new hazards and resulted in loss of humans and training mission).

h. Materiel Factors Analysis: Are factors related to materiel failures or malfunctions that may be the result of a defect or design flaw. This usually requires the assistance of key maintenance personnel with expertise of specific components or systems. Consider all materiel failures and malfunctions thoroughly, whether they occurred because of normal or abnormal means. Analysis of materiel factors also leads investigators to examine if the required equipment was available, if it was used, and if it was used correctly.

TIP: If the equipment was not used appropriately it is not a materiel failure and is assessed as human error.

Determine if the equipment functioned as designed, and if the design was adequate/appropriate for use (Fit, Form and Function). Materiel factors analysis is primarily concerned with evaluating the performance of the aircraft, vehicle, weapons system, ground support equipment, or other support material. Data concerning how operational conditions affected the vehicle/system/equipment performance is also collected. In the event you determine there is a materiel or material factor, then an Engineering Investigation (EI) can provide an in-depth analysis of equipment function or malfunction. When the investigator desires an EI, request assistance from the appropriate authority and/or systems command.

NOTE 1. In accordance with SECNAVINST 4855.5C/AFI 21-2115/DCMAINST 305 (19 Sept 18), a Priority Quality Deficiency Report (PQDR) must be submitted to address material failures found during the investigation, even if it is suspected. The owning unit is responsible for completing the PQDR and a copy is submitted with the mishap investigation report.

NOTE 2. Ammunition deficiencies shall be reported to NOSSA and MARCORSSYSCOM per OPNAV M-8000.16 and MCO 8025.1.

NOTE 3. Nuclear weapon materiel deficiencies shall be reported per Navy SWOP 5-8.

NOTE 4. Aeronautical equipment deficiencies shall be reported per OPNAVINST 4790.2.

1) Ground EI Process (Includes all USN-USMC ground tactical training and operations): Contact the appropriate supporting SYSCOM if any of the following malfunction and might require engineering investigation:

- Weapons system components
- Ammunition (cracked casings, malfunction, etc.)
- Explosives (damage, cracked casings and Post Blast Analysis)
- Live Fire Ranges (call TECOM RTAM)
- Seats, turrets, hatches, doors of tactical MV systems
- Restraint systems, helmet, cranial
- Parachute components
- Suspension components
- Brake system components
- Engine components (If malfunction)
- Technological system components (navigation, targeting, etc.)
- Position of controls (engine, weapons) at impact
- Tactical vehicle system junction boxes
- Electrical sources of fire ignition
- Bilge pumps

- ↘ Communications mount and equipment
- ↘ Material Handling Equipment components
- ↘ Instrument readings
- ↘ Fluid contamination and type
- ↘ Component operating at impact or explosion
- ↘ Type/source of combustible material
- ↘ Heat-distressed items
- ↘ Latching or fastening devices on tactical MV systems
- ↘ Rigging and Sling components

NOTE 1. (MARINE CORPS ONLY) IAW MCO 5100.34A, all Marine Corps units shall immediately contact MARCORSYSCOM for any hazards found with weapons systems or tactical vehicle and equipment systems.

NOTE 2. Components (engines, seats, hydraulic components, turrets, hatches, gun breach, etc.) should not be dismantled in the field without appropriate maintenance experts and/or cognizant engineer present to direct disassembly. Field disassembly risks losing evidence and might spoil opportunity to conduct functional tests.

2) Afloat EI Process. Contact the appropriate supporting SYSCOM (e.g., NAVSEASYSCOM) if any of the following malfunction and might require engineering investigation:

- ↘ Weapons system components
- ↘ Ammunition (cracked casings, malfunction, etc.)
- ↘ Explosives (damage, cracked casings and Post Blast Analysis)
- ↘ Seats, turrets, hatches, doors
- ↘ Restraint systems, helmet, cranial
- ↘ Suspension components
- ↘ Brake system components
- ↘ Engine components (If malfunction)
- ↘ Technological system components (navigation, targeting, etc.)
- ↘ Position of controls (engine, weapons) at impact
- ↘ Junction boxes (vehicles, shipboard, etc.)
- ↘ Material Handling Equipment components
- ↘ Electrical sources of fire ignition
- ↘ Bilge pumps
- ↘ Steam production/delivery system components
- ↘ Communications mount and equipment.
- ↘ Instrument readings
- ↘ Fluid contamination and type
- ↘ Component operating at impact or explosion
- ↘ Type/source of combustible material
- ↘ Heat-distressed items
- ↘ Latching or fastening devices
- ↘ Rigging and Sling components

3) Installation / Ashore EI Process. Contact the appropriate supporting SYSCOM if any of the following malfunction and might require engineering investigation:

- ↘ Weapons system components
- ↘ Ammunition (cracked casings, malfunction, etc.)
- ↘ Explosives (damage, cracked casings and Post Blast Analysis)
- ↘ Live Fire Ranges
- ↘ Seats, turrets, hatches, doors
- ↘ Restraint systems, helmet, cranial
- ↘ Suspension components
- ↘ Brake system components
- ↘ Engine components (If malfunction)
- ↘ Technological system components (navigation, targeting, etc.)
- ↘ Position of controls (engine, weapons) at impact
- ↘ Junction boxes (vehicles, shipboard, etc.)
- ↘ Material Handling Equipment components
- ↘ Electrical sources of fire ignition
- ↘ Bilge pumps
- ↘ Steam production/delivery system components
- ↘ Communications mount and equipment.
- ↘ Instrument readings
- ↘ Fluid contamination and type
- ↘ Component operating at impact or explosion
- ↘ Type/source of combustible material
- ↘ Heat-distressed items
- ↘ Latching or fastening devices
- ↘ Rigging and Sling components

i. Mishap Re-enactment. The main challenge for the investigator(s) is to distinguish between accurate and erroneous information in order to focus on areas that will lead to identifying the causal factors. You may encounter conflicting information while examining evidence (documents, physical evidence and witness interviews).

Sometimes, if the sequence of events or conditions of the mishap cannot be developed in any other way, significant new information can be gained from reenactment.

The re-enactment can either provide a key to prevent recurrence or verify the theories and opinions of the investigator(s). If possible, use the original personnel involved in the mishap however, re-enactment is not advisable if the participants are emotionally upset, nervous, tense, or agitated.

1) Re-enactment Process. When reenacting mishap:

- ↘ Ensure qualified supervisory personnel monitor the progress of the re-enactment.

- Brief the participants, before starting, to proceed up to the point of the mishap. Beyond that point, use a talk-and-walk method of re-enactment.
- Warn the participants not to repeat the act or unsafe practice that caused the mishap. Be prepared to stop the re-enactment if the participants are about to take an unnecessary risk.
- Ask the participants to demonstrate their actions slowly and deliberately, explaining as they demonstrate.

2) Video recording the re-enactment. Many times you will discover factors that influenced the unsafe act(s) or hazardous conditions unknown to the mishap personnel. Recording a reenactment of the chain of events leading to a mishap can serve as a valuable supplement to still photography. A video made by safety investigators to reenact a mishap is privileged, since the tape reflects the board's deliberations. Other video made by reporters, passersby, or a single investigator are not privileged since they are physical evidence.

j. Department of Defense Human Factors Analysis and Classification System (DoD HFACS). The last part of mishap analysis is focused on determining human error. There are several reasons for this focus. First, academic studies prove human error is involved with over 85% of all mishaps. Second, identifying human error is the least objective of all the causal factors. Third, human error is often present in mishaps where environmental factors and materiel failures are involved.

Finally, the complex nature of human behavior and organizational culture that influences human behavior mandates a systematic approach to investigations to ensure that all areas are thoroughly addressed.

The DoD HFACS tool was designed specifically for the DoD components and intended for use to determine potential hazards and risk during Risk Management (RM) in operational planning, develop interview questions during mishap investigations and guiding root cause analysis of human error pathways. This tool is the last component of the analysis process as it complements the CFaM and other analysis tools.

After completion of mapping the mishap, investigators will use the latest version of the DoD HFACS taxonomy as follows:

1) STEP 1 - Determine the Unsafe Act(s):

- Begin by asking "WHAT did the person / operator do, or not do, to cause the mishap?"
- Determine if the last Unsafe Act was an Error or Violation.
- If determined to be an Error, proceed to assessing which AE codes apply.
- If determined to be a Violation, proceed to assessing which AV codes apply.

NOTE: There may be more than one unsafe act committed by the individual/operator/team. You may determine some acts to be errors and some to be violations. Be sure to focus on the last act and remember, the "act" CANNOT be an error and a violation - It must be one or the other.

TIP: Another tool that is useful in determining if the act was an "error" or a "violation" is the Compliance/Non-compliance tool. (See section K.)

This technique compares evidence collected against three categories of noncompliance to determine the roots of a noncompliance issue. As discussed in section K, these are: "Don't Know," "Can't Comply," and "Won't Comply." Examining these three areas independently without applying DoD HFACS will limit the application of this technique; however, the technique is highly useful in determining if the act is an error or violation, then determining the preconditions (why) as well as supervisory and/or organizational influences (why).

2) STEP 2 - Determine all the Preconditions that allowed the individual / operator / team to commit the unsafe act.

- Begin by asking "WHY did the individual/team commit the unsafe act?"
- Determine if there were any physical or mental conditions of the individual/operator/team were contributory to the unsafe act(s). Select all codes that apply.
- Determine if any environmental factors were contributory to the unsafe act(s). Select all codes that apply.
- Determine if there were any teamwork factors (i.e., communication, task planning and briefing, etc.) were contributory to the unsafe act(s). Select all codes that apply.

3) STEP 3 - Determine the role of first line supervisors (what (if any) supervisory conditions influenced either one or more of the preconditions or the unsafe act(s)).

- Begin by asking "Who knew about the person's/team's preconditions but did not take proper steps to avoid the unsafe act?"
- Determine if the first line supervisor(s) guidance, training or role modeling was inadequate/ineffective and contributed to either the precondition(s) or directly to the unsafe act(s). Select all codes that apply.
- Determine if the first line supervisor(s) failed to adequately assess hazards and risks during the planning of the task/event/mission and contributed to either the precondition(s) or directly to the unsafe act(s). Select all codes that apply.
- Determine if the first line supervisor(s) violated policies or standards in the planning or execution of the task/event/mission which either contributed to the precondition(s) or directly to the unsafe act(s).

4) STEP 4 - Determine the role of the organization. (Did any organizational conditions influence either supervisory conditions or the precondition(s) or the unsafe act(s)).

- Begin by asking “Are there any organizational vulnerabilities that affected supervisory practices and/or preconditions, and/or directly to the unsafe act(s)?
- Determine if climate and/or culture (unit level or higher) influenced first line supervisor(s) guidance, training or role modeling, the precondition(s) or directly to the unsafe act(s). Select all codes that apply.
- Determine if policies and/or processes (unit level or higher) influenced either first line supervisor(s) guidance, training or role modeling, the precondition(s) or directly to the unsafe act(s). Select all codes that apply.
- Determine if resource problems (installation or higher command) influenced either first line supervisor(s) guidance, training or role modeling, the precondition(s) or directly to the unsafe act(s). Select all codes that apply.
- Determine if personnel selection (recruiting) and/or staffing problems (Big Navy or Marine Corps) influenced either first line supervisor(s) guidance, training or role modeling, the precondition(s) or directly to the unsafe act(s). Select all codes that apply.

