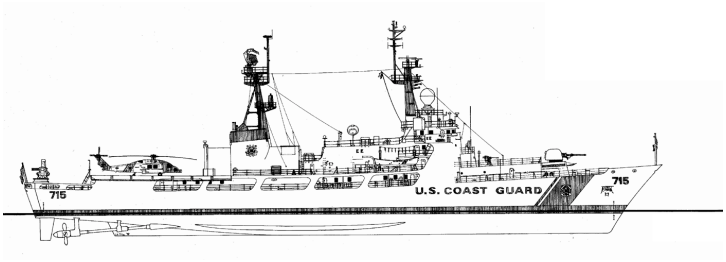
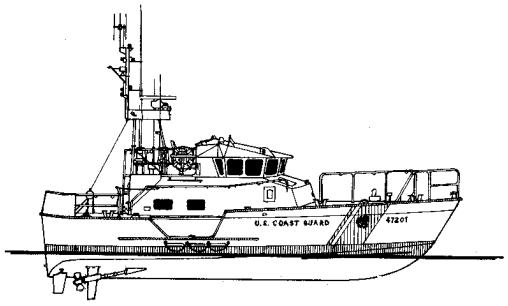
U.S. Department
of Transportation

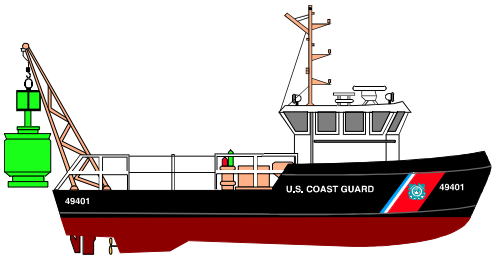
**United States
Coast Guard**

TEAM COORDINATION TRAINING EXERCISES & CASE STUDIES





Boats, Cutters, & ATON



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TEAM COORDINATION TRAINING EXERCISES & CASE STUDIES

INDEX

Section I: Class Exercises

Section II: Case Studies

Section II: Case Studies

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Section I: Class Exercises

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SKILLS DEMONSTRATED IN EXERCISES

Exercise	Prominent Skill	Reference
Galley Exercise	TCT Intro. Decision Making	I – 5
Attitude Survey	Leadership	I – 7
Missing at Sea	Mission Analysis Leadership Decision-Making	I – 15
Judgment Exercise	Adaptability and Flexibility	I – 17
How Much Stress in Your Life	Adaptability and Flexibility	I – 25
Hijacking at Sea	Decision-Making	I – 29
Finished Files Exercise	Situational Awareness	I – 31
Murder One	Communication	I – 33
The Farmer's Land	Decision-Making	I – 45
Hidden Squares	Decision-Making	I – 47
Arithmetic Test	Communication	I – 49
The Ferry Boat Story	Communication	I – 51
Communications Exercise	Communication	I – 53
Broken Squares	Communication Assertiveness	I – 55

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GALLEY EXERCISE

A Petty Officer had just turned off the lights in the Galley when a man appeared and demanded money. The Subsistance Specialist opened a cash box. The contents of the cash box were scooped up, and the man sped away. A member of Security was notified promptly.

Statements About the Story

1. A man appeared after the Subsistance Specialist had turned off the lights in the galley. T F ?
2. The robber was a man. T F ?
3. The man did not demand money. T F ?
4. The man who opened the cash box was the Subsistance Specialist. T F ?
5. The Subsistance Specialist scooped up the contents of the cash box and ran away. T F ?
6. Someone opened a cash box. T F ?
7. After the man who demanded the money scooped up the contents of the cash box, he ran away. T F ?
8. While the cash register contained money, the story did not state how much. T F ?
9. The robber demanded money of the Subsistance Specialist. T F ?
10. The story concerns a series of events in which only three persons are referred to: The Subsistance Specialist, a man who demanded money, and a member of Security. T F ?
11. The following events in the story are true: Someone demanded money, a cash box was opened, its contents were scooped up, and a man dashed out of the galley. T F ?

Adapted from:
A Handbook of Structured Experiences for Human Relations Training, Volume V
J. William Pfeiffer and John E. Jones, Editors

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ATTITUDE SURVEY

SCALE

A	**B**	**C**	**D**	**E**
Always/ Agree	Often/ Agree Slightly	Occasionally/ Neutral	Seldom/ Disagree Slightly	Never/ Disagree

____1. Crew members should avoid disagreeing with others because conflicts create tension and reduce crew effectiveness.

____2. Vessel crew members should feel obligated to mention their own psychological stress or physical problems to other crew members before getting underway or during a mission.

