



Repair Party for Small Cutters (175 Feet and Smaller) Tactics, Techniques, and Procedures (TTP)



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COAST GUARD TACTICS, TECHNIQUES, AND PROCEDURES 3-91.5

Subj: REPAIR PARTY FOR SMALL CUTTER (175 FEET AND SMALLER) TACTICS, TECHNIQUES, AND PROCEDURES CGTTP 3-91.5

- Ref:
- (a) Naval Ships' Technical Manual (NSTM), Chapter 079, Volume 2: Damage Control Practical Damage Control, S9086-CN-STM-020 (series)
 - (b) Naval Ships' Technical Manual (NSTM), Chapter 079, Volume 3: Damage Control Engineering Casualty Control, S9086-CN-STM-030 (series)
 - (c) Naval Ships' Technical Manual (NSTM), Chapter 555, Volume 1: Surface Ship Firefighting, S9086-S3-STM-010 (series)
 - (d) Machinery Space Firefighting Doctrine for Class Bravo Fires, COMDTINST M9555.1 (series)
 - (e) Naval Engineering Manual, COMDTINST M9000.6 (series)
 - (f) Surface Ship Survivability, CGTTP/NTTP 3-20.31 (series)
 - (g) Naval Ships' Technical Manual (NSTM), Chapter 074, Volume 3: Gas Free Engineering, S9086-CH-STM-030 (series)

1. PURPOSE. To provide Coast Guard personnel conducting damage control aboard cutters with usable tactics, techniques, and procedures (CGTTP) for classes of cutters 175 feet and smaller in the Coast Guard.
2. ACTION. This CGTTP publication applies to all Coast Guard cutters 175 feet and smaller. Internet release authorized.
3. DIRECTIVES/TTP AFFECTED. None.
4. DISCUSSION. This TTP publication outlines procedures for damage control (DC) organization, equipment, and investigation; compartment isolation; firefighting; toxic gas; ship stability and flooding control; CBRNE; and personal casualty. It is scalable to different classes of cutters.
5. DISCLAIMER. This guidance is not a substitute for applicable legal requirements, nor is itself a rule. It provides guidance for Coast Guard personnel and does not impose legally-binding requirements on any party outside the Coast Guard.

6. ENVIRONMENTAL ASPECT AND IMPACT CONSIDERATIONS. While developing this publication, Integrated Process Team (IPT) members examined environmental considerations under the National Environmental Policy Act (NEPA) and determined they are not applicable.
7. DISTRIBUTION. FORCECOM TTP Division posts an electronic version of this TTP publication to the CGTTP Library on CGPortal. In CGPortal, navigate to the CGTTP Library by selecting References, Tactics, Techniques, and Procedures (TTP), and then TTP Library. FORCECOM TTP Division does not provide paper distribution of this publication.
8. RECORDS MANAGEMENT CONSIDERATIONS. Integrated Process Team (IPT) members thoroughly reviewed this publication during the TTP coordinated approval process and determined there are no further records scheduling requirements per Federal Records Act, 44 U.S.C. Chapter 31 § 3101 et seq., NARA requirements, and Information and Life Cycle Management Manual, COMDTINST M5212.12 (series). This publication does not have any significant or substantial change to existing records management requirements.
9. FORMS/REPORTS. None.
10. REQUEST FOR CHANGES. Submit recommendations for TTP improvements or corrections via email to FORCECOM-PI@uscg.mil or through the TTP Request form on CGPortal. In CGPortal, navigate to the TTP Request form by selecting References, Tactics, Techniques, and Procedures (TTP), and then TTP Request.

Info COMCOGARD FORCECOM NORFOLK VA//FC-P// on message traffic containing lessons learned applicable to this TTP publication.

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Table of Contents

Chapter 1: Introduction	1-1
Section A: Introduction.....	1-2
Section B: Notes, Cautions, and Warnings.....	1-3
Chapter 2: Organization	2-1
Section A: Required Repair Locker Materials and Publications	2-2
Section B: Duplicate DC Materials for Command.....	2-3
Section C: Repair Locker Organization.....	2-4
Section D: Underway Rescue and Assistance Bill	2-5
Section E: Alarms.....	2-7
Chapter 3: Investigating Damage	3-1
Section A: Investigation Procedures.....	3-2
Section B: DC Communications	3-5
Chapter 4: Compartment Isolation	4-1
Section A: Isolation Lists	4-2
Chapter 5: Firefighting	5-1
Section A: General Shipboard Firefighting.....	5-2
Section B: Machinery Space Firefighting Doctrine (MSFD) for Class Bravo Fires	5-4
Section C: Firefighting Methods	5-5
Section D: Compartment Hazards/Areas (Examples)	5-6
Section E: Magazine Sprinkler Control Valves.....	5-7
Section F: Smoke Control.....	5-8
Chapter 6: Toxic Gas Bill	6-1
Section A: Responsibilities	6-2
Section B: Sources and Types of Toxic Gases	6-4

Chapter 7: Ship Stability and Flooding Control	7-1
Section A: Required and Available Stability.....	7-2
Section B: Procedures After Damage.....	7-3
Section C: Jettison Bill.....	7-5
Section D: Modified Zebra Bill	7-6
Chapter 8: Strip Ship/Clear Ship Bill.....	8-1
Section A: Strip Ship and Clear Ship Procedures	8-2
Chapter 9: Personnel Casualty Procedures	9-1
Section A: General Procedures in Case of Injury	9-2
Section B: Personnel Casualty Immobilization and Transportation	9-7
Appendix A: Glossary & Acronyms	A-1
Appendix B: Inport Checklist for Toxic Gas Bill	B-1
Appendix C: Underway Checklist for Toxic Gas Bill	C-1
Appendix D: Checklist for Shipboard Fires.....	D-1
Appendix E: Additional Resources	E-1
Index.....	I-1

Chapter 1: Introduction

Introduction

This chapter overviews the contents of this tactics, techniques, and procedures (TTP) publication. It also defines the use of notes, cautions, and warnings in TTP publications.

In This Chapter

This chapter contains the following sections:

Section	Title	Page
A	Introduction	1-2
B	Notes, Cautions, and Warnings	1-3

Section A: Introduction

A.1. Overview

Repair party personnel provide the first line of defense in damage control (DC) procedures for Coast Guard cutters. The commanding officer/officer in charge (CO/OIC) of each Coast Guard cutter is responsible for adherence to, and effective application of, principles and standards established in this and all damage control publications.

Guidance in this publication is flexible and adaptable enough to meet anticipated needs. U.S. Coast Guard Force Readiness Command (FORCECOM) updates this publication as needed to ensure it remains current and relevant and provides a framework for standardized repair party procedures.

A.2. Applicability

This TTP publication applies to the following vessels:

- 175-foot Coastal Buoy Tender (WLM).
 - 160-foot Inland Construction Tender (WLIC).
 - 154-foot Fast Response Cutter (WPC).
 - 140-foot Icebreaking Tug (WTGB).
 - 110-foot Patrol Boat (WPB).
 - 100-foot Inland Buoy Tender (WLI).
 - 100-foot Inland Construction Tender (WLIC).
 - 87-foot Coastal Patrol Boat (WPB).
 - 75-foot River Buoy Tender (WLR).
 - 75-foot Inland Construction Tender (WLIC).
 - 65-foot River Buoy Tender (WLR).
 - 65-foot Inland Buoy Tender (WLI).
 - 65-foot Small Harbor Tug (WYTL).
-

Section B: Notes, Cautions, and Warnings

B.1. Overview The following definitions apply to notes, cautions, and warnings found in TTP publications.

NOTE: **An emphasized statement, procedure, or technique.**

CAUTION: **A procedure, technique, or action that, if not followed, carries the risk of equipment damage.**

WARNING: *A procedure, technique, or action that, if not followed, carries the risk of injury or loss of life.*

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Chapter 2: Organization

Introduction

This chapter discusses organization and placement of DC personnel and equipment throughout the ship. This organization plan is per the following references:

- Reference (a), Naval Ships' Technical Manual (NSTM) Chapter 079 Volume 2: Damage Control Practical Damage Control S9086-CN-STM-020 (series).
- Reference (b), Naval Ships' Technical Manual (NSTM) Chapter 079 Volume 3: Damage Control Engineering Casualty Control S9086-CN-STM-030 (series).
- Reference (c), Naval Ships' Technical Manual (NSTM) Chapter 555 Volume 1: Surface Ship Firefighting S9086-S3-STM-010 (series).