TIPS to Application of DoD HFACS: The following are best practice tips based on the experience of seasons mishap investigators.

- Read definitions completely, not just titles. One word in the definition may make the code inappropriate.
- Don't paint stripes on a horse and try to call it a zebra. Avoid personal bias, let the evidence and/or your “CFaM” guide you to the appropriate code. (When in doubt – refer to the evidence and your CFaM) (See example on *Figure 3-9*)
- Each selected nano-code MUST be supported by evidence. Again – let the evidence be your guide. A best practice is to support each selected code with a brief statement. This aids in the preparation of recommendations and the SIR.
- Avoid the rabbit holes. Be willing to move on – come back. It is very easy to become distracted from the facts by debating with yourself or the investigation team whether or not a specific code applies. A best practice is to tick-mark the code and move on. You or the team will go through two or more iterations of “scrubbing” and validating each code.
- Choose MOST applicable codes to support causal factors and mitigating hazards. Some codes may seem similar, yet as you “scrub” the codes, you will find that certain codes are more applicable than others. Be willing to deselect codes that are contentious.

- There are no minimums or limitations on number of nano-codes. If the code fits – it fits.
- Nano-codes may apply directly to the “unsafe act” or to other nano-codes that applies directly to the “unsafe act”. It sometimes becomes confusing as to how a “supervisory” code or an “organizational” code is applicable to the individual’s “Unsafe Act”. If supervisory and/or organizational codes had any influence on one or more preconditions to the unsafe act – then you are correct.
- When in doubt – Follow your CFaM. A simple way to understand how codes are traced back to code at the supervisory or organizational levels is to ALWAYS refer back to the “CFaM” and follow the error pathways. (See example *Figure 3-9*)



NOTE: This example does not include the “Unsafe Act” which is later in the timeline. The intent is to help establish an unsafe trend that was not corrected by supervisors and combined with other contributing factors, ultimately resulted in a mishap. This example demonstrates a contributing factor of “fatigue” which the mishap operator took an action to inform the supervisor, was ordered to drive, then took another action in an attempt to compensate for the fatigue. Using the DoD HFACS in conjunction with a causal factors map graphically depicts the linkage between a contributing factor (fatigue) and two of the root causes of the operator’s fatigue which were “Ineffective Planning/Deliberate Risk Assessment” and “Ineffective Supervision,”

This process is highly useful when determining relationships of causes and in writing the investigation report.

k. Compliance / Noncompliance Analysis. The compliance/noncompliance technique is useful when investigators suspect noncompliance to be a causal factor. This technique compares evidence collected against three categories of noncompliance to determine the root cause of a noncompliance issue. As discussed in Table 3-1, these are: “Don’t Know,” “Can’t Comply,” and “Won’t Comply.”

Examining these three areas in conjunction with the DoD HFACS is highly useful in determining if the act is an error or violation, then determining the reasons “why” the unsafe act was committed (i.e., preconditions, supervisory and/or organizational influences). The basic steps for applying the compliance/noncompliance technique are:

- Have a complete understanding of the facts relevant to the event.
- Broadly categorize the non-compliance event.
- Determine why the non-compliance occurred (i.e., what were the preconditions? Was there a supervisory and/or organizational influence?)

For example, investigators may use this technique to determine whether an individual was aware of particular safety requirements, and if not, why he or she was not (e.g., the worker didn’t know the requirements, forgot, or lacked experience). If the worker was aware but was not able to comply, a second line of questioning can be pursued.

Perhaps the worker could not comply because the facility did not supply personal protective equipment. Perhaps the worker would not comply in that he or she refused to wear the safety equipment. Lines of inquiry are pursued until investigators are assured that a root cause is identified.

Lines of questioning pertaining to the three compliance/noncompliance categories follow. However, it should be noted that these are merely guides; an mishap investigation board should tailor the lines of inquiry to meet the specific needs and circumstances of the mishap under investigation.

1) Don’t Know: Questions focus on whether an individual was aware of or had reason to be aware of certain procedures, policies, or requirements that were not complied with.

2) Can’t Comply: This category focuses on what the necessary resources are, where they come from, what it takes to get them, and whether personnel know what to do with the resources when they have them.

3) Won’t Comply: This category focuses on conscious decisions to not follow specific guidance or perform to a certain standard. NOTE: This will include DoD HFACS unsafe act codes of AV 00x before assessing the preconditions, unsafe supervision and organizational influences.



CAN'T COMPLY		WON'T COMPLY		DON'T KNOW	
Scarce Resources	Lack of funding is a common rebuttal to questions regarding non-compliance. However, resource allocation requires decision-making and priority setting at some level of command. <i>(Carefully assess DoD HFACS Organizational Influences - OR 00x codes)</i>	No Reward	An investigator may have to determine whether there is a benefit in complying with requirements or doing a job correctly. Perhaps there is no incentive to comply. <i>(Carefully assess DoD HFACS AV codes, Preconditions, Unsafe Supervision and Organizational Influences)</i>	Never Knew	This is often an indication of poor training or failure in a work system to disseminate guidance to the working level. <i>(Carefully assess DoD HFACS Preconditions, Unsafe Supervision and Organizational Influences)</i>
Don't know how	This issue focuses on lack of knowledge (i.e., the know-how to get a job done). <i>(Carefully assess DoD HFACS Preconditions, Unsafe Supervision and Organizational Influences)</i>	No Penalty	This issue focuses on whether sanctions can force compliance, if enforced. <i>(Carefully assess DoD HFACS AV codes, Preconditions, Unsafe Supervision and Organizational Influences)</i>	Forgot	This is usually a local, personal error. It does not reflect a systemic deficiency, but may indicate a need to increase frequency of training or to institute refresher training. <i>(Carefully assess DoD HFACS Preconditions)</i>
Impossibility	This issue requires investigators to determine whether a task can be executed. Given adequate resources, knowledge, and willingness, is a worker or group able to meet a certain requirement? <i>(Carefully assess DoD HFACS Preconditions, Unsafe Supervision and Organizational Influences)</i>	Disagree	In some cases, individuals refuse to perform to a standard or comply with a requirement that they disagree with or think is impractical. <i>(Carefully assess DoD HFACS AV codes, Preconditions, Unsafe Supervision and Organizational Influences)</i>	Tasks Implied	This is often a result of lack of experience or lack of detail in guidance. <i>(Carefully assess DoD HFACS Preconditions and Unsafe Supervision.)</i>

Table 3-1

MISHAP ANALYTICAL TOOLS

METHOD	WHEN TO USE	ADVANTAGES	DISADVANTAGES	REMARKS
<p>Causal Factors Analysis Mapping (CFaM)</p> <p><i>AKA: Cause and Effect Analysis</i></p>	<p>To help identify all the reasons why a process went out of control.</p> <p>For multifaceted problems with long or complex causal factor chains.</p> <p>To visually depict error pathways.</p>	<p>Easy to apply and provides a comprehensive overview of how a single quantity depends on other quantities.</p> <p>Provides visual display of analysis process.</p> <p>Identifies contributors and roots to any event.</p>	<p>Time consuming and requires familiarity with the process to be effective.</p>	<p>Identifies many possible causes of a problem.</p> <p>It can be used to structure a <i>"Risk Assessment"</i> session during a pre-event <u>Planning Process</u>.</p> <p>Makes the distinction between conditions that allow other conditions to exist or affect events.</p> <p>Helps to identify where deviations occurred from acceptable methods.</p>
<p>Five Whys</p>	<p>When problems involve human factors or interactions.</p>	<p>Determine relationships between causes.</p> <p>Simplest of tools without statistical analysis.</p>	<p>Root causes may not be identified w/o all facts.</p>	<p>Excellent tool to use in conjunction with CFaM to ask "why did an event occur?" or "why did a specific condition exist?"</p>
<p>Barrier Analysis</p>	<p>Identify barrier equipment failures and procedural or admin problems.</p>	<p>Provides systemic approach.</p>	<p>Requires familiarity with process to be effective.</p>	<p>This process is based on the MORT Hazard / Target concept and may require input from systems safety engineers.</p>
<p>Change Analysis</p>	<p>Use when cause is obscure. Especially useful in evaluating equipment failures.</p>	<p>Simple Six-step process.</p>	<p>Limited value: Danger of accepting wrong. "Obvious" answer.</p>	<p>A singular problem technique that can be used in support of a larger investigation. Root causes may not be identified.</p>
<p>DoD HFACS</p>	<p>In conjunction with causal factors analysis mapping.</p>	<p>Structured analysis of error pathways.</p> <p>Applicable to all mishaps and near-mishaps.</p> <p>Targets the need for specific intervention (RM controls) - better command decisions</p>	<p>Likely will not achieve positive Inter-rater reliability without effective understanding of applicability.</p>	<p>Nano-codes may apply directly to the "unsafe act" or to another nano-code that applies directly to the "unsafe act".</p> <p>The categories within each major tier may be used to assist in risk analysis and the planning process.</p>

► TABLE 3-1

MISHAP ANALYTICAL TOOLS				
METHOD	WHEN TO USE	ADVANTAGES	DISADVANTAGES	REMARKS
Material Analysis	When there is a suspected failure of equipment, weapons systems, vehicles systems, communications systems or components of a system.	Improve engineering controls as well as fit, form, and function.	Analysis and long term corrective measures will likely take more than 30 days.	Engineering investigations are to be conducted at the local installation whenever possible. An engineering investigation (EI) can provide an in-depth analysis of equipment function or malfunction. When the investigator desires an EI, submit a request to the appointing authority.

▶ TABLE 3-2

3-6. DELIBERATIONS - FINALIZING CONCLUSIONS

a. Overview. Deliberations are the final stage of analysis and result in the development of findings and recommendations. Using the weight of evidence, professional knowledge and good judgment, the investigator(s) must decide on the most likely reason(s) for the mishap and develop findings, factors, and recommendations. If the mishap evidence was thoroughly analyzed with all analytical tools this phase of the investigation should be simplified.

The investigator(s) must analyze the relationships of event causes to each other and base conclusions on their deductions from all available evidence as to which factors caused the mishap, which factors contributed (increased the likelihood) to the mishap, and which factors caused further damage or injury during the mishap or during the response.

b. Sequence of Events. This is where the investigator “tells the story.” The narrative can be in paragraph form or in timeline format and shall tell the full story of what happened. Background information should NOT be inserted into this area.

Officer X was a relatively new employee at base X and had been working the day shift. He volunteered for overtime and was assigned to work the night shift which required checks to be completed at point B every other hour. This policy did not give any consideration or mitigations to weather conditions or time of day. On this date, the weather was as follows: insert weather conditions. At about 0220, MD was driving GV from point A to point B in order to conduct required gate checks at point

B. (This repetitive check took about 30 minutes to complete once the officer left the base.) Deer ran across the road. MD attempted to avoid the deer by swerving and ran off the road.

c. Background Information. This is where the investigator will insert the information that is needed to “set the stage” for the reader. This should not be used to establish background for the individual, such as qualifications, training, etc. That is completed under the Personal Background section. Include items here like machinery background or when an aircraft/ vehicle/vessel arrived at a current location for example.