In This Chapter

This chapter contains the following sections:

Section	Title	Page
A	Required Repair Locker Materials and Publications	2-2
B	Duplicate DC Materials for Command	2-3
C	Repair Locker Organization	2-4
D	Underway Rescue and Assistance Bill	2-5
D	Alarms	2-7

Section A: Required Repair Locker Materials and Publications

A.1. Required Materials and Publications

- Liquid loading diagram, updated to reflect the latest tank and void soundings provided by the fuel, oil, and water king (FOWK), and the sounding and security watch.
 - Flooding effects diagram.
 - Clinometers for determining actual list and trim.
 - Damage control book/stability and loading booklet.
 - Tank sequencing chart and/or tables.
 - Closure log.
 - List of preplanned routes to ready shelter, combat systems equipment, casualty control supply support centers, battle-dressing stations, battle messing, and other battle logistics supply centers/storerooms.
 - Charts, nomograms, and other required materials to calculate various radiological factors.
 - Reference (d), Machinery Space Firefighting Doctrine for Class Bravo Fires COMDTINST M9555.1 (series).
 - Chemical, Biological, and Radiological Defense Bill.
 - Repair Party Instruction with this Small Cutter Repair Party TTP, CGTTP 3-91.5.
 - Reference (e), Naval Engineering Manual COMDTINST M9000.6 (series).
-

Section B: Duplicate DC Materials for Command

B.1. Overview

Provide the following DC materials for command:

- To make sure the CO/OIC is aware of, and can visualize, the damage control situation, provide a duplicate set of DC diagrams showing the hull, all decks, and compartments to command control or the pilot house/bridge.
 - The DC diagrams need not be permanently mounted or hard laminated like those in the pilothouse. Due to space considerations, cut down or modify plates/diagrams as appropriate so long as they remain functional (for cutters required to have them as per reference (e), Naval Engineering Manual COMDTINST M9000.6 (series)).
 - The engineering officer (EO)/engineering petty officer (EPO) provides the bridge or quarterdeck with a copy of the repair party manual and DC diagrams for plotting and evaluating damage.
-

Section C: Repair Locker Organization

C.1. Personnel Assignments

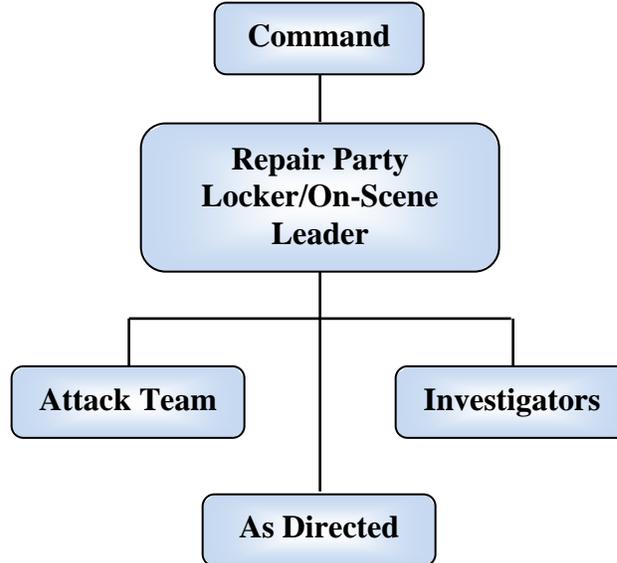
Personnel assignments:

- Bridge - CO/OIC.
- Engineering Control Center –EO/EPO.
- Repair locker – On-scene leader.

NOTE:

When the repair locker leader is absent, the next senior member of the repair party steps up to assume the role of repair locker leader.

C.2. Typical DC Organization Chart



Section D: Underway Rescue and Assistance Bill

D.1. Overview The underway rescue and assistance (R&A) team is comprised of the ship's duty section personnel.

NOTE:

The decision to reduce the responding cutter's readiness by sending assistance is the responsibility of the CO/OIC or the officer of the deck (OOD).

D.2. OOD Responsibilities

- Notify the CO/OIC and EO/EPO.
- Inform the engineering officer of the watch (EOW) of the situation.
- Announce over the 1MC circuit: "Now fire/flooding has been reported onboard (vessel's name) approximately (miles) away. Rescue and assistance detail to include (list crewmembers from EO/EPO). Rescue and assistance detail muster (location)."
- Announce over the 1MC circuit: "Now fire/flooding has been reported onboard (vessel's name) approximately (miles) away. Boat lowering detail lay to the (location) boat deck, provide from repair locker as needed."
- Record the R&A team member's names in the Smooth Log.

D.3. EO/EPO Responsibilities

- Decide which crewmembers respond as the R&A team (use input from the on-scene leader (OSL) and CO/OIC).
- Conduct a risk assessment brief with all R&A team members.
- Keep a log of all communication with the OSL.
- Select personnel to break out required gear.
- Remain on the bridge to relay information to OOD and CO/OIC.

D.4. EOW Responsibilities

- Operate the plant as requested by the OOD and required by the evolution.

D.5. OSL Responsibilities

- Ensure all required equipment is available at the scene.
 - Communicate between the vessel's point of contact (POC) and the EO/EPO.
 - Re-evaluate risk assessment once onboard vessel.
-

**D.6. R&A Team
Members**

- Muster at the direction of the OSL.
- Assemble necessary equipment and perform services as required by the inport emergency bill.
- Approach, board, and investigate vessels in distress using the utmost caution.
- Maintain communications with the ship by any available means.

NOTE:

It is important that each individual supply equipment for which he or she is responsible and not equipment that is a responsibility of another, unless so directed.

Section E: Alarms

- E.1. Overview** The 1MC integrates with a system of alarm signals. The signals override the microphone control stations and notify the ship’s crew of imminent danger. These alarms, in order of priority, are collision, chemical, general, and toxic gas.
-
- E.2. Collision Alarm** This alarm, sounded by the OOD/conning station, indicates a possibility that another waterborne unit might strike the ship. After bracing for shock and relaxing brace, all hands set material condition ZEBRA and prepare to control fires and flooding.
-
- E.3. Chemical, Biological, Radiological, and Nuclear Attack** Sounded by the OOD/conning station, or possibly sounded automatically by the improved (chemical agent) point detection system (IPDS) or the IPDS life cycle replacement (IPDS-LR) — the alarm warns of chemical, biological, radiological, nuclear, and high-explosive (CBRNE) attacks. All hands exercise protective measures and procedures to reduce exposure and personnel injuries.
-
- E.4. General Alarm** This alarm signal notifies the crew that the ship is going to battle stations/general emergency.
-
- E.5. Toxic Gas Alarm** Sound this alarm by ringing the cutter’s bell in lieu of the general alarm to alert the crew of toxic gas hazard.
-
- E.6. Testing** Test alarms daily over the 1MC, preceded by the announcement “The following is a test of the general, chemical, and collision alarms.” The test finishes with “Test complete; regard all further alarms.”
-

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Chapter 3: Investigating Damage

Introduction

This chapter discusses sending an investigation team from the repair party to damaged areas of the ship to determine the extent of the damage per reference (a), Naval Ships' Technical Manual (NSTM) Chapter 079 Volume 2: Damage Control Practical Damage Control S9086-CN-STM-020 (series).

In This Chapter

This chapter contains the following sections:

Section	Title	Page
A	Investigation Procedures	3-2
B	DC Communications	3-5

Section A: Investigation Procedures

A.1. Overview

The investigators' primary responsibility is to locate damage to the cutter rapidly and report it to the repair locker. Secondly, investigators take limited initial action to minimize damage, but must not become bogged down in combating damage. Rapid and continuous assessment of the damaged and surrounding area provides important information for the DC organization.

To prevent further damage in the course of investigation, personnel:

- Maintain positive control of watertight fittings during access, egress, and inspection.
- Secure compartments after inspection.
- Look for hidden damage.

A.2. Inspect Each Compartment

Inspect each compartment for:

- Fire and/or smoke.
- Flooding.
- Structural damage.
- Electrical cableway damage.
- Mechanical/equipment/vent duct damage.
- Personnel casualties.

Personnel in manned spaces investigate on-station and report results to the appropriate supervisory watch station, which in turn reports to the bridge. Investigators concentrate on unmanned spaces. Do not confine ship damage inspections to the primary damage area. Inspect outward from the damaged area and along the projectile path, if applicable. Inspect from the topside boundary fittings, if possible.

WARNING:

Per reference (a), Naval Ships' Technical Manual (NSTM) Chapter 079 Volume 2: Damage Control Practical Damage Control S9086-CN-STM-020 (series), do not open any watertight door, hatch, air fitting, oil fitting, cap, plug, scuttle, or manhole until certain that the compartment on the other side is either dry or only minimally flooded so that opening the closure will not spread flooding.

**A.3. Determine if
Compartment is
Flooded**

To determine if the compartment is flooded:

- Check for condensation on adjacent bulkheads.
 - Tap diagonally on the bulkhead with a dogging wrench or similar object, listening for a distinct change in the echo tone.
-

**A.4. Underwater
Hull Damage**

When underwater hull damage is found or suspected:

- Sound and compare all tanks and voids with the pre-damage soundings.
- Sound tanks and voids closest to the suspected damage first. Keep in mind that underwater structural damage may spread beyond what is visible.

WARNING:

To test a compartment for flooding, slowly slack off some of the dogs on the hinged side of a closed hatch or door. There is a slight amount of clearance around the hinge pins and, as the dogs loosen, any water present seeps between the gasket and the knife-edge. The hinges and the opposite dogs still maintain the control of the door/hatch. To check quick-acting doors and scuttles, slightly loosen the door handle or wheel while maintaining pressure on the dogs.

**A.5. Tell-Tale
Indications of
Damage**

- Smoke or toxic gases.
 - Loss of electrical power or lighting.
 - Loss of interior communications.
 - Sudden pressure gauge change.
 - Split seams, bulging bulkhead, or warped decks.
 - Unexplained change in list or trim.
 - Unusual noise or vibration.
 - Unexplained changes in tank soundings or contents.
 - Unusually warm vent ducting.
 - Hot machinery bearing.
 - Hot electrical cable or circuits.
-

A.6. Use of a Fire Finder

Use a fire finder to:

- Locate hot spots on bulkheads, decks, overheads, and within ventilation ducting.
- Locate overheating electrical cables, controllers, or components as an indicator of a component failure.

Report casualty or damage discoveries to the repair party leader/fire marshal by the quickest means available. One member reports the damage while the other takes immediate action to control the casualty until the repair party arrives. If only one investigator is working, make the damage report first and then take damage control actions.

Investigators continue rounds until stood down from general quarters/general emergency (GQ/GE).

Section B: DC Communications

- B.1. Overview** Throughout the Coast Guard, DC communications vary among cutters. Minimum communications consist of multi-channel, handheld radios in each repair locker, and/or sound-powered telephones per reference (f), Surface Ship Survivability CGTTP/NTTP 3-20.31 (series).
- Store the radios in a charger with spare batteries. Designate these radios for damage control use only. The bridge monitors all channels the repair party uses during casualties. Assign radio frequencies in advance to avoid confusion during casualties. Ensure message blanks are available for use in the event that other forms of communication fail.
-
- B.2. Emission Control (EMCON) Plan** All radios emit detectable radio frequency (RF) signals, so consider radio use in the ship's EMCON plan.
- Recommended procedures for radio communications checks are:
- When GQ/GE sounds due to a shipboard emergency, repair lockers perform communications checks.
 - When GQ/GE sounds in preparation for battle, repair lockers perform communication checks when authorized to break EMCON.
-
- B.3. Hazardous Electromagnetic Radiation to Ordnance** In general, do not use radios in a weapons handling incident/accident. Specifically, do not use portable radios closer than 10 feet to Hazardous Electromagnetic Radiation to Ordnance (HERO) susceptible or unsafe ordnance, especially in the presence of any damaged, broken, or otherwise exposed explosive ordnance.
-
- B.4. Radios/ Sound-Powered Telephones** Use standard procedures and phraseology per reference (a), Naval Ships' Technical Manual (NSTM) Chapter 079 Volume 2: Damage Control Practical Damage Control S9086-CN-STM-020 (series).
- When GQ/GE sounds, distribute radios (if available) to the OSL and investigators. Written messages from the repair locker leader, the OSL, or investigators are not required as long as radio communications work. Scene leaders and investigators still need message blanks with them for contingency purposes.
 - Use message blanks or a telephone talker's logbook to document reports received in the repair locker. This is for both plotting and maintaining a record of communications.
 - Use radios frequently, not only to train key personnel in use of radio procedures, but also to learn system limitations.
-

B.5. Background Noise

Loud background noises near the radio microphone can cause voice transmissions to be inaudible. The noise created by the fire itself or the rush of firefighting water being discharged from a hose nozzle creates background noise, which impairs clear voice transmission when in close proximity to a nozzle man. Therefore, be aware of the potential for background noise and be prepared to reposition to “clear” the interference.

B.6. Hot Operations

Use the following “hot operations” procedures when ambient temperature at a base station is expected to be 90° Fahrenheit or higher:

- Remove charged batteries from the charger until the ambient temperature has cooled down.
 - When charging is required, use a charger or conditioner where the ambient temperature is below 90° Fahrenheit.
 - If a hot period might last more than 3 days, store batteries and radios in a cool area. Return to normal storage when temperatures cool.
-

Chapter 4: Compartment Isolation

Introduction This chapter discusses isolating a damaged compartment from all cutter systems.

In This Chapter This chapter contains the following section:

Section	Title	Page
A	Isolation Lists	4-2

Section A: Isolation Lists

A.1. Overview

Prepare compartment isolation lists for each significant compartment on the cutter; maintain copies in pilothouse/bridge. Each isolation list identifies:

- Electrical-440V/110V electrical loads. Reference (c), Naval Ships' Technical Manual (NSTM) Chapter 555 Volume 1: Surface Ship Firefighting S9086-S3-STM-010 (series), provides rules for electrical isolation in the event of fire.
- Mechanical.
- All fuel/lube/hydraulic oil systems.
- Compressed air systems.
- Chill water systems.
- Fire main isolation valves.
- Ventilation.
- Ventilation controllers: Supply, exhaust, and recirculation.
- Natural ventilation closures, Circle William fittings.
- DC equipment. Firefighting equipment as required.
- Hazardous materials: Hazardous materials stored in each compartment.
- Watertight, airtight, and oil tight closures: DC closures in each compartment.

List individual items logically while considering relative importance.

NOTE:

Repair locker/damage control training team (DCTT) personnel frequently verify/update compartment isolation lists during DC drills and following significant maintenance periods. Each qualified EOW and individual repair party electrician not qualified as an EOW physically review the lists.

**A.2.
Sample Isolation List**

<i>TAB A - ISOLATION LIST (example)</i>		
<i>COMPARTMENT NAME:</i> _____		
<i>COMPARTMENT NUMBER:</i> _____		
<u>EQUIPMENT/ SYSTEM</u> LOAD CENTER 110V OUTLETS	<u>ELECTRICAL ISOLATION</u> <u>CIRCUIT ID #</u> 1S-3P-11 (3-45-2)-1P-C-P	<u>BREAKER LOCATION</u> 1-2-3-E
<u>PIPING</u> MAIN DRAIN F/O/SUPPLY LP AIR	<u>MECHANICAL ISOLATION</u> <u>VALVE SYSTEM #</u> 5-107-2 FO-1 LPA-1	<u>VALVE LOCATION</u> 5-170-0-E 1-2-0-1 1-2-0-L
<u>VENTILATION</u> SUPPLY EXHAUST NATURAL	<u>VENTILATION</u> <u>NUMBER</u> 1-2-1	<u>CONTROLLER LOCATION</u> 1-2-0-L
<u>EQUIPMENT NAME</u> FIXED HALON 5LB CO ₂ BTL RAM FAN	<u>DAMAGE CONTROL EQUIPMENT</u> <u>FRAME</u> FR 10 FR 3 FR 1	<u>REMOTE OPERATOR</u> 2-30-2-1 HALON STRM
<u>STORAGE AREA</u> HAZMAT LOCKER	<u>HAZARDOUS MATERIALS</u> <u>FRAME #</u> FR 5	<u>CONTENTS</u> OILS (VARIOUS)
<u>CLOSURE TYPE</u> QAWTD WTD ATC	<u>CLASSIFICATION NUMBER</u> ZEBRA 1-12-0 YOKE 1-9-1 X-RAY 1-8-1	<u>ACCESS TO</u> 1-12-2-L 1-4-1-Q 1-4-1-Q

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Chapter 5: Firefighting

Introduction This chapter discusses general firefighting organization and practices, and machinery space firefighting doctrine (MSFD) for class Bravo fires.

In This Chapter This chapter contains the following sections:

Section	Title	Page
A	General Shipboard Firefighting	5-2
B	Machinery Space Firefighting Doctrine (MSFD) for Class Bravo Fires	5-4
C	Firefighting Methods	5-5
D	Compartment Hazards/Areas (Examples)	5-6
E	Magazine Sprinkler Control Valves	5-7
F	Smoke Control	5-8

Section A: General Shipboard Firefighting

A.1. Overview

Each crewmember must be concerned with fire prevention and be aware of firefighting details in the following references:

- Reference (a), Naval Ships' Technical Manual (NSTM) Chapter 079 Volume 2: Damage Control Practical Damage Control S9086-CN-STM-020 (series).
- Reference (b), Naval Ships' Technical Manual (NSTM) Chapter 079 Volume 3: Damage Control Engineering Casualty Control S9086-CN-STM-030 (series).
- Reference (c), Naval Ships' Technical Manual (NSTM) Chapter 555 Volume 1: Surface Ship Firefighting S9086-S3-STM-010 (series).
- Reference (f), Surface Ship Survivability CGTTP/NTTP 3-20.31 (series).
- Reference (g), Naval Ships' Technical Manual (NSTM) Chapter 074 Volume 3: Gas Free Engineering S9086-CH-STM-030 (series).

Major steps involved in shipboard firefighting are locating, reporting, containing, extinguishing, and restoring from the casualty.

Considerations for locating fire include knowledge of ventilation systems and employment of a thermal imager. Thermal imagers are great tools for locating a fire source. Thermal imagers cannot see through, but they detect heat transferred to the surface of an object. A user can observe as little as a 0.05° Celsius difference in surface temperature.

Discovery of smoke normally precedes discovery of a fire; therefore, personnel must be familiar with the ventilation systems and air flow through their spaces for quicker response.

A.2. Reporting

Report fire/smoke as follows: Access the ship's emergency number, identify yourself, report class of fire or smoke color, report location (space nomenclature preferred), and specify compartment number, if known.

A.3. Initial Action

If the space is tenable, proceed to the fire and take initial firefighting actions. If it is untenable, isolate the space and then return to your assigned GE billet. Make sure all personnel in the surrounding area are aware of the fire/smoke.

**A.4.
Containment**

If initial actions of personnel on duty in the affected space do not control a fire, dress a hose team in full firefighter's ensemble. Once the fire is controlled, the OSL adjusts personal protective equipment (PPE), as necessary. For example, as spaces cool, improve personnel endurance by using engineering coveralls rather than firefighter coveralls.

Recent lessons learned from shipboard fires have shown how spaces are more vulnerable to vertical fire spread. Topside fire boundaries cannot be over-emphasized. Fire boundary personnel must be very active in removing combustibles from adjacent spaces. If the space has false decks, remove or wet them down. One inch of water on deck can prevent fire spread even when the temperature in the space below is above 1000° Fahrenheit.

**A.5.
Extinguishing**

Put the fire out using preferred agents listed in [Section C: Firefighting Methods](#).