The ship arrived to base XYZ on this date and was moored port/ starboard side to pier x. She had just completed this many days in an CNO maintenance availability at XY shipyard and still needed to complete numerous work items due to delays and setbacks. OR MV attended XYZ school on this date and has been qualified as vehicle operator since.

d. Factors. Factors, when combined, answer the “why” an event occurred question. Factors are based on the weight of evidence, professional knowledge, and good judgment of the investigators. The analysis contained in factors lead to the findings and recommendations. Factors that directly led to injury, damage, or a hazardous event are considered causal and result in causal findings. All Class A and B mishaps will contain at least one causal factor.

1. Causal Factors

Causal Factors are factors which caused the mishap. If this factors had been corrected, eliminated, or avoided, the mishap/ hazard/incident would not have happened.

2. Factors that are non-causal but contributed to the mishap.

These are ones that were present, but were not necessarily causal to the mishap.

3. Non-Factors Worthy of Discussion

Non-Factors Worthy of Discussion typically fall into one of two categories: areas uncovered during the investigation that did not cause the event or influence the outcome but should be fixed due to the potential to be a factor in a future event (e.g., incorrect information in a maintenance procedure), areas that were thoroughly investigated and subsequently ruled out as factors (to provide context to the audience on why these areas are not factors). Non-Factors Worthy of Discussion are the source for Other Findings and Recommendations of Significance.

Not all Non-Factors Worthy of Discussion result in Other Findings and Recommendations of Significance, but all Other Findings and Recommendations of Significance must have a corresponding Non-Factor Worthy of Discussion. For system-related events, determine whether the program office previously identified the hazards that played a role in the event sequence and had included those hazards in its Operational Safety, Suitability, and Effectiveness risk management efforts.

All system-related Class A and B mishaps should include a program office analysis of hazards that contributed to the mishap and recommendations for material risk mitigation measures, especially those that minimize potential human errors.

Writing a Factor. First, determine if the factor is a Causal Factor, a Factor or a Non-Factor Worthy of Discussion. Although not required, supporting photos and/or diagrams can be added to support the factors. (Only .jpg, .jpeg, .gif, .png, and .bmp file formats can be used.) Investigators are encouraged to add these supporting photos/diagrams when applicable.

Example:

- **Factor Title.** Factor title shall be a single sentence and written in the whom, verb, description format. For example: "MV failed to come to a complete stop at the stop sign," or "This unit/organization failed to update this instruction."
- **Investigative Area.** Select the appropriate investigative area from drop-down list.
- **Investigation and Analysis Narrative.** This should expand on the factor title and shall be written in narrative form and include detailed analysis of the actions or conditions that influenced the mishap.
- **Determination.** Select either "causal factor," "factor" or "non-factor worthy of discussion."

Findings: A finding is a significant fact derived from the investigation's analytical results. They are the significant facts that support the causal factors. Findings must be linked to factors, HFAC/MFACs, and recommendations.

Finding Type.

Select either Primary Finding and Other Finding of Significance. Primary findings are directly related to the mishap and while Other Finding of Significance are important things discovered and need to be addressed, but not causal to the mishap.

Causal Indicator. Select either Causal or Non-Causal. After determining the causal findings, apply the following "Cause Test" for validation:

- ➔ Is the causal finding correctable by commanders, supervisors, or individuals?
- ➔ Is the causal finding a clear and simple statement of a single condition or event?
- ➔ Is the causal finding in the active voice, past tense, and does it follow the format: Who did what to whom/what and why?
- ➔ Is the causal finding an effect or an expected result of a previously identified cause, even though its inclusion sustains the event sequence? If so, it is not causal.

If the finding does not meet the causal test, it is non-causal.

Finding Narrative

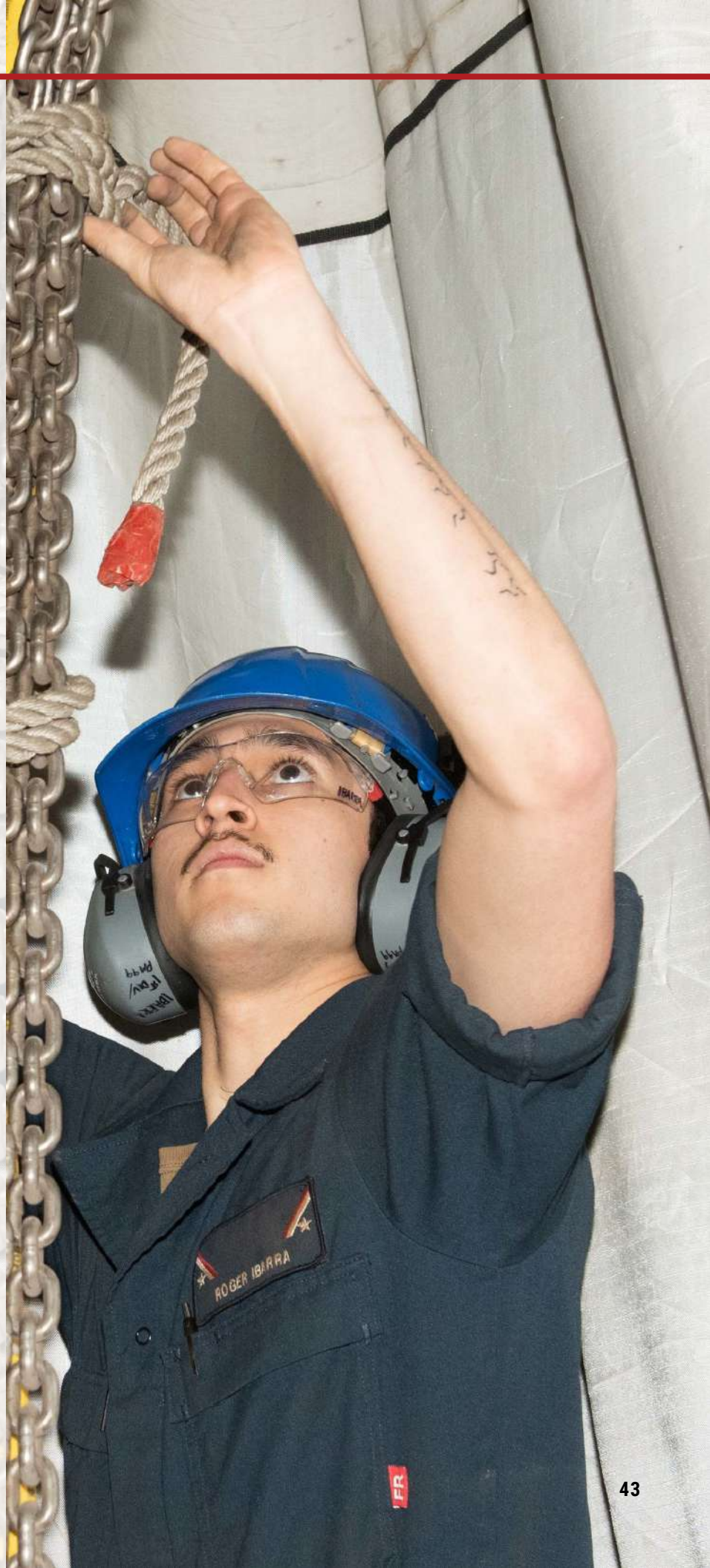
- Findings must be concise (one sentence) and will not include any more information than is necessary to explain the event.
- Findings summarize the essential steps in the mishap sequence and culminate the analysis of the associated factor.
- Findings are based on the weight of evidence, professional knowledge, and good judgment of the investigators.
- Findings must be based on factors. All Class A – D mishaps will have findings (see discipline-specific manuals for exceptions). Findings are optional for all Class E mishaps and all other events. Each finding is a single event or condition.
- Each finding is an essential step in describing the complete event sequence, but not every finding is causal.
- Each finding is a single sentence statement of fact that is supported by a piece of evidence. The evidence that supports the finding shall be placed in parenthesis after the statement and shall be the same name as what is included in exhibits.

Place a (P) in any finding that was derived from a privileged source/evidence.

- (P) MD had two beers prior to driving home (witness interview)
- Posted speed limit was 25 mph (speed limit sign)
- (P) MD takes "cat nap" prior to operating PMV (witness interview)
- MWR budget cut by 50% in 2020 (budget plan)
- OPNAVINST xxx states: "insert verbiage from instruction" (OPNAVINST xxx)

The finding should meet the finding test.

- Is the Finding necessary to sustain the event sequence?
- Is the Finding a single event or condition?
- Is the Finding specific enough without including supporting evidence?
- Is the Finding relevant or simply interesting to the reader?
- Does the Finding logically connect to the preceding finding? Read the last finding.
- Ask "why?", then see if there is a next step and continue.
- Primary Finding. These findings are associated with a causal factor and shall be written in active voice and past tense.



Other Finding of Significance. These findings are associated with a non-factor worthy of discussion and shall be written in active voice and past tense.

- Do not list all of the possible alternatives that could have existed merely because they cannot be eliminated. Place this sort of conjecture in the analysis and narrative.
- Do not include people's names, call signs, DoD Human Factors Analysis and Classification System codes, names of bases or companies in the findings. Use terms such as "the mishap victim," "the mishap vehicle operator," "the mishap mechanic," "Officer of the Day," etc.
- Do not include supporting evidence in the findings. The report narrative includes supporting evidence and conclusions.

TIP: Causal Factors are generally found in higher tiers/outer edge because that is where leaders and man responsible for directing and overseeing activities.

However, they may be found closer to individual act. The "root" cause of a mishap can be found at the worker level if, and only if, the following conditions are for:

- Safety management systems were in place and functioning, and provided leadership with feedback on system implementation and performance.
- The chain of command took appropriate actions based on the feedback.
- The chain of command could not reasonably have been expected to take additional actions based on the responsibilities and authorities.

3-7. DEVELOPING RECOMMENDATIONS FOR CORRECTIVE ACTIONS.

a. Overview. Every near-miss or mishap investigation report requires some corrective action to be taken throughout the unit/command or chain of command. When developing and writing recommendations, investigators should use the following guidelines, and test these recommendations with the question:

"If this had been done before the mishap, would these additional hazards have been eliminated?"

Do not include any recommendations that fail this test; rather, include them in a HAZREP. If in doubt, contact Naval Safety Command/CMC (SD) mishap investigations team at (757) 444-3520 ext.7890, and email NAVSAFECOM_CODE90_MISHAP_INVESTIGATIONS@navy.mil

b. Preparation Guidelines. In accordance with OPNAVINST 5102.1/MCO 5100.29 (series), the following guidelines shall be used in the composition of recommended corrective actions:

- 1) Recommendations shall NOT refer to disciplinary or administrative action.**
- 2) Each causal factor shall have at least one recommendation, yet the number of recommendations per causal factor are not limited.**
- 3) Recommendations should be stated in the same sequence as the causal factors.**
- 4) Each recommendation must be assigned an "Action Agency" to complete the corrective action ("who" should do exactly "what.")** Sometimes, "how," "where" and "when" are also appropriate. Direct each recommendation at the unit, command, or activity having responsibility for and which is best capable of implementing the actions contained in the recommendation.

Most actions are required at the mishap "Unit/Command Level" (i.e., Battalion/Squadron/Ship/Installation). However, sometimes unit-or board-level investigators will determine that certain corrective actions can only be implemented by "higher level" command (i.e., one- and two-star flag/general officer commands, as well as three-star regional commands), and/or the "CNO- or CMC-Level" to include supporting agencies such as TECOM, NETC, NAVFAC, the appropriate SYSCOM, LOGCOM, BUMED, NAVSUP, NAVSAFECOM, CMC (SD), etc.

5) Recommendations must be expressed in a complete, self-explanatory statement. They must stand alone. Recommendations are often included in endorsements and separate from the detailed analysis of the deductive process.

This is especially true for SIBs.

- 6) State only one recommendation at a time.**
- 7) Address only one subject in each recommendation.** Avoid dual recommendations (do this and do that), and alternative recommendations (do this or do that). If alternatives are apparent, select and recommend the optimum or include a second recommendation that does not conflict with the first.
- 8) Be practical and realistic.** Avoid vague wishful thinking which usually includes terms such as "all crew members read and comply", "all personnel do XYZ," "good seamanship is to be re-emphasized," or "safety compliance is to be stressed."

Describe precisely how the desired end is to be accomplished, and by whom. The exception to this rule is recommendations to brief the contents the “Lessons Learned” to an identifiable group (e.g., “all team members, all maintenance personnel, or all operators”) as a means to raising awareness about the hazards encountered in mishap.

9) **Do not include extraneous material.** Analysis, conclusions and justification being elsewhere in the report.

10) Recommend the use of established procedures for changes of publications. When appropriate, recommend “*who*” (usually the reporting command/custodian that sustained the mishap) should submit exactly “*what*” change to the applicable publication (e.g., NWPs, MCOs, maintenance program directives, SOP’s safety publications.).

NOTE: When possible, include a verbatim draft of the recommendation change to show exactly what is intended.

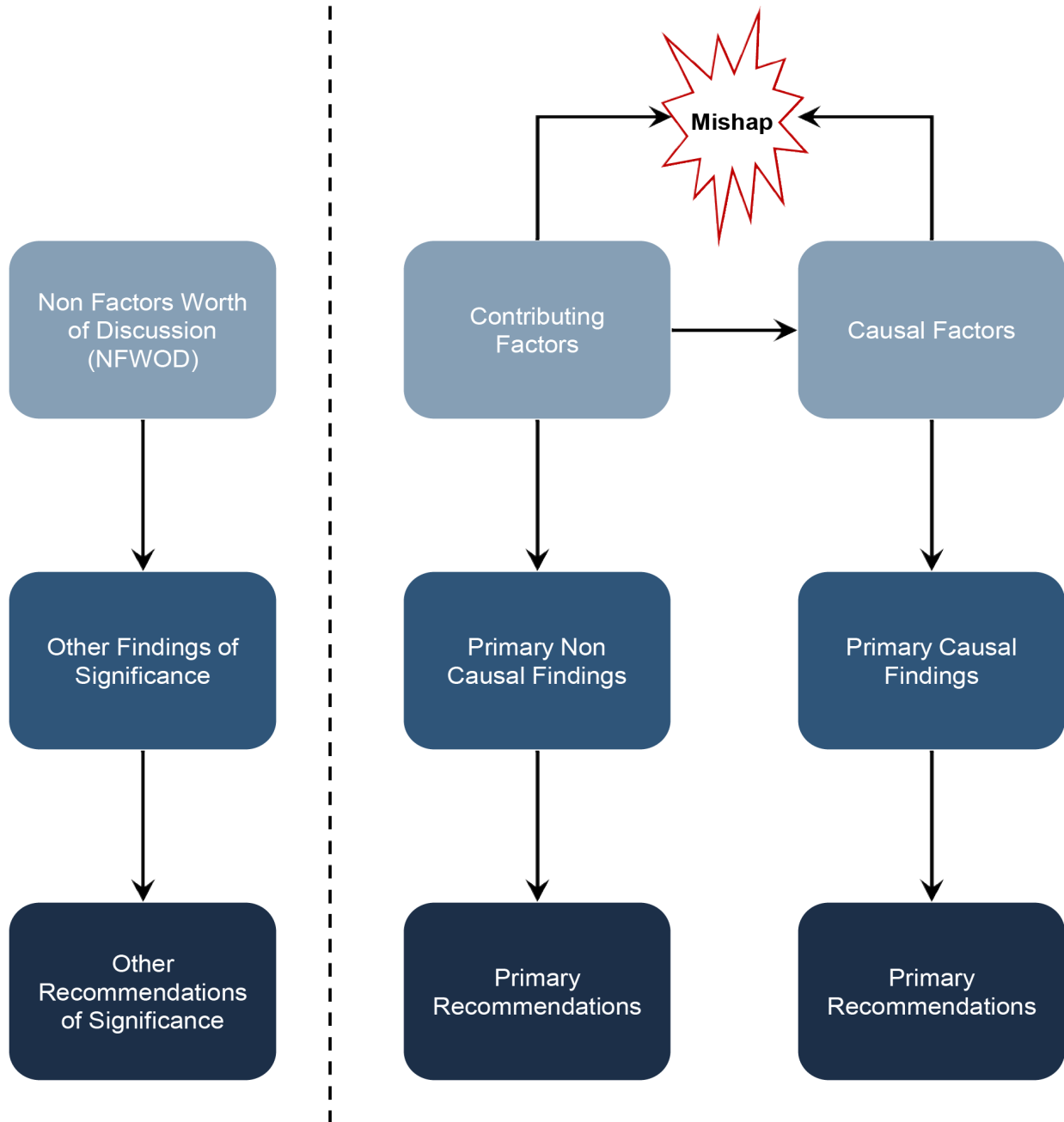


Figure 3-10 (Example of Factor Relationships)

CHAPTER 4 RISK MANAGEMENT INFORMATION (RMI)

4-1. GENERAL

The RMI initiative is a mission-essential capability to improve the readiness of the DoN by way of:

- Safety data capture
- Data management
- Data analysis
- Dissemination of the leading indicators of safety risk to our Sailors and Marines

RMI is a single program of record to improve Navy and Marine Corps safety management. The RMI initiative promulgates a safer environment for Navy and Marine Corps personnel by capturing and analyzing safety incident reporting data. RMI will synthesize incident reporting data into useful products for improving risk and safety conditions by consolidating existing legacy and core safety programs, risk management systems, applications, and data.

This section will discuss the RMI Streamlined Incident Reporting (SIR) pillar. SIR replaced the legacy systems of RMI, ESAMS, INJTRACK, MMAC, and POAIRS as the only approved mishap reporting tool on 31 August 2020.

4-2. Available Roles in RMI

RMI is a role-based application, users will request roles and justifications during registration. User administrators will grant approval of requested roles based on the user's assigned duties. The available roles in RMI are:

- Event Investigator – This role allows you to enter data for events for which you are assigned as an investigator.
- Safety Investigator Supervisor – This role allows you to enter data for event investigations for which the convening authority is below your organization and in your chain of command.
- Message Approver – This role allows you to review, approve and release all messages for your organization and subordinate commands.
- Recommendations Approver – This role allows you to approve the closure of recommendations. The recommendation must have your organization assigned as an approval authority.

- Quality Control Event – This role provides the ability to perform quality control functions such as accepting or rejecting an event message and editing any open or closed event.

4-3. ACCESSING RMI.

There are two RMI sites: **Production and Simulation**. To access the RMI SIR production site where live data is processed, navigate to: <https://afsas.safety.af.mil>.

To access the simulation site where fictitious data is used for training purposes only, navigate to: <https://sim.afsas.safety.af.mil>.

NOTE: These sites are not linked and operate independently of each other. Users must register for each site and roles are assigned as required for each person.

NOTE: RMI has multiple help files and COMNAVSAFECOM has documents to assist with entering data on their CAC-enabled SharePoint Site, <https://navalsafetycommand.navy.mil> and <https://intelshare.intelink.gov/sites/nsc/Pages/default.aspx>





Appendices

SAMPLE WITNESS OPENING

SAMPLE PRE-MISHAP PLAN EXAMPLE

SIB CONVENING MESSAGE TEMPLATE



SAMPLE WITNESS OPENING

Good morning or afternoon!

My name is **INSERT NAME**. I have been assigned the Senior Member for the Safety Investigation Board convened by **INSERT CA**, to look into the events leading up to the **INSERT DATE** and what the mishap is. I have a copy of my appointment letter right here if you would like to see it. I will let my team introduce themselves to you in just a minute. Let me start by saying this is a safety investigation. As you might know, there are several different investigations being conducted right now. For example, the Line of Duty investigation is for benefits, the command investigation or JAGMAN looks for blame...you messed up now we hold you accountable. We are conducting the safety investigation. We do not care who did what. Our goal is to figure out what happened, why it happened, and what recommendations we can make to prevent this from happening again. One of the benefits of safety investigations vs. other investigations, is that safety investigations are conducted under the concept of safety privilege. Some of the information you provide can and will be used in the report, but it will not be linked to you, nor will we tell anyone, including your supervisors what you said to us. In other words, you could tell us you started the fire that caused the building to burn down, and we could not tell anyone that you told us that. Any questions?

I WILL NOW ASK MY TEAM TO INTRODUCE THEMSELVES.

Can you please introduce yourself and tell us a little about you?

AFTER THE INTERVIEW IS DONE...

Thank you for speaking with us. Now I would like to turn the tables a little. Is there anything that we should have asked that we didn't, anything you want to add, anyone you think we should talk to that might help us understand what happened?

LAST COMMENTS...

We ask that you do not tell anyone what we talked about in here. That is for two reasons. Firstly, it is to protect our promise to you about not telling anyone what you said to us, and secondly, so that we can get the unadulterated truth from others as well.



SAMPLE PRE-MISHAP PLAN



Unit/Command name

Pre- MISHAP ACTION PLAN / EMERGENCY ACTION PLAN
For Xxxxxxx training evolution

This plan is intended to either reside in the Duty binder, or accompany an LOI for any operation or event. Commanders may modify this plan as needed for the respective activity and location of the activity.

DoD Mishap. An unplanned event or series of events that results in damage to DoD property; occupational illness to DoD personnel; injury to on- or off-duty DoD military personnel; injury to on-duty DoD civilian personnel; or damage to public or private property, or injury or illness to non-DoD personnel, caused by DoD activities (DoDI 6055.07).