**A.6. Post-fire
Procedures**

The extent of damage usually determines the speed of casualty restoration. Use standard operating procedures (SOPs) where applicable.

Section B: Machinery Space Firefighting Doctrine (MSFD) for Class Bravo Fires

- B.1. Overview**
- Consult reference (d), Machinery Space Firefighting Doctrine for Class Bravo Fires COMDTINST M9555.1 (series), to complete isolation lists in the prescribed order. Clearly identify power sources for firefighting systems in the electrical isolation list.
 - Prepare laminated copies of MSFD pages that require action by propulsion plant watchstanders and insert into the Engineering Casualty Control Manual.
 - Prepare laminated copies of MSFD pages that require action by repair/fire party personnel and keep in the DC repair lockers.
 - Note aqueous film forming foam (AFFF) activation times in the MSFD.

NOTE: **Break out the entire MSFD so all contents are available for review.**

Section C: Firefighting Methods

	Common Combustibles and Locations	Fire	Extinguishing Agents
C.1. Furnishings	Woodwork, bedding.	A	1. Fire main.
	Clothing, combustible stores.		2. AFFF.
C.2. Explosives	Explosives, propellants.	A/D	1. Magazine sprinkling.
			2. Fire main.
			3. AFFF.
C.3. Flammable Liquids/Fuels	Paints, spirits.	B	1. Fire protection system.
	Flammable liquid stores.		2. AFFF.
	Fuel oil.		3. Fire main.
			4. Potassium bicarbonate powder (PKP).
			5. CO ₂ .
C.4. Galley Flammables	Deep fat fryer, R102 system	B	1. Aqueous potassium carbonate (APC) range guard.
C.5. Electronic Equipment	Electrical/electronic.	C	1. De-energize circuit.
			2. CO ₂ .
			3. Fire main.
			4. AFFF.
			5. PKP.
WARNING:	<i>When possible, de-energize electrical circuits before starting firefighting efforts to minimize risk of personnel shock/electrocution.</i>		
CAUTION:	Use PKP on electronics as a last resort due to its corrosive nature.		
C.6. Flammable Metals	Magnesium alloy.	D	1. Jettison overboard. 2. Fire main (not solid stream).

Section D: Compartment Hazards/Areas (Examples)

D.1. Repair Locker (Example)	Space	Hazard	Remarks
	Bow Thruster Machinery Room (3-10-0-Q)	Hydraulic oil.	PRI - FPL 2-14-1 w/inline eductor/AFFF. SEC - FPL 2-13-1 w/inline eductor/AFFF.
	Lift Station (3-20-0-Q)	H2S, methane, raw sewage.	Toxic/flammable.
	Air Conditioning Equipment Room (3-22-0-Q)	Refrigerant.	Toxic/personnel hazard.
	Vac Collection Holding & Transfer Room (3-28-2-E)	H2S, methane, raw sewage.	Toxic/flammable.
	Boatswain Shop & Strm (2-10-0-A)	Hydraulic oil.	PRI - FPL 2-18-1 w/inline eductor/AFFF. SEC - FPL 2-20-1 w/inline eductor/AFFF.
	57 mm Magazine (2-16-0-M)	Ammunition.	PRI - Magazine sprinklers. SEC - FPL 2-22-1.
	Rescue Station (2-48-1-Q)	Hydraulic oil.	PRI - FPL 2-53-1 w/eductor/AFFF.

Section E: Magazine Sprinkler Control Valves

E.1. Magazine Sprinkler Control Valves (Example)	<u>Repair</u>	<u>Remote Valve</u>	<u>Local Actuation/Location</u>	<u>Compt. Served</u>
	2	2-21-1	2-53-1/ECR (2-52-1-E)	2-16-M (ex.) magazine.
	2	1-18-2	Floods with the 57 mm mag.	1-16-2-M small arms magazine.
	3	02-59-2	2-53-2/ECR (2-52-1-E)	02-59-2-M (CIWS magazine).

NOTE:

Unless otherwise specified, activate magazine sprinkler systems only with the CO's permission (or the OOD during inport).

Section F: Smoke Control

- F.1. Overview** Use smoke boundaries to establish a controlled path when exhausting smoke to the weather. The smoke boundary nearest the fire is the inner smoke boundary and normally coincides with the primary fire boundary. Set a second smoke boundary, called the outer smoke boundary, farther away from the fire. The area between the inner and outer smoke boundaries is the smoke control zone. Thus, when the attack team opens access to the fire space, the smoke control zone traps the smoke.
-
- F.2. Rules for Smoke Boundaries**
- Keep access to the fire space within the smoke control zone.
 - Keep fireplugs and hose reels used by the fire party within the smoke control zone to a minimum.
 - To de-smoke, establish and maintain an active de-smoking flow path (supply and exhaust) from the smoke control zone to weather. Set the inner smoke boundary by closing doors and hatches to the fire space.
 - Use smoke curtains and blankets to maintain smoke boundaries when firefighting personnel open doors and hatches.
 - Use smoke curtains and blankets to set smoke boundaries when doors and hatches are no longer tight due to damage.
-
- F.3. Machinery Space Smoke Control** Reference (d), Machinery Space Firefighting Doctrine for Class Bravo Fires COMDTINST M9555.1 (series), defines smoke control in chapter 7. Refer to cutter MSFD for list of controllers and vent closures.
-
- F.4. SCBAs** Use self-contained breathing apparatus (SCBA) for all personnel working within a smoke control zone as well as affected spaces until the atmosphere is safe.
-

Chapter 6: Toxic Gas Bill

Introduction

This chapter discusses actions to take in the event of an unexpected toxic gas release that causes personnel injury, equipment damage, or exceeds the permissible exposure limit (PEL). This chapter also overviews sources and types of toxic gases.

In This Chapter

This chapter contains the following sections:

Section	Title	Page
A	Responsibilities	6-2
B	Sources and Types of Toxic Gases	6-4

Section A: Responsibilities

A.1. Overview

Cutters carry toxic substances such as refrigerant, carbon dioxide, and solvents. Fire, oxidation, and anaerobic decomposition of organic material might create additional toxic gas hazards. The severity of a toxic gas incident is determined by comparing a measured concentration of the toxic gas against established exposure limits.

This bill addresses actions to take in the event a toxic gas release causes personnel injury, equipment damage, or exceeds the PEL set in reference (g), Naval Ships' Technical Manual (NSTM) Chapter 074 Volume 3: Gas Free Engineering S9086-CH-STM-030 (series). This bill deals with emergencies. The following references provide procedures and precautions to take for non-emergency releases of toxic gases, including working with paints or solvents and entry into confined spaces for maintenance:

- Reference (c), Naval Ships' Technical Manual (NSTM) Chapter 555 Volume 1: Surface Ship Firefighting S9086-S3-STM-010 (series).
- Reference (f), Surface Ship Survivability CGTTP/NTTP 3-20.31 (series).
- Reference (g), Naval Ships' Technical Manual (NSTM), Chapter 074, Volume 3: Gas Free Engineering, S9086-CH-STM-030 (series)

A.2. All Hands

- Personnel evacuate the affected compartment immediately. Only necessary personnel reenter the compartment, and only with the appropriate breathing devices.
- Pass the word to the OOD, giving the type of gas and source (if known), compartment name and number, and any casualties.
- Alert personnel in surrounding spaces.
- Isolate compartments enroute to muster area or fresh air by closing all airtight and watertight fittings. Secure ventilation in and around the affected area unless the system is specifically for toxic gas removal.

A.3. OOD

- Call the inport or underway toxic gas response team. Take or direct action per [Appendix B: Inport Checklist for Toxic Gas Bill](#) or [Appendix C: Underway Checklist for Toxic Gas Bill](#).

NOTE: **Rapidly ring the cutter's bell to alert the crew to a toxic gas hazard.**

- Pipe via the 1MC (no less than twice) and include the compartment(s) involved, areas to avoid, and the type of gas (if known).
- Take an accurate muster.
- If inport:
 - Notify SOPA and surrounding commands.
 - Call 911 for medical support.
 - Secure the brow and pier.

A.4. EO/EPO

- The gas free engineer, under the direction of the EO/EPO, is responsible for maintaining and administering this bill.
- Establish and coordinate training of all hands in the hazards of toxic gases and the response to a toxic gas incident per this bill.
- Man-up pilothouse as the primary controlling station during an emergency toxic gas situation.

NOTE:

On some small cutters, an inability to isolate the pilothouse might compromise its safety.

- Establish and coordinate training of gas free engineering personnel (GFEP) in the use of oxygen, explosive, and toxic gas instruments.
- Coordinate ventilation efforts with the toxic gas response team and manned locker.
- Provide recommendations to the OOD concerning wind direction.
- Review the NIOSH Pocket Guide to Chemical Hazards:
<http://www.cdc.gov/niosh/npg/>

NOTE:

Rescue personnel do not use emergency escape breathing devices (EEBDs); however, a conscious toxic gas victim can use one.

WARNING:

Wear additional personal protective equipment (PPE), such as solvent resistant gloves and spill suits, according to guidelines contained in the NIOSH pocket guide. If the toxicant is unknown, the OSL determines necessary PPE based on available information.

A.5. Repair Locker Personnel

- Establish communications with the quarterdeck (inport) or pilothouse (underway).
- Prepare a trunked fan for operation as directed by the EO/EPO.