Report	Purpose	Action Office	Report due	Method	Reference
Immediate Notification (To NSC & CMC (SD))	<ul style="list-style-type: none"> - Class-A (on-duty DoD Civilian) - Class-A (on & off duty Military) - Class-A (Explosive mishaps) - Hospitalization of <u>3 or more</u> personnel in same mishap caused by a DoD activity, operation, or event. (Note: This is a Class B) - All other non-combat military fatalities. - All other civilian fatalities caused by military activity. 	<p><u>Non-Mishaps</u>: Unit Duty Officer</p> <p><u>Mishaps</u>: Unit Duty Officer or Safety</p>	To CMC(SD) & NAVSAFECOM NLT 8 hrs. of unit learning of mishap	<ul style="list-style-type: none"> - Phone 757-444-2929 (preferred) - PCR and/or OPREP-3 SIR message - RMI/SIR 	<p>29 CFR 1904 (civilian fatality)</p> <p>OPNAV M-5102.1 MCO 5100.29C VOL 9 27 Sep 2021</p>
Hazard Report (HAZREP)	To notify the appropriate systems command of <u>hazards</u> or <u>near-mishaps</u> that have the potential to affect other commands or a community who has or may have the same type of equipment or process.	Safety	USN: Immediately to NAVSAFECOM and SYSCOM	RMI/SIR	OPNAV M-5102.1 MCO 5100.29C VOL 9 27 Sep 2021
	Required for all near misses and specific hazards that do not warrant submission of a Safety Investigation Report (SIREP) in the RMI.	Safety	USMC: Immediately to Marine Corps Systems Command (MCSC) and CMC (SD) for hazards related to tactical equipment and weapons systems	Email to MCSC and CMC (SD) followed by RMI/SIR entry.	OPNAV M-5102.1 MCO 5100.29C VOL 9 27 Sep 2021 MCO 5100.34A
Safety Investigation Report (SIREP)	Report all causal factors and corrective actions for all DON reportable mishaps per OPNAVINST 5102.1/MCO P5102.1	Safety	w/in 30 days of the mishap	RMI/SIR	OPNAV M-5102.1 MCO 5100.29C VOL 9 27 Sep 2021
OSHA 300 log	Capture all OSHA " <u>recordable</u> " and " <u>reportable</u> " mishaps for on-duty DoD Civilian personnel.	Safety	w/in 30 days of mishap and IAW OSHA 1904	RMI/SIR	29 CFR 1904
OSHA 300A log	Summary of all DoD civilian occupational-related mishaps (Military reports are optional.)	Safety	Annually. Posted NLT 01 Feb.	Generated from the RMI/SIR	OPNAV M-5102.1 MCO 5100.29C VOL 9 27 Sep 2021

STOP! CAUTION

From this point on, unless directed by the CO or the Mishap Plan, give no information over the phone about the mishap. Be polite, but tell the caller the following:

"I am not able to comment. Please call the Public Affairs Office at (XXX) XXX-XXX."

NOTE: Unauthorized disclosure of Safety information by military personnel is a criminal offence punishable under Article 92 of the UCMJ. Unauthorized disclosure by civilian personnel will subject them to disciplinary action under CIVPERSINST 752. Chapter 7, para 7003.

STEP 1 - RECEIVE NOTIFICATION / MISHAP INFO WORKSHEET

KEY NOTES REGARDING SHARING OF MISHAP-RELATED INFORMATION:

1. DoDI 6055.07 requires legal investigations for all on-duty Class-A mishaps.
2. JAGMAN, Safety, and NCIS investigations are to be conducted simultaneously, yet independently and apart from each other. All three investigative bodies provide the unit commander with information relevant to each investigation's purpose. Only the unit commander shall be privy to the information developed by each of the investigative bodies.
3. Safety Privilege and Protection of Safety Information: Safety privilege is based on a national defense need for rapid and accurate assessment of the causes of mishaps to prevent a recurrence and maintain mission readiness. This privilege creates restrictions on handling and releasing information in safety investigation reports IAW DoDI 6055.07 and MCO 5100.29:
 - a. JAG and Safety investigators are NEVER the same person(s).
 - b. JAGMAN shall be conducted independently and separately from the safety investigation.
 - c. IAW Federal Law, the Office of the Judge Advocate General (OJAG) and SJA shall NOT have access to any safety investigation reports however, safety investigators may have access to legal investigation reports (i.e., JAGMAN, NCIS)
 - d. IAW DoDI 6055.07 and OPNAVINST 5102.1/MCO 5100.29, privileged mishap investigation information:

- Shall NOT be released to the Office of the Judge Advocate General (OJAG) and Staff Judge Advocate (SJA).
- Shall NOT be released to individuals outside the privileged safety chain.
- Shall NOT be released in public forum.
- Shall NOT be released to commands outside designated endorsers and action agencies.
- Shall NOT be used in making any determination affecting the interest of an individual.
- Shall NOT be used as evidence to determine line-of-duty status.
- Shall NOT be used as evidence for any punitive (disciplinary or administrative) action.
- Shall NOT be used as evidence to determine liability of the government for property damage.
- Shall NOT be used as evidence before administrative bodies.
- Shall NOT be used for any other investigation or report of the mishap.

TASK: Command duty officers, staff duty officers, officer of the day, etc.

DATE: _____ TIME: _____
 UNIT and
 COMMAND: _____
 LOCATION OF MISHAP (City, State, Installation, ship, or Country): _____
 DESCRIBE WHAT HAPPENED: _____

INJURY STATUS OF PERSONNEL							
MO	ME	NO	NE	FED CIV	OTHER CIV	CTR*	TOTAL

*Abbreviation CTR refers to contractor

HAVE MISHAP VICTIMS BEEN TREATED / EVACUATED?	YES	NO	N/A
HAS THE SCENE BEEN PRESERVED BY THE SR. PERSON ON SCENE OR THE UNIT SAFETY OFFICER? (See Step 1a, page 5)	YES	NO	N/A
HAS RANGE CONTROL BEEN NOTIFIED:			
WAS, OR IS THERE A FIRE?	YES	NO	N/A
HAS THE FIRE DEPARTMENT BEEN NOTIFIED?	YES	NO	N/A
IS ORDNANCE INVOLVED?	YES	NO	N/A
HAS EOD BEEN NOTIFIED?	YES	NO	N/A
WHAT IS THE MISHAP INJURY CLASSIFICATION? (See Appendix ?, page ?)	YES	NO	N/A

WHAT IS/ARE THE NATURE OF INJURIES TO PERSONNEL? _____

WHAT IS THE LOCATION OF THE MISHAP VICTIM(S) (I.E., HOSPITAL LOCATION): _____
 WHAT IS THE EXTENT OF DAMAGE TO PRIVATE (NON-DoD) PROPERTY (IF INVOLVED)? _____

WHAT IS THE EXTENT OF DAMAGE TO DoD PROPERTY/ EQUIPMENT (IF INVOLVED)? _____

WHAT IS THE BEST ROUTE TO THE MISHAP SITE? _____

STEP 1 A - PROCEDURE FOR MISHAP SITE PRESERVATION AND SECURITY

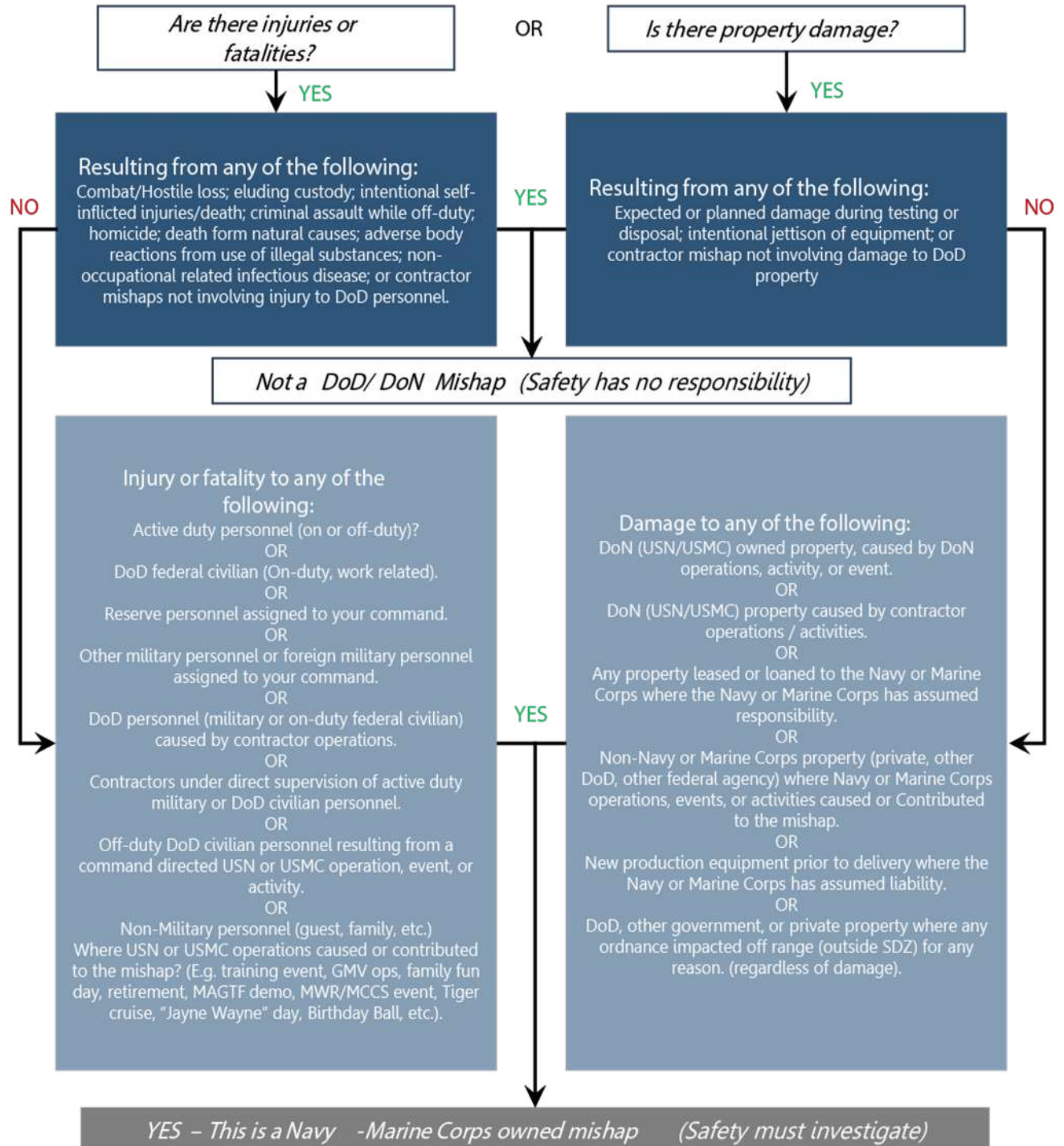
TASK: Command duty officers, staff duty officers, officer of the day or senior person on scene.

In accordance with OPNAVINST 5102.1E / MCO 5100.29C Vol. 9, command duty officers, staff duty officers, the officer of the day or senior person at the scene of a mishap shall:

- a. Ensure care and first aid is provided to the injured personnel. Emergency Medical Services (EMS) personnel may need to disturb or remove items of evidence to preserve life.
- b. Eliminate or control hazards created by the mishap. Operational requirements or damage control measures may require disturbing the scene of the mishap.
- c. Inform proper authorities; e.g., unit commander (and responsible commander if other than unit commander), unit or installation safety officer or manager, Provost Marshal's Office (PMO), fire and rescue, and public affairs.
- d. Secure the mishap site to protect the public, safeguard Navy and Marine Corps property, and prevent disturbance of the site. For on-duty Class A and B mishaps and all explosive mishaps, assign personnel to:
 - Make an accurate plot of the scene before moving or removing any wreckage or equipment.
 - Take photographs or videotape recordings of the wreckage, its distribution, and the surrounding area. Photograph the mishap site from a minimum of eight points surrounding the site and all items of evidence prior to removal, when possible.
 - Make a diagram of any damage. A sketch should accompany the items to depict "as found" location and condition.
 - Collect all log books, maps, charts, overlays and other documents to prevent the loss of vital information.
- e. Make a list of witnesses and encourage them to develop personal notes concerning the mishap for them to refer to during witness interviews. Witnesses should write down their own observations and should not discuss the mishap with other witnesses.