Section B: Sources and Types of Toxic Gases

**B.1. Location of
 Toxic Gas
 Hazards**

(Make example specific to your cutter.)

Toxic Gas Hazards						
Space	Compt.	Hazards	Supply	Exhaust	Size of Space (ft ³)	Min for 2 air changes by Ram Fan
Flammable Stores	3-22-0-K	Numerous	2-26-1	2-48-2-Q	3000	3
			Wind Rm	Bosn Wks		
Pump Room #1 (#1 Fire Pump Rm)	5-96-0-E	Benzene, Hydrogen Sulfide	2-32-1-Q	1-68-2-A	1500	2
			Fan Room	Deck Gr Lckr		
Sewage Treatment Room #1 (Fwd Sewage)	5-144-0-Q	Hydrogen Sulfide, Methane, Benzene	01-97-1-Q	01-97-2-Q	3450	3
			Fan Room	Fan Room		
Aux Machinery Room #1 (AC Flat)	3-179-1-Q	R-12	3-177-1	3-186-2	10000	10
			EM Shop	Aux Shop		
Pump Room #2 (DOPR)	5-192-0-E	Benzene, Hydrogen Sulfide	01-207-2	1-232-2	1500	2

NOTE:

Follow this bill for unintended releases of Halon 1301/CO₂/FM 200 from any of the cutter's systems. Only enter the space if wearing an SCBA. Cutters with R-22 and R-134: Include required information in the matrix.

B.2. List of Toxic Gases/Vapors

Common Toxic Gases				
Gas/Vapor	How Usually Produced	How Probably Detected	Effects of Exposure	Max Allowable Concentration
Acetone	Used as a solvent	Smell	Fire hazard, slight eye/nose irritant @ high concentration	PEL: 750 PPM
Acetylene	Welding bottle leak	Smell of garlic	Suffocation @ high concentration	IDLH: 8 PPM
				PEL: 1 PPM
Acrolein	Cooking, engine exhaust, cigarettes	Smell	Disagreeable choking odor, irritant to eyes and throat	PEL: 0.1 PPM
Ammonia	Amine decomposition	Ammonia odor	Irritant to eyes and throat	IDLH: 300 PPM
				PEL: 50 PPM
Arsine	Battery gassing	Garlic or rotten egg smell	Nausea or vomiting	IDLH: 3 PPM
				PEL: 0.05 PPM
Benzene	JP-5	Fuel smell/Dräger tube	Carcinogen	IDLH: 500 PPM
				PEL: 1 PPM
Carbon dioxide	Human exhale, fire ext., combustion	Dräger tube	Headache, dizzy, blunt asphyxiant at high conc.	PEL: 5000 PPM
Carbon monoxide	Cigarettes, product of combustion	Smoke smell, Dräger tube	Headache, sleepy, subtle asphyxiant	IDLH: 1200 PPM
				PEL: 35 PPM
Chlorine	Salt in battery	Bleach odor	Burning eyes/throat	IDLH: 10 PPM
				PEL: 0.5 PPM
Hydrocarbons	Cooking, paints, solvents, fuels	Smell	Dizzy, irritant to eyes and throat	IDLH: 30 PPM
Hydrochloric acid fumes	Oxidation of R-12 (refrigerant)	Acrid odor	Burning of eyes and throat	C: 5 PPM
Hydrogen sulfide	Sewage	Rotten egg smell	Eye irritant, asphyxiant	IDLH: 100 PPM
				PEL: 10 PPM
Nitric oxide	Magazines/armory	Ether/alcohol smell	Dizzy, sleepy, asphyxiant	IDLH: 25 PPM
				PEL: 25 PPM
Mercury	Leaking mercury	Mercury vapor detector	Long term effects (cancer, insanity)	IDLH: 10 PPM
				PEL: 0.05 mg/m ³
Ozone	High voltage equip.	Smell	Headache, respiratory irritant	IDLH: 5 PPM
				PEL: 0.1 PPM
Phosgene	Oxidation of R-12 (refrigerant)	Odor of fresh-cut grass	Burning of eyes and throat	IDLH: 2 PPM
				PEL: 0.1 PPM
Stibine	Battery gassing	Garlic or rotten egg smell	Nausea or vomiting	IDLH: 5 PPM
				PEL: 0.1 PPM
Sulfuric acid	Battery gassing	Acrid	Burning of eyes and throat	IDLH: 15 mg/m ³
				PEL: 1 mg/m ³

- PEL: “Permissible exposure limit” refers to time-weighted average concentrations for a particular chemical or toxic gas that an individual must not exceed during any 8-hour work shift.
 - C: “Ceiling” refers to the maximum concentration for a particular chemical or toxic gas allowable during any part of the workday.
 - IDLH: “Immediately dangerous to life and health” refers to the maximum concentration of a particular chemical or toxic gas that, if exceeded for even a short period, is life threatening.
-

Chapter 7: Ship Stability and Flooding Control

Introduction This chapter discusses ship stability during flooding conditions.

In This Chapter This chapter contains the following sections:

Section	Title	Page
A	Required and Available Stability	7-2
B	Procedures After Damage	7-3
C	Jettison Bill	7-5
D	Modified Zebra Bill	7-6

Section A: Required and Available Stability

A.1. Overview

Observe the following limitations to ensure the ship has its required stability and reserve buoyancy:

- The limiting drafts specified in reference (a), Naval Ships' Technical Manual (NSTM) Chapter 079 Volume 2: Damage Control Practical Damage Control S9086-CN-STM-020 (series), are not submerged before damage.
- There are no excessive or unusual topside weights or deck loads, such as icing.
- Follow liquid and dry cargo loading instructions contained in reference (a) and Damage Control Diagram 1 (Liquid Loading Diagram).
- Maintain a proper degree of watertight integrity (watertight fittings maintained and personnel trained to set the material condition).

A.2. Daily Stability Calculations

The EO/EPO determines the ship's stability per a cutter's damage control book or the stability and loading data booklet and completes a draft report at least daily and following any major alteration to the ship's loading. If following liquid and dry cargo loading instructions, only drafts, trim, and displacement need to be determined.

Section B: Procedures After Damage

- B.1. Overview** Reference (a), Naval Ships' Technical Manual (NSTM) Chapter 079 Volume 2: Damage Control Practical Damage Control S9086-CN-STM-020 (series), provides detailed instructions and procedures to follow in the event of damage. The following is a generic sequence of events.
-
- B.2. Step 1:
Contain Damage**
- Isolate flooding.
 - Set flooding boundaries.
 - Isolate electrical power.
 - Isolate mechanical systems.
-
- B.3. Step 2:
Determine
Impact of
Flooding and
Prioritize
Dewatering
Efforts**
- Dewater spaces colored pink on the flooding effects diagram that are sufficiently tight to allow pumps to be effective.
 - Dewater spaces that have the greatest free surface effect first.
 - Use locally prepared stability data cards, if applicable, to assess flooding effects.
 - Use Flooding Casualty Control Software (FCCS) to assess the effects of stability (if available).
-
- B.4. Step 3:
Evaluate Critical
Stability**
- Stability is critical when immediate improvement is necessary to avoid loss of the ship. Consider stability critical if any of these conditions exist:
- Small or negative metacentric height (GM).
 - The ship is sluggish, with a slow erratic roll period and a tendency to hang at the end of the roll.
 - The ship has a tendency to list at the same angle to either side.
 - The ship has a list that cannot be accounted for by off-center weight.
 - Approaching or exceeding floodable length:
 - The extent of flooding approaches or exceeds the maximum amount of flooding tabulated in reference (a).
 - Excessive list:
 - The ship lists to a static heel of 15° or more.
 - Heavy winds and seas:
 - Heavy winds and rough seas are prevailing or anticipated.
-

**B.5. Step 4:
If Stability is
Critical**

- Suppress free surface effect by dewatering or partially filling flooded compartments (only if marked “yellow” on DC diagrams.)
- Strike down solid weights, such as ammunition, from upper deck handling rooms to magazines.
- Ballast tanks according to the ship’s liquid loading instruction.
- If freeboard is adequate, completely fill those compartments that improve stability when flooded solid (“yellow” or “green” compartments on the flooding effects diagram).
- Favor stability in the handling and maneuvering of the ship. Limit speed and rudder angle to reduce dynamic forces.
- Jettison topside weights if the first two measures in the list above are insufficient or impossible (these are difficult and time-consuming procedures). Concentrate on heavy items and plan ahead, considering the effect of removing various items.

**B.6. Step 5:
Eliminate or
Reduce List**

List caused by off-center flooding only:

- Counter-balance on the high side to reduce list. Add only that amount that would correct for one-half the list.
- Evaluate the effect of this action and then proceed to correct the list.

List caused by negative GM only:

- DO NOT add weight to the high side to correct for list. Take action to lower the ship’s center of gravity by ballasting low tanks symmetrically, jettisoning topside weight symmetrically, and shifting weight low symmetrically and at all times by suppressing free surface effect.

List caused by a combination of off-center loading and negative GM:

- First, take all corrective actions listed above to restore positive GM. Then, proceed with actions to correct off-center flooding.
-

Section C: Jettison Bill

C.1. Overview The EO/EPO maintains a jettison bill to establish procedures for jettisoning material to improve stability impaired by damage or grounding.

Maintain a list of materials and equipment that might require jettisoning -- in order of priority with location, weight, and height -- above waterline.

Conditions which might warrant jettisoning material from the ship are:

- When stability is degraded.
- To lighten ship when grounded.
- When damage has reduced stability.
- When list or trim impairs the efficiency of the cutter's gun platform (wartime).
- When it is imperative to increase the range of stability to prevent capsizing.
- When a stranded ship needs lightening for salvage.
- After a CBRNE attack, jettison material that cannot be decontaminated. Advise the CO/OIC regarding all material jettisoned from the ship.
- After catastrophic damage, and with the CO/OIC permission, clear all damaged material from the ship that is not useful.

All available personnel participate in jettison actions. Remove the highest, heavy mobile weight first followed by lower, heavy mobile weights in order of accessibility. Maintain weight-handling equipment until no longer useful.

C.2. Small Boat Jettison If jettisoning small boats, crew one small boat (at a minimum) per standard small boat operations. The crewed small boat rounds up and rafts together non-crewed small boats, once launched. All small boats remain under control of the crewed small boat within close proximity of the cutter.

C.3. Life Rafts Jettison life rafts last. If jettisoning life rafts, deploy them per standard operating procedures. Once deployed, the small boat is responsible for lashing the life rafts to the small boat and keeping them under control.

C.4. Anchors Jettison the port and starboard anchors. Break the chain at an appropriate fathom shot.

Section D: Modified Zebra Bill

D.1. Overview

Situations arise in which the CO/OIC might wish to set a modified material condition zebra. Setting modified material condition zebra gives a higher survivability stance than yoke. At the same time, modified zebra is less restrictive and more readily allows accomplishment of operational requirements than zebra. Situations that make modified material condition zebra desirable are:

- Underway replenishment.
- Vertical replenishment.
- Air operations.
- Transit of known or suspected hazardous navigation areas.

Refer to the DC Closure Log for modifications to the setting of Zebra.

NOTE: Follow your cutter's specific bill.

NOTE: Do not enter structural zebra into the closure log, as it is not a material condition.

NOTE: The appropriate pipe is, "Now set modified zebra throughout the ship. Secure all structural fittings main deck and below."

Chapter 8: Strip Ship/Clear Ship Bill

Introduction This chapter provides strip ship and clear ship procedures.

In This Chapter This chapter contains the following section:

Section	Title	Page
A	Strip Ship and Clear Ship Procedures	8-2

Section A: Strip Ship and Clear Ship Procedures

A.1. Overview This bill provides organization and procedures to strip and clear ship in the event that CBRNE warfare or catastrophic damage is possible, or when preparing for wartime deployment. The EO/EPO is responsible for this bill.

Strip items from the ship that are not necessary for the reasonable comfort of personnel at sea, sustaining the cutter, or needed in Condition I or Condition III. Strip items that are fire hazards or that can be broken to cause splinters or missiles.

A.2. CO Responsibilities

- Order the EO/EPO to start strip ship and clear ship procedures.
- Be informed of all material jettisoned from the ship.

A.3. EO/EPO Responsibilities

- Maintain a list of materials and equipment that might require jettisoning, in order of priority with location, weight, and height above waterline.
- Make sure each department complies with this bill.

A.4. Department Head Responsibilities

- Provide lists of material falling within the purview of this procedure to the EO/EPO. After initial submission, inform the EO/EPO of any changes in the status of material on the lists.
- Per procedures in reference (a), Naval Ships' Technical Manual (NSTM) Chapter 079, Volume 2: Damage Control Practical Damage Control S9086-CN-STM-020 (series), remove all porous materials from the weather deck that absorb CBRNE agents. Remove all non-essential items that are fire hazards from the ship, such as:
 - Wooden articles: Excess portable tables and benches, gratings, chests, lockers, sawhorses, stepladders, bulletin boards, boxes and cartons, lumber not suitable for damage control shoring, and accommodation ladders.
 - Insulation except where vital (e.g., hot machinery).
 - Non-fireproof fabrics: Bulk canvas, baled rags, hose covers, side curtains, below deck covers, decorating flags and dressing lines, curtains, rugs, carpets, coca and rubber matting, chair and transom covers, civilian clothes, trunks, suitcases, and unnecessary personal effects, old and surplus charts, correspondence more than 1-year old, canvas awnings, canvas ladder screens, upholstered lounge chairs, paper and office supplies in excess of 3-month supply, excess flags and bunting, excess toilet paper, excess manila line and cordage, newspapers, magazines, and books. Treat all covers and life jackets retained aboard with a flame resistant compound.

- Flammable fluids and acids: Alcohol, ordnance oils, cleaning and lighter fluids, paints, varnish, paint remover, furniture polish, boat lubricating oils, oils and grease in excess of 3-month supply, lacquer, paint thinner, turpentine, and linseed oil. Stow in a flammable storage locker and distribute in small quantities.
 - Other flammable supplies: Cooking oils, matches, and medical supplies. Store below the waterline and issue in small quantities.
 - Decorative equipment and articles that are useful in times of peace but do not contribute to fighting efficiency: Glass in bulletin boards, overhead paneling, surveyed items, etc.
- Ensure that equipment vital to the safety of the ship and crew is on board in the proper quantity. These items include all repair locker inventory and issued CBRNE PPE.
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Chapter 9: Personnel Casualty Procedures

Introduction This chapter discusses general procedures for first aid, immobilization, and transportation of victims in the event of injury.

In This Chapter This chapter contains the following sections:

Section	Title	Page
A	General Procedures in Case of Injury	9-2
B	Personnel Casualty Immobilization and Transportation	9-7

Section A: General Procedures in Case of Injury

A.1. Head-to-Toe Technique The most common technique used to evaluate victims, both conscious and unconscious, is the head-to-toe technique. The head-to-toe technique examination initially seems a long process, but an experienced first responder can accomplish it in just a few minutes.

This technique is divided into five areas:

- Head.
- Chest.
- Abdomen.
- Lower extremities.
- Upper extremities.

Each of these areas has specific tasks a first responder completes before moving to the next head-to-toe technique area.

A.2. Symptoms to Look For The head-to-toe technique is a systematic approach used when performing a victim evaluation. Traditionally, a head-to-toe technique examination starts with the head. However, most medical authorities now recommend examining the neck first in an effort to detect possible spinal injuries. During a head-to-toe technique examination, look for the following:

- Discolorations.
- Deformities.
- Penetrations.
- Wounds/bleeding.
- Any unusual chest movements.

A.3. Symptoms to Feel For During a head-to-toe technique examination, feel for the following:

- Deformities.
 - Tenderness.
 - Abnormal hardness.
 - Abnormal softness.
 - Spasms.
 - Skin temperature.
-

A.4. Symptoms to Listen For	During a head-to-toe technique examination, listen for unusual breathing sounds.
A.5. Protective Equipment	First responders wear all necessary PPE, such as exam gloves, when conducting a head-to-toe technique examination.
A.6. Procedures	<p>When performing an evaluation of the head:</p> <ul style="list-style-type: none">• Kneel beside the victim's head.• Check for breathing by visually observing the rise and fall of the chest and by listening and feeling for the victim's breath.• Quickly take a visual overview of the victim's body.• Gently slide your hands, palms up, under both sides of the victim's neck to check the back of the neck and base of the skull for tenderness and deformity.• Visually inspect the front of the victim's neck for indications of injury, such as a deviated trachea (breathing tube) from the midline of the neck, bruises, deformities, and/or penetrating injuries. If unconscious, assume the victim has a spinal injury.• Inspect the victim's scalp starting at the top of the head and gently run your fingers through the victim's hair, keeping the victim's head immobile to avoid aggravating an existing spinal injury and to prevent further injuries. Gently use your hands and fingers, as any pressure on the scalp might drive bone fragments or dirt into wounds.• Inspect the victim's face for deformities and depressions by visually examining facial bones for signs of fractures. If injuries are not visible, gently use your hands to feel the cheekbones, forehead, and lower jaw. Inspect the victim's ears and nose, while keeping the head immobile, for cuts, tears, burns, and the presence of blood or clear fluids.

NOTE: **Blood and clear fluids in the ears or nose are strong indicators of a skull fracture.**

A.7. Chest

Gently feel the following areas of the chest for possible unseen fractures:

- Clavicles (collarbones): Use your fingers to feel for deformities or tenderness.
- Sternum (breastbone): Use your fingers to feel for deformities or tenderness.
- Rib cage: Place your hands on both sides of the rib cage and apply gentle pressure. If there is a fracture of the rib cage, the compression causes pain.
- Scapulae (shoulder blades): Slide your hands under the shoulder blades and feel for deformities or tenderness.