Is this a DoD / DoN (Navy or Marine Corps) Mishap?

Mishap: *An unplanned event or series of events that results in damage to DoD Property; occupational illness to DoD personnel; injury to on – or off-duty DoD military personnel; injury to on-duty DoD civilian personnel; or damage to public or private property; or injury or illness to non-DoD personnel caused by DoD activities.*



STEP 2 - DETERMINE IF A REPORTABLE MISHAP HAS OCCURRED

If this is a mishap, go to step 3 to determine the mishap classification, then go to step 3a to determine mishap investigation and reporting requirements. If this is not a DoD/DON mishap, go to step 3b.

The following mishaps require a safety investigation & reporting to DON and/or OSHA (Refs: OPNAVINST 5102.1/MCO 5100.29 (series):		
Active Duty	DON reportable	OSHA reportable
On- or Off-duty mishap where injuries result in a fatality (immediate or within months following the mishap), a Permanent Total Disability (PTD) or Permanent Partial Disability (PPD)	YES	n/a
On- or Off-duty mishap where injuries cause one or more days away from work beyond the day of the injury. (Includes: SIQ, hospitalization as an inpatient, or convalescent leave)	YES	n/a
On- or Off-duty mishap where injuries result in Light Duty or Limited Duty. (I.e. Injuries incurred during physical training, work, field training, recreational activities, etc.)	YES	n/a
On- or Off-duty mishap where injuries result in medical treatment beyond first aid. (The injury may not have resulted in light-duty, limited-duty, SIQ, etc., but received medical treatment)	YES	n/a
On- or Off-duty mishaps where alcohol was a contributing factor. (E.g. motor vehicle crash, alcohol overdose, recreational mishaps, etc., regardless of age or potential disciplinary actions.)	YES	n/a
On-duty mishap resulting in a loss of consciousness. (E.g. resulting from a training event, physical screening event, diving, confined space activity, etc.)	YES	n/a
On-duty heat stress or cold injury requiring medical treatment above first-aid. (Includes hyperthermia causing heat exhaustion or heat stroke; hypothermia or frost bite)	YES	n/a
On-duty diving mishaps (hyperbaric treatment for <u>any reason</u> , CNS involvement, O2 toxicity, pulmonary over inflation syndrome, etc.)	YES	n/a
On-duty formal school training related mishaps. (Includes loss of one training day or rollback in training or disenrollment during High Risk or Medium Risk Training, etc.)	YES	n/a
On-duty injury or fatality from a violent act while performing official duties. (E.g. assaulted while standing duty, conducting an inspection, on shore patrol, security, etc.)	YES	n/a
All live fire training mishaps with any degree of injury caused by impact from ammunition. (I.e. ricochets, negligent discharge, direct impact, etc.)	YES	n/a
All explosive related mishaps resulting from military operations, activity or evolution. (I.e. "cook-off", ordnance impacting outside SDZ, unexploded ordnance, etc.)	YES	n/a
All ordnance impacting off range during training. (I.e. outside SDZ)	YES	n/a
All GMV & GVO mishaps (collision, rollover, etc.) causing \$5,000 or more in damage. (Includes cost to DOD and/or non-DoD property when the operator of the GMV or GVO is a cause.)	YES	n/a
All Helicopter Rope Suspension Technique (HRST), air-cargo drop and/or parachuting regardless of damage or injury status.	YES	n/a
Medically diagnosed occupational-related illness or injury. (E.g. respiratory, blood, or skin disease, ergonomics related cumulative trauma or musculoskeletal disease, etc.)	YES	n/a
Work related Significant Threshold Shift (STS) or Permanent Threshold Shift (PTS). (See MCO 6260.3A, OPNAVINST 5100.19E, OPNAVINST 5100.23G & NMCPHC-TM 6260.51.99-2)	YES	n/a
Work related needle stick or cut from sharp object that is contaminated with the blood or potentially infectious material.	YES	n/a
Occupationally related Tuberculosis (Tb) infection. (Verified by a positive TST)	YES	n/a
Any member medically removed under medical surveillance requirements of an OSH health standard by a competent medical authority. (e.g. chemical exposure) (See DoD 6055.05-M)	YES	n/a
Ship grounding, collision, or flooding and fires afloat (except small trash can fires)	YES	n/a
Any of the above that occurs in the combat zone and is not the result of direct enemy action.	YES	n/a

NOTE: Reporting all OSHA required occupational-related "recordable" mishaps to NAVSAFECOM via the current authoritative mishap data collection system (i.e., the RMI) satisfies the OSHA requirement to maintain the OSHA 300 log. The RMI also generates the OSHA 300A log for commands to post IAW U.S. Department of Labor regulations.

Federal Civilian Employees (Includes NAF, GS, etc.)	DON Reportable	OSHA Reportable
On-duty, occupational related mishap where injuries result in a <u>fatality</u> or <u>permanent total disability</u> (PTD).	YES	YES (w/in 8 hrs.)
On-duty, occupational related mishap resulting in in-patient hospitalization of <u>one or more</u> personnel.	YES	YES (w/in 24 hrs.)
On-duty, occupational related mishap resulting in an <u>amputation</u> of a body part. (OSHA does require bone loss as part of the amputation)	YES	YES (w/in 24 hrs.)
On-duty, occupational related mishap resulting in a <u>loss of an eye</u> .	YES	YES (w/in 24 hrs.)
On-duty, occupational related mishap resulting in one or more <u>days away from work</u> beyond the day or shift of the injury. (I.e. any leave associated with the mishap such as sick leave, convalescent leave, etc.)	YES	If it meets one of the above four criteria
On-duty, occupational related mishap resulting in <u>restricted work</u> or <u>transfer</u> to another job.	YES	If it meets one of the above four criteria
On-duty, occupational related mishap resulting in medical treatment beyond first aid. (E.g. heat injuries, lacerations, sprains, strains, blunt force trauma, etc.)	YES	If it meets one of the above four criteria
On-duty mishap resulting in a loss of consciousness. (E.g. resulting from a training event, physical screening event, diving, confined space activity, etc.)	YES	If it meets one of the above four criteria
On-duty heat stress or cold injury requiring medical treatment above first-aid. (includes heat exhaustion, heat stroke, hypothermia or frost bite)	YES	If it meets one of the above four criteria
On-duty diving mishaps (CNS involvement, O2 toxicity, hyperbaric treatment, pulmonary over inflation syndrome, etc.)	YES	If it meets one of the above four criteria
On-duty injury or fatality from a violent act while performing official duties. (E.g. assaulted as a member of Law enforcement, EMS, Firefighter, etc.)	YES	If it meets one of the above four criteria
All live fire training mishaps with any degree of injury caused by impact from ammunition. (I.e. ricochets, negligent discharge, direct impact, etc.)	YES	If it meets one of the above four criteria
All explosive related mishaps resulting from military operations, activity or evolution. (I.e. ordnance impacting outside SDZ, unexploded ordnance, "cook off", etc.)	YES	If it meets one of the above four criteria
On-duty GMV & GVO mishaps (collision, rollover, etc.) causing \$5,000 or more in damage. (Includes cost to DOD and/or non-DoD property when the operator of the GMV/GVO is a cause.)	YES	If it meets one of the above four criteria
Medically diagnosed occupational-related illness or injury. (E.g. respiratory, blood, or skin disease, ergonomics related cumulative trauma or musculoskeletal disease, etc.)	YES	If it meets one of the above four criteria
Work related Significant Threshold Shift (STS) or Permanent Threshold Shift (PTS). (See MCO 6260.3A, OPNAVINST 5100.19E, OPNAVINST 5100.23G & NMCPHC-TM 6260.51.99-2)	YES	n/a
Occupational related needle stick or cut from sharp object that is contaminated with blood or potentially infectious material.	YES	n/a
Occupational related Tuberculosis (Tb) infection. (Verified by a positive TST).	YES	If it meets one of the above four criteria
Any member medically removed under medical surveillance requirements of an OSH health standard by a competent medical authority. (e.g. chemical exposure) (See DoD 6055.05-M)	YES	If it meets one of the above four criteria

Family members, guests, off-duty federal civilian employees, other civilians	DON Reportable	OSHA Reportable
Any injury or death of a civilian guest, patron or military family member as the result of a DoD operation, activity or evolution. (Any activity where the host commander has responsibility to assess, eliminate or mitigate hazards associated with the activity.) (Examples include: family fun day, "in their boots/Jane Wayne day", retirement ceremony, tent sale, military ball, static display, demonstration of operational capability, Tiger cruise, MWR / MCCS event, etc.)	YES	n/a
Property Damage	DON Reportable	OSHA Reportable
Any damage to DoD and/or Non-DoD property (private property) as the result of an official military operation, activity or evolution. (E.g. GMV/GVO crash, explosives event, maritime or amphibious operations, training, fire, flooding, collisions, MWR event, etc.)	YES	n/a
Contractors / Contracted Employees	DON Reportable	OSHA Reportable
On-duty contractor <u>fatality or permanent total disability (PTD)</u> where the contractor is under <u>direct supervision</u> of Department of the Navy (DON) military or federal civilian personnel.	YES	Call NAVSAFECOM
On-duty contractor <u>work-related injuries</u> where the contractor is under <u>direct supervision</u> of Department of the Navy (DON) military or federal civilian personnel.	YES	Call NAVSAFECOM
Fatality or PTD to any on-duty DoD civilian personnel <u>caused by</u> contractor operations, or activities.	YES	Call NAVSAFECOM
Fatality or PTD to on- or off-duty military personnel <u>caused by</u> contractor operations, or activities.	YES	Call NAVSAFECOM
Damage to DoD property <u>caused by</u> contractor operations, or activities.	YES	n/a
Any injury or death of a contractor <u>caused by</u> or <u>as the result of</u> a DoD operation, activity or evolution.	YES	Call NAVSAFECOM
Injury or death to an on-duty contractor where the contractor is <u>not</u> under the direct supervision of DoD/DON personnel and results <u>solely from</u> contractor operations. DoN has no direct means to correct, control, eliminate or prevent recurrence of similar incidents.	NO	Only for the contractor
Injury or death of an Off-Duty contractor not related to military operations, activities, or evolutions. DoN has no direct means to correct, control, eliminate or prevent recurrence of similar incidents.	NO	n/a