A.8. Abdomen

When performing an evaluation of the abdomen:

- Visually inspect the abdomen for obvious signs of injuries, such as abdominal distension, cuts, bruises, penetrations, open wounds with protruding organs (evisceration), or burns.
 - Gently feel the victim's entire abdomen for tenderness, tight (rigid), or swollen (distended) areas while noting attempts to protect the abdomen (e.g., victim drawing up the legs) or facial expressions indicating pain (e.g., grimacing).
 - Gently slide your hands under the void created by the curve of the spine and apply gentle pressure to check the victim's lower back for point tenderness and deformities. Postpone this step until the victim's entire back is exposed during preparation for being placed on a stretcher/litter.
 - Visually inspect the victim's pelvis for obvious injuries.
 - Gently slide your hands down both sides of the small of the victim's back and apply compression downward and then inward to check the stability of the pelvic girdle (hips), feeling for deformities and noting responses from the victim. Hip joint injury or fracture to the pelvis is possible if a grating sound is heard.
 - Visually inspect for obvious injuries to the genital region such as bleeding wounds, objects impaled in the area, or burns.
-

A.9. Lower Extremities

When performing a patient evaluation of the lower extremities:

- DO NOT move, lift, or rearrange the victim's lower extremities (legs and feet) before or during the examination to avoid further injury.
 - Visually inspect for obvious injuries by inspecting each limb, one at a time, from hip to foot comparing each limb to the other as you go.
 - If there are not any obvious injuries, rearrange or remove clothing and footwear in a manner that does not aggravate any possible injuries, such as cutting along the seams and removing only enough to examine the affected area to prevent or mitigate shock.
 - Gently slide your hands down both sides of each leg and over each foot, checking for tenderness or deformities and noting responses from the victim.
 - Check for impaired capillary refill due to possible injury (e.g., shock, major artery supplying the limb being pinched, severed, blocked, etc.) or from splints or bandages.
 - Pinch and release each toe. The color (blood) should return to the area immediately. If more than 2 seconds pass before color returns, consider capillary refill as delayed. If applying splints or bandages, check for capillary refill again to make sure circulation is not impaired.
 - Check for nerve function and possible paralysis of lower extremities. A victim's inability to perform the following tasks might be an indication of nerve damage. When nerve damage is suspected, assume the victim has a spinal injury.
 - Without allowing the victim to see you or your actions, touch a toe on each foot and ask the victim which toe you are touching.
 - If the victim cannot feel your touch or if the sensations in each foot are not the same, assume nerve damage in the limb or a spinal injury has occurred.
 - If sensations appear normal and no injuries are present, have the victim wiggle his or her toes.
 - Ask the victim to press the soles of his or her feet gently against your hand.
-

**A.10. Upper
Extremities**

When performing a patient evaluation of the upper extremities:

- DO NOT move, lift, or rearrange the victim's upper extremities (arms and hands) before or during the examination to avoid further injury to the victim.
 - Visually inspect for obvious injuries by inspecting each arm, one at a time, from shoulder to hand comparing each arm to the other as you go.
 - If there are not any obvious injuries, rearrange or remove clothing and hand wear in a manner that does not aggravate any possible injuries, such as cutting along the seams and removing only enough to examine the affected area to prevent or mitigate shock.
 - Gently slide your hands down both sides of each arm and over each hand checking for tenderness, swelling, bruising, or deformities and noting any painful responses from the victim, as any of these might indicate a fracture.
 - Check for capillary refill.
 - Check for nerve function and possible paralysis of the upper extremities by asking the victim to squeeze your fingers as hard as possible to evaluate strength in each hand. The inability of the victim to perform this task might be an indication of nerve damage.
 - If there are no indications of injury to the head, neck, spine, upper or lower extremities, chest, or abdomen, gently roll the victim, as a unit, toward your knees and inspect the surface of the back for bleeding or obvious injuries. Postpone until the victim's entire back is exposed during preparation for being placed on a stretcher or litter.
-

Section B: Personnel Casualty Immobilization and Transportation

B.1. Overview

The purpose of patient immobilization is to:

- Prevent spinal column damage or injury during care and transport.
- Stabilize damage or injury to the spinal column to prevent aggravation during care and transport.
- Minimize additional stress and secure a victim with a suspected spinal column injury to a Stokes or search and rescue litter.
 - With a spinal column injury, such as a fracture, the spinal cord might be crushed, cut, or otherwise damaged so severely that paralysis or death might occur. A recovery is possible if the spinal cord is not damaged seriously and the victim is properly cared for (including proper patient immobilization).
 - During spinal column injuries, any twisting or bending of the neck or back is likely to cause irreparable damage to the spinal cord.

B.2. Immobilization Procedures

Immobilize any victim suspected of having a spinal column injury. Place the victim on an approved stretcher/litter before transporting and station a crewmember at the victim's head to maintain C-spine. To place the victim on the stretcher or litter, use the log roll method or straddle slide method.

B.2.a. Log Roll Method

The log roll method has the crewmembers roll the victim onto his or her side and then roll the victim back onto the approved stretcher/litter. When immobilizing the spinal column using the log roll method:

- Four crewmembers position just below the shoulders, at the head/neck, at the waist, and at the knees, all on the same side of the victim.
 - As a single unit, the crewmembers roll the victim towards themselves on command of the crewmember stationed at the head of the victim, aware this crewmember is maintaining C-spine precaution.
 - Position the stretcher/litter beneath the victim with victim's back facing the stretcher/litter. Do not place anything on the stretcher/litter as it might cause unnecessary movement of the victim's spine and neck.
 - As a single unit, roll the victim back onto the stretcher/litter.
 - Secure the victim on the stretcher/litter using straps. Begin with the trunk of the body and work your way down to the feet. Secure the head last. The crewmember stationed at the victim's head maintains C-spine precaution throughout the entire securing process.
-

**B.2.b. Straddle
Slide Method**

The straddle slide method has the crewmembers slide the stretcher/litter under the victim while being held immobile. Use it when a victim is in a narrow space or passageway and there is no room for the rescuers to kneel beside the victim.

When immobilizing the spinal column using the straddle slide method:

- Four crewmembers take positions: three straddling the victim at the head/neck, just below the shoulders, at the hips, and one kneeling at the victim's head with a stretcher/litter.
- The crewmember at the head/neck supports the victim's head and neck while he or she, along with the two crewmembers positioned just below the shoulders and at the hips, as a single unit, lift the victim.
- The crewmember positioned at the victim's head slides the stretcher/litter under the victim.
- As a single unit, the three crewmembers lower the victim onto the stretcher/litter.
- Secure the victim onto the stretcher/litter.

WARNING:

Four is the optimum number of crewmembers needed (two on each side) when lifting and transporting a victim. More crewmembers ensure an easier transportation process on the victim and the crew. Two crewmembers can exacerbate the injury or cause more injuries.

**B.3.
Transporting**

- Lift the victim using the handles on the stretcher/litter only if there are a sufficient number of crewmembers available.
 - Carry the victim with his or her head facing the direction traveled.
-

Appendix A: Glossary & Acronyms

AFFF	Aqueous film forming foam.
APC	Aqueous potassium carbonate.
ATC	Air test cap.
BTL	Bottle.
C	Ceiling.
CBR	Chemical, biological, and radiological warfare.
CBRNE	Chemical, biological, radiological, nuclear, high-yield explosive.
CIWS	Close-In Weapons System.
CO/OIC	Commanding officer/officer in charge.
CO₂	Carbon dioxide.
Cold work	A term used for operations involving inspections, cleaning, or minor repair where no hot work will be conducted. Examples include space inspections, spray painting, chemical cleaning, and the use of any strippers, thinners, paints, or cleaners that produce vapors.
Compt	Compartment.
DC	Damage control.
DCTT	Damage control training team.
DOPR	Diesel oil purifier room.
EEBD	Emergency escape breathing device.
EMCON	Emission control.
EO	Engineer officer.
EOW	Engineering officer of the watch.

EPO	Engineering petty officer.
FB	Fire boundary.
FCCS	Flooding Casualty Control Software.
FFW	Firefighting water.
FM 200	A fire suppression agent used as an alternative to Halon 1301 in new ship design applications. Also known as heptafluoropropane (HFP). FM 200 is a colorless, odorless, and electrically non-conducting gas.
FO	Fuel oil.
FORCECOM	U.S. Coast Guard Force Readiness Command.
F/O/Supply	Fuel oil supply.
FOWK	Fuel, oil, and water king.
FPL	Fire plug.
FR	Frame.
GE	General emergency.
GFE	Gas free engineer.
GFEA	Gas free engineer assistant.
GFEP	Gas free engineering personnel.
GM	Metacentric height.
GPOW	Gangway petty officer of the watch.
GQ	General quarters.
Gr Lckr	Gear locker.
H2S	Hydrogen sulfide.
Halon 1301	A fire suppression agent. Known chemically as bromotrifluoromethane. For shipboard installation, Halon 1301 is super-pressurized with nitrogen and stored in gas cylinders as a liquid. When released, it vaporizes to a colorless, odorless gas with a density approximately five times that of air.

HAZMAT	Hazardous material.
HERO	Hazardous electromagnetic radiation to ordnance.
ID	Identification.
IDLH	Immediately dangerous to life and health.
IET	Inport emergency team.
IPDS	Improved point detection system.
IPDS-LR	Improved point detection system life cycle replacement.
LB	Pound.
LPA	Low-pressure air.
Mag.	Magazine.
mg/m³	Milligrams per cubic meter of air.
mm	Millimeter.
Main Ctrl	Main control.
MSFD	Machinery space firefighting doctrine.
NIOSH	National Institute for Occupational Safety and Health.
OOD	Officer of the deck.
OSL	On-scene leader.
PECU	Portable exothermic cutting unit.
PEL	Permissible exposure limit.
PKP	Potassium bicarbonate powder.
POC	Point of contact.
PPE	Personal protective equipment.

PRI	Primary.
QAWTD	Quick acting watertight door.
R-22	An air conditioning refrigerant of choice for more than four decades. Unfortunately, R-22 contributes to ozone depletion and is being replaced by R-134.
R-134	An air conditioning refrigerant with properties similar to R-22, but with less ozone depletion potential.
R&A	Rescue and assistance.
RF	Radio frequency.
Rm	Room.
RRT	Rapid response team.
SB	Smoke boundary.
SCBA	Self-contained breathing apparatus.
SEC	Secondary.
SOP	Standard operating procedure.
SOPA	Senior officer present afloat.
STRM	Storeroom.
TTP	Tactics, techniques, and procedures.
V	Volt.
Wks	Workshop.
WTD	Watertight door.
XO/XPO	Executive officer/executive petty officer.