STEP 3 - CLASSIFY THE MISHAP USING THE CHART BELOW

RMI Event Classification Training Aid

28-MAR-2022

Class	DoD Property Damage	Investigation Type Injury Classification
A	\$2,500,000 +	<p style="text-align: center;">Fatality (<i>immediately or months after the mishap</i>) or Permanent Total Disability (PTD) that resulted from a reportable injury or illness.</p> <p><u>PTD</u>: A non-fatal injury or work-related illness, in the opinion of competent medical authority, permanently and totally incapacitates a person to the extent that he or she cannot follow any gainful occupation. Note: The loss or loss of use, of both hands, both feet, both eyes or a combination of any of these parts of the body as a result of a single mishap, must be considered as a permanent total disability.</p> <p><u>DoD and DON Mishap Reporting Exemptions</u>: (Reported as Incidents in RMI)</p> <ul style="list-style-type: none"> - (3) Injuries associated with Non-Occupational Diseases - (4) Injuries resulting from altercations, attack or assault (not in performance of official duties) - (9) Attempted or consummated suicide, murder or intentionally self-inflicted injuries - (13) Injuries or fatalities to persons in the act of escaping from or eluding military or civilian custody or arrest - (14) Death due to natural causes - (17) Off-Duty death or injury as a result of vandalism, riots, civil disorders, sabotage, terrorist activities or criminal acts, such as arson - (18) Adverse bodily reactions resulting directly from the use of drugs under the direction of competent medical authority - (19) Death or injury resulting directly from the illegal use of drugs or other substance abuse - (21) Contractor mishaps in which the contractor employee is not under the direct supervision of DoD personnel
B	\$600,000 to \$2,499,999	<p style="text-align: center;">Hospitalization for inpatient care of three or more personnel as a result of a single mishap or Permanent Partial Disability (PPD) that resulted from a reportable injury or illness.</p> <p><u>PPD</u>: injury or work-related illness that does not result in death or permanent total disability, but, in the opinion of competent medical authority (CMA), results in permanent impairment through loss of the use of any part of the body with the following exceptions: loss of teeth, fingernails, loss of tips of fingers/toes <u>without</u> bone loss, repairable hernia, disfigurement, sprains or strains that do not cause permanent loss of motion. Note: OSHA's definition of "Amputation" for civilian personnel includes fingertip amputations with or without bone loss, medical amputations resulting from irreparable damage and amputations of body parts that have since been reattached.</p>
C	\$60,000 to \$599,999	<p style="text-align: center;">One or More Days Away from Work (i.e., lost-time case)</p> <p><u>Active Duty Military</u>: *On or Off-Duty* injury or work-related illness that resulted in one or more full calendar days, weekends included, that a person was unable to work, excluding the day of the mishap and the day returned to duty or work. Note: Includes periods of time for sick in quarters, inpatient hospitalization, convalescent leave and command-directed removal from duties.</p> <p><u>DoD Civilians</u>: *On-duty* work-related injury or illness that resulted in one or more full calendar days, weekends included or a full work shift, that a person was unable to work, excluding the day of the mishap and the day returned to duty or work. Note: Includes periods of time for inpatient hospitalization and any leave associated with the mishap (e.g., annual leave, sick leave, continuation of pay leave, leave without pay granted, etc.).</p>

Military Injuries: Include injuries as a result of either on- or off-duty mishaps.

DoD Civilian Injuries: Includes on-duty mishaps. If off-duty, the injury must be the result of a military operation or activity.

Illness: Whether one is DoD civilian or military, the illness must be occupational related to meet the mishap classification criteria. (e.g., illness due to an exposure to a workplace health hazard.)

D	\$25,000 to \$59,999	<p style="text-align: center;">On-Duty injury or illness not otherwise classified as a Class A, B or C mishap.</p> <p>Examples:</p> <ul style="list-style-type: none"> - Illness or injury that involves medical treatment beyond first aid (I.E. Use of a non-prescription medication at prescription strength, Administering hepatitis B vaccine or rabies vaccine, wound closing devices such as sutures, staples, etc., devices with rigid stays or other systems designed to immobilize parts of the body, physical therapy or chiropractic treatment.) - Loss of consciousness - Light or limited duty for military personnel - Restricted work or job transfer for on-duty Navy and Marine Corps civilian employees - Needlestick injuries and cuts from sharps that are contaminated from another person's blood or other potentially infectious material. - Work-related hearing loss illness that resulted in either a permanent threshold shift (PTS) or significant threshold shift (STS).
E	\$1 to \$24,999	<p style="text-align: center;">On-Duty injury or illness not otherwise classified as a Class A, B, C, or D mishap.</p> <p>Examples:</p> <ul style="list-style-type: none"> - Using a non-prescription medication at nonprescription strength - Administering tetanus immunizations - Cleaning, flushing or soaking wounds on the surface of the skin - Using wound coverings, such as bandages, Band-Aids™, gauze pads, etc.; or using butterfly bandages or Steri-Strips™ - Using hot or cold therapy - Using any non-rigid means of support, such as elastic bandages, wraps, non-rigid back belts - Using temporary immobilization devices while transporting an accident victim - Drilling of a fingernail or toenail to relieve pressure or draining fluid from a blister - Using eye patches - Removing foreign bodies from the eye using only irrigation or a cotton swab - Removing splinters or foreign material from areas other than the eye by irrigation, tweezers, cotton swabs or other simple means - Using finger guards - Using massages - Drinking fluids for relief of heat stress - Class E mishap reporting is not a mandatory DON requirement, but may be required by specific communities
Incident	<ul style="list-style-type: none"> - Used to capture events that do not meet the criteria for Class A-E Mishap, but where an event / injury did occur. <ul style="list-style-type: none"> o Example: "Mishap Victim suffered a sprained ankle skateboarding while Off-Duty and received 14 days of LLD (Light, Limited, Restricted Duty)." - Used to capture events that are exempt from the provisions of the DoDI 6055.07 (Table 8) (e.g., intentional acts, workplace violence, near misses). 	
Hazard	<ul style="list-style-type: none"> - Used to capture reported work place conditions that might result in injury, health impairment, illness, disease, or death to any worker who is exposed to the condition, or which might result in damage to or loss of property or equipment. Mishap investigators use the term to explain causes of mishaps. - Hazards are detected through inspections, industrial hygiene surveys, observations, safety program evaluations, or from other activity reports. Examples: unguarded machine, exposed energized wiring, pothole in a parking lot, etc. 	

4. If the hazard, injury, illness, or property damage resulted from military activity or operation, then see Note 5 for immediate notification requirements.

5. Regardless of cause (mishap, suicide, or homicide, notify COMNAVSAFECOM and CMC (SD) within 8 hours by telephone at Comm: (757) 444-2929, DSN: 564 if the mishap or non-combat incident meets one of the following criteria:

- Hospitalization of three or more personnel caused by DoD activity, operation, or event or,
- On-duty DoD civilian fatality or PTD or,
- On- or off-duty fatality or PTD of military personnel or,
- Explosive mishap causing fatality, PTD, or potential for greater than \$2 million in damage. (See Chapter 3 of Reference B)

STEP 4 - NOTIFY THE CHAIN OF COMMAND

DO NOT, UNDER ANY CIRCUMSTANCES, GIVE OUT THESE PHONE NUMBERS TO ANYONE THAT CALLS YOU.

If someone claims to be in your chain of command or from an immediate superior command such as a Echelon II, MARFOR, OPNAV or HQMC, etc., and you have not validated their position, get their information and call them back through their respective command duty office, or have the CO, XO or safety officer call them back at the number they provide for you.



Other KEY PERSONNEL / ORGANIZATIONS			
Billet	Name	Mobile phone	Work phone
Supporting PAO			
Range Control			
Supporting Installation Safety Office			
Base Environmental Office			
Military Treatment Facility or local Hospital			
Base PMO or local Law Enforcement			
Dept. of Public Works (Power and/or water)			
Naval Safety Command Mishap Investigations (Crash Line)	n/a		757-444-3520 ext.7890

STEP 5 - PREPARE FLASH REPORT (IF REQUIRED BY LOCAL COMMAND SOP)

As soon as possible but no later than 30 minutes after Mishap Notification

NOTE to Commander and Safety Officer or Manager: Use this section to provide your local command's instructions of the process to complete and submit the "Flash Report."

Note: The "Flash report is not a Marine Corps or Navy requirement. Many MARFORs, MEFs or MSCs within a MEF use a "flash report" to notify a local commander of CCIRs for all mishaps and non-safety/non-mishap incidents.

STEP 6 - CASUALTY ASSISTANCE CALL OFFICER (CACO) NOTIFICATION (IF FATALITY INVOLVED)

STOP!

Do NOT, under any circumstances, notify next of kin or answer any questions with regard to the health or status of any personnel to anyone except the CO, XO, SgtMaj and/or CMC.

NOTE: The notification of next-of-kin is the responsibility of the Casualty Assistance Calls Officer (CACO). This responsibility will **not** be assumed by any other member of the command.

1. If a family member of ANYONE in the command calls about the mishap and the welfare of their loved one, tell them that: "I'm sorry sir or ma'am, but we do not have any information we can release at this time. The Commander or PAO will provide information to you as soon as it is possible."
2. Do not tell them the status of their family member, good or bad!
3. Get a recall number and tell them the CO or his/her representative will call them back as soon as possible.
4. Contact the Admin. Request they begin the preparation for the CACO / RECORD OF EMERGENCY DATA FORMS. These forms will be required by the CACO, the S-1/G-1, and CO to generate the Personnel Casualty Report (PCR). Reference (MCO 3040.4E)
5. Contact Operations to release the OPREP-3 SIR. Provide the information collected.
6. The CO and/or XO will coordinate the CACO assignment.



NOTE: Unauthorized disclosure of Safety information by military personnel is a criminal offence punishable under Article 92 of the UCMJ.

Unauthorized disclosure by civilian personnel will subject them to disciplinary action under CIVPERSINST 752. Chapter 7, para 7003.

STEP 7 - NOTIFY NAVAL SAFETY COMMAND IF ANY OF THE FOLLOWING MISHAPS OR INCIDENTS OCCURRED

"Immediate Notification" requirements:

Notify Naval Safety Command "Crash Line" within eight hours of mishap notification for all:

- Class-A (on-duty DoD Civilian)
- Class-A (on and off duty Military)
- Class-A (Explosive mishaps)
- Hospitalization of three or more personnel in the same mishap resulting from a DoD/USMC operation, activity, or event.
(Note: This is a Class B)
- All other non-combat military fatalities (i.e., homicide, suicide, or not from natural causes).
- All other civilian fatalities caused by military activity.

After notification of the CO or XO, notify the Naval Safety Command "Crash Line" within eight hours of for any mishap or incident meeting the criteria above.

1. Call the Naval Safety Command at **(757) 444-3520 ext.7890**
2. Ensure you pass along to the XO and/or CO any additional guidance from the Naval Safety Command (mishap Investigations branch or duty officer) for any mishap or incident meeting the criteria above.

NOTE: Listen to the computer voice prompt and follow the directions "To report a mishap" using the information gathered in STEP 1.

STEP 8 - NOTIFY BASE ENVIRONMENTAL

Ensure Base Operations notifies the Environmental Department, if required. If there has been a crash of any kind or a fire, or spill, make this call.

Base Environmental Emergency Contacts		
Billet	Mobile phone	Work phone
Spill Reporting and Response		
Wildlife response		
Water Conservation		
Base Environmental Office		

NOTE: After normal working hours, call Base Emergency Services at _____.
DO NOT call 911 unless it is appropriate or that is the Installation Commander’s policy. Time Completed: _____
 Name, Rank and position of person at NSC Notified: _____

STEP 9 - COORDINATE WITH OTHER AGENCIES

Use this section to identify all other internal and external agencies need to be notified. Define who in the command structure is going to be the primary POC to coordinate support and response.

This includes but not limited to law enforcement, fire department., NCIS, county coroner or mortuary affairs, power company, water company, vehicle recovery, etc.



STEP 10 - IMPLEMENT BLOOD BORNE PATHOGEN EXPOSURE PREVENTION PLAN (IF NEEDED)

Use this section to identify your commander's plan to clean up trauma scenes.

Note: Command activities will as part of their Blood borne Pathogens Standard Operating Procedures (29 CFR 1910.1030 and NAVMC DIR 5100.8, Chapt. 20) develop procedures how to manage such clean-up of trauma scenes. Examples include suicide, homicide, and similar incidents generating blood, body fluid, or tissue. Navy Medicine's role in these situations is limited to consultation only.

Medical Treatment Facilities (MTF) should not be tasked to sanitize the scene or to resource scene clean-up.

POC: NSC Industrial Hygienist and Liaison to BUMED with phone number.

The Blood borne Pathogen Standard requires that Commands:

- Implement an Exposure Control Plan that identifies steps taken to protect workers and the public from blood borne pathogens during trauma scene management.
- Provide training for employees who may have contact with human blood and other bodily fluids
- Provide appropriate personal protective equipment (such as gloves, eye protection and impermeable coveralls).
- Offer Hepatitis B vaccination to all personnel who may be exposed to blood or body fluids.
- Record all contact with blood, other bodily fluids and potentially contaminated sharp objects, and offer follow-up medical attention if needed.

Read the full Blood borne Pathogens Standard at <https://www.osha.gov> (search for "blood borne pathogen standard").

STEP 11 - ADMINISTRATIVE SUPPORT FOR A SIB

Use this section to identify your commander's plan to administratively support a Safety Investigation Team. This includes arranging a secluded location where the SIB can conduct interviews, analysis of evidence and deliberations without interference from the command or higher command. Items needed are rooms with IT support and email access, post it notes, dry erase board or easels.

NOTE: A formal Safety Investigation Board (SIB) is mandated by the CNO and CMC for all mishaps involving:

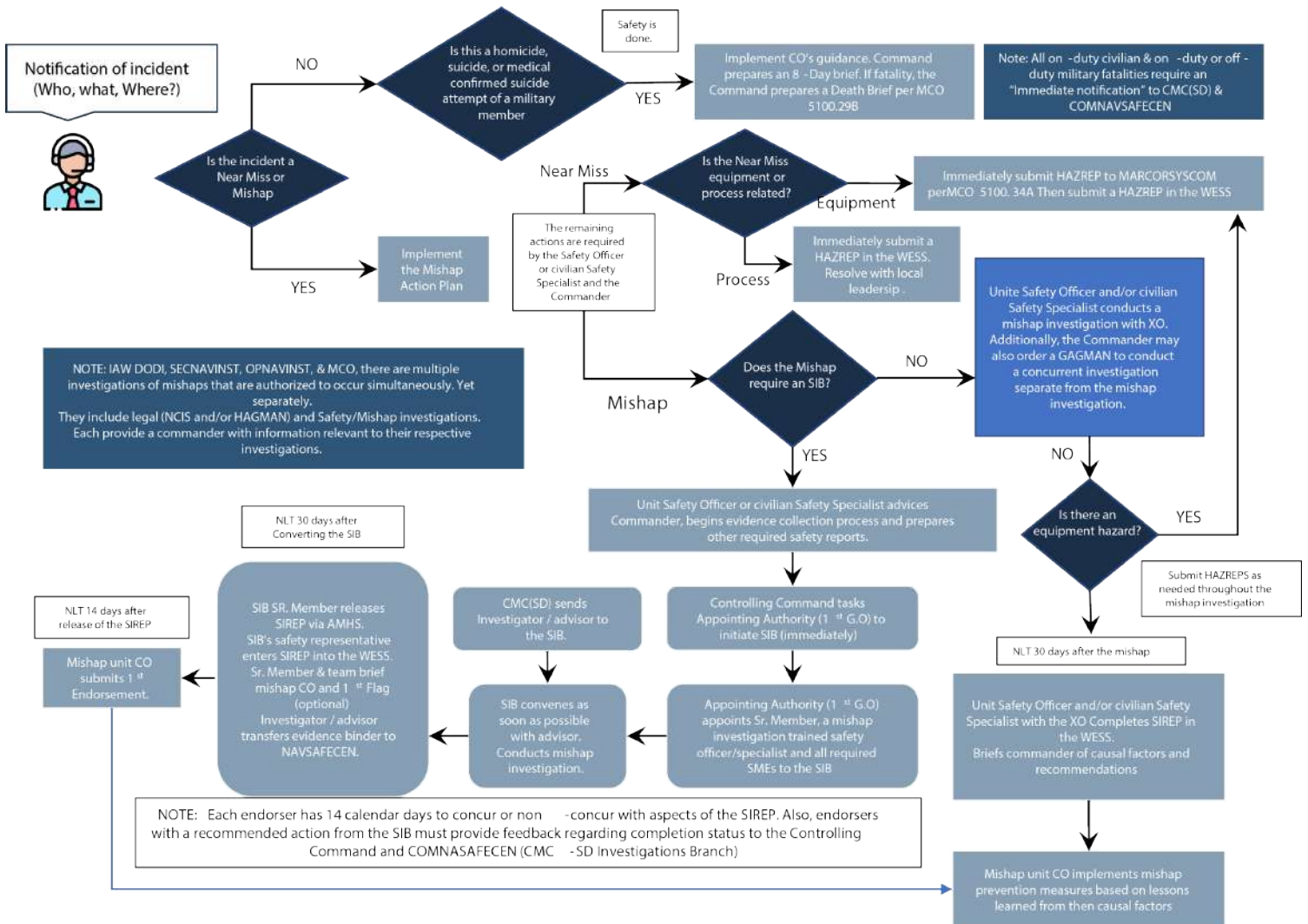
- All On-duty Class A mishaps that occur on or off base (Military or FedCiv).
- All Off-duty Class A mishaps that occur on base, involving military personnel.
- A Military death that occurs during or within one hour after completion of organized, command sponsored physical training (PT) activities regardless of pre-existing medical condition. (e.g., PFT, CFT, MCMAP, conditioning hikes, swim qualification, etc.)
- Where DoD property damage is expected to exceed \$2,500,000.
- An on-duty injury where death or permanent total disability (PTD) is likely to occur.
- Hospitalization, beyond observation, of 3 or more personnel involved in a single mishap where at least one is an on-duty DoD civilian employee.
- All explosive mishaps.

- All live fire mishaps resulting in an injury. (Includes first aid. The injury must result from firing of weapons, i.e., ricochets, negligent discharge, direct impact, etc.)
- All ordnance impacting off range. (Outside the surface danger zone)
- Any mishap that a Controlling Command or higher determines the need for a more thorough investigation and report, beyond that provided by the command's safety investigator.

STEP 12 - MAP REVIEW, TRAINING AND REHEARSAL PLAN

This plan must be updated for training exercises and deployments.

Use this section to identify your commander's plan to review this MAP and rehearse a simulated event to test the plan.



SAMPLE INTERVIEW

Sample Interview Intro

Good morning/afternoon. My name is **Rank and Name**. I have been assigned as the Senior Member to the Safety Investigation Board convened by **Convening Authority** to look into the mishap that occurred **on this date**.

I have a copy of my appointment letter right here if you would like to see it. I will let my team introduce themselves to you in just a minute. Let me start by saying this is a safety investigation. As you might know, there are several different investigations being conducted right now. For example, the Line of Duty investigation is for benefits, the command investigation or JAGMAN looks for blame...you messed up now we hold you accountable. We are conducting the safety investigation. We do not care who did what.

Our goal is to figure out what happened, why it happened, and what recommendations we can make to prevent this from happening again. One of the benefits of safety investigations vs. other investigations, is that safety investigations are conducted under the concept of safety privilege.

Some of the information you provide can and will be used in the report, but it will not be linked to you, nor will we tell anyone, including your supervisors what you said to us. In other words, you could tell us you started the fire that caused the building to burn down, and we could not tell anyone that you told us that.

Any questions?

I will now ask my team to introduce themselves.

Can you please introduce yourself and tell us a little about yourself?

After the interview is done...

Thank you for speaking with us. Now I would like to turn the tables a little. Is there anything that we should have asked that we didn't, anything you want to add, anyone you think we should talk to that might help us understand what happened?

LAST COMMENTS...

We ask that you do not tell anyone what we talked about in here. That is for two reasons. First it is to protect our promise to you about not telling anyone what you said to us and second so that we can get the unadulterated truth from others as well.

CONVENING MESSAGE TEMPLATE

ZNR UUUUU
R XXXXXXZ MAR 22 ZYB
FM Convening Authority
TO Ech II if CA has been delegated from Controlling Command
COMNAVSAFECOM NORFOLK VA//00/20/40/90//
Mishap Unit
INFO
All info organizations
BT
UNCLAS //N05102//
SECINFO/-/-//
MSGID/GENADMIN/msg originator PLAD//
SUBJ/APPOINTING A SAFETY INVESTIGATION BOARD (SIB)//
REF/A/MSGID:OPREP-3/who sent OPREP-3/DTG of OPREP//
REF/B/MSGID:DOC/CNO/18FEB22//
NARR/REF A IS INITIAL OPREP-3 NOTIFICATION. REF B IS OPNAVINST
5102.1E, NAVY AND MARINE CORPS MISHAP AND SAFETY
INVESTIGATION REPORTING MANUAL.//
POC/name/CIV or MIL/UNIT:unit/TEL:contact number/EMAIL:email address//
GENTEXT/REMARKS/1. REF A title of OPREP-3.

2. THIS MSG APPOINTS A SIB WITH THE FOLLOWING MEMBERS: List Senior Member and Members of the SIB.
MEMBERS OF THE SIB CANNOT BE ASSIGNED TO ANY
OTHER INVESTIGATION (JAGMAN, BOARD OF INQUIRY) INTO THE MISHAP.
MEMBERS OF THE MISHAP UNIT SHALL NOT BE APPOINTED TO THE SIB.

3. COMNAVSAFECOM HAS PROVIDED AN ADVISOR TO ASSIST THE SIB IN THE
INVESTIGATION. THE SENIOR MEMBER SHOULD CONTACT COMNAVSAFECOM,
Identify advisor with contact number and email.

4. IF THE BOARD NEEDS TECHNICAL ASSISTANCE, THE SENIOR MEMBER MUST
REQUEST ASSISTANCE EITHER THROUGH controlling command (CONTROLLING
COMMAND) OR COMNAVSAFECOM.

5. UPON COMPLETION OF THE INVESTIGATION, THE SENIOR MEMBER SHOULD
SEND THE BOARD REPORT (SIR) TO THE FOLLOWING COMMANDS FOR MOFE
COMMENTS:

- A. Identify initial MOFE units
 - B. Identify initial MOFE units
- BT

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