Appendix B: Inport Checklist for Toxic Gas Bill

Inport Checklists for Toxic Gas Bill	
OOD Actions	
	<p>Ring the bell rapidly for 5 seconds.</p> <p>Pipe over the 1MC:</p> <p>For leak of known origin:</p> <p>“Toxic gas, toxic gas. There is _____ gas present in compartment(s) _____. Duty section, investigate. All other hands stand clear of (name of compartment). All personnel on today’s duty section lay to the repair locker. All personnel not on today’s duty section lay to the flight deck/muster point.”</p> <p>For leak of unknown origin:</p> <p>“Toxic gas, toxic gas. There is a toxic gas of unknown origin present in compartment(s) _____. Toxic Gas Response Team, investigate. All other hands stand clear of (name of compartment). All personnel in today’s duty section lay to [repair locker furthest from toxic gas]. All personnel not in today’s duty section lay to the flight deck/muster point.”</p> <p>Ring the bell rapidly for 5 seconds.</p>
	Secure the brow to all non-essential traffic.
	Establish communications to repair locker via phone or radio.
	Order toxic gas boundaries.
	Repeat applicable pipe every 5 minutes.
	After trunked fan is set up, pipe over the 1MC: <i>“All hands stand clear of ventilation equipment and ventilation exhaust.”</i>
	Notify the Fire Department, adjacent commands.
	Direct the gas free engineer (GFE) or gas free engineer assistant (GFEA) to test compartments, working toward the affected space.
	When GFE/GFEA certifies the space safe for personnel, pipe over the 1MC: <i>“Compartment (number), (noun name) is now open for normal use.”</i>
	Don SCBAs.
	Obtain pass-down from the OSL on status of boundaries, personnel casualties, and installed ventilation.
	Locate and isolate the source of toxic gas.
	Obtain NIOSH information for the substance causing the toxic gas.
	While wearing proper PPE, begin clean up of source per NIOSH (if necessary).
	Set up trunked fan or appropriate equipment to ventilate compartment per the Toxic Gas Hazards table in B.2 List of Toxic Gases/Vapors , page 6-5.
	Request OOD pipe over the 1MC for all hands to stand clear of ventilation equipment and ventilation exhaust before energizing RAM FAN.
	Request GFE conduct atmospheric tests.
	Stand down from Toxic Gas Bill once GFE/GFEA has certified space safe for personnel.

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Appendix C: Underway Checklist for Toxic Gas Bill

Underway Checklists for Toxic Gas Bill	
OOD Actions	
	<p>Ring the bell rapidly for 5 seconds.</p> <p>Pipe over the 1MC:</p> <ul style="list-style-type: none"> • For leak of known origin: “Toxic gas, toxic gas. There is _____ gas present in compartment(s) _____. Rapid Response Team, investigate. All hands stand clear of (compartment name).” • For leak of unknown origin: “Toxic gas, toxic gas. There is a toxic gas of unknown origin present in compartment(s) _____. Rapid Response Team, investigate. All other hands stand clear of (name of compartment).” <p>Ring the bell rapidly for 5 seconds.</p>
	Repeat applicable pipe every 5 minutes.
	Upon recommendation of the EO/EPO, establish a safe course with appropriate relative winds across the decks to allow for ventilation of the affected space.
Toxic Gas Response Team Actions	
	Don SCBAs.
	Confirm reported location of toxic gas location (compartment number and noun name) to the pilothouse.
	Set and maintain toxic gas boundaries.
	Verify that the affected area is clear of personnel.
	Rescue any personnel overcome by the gas in the affected space (EEBDs can be given to conscious victims).
	Secure installed ventilation to the affected space unless ventilation is designed to remove toxic gas.
	Locate and isolate the source of toxic gas.
	Request reliefs/assistance from locker if needed.
	Set up the trunked fan to ventilate with Attack Team’s assistance.
	Request gas free engineer (GFE) conduct atmospheric tests.
	Request OOD pipe over the 1MC for all hands to stand clear of ventilation equipment and ventilation exhaust before energizing trunked fan.

CGTTP 3-91.5
 Repair Party for Small Cutter (175 Feet & Smaller)

EO/EPO	
	Establish communications via phone or radio.
	Confirm toxic gas boundaries are set with toxic gas response team.
	Look up NIOSH for toxin. Pass PPE needed to response personnel.
	After trunked fan is set up, pipe over the 1MC: <i>“All hands stand clear of ventilation equipment and ventilation exhaust.”</i>
	Have gas free engineering personnel (GFEP) calibrate gas free equipment and commence inward testing towards compartment.
Attack Team Actions	
	Don SCBAs.
	Obtain pass-down from the OSL and investigators on status of boundaries, personnel casualties, and installed ventilation.
	Locate and isolate the source of toxic gas.
	While wearing proper PPE, begin clean up of source per NIOSH (if necessary).
	Set up trunked fan to ventilate compartment with OSL’s assistance.
	Request OOD pipe over the 1MC for all hands to stand clear of ventilation equipment and ventilation exhaust before energizing the trunked fan.

Appendix D: Checklist for Shipboard Fires

Checklists for Shipboard Fires	
(checklist is scalable)	
	Fire/smoke reported in compartment _____.
	Check fire main pressure (P-100 required? Yes or No).
	Repair lockers manned/ready: Yes _____ No _____.
	Investigators out - Time _____.
	Order fire boundaries set (6 sides, Topside critical).
	Order smoke boundaries set (smoke curtains/blankets).
	Order electrical isolation.
	Order mechanical isolation.
	Secure ventilation.
	Secure fuel transfer.
	Space evacuated/casualties.
	OOD notified.
	Notify TACON.
	Call 911 if inport.
	Class of fire: Alpha/Bravo/Charlie/Delta.
	Fuel source secured.
	Electrical power secured.
	Installed firefighting systems activated.
	Status of flammable/explosive spaces near affected compartment.
	Check DC diagrams for color code per reference (f), Surface Ship Survivability CGTTP/NTTP 3-20.31 (series).

CGTTP 3-91.5
 Repair Party for Small Cutter (175 Feet & Smaller)

	Magazine/fuel tanks/storerooms/compartments with batteries.
	Off duty ship's personnel required/back-up fire party location.
	Self-contained breathing apparatus (SCBA) change-out area set up (water, firefighter protective gear, spare SCBA bottles).
	Investigators report at least every 15 minutes.
	Fire/smoke boundaries set:
	Fire boundary (FB) time.
	Smoke boundary (SB) time.
	Status of mechanical/electrical isolation.
	SCBA activation times (except investigators).
	Space entered (direct/indirect) - Time _____.
	Forcible entry required/portable exothermic cutting unit (PECU).
	Status of dewatering space firefighting water (FFW) (affecting stability, high/low in ship).
	Coordinate reliefs (SCBA change-out).
	Fire out - Time _____.
	Reflash watch set - Name _____.
	Desmoke (with EO/EPO's permission for installed ventilation).
	Oxygen test.
	Explosive test.
	Toxic test.
	Stand down from GE. Re-man the watch.
	Major fire/vital system restoration (coordinate with EOW).
	Post fire-damage report.

Appendix E: Additional Resources

CART Checklists	
	<ul style="list-style-type: none">• http://cgweb.comdt.uscg.mil/CG-751/programs/CART.htm (Select the Damage Control (DC) link.)
Other useful references	
	<ul style="list-style-type: none">• Sound-Powered Telephone Talkers Manual, COMDTINST M9430.1.• Chemical, Biological, Radiological and Nuclear (CBRN) Policy for Coast Guard Expeditionary Forces, COMDTINST 3400.4 (series).• Cutter Standard Repair Party Locker Inventory, COMDTINST 9664.1 (series).• Standard Repair Party Manual for Naval Surface Force, COMNAVSURFORINST 3541.1 (series).• Naval Ships' Technical Manual (NSTM), Chapter 470, Shipboard BW/CW Defense and Countermeasures, S9086-QH-STM-010 (series)

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Index

Acronyms	A-1	Isolation lists	
Alarms	2-7	Example.....	4-3
Casualty procedures		General.....	4-2
Head-to-toe technique	9-2	Repair locker	
Immobilization and transportation		Materials and publications.....	2-2
Log roll method.....	9-7	Organization	2-4
Straddle side method	9-8	Ship stability and flooding control	
DC materials for command	2-3	Jettison bill.....	7-5
Firefighting		Modified Zebra bill	7-6
Checklist for shipboard files.....	D-1	Procedures after damage.....	7-3
Machinery space firefighting doctrine	5-4	Required and available stability.....	7-2
Magazine sprinkler control valves (example)		Strip ship and clear ship procedures	8-2
.....	5-7	Toxic Gas Bill	
Methods	5-5	Inport checklist.....	B-1
Shipboard	5-2	Responsibilities.....	6-2
Smoke control.....	5-8	Sources/types of toxic gases.....	6-4
Further reading.....	E-1	Underway checklist	C-1
Investigating damage		Underway checklist for Toxic Gas Bill.....	C-1
DC communications.....	3-5	Underway R&A bill	2-5
Procedures	3-2		