____3. It is important to avoid negative comments about the procedures and techniques of other crew members.

____4. The CO/OIC/DWO/Coxswain should dictate all procedures to other crew members.

____5. Casual, social conversation during periods of low workload can improve crew performance.

____6. Each crew member should monitor other crew members for signs of stress or fatigue, and should discuss the situation with the crew member.

____7. Good communications and crew coordination are as important as technical proficiency for safe vessel operations.

____8. Crew members should be aware of, and sensitive to, the personal problems of other crew members.

____9. The CO/OIC/DWO/Coxswain/Buoy Deck Supervisor should <u>verbalize</u> plans for procedures or maneuvers and should be sure that the information is understood and acknowledged by crew members affected.

SCALE

A	B	C	D	E
Always/ Agree	Often/ Agree Slightly	Occasionally/ Neutral	Seldom/ Disagree Slightly	Never/ Disagree

___10. Other crew members should not question the decisions or actions of the CO/OIC/DWO/Coxswain/Buoy Deck Supervisor except when these actions threaten the safety of the vessel or the crew.

___11. Crew members should alert others to their actual or potential work overloads.

___12. Even when fatigued, I perform effectively during critical vessel operations.

___13. The CO/OIC/DWO/Coxswain/Buoy Deck Supervisor should encourage other crew members to question procedures during normal operations and in emergencies.

___14. A debriefing and critique of procedures and decisions is an important part of developing and maintaining effective crew coordination.

___15. My performance is adversely affected by working with an inexperienced or less capable crew member.

___16. Overall, successful mission accomplishment is primarily a function of the technical proficiency of the CO/OIC/DWO/Coxswain/Buoy Deck Supervisor.

___17. Training is one of the most important responsibilities of the CO/OIC/DWO/Coxswain/Buoy Deck Supervisor.

___18. Good crew coordination is more important in emergency or abnormal situations than in normal routine operations.

___19. The pre-mission crew briefing is important for safety and for effective crew management.

___20. Effective crew coordination requires crew members to take into account the attitudes, personalities and values of other crew members.

SCALE

A	**B**	**C**	**D**	**E**
Always/ Agree	Often/ Agree Slightly	Occasionally/ Neutral	Seldom/ Disagree Slightly	Never/ Disagree

___21. The responsibilities of the CO/OIC/DWO/Coxswain/Buoy Deck Supervisor includes coordination of other crew personnel.

___22. A truly professional crew member can leave the effects of personal problems behind when performing his/her job.

___23. My decision making ability is as good in emergencies as in routine mission situations.

___24. Training during normal missions can be accomplished without affecting safety and mission accomplishment.

___25. Leadership of the crew team is expected to come solely from the CO, or in his/her absence the CO/OIC/DWO/Coxswain/Buoy Deck Supervisor.

___26. Questions and suggestions from everyone should be considered by the CO/OIC/DWO/Coxswain/Buoy Deck Supervisor.

___27. When joining a crew for the first time, a new crew member should willingly offer suggestions or opinions even if not asked.

___28. Aboard the vessel, it is reasonable to expect that status or seniority differences among crew members will create barriers that threaten mission safety and crew effectiveness.

___29. A CO/OIC/DWO/Coxswain/Buoy Deck Supervisor who accepts and implements suggestions from the crew lessens his/her stature and reduces his/her authority.

___30. Vessel crews that work together as a team, know what is expected of them, and communicate problems to others can greatly reduce risk in any operation.

SCORING KEY FOR TEAMWORK

Scoring Instructions

Circle the score you obtained for each listed question. Question numbers are in the left column. Answers are in the top row. Find your answer for each question and circle the value in the corresponding row and column. For example, if your response to question "4" was "D" you would circle "4". Do this for each of the 10 questions below.

Question Number	A Always	B Often	C Occasionally	D Seldom	E Never
4	1	2	3	4	5
16	1	2	3	4	5
17	5	4	3	2	1
19	5	4	3	2	1
21	5	4	3	2	1
24	5	4	3	2	1
26	5	4	3	2	1
27	5	4	3	2	1
29	1	2	3	4	5
30	5	4	3	2	1

Add the circled items and place your score below:

TEAMWORK: _____

SCORING KEY FOR COMMUNICATION

Scoring Instructions

Circle the score you obtained for each listed question. Question numbers are in the left column. Answers are in the top row. Find your answer for each question and circle the value in the corresponding row and column. For example, if your response to question "1" was "A" you would circle "1". Do this for each of the 10 questions below.

Question Number	A Always	B Often	C Occasionally	D Seldom	E Never
1	1	2	3	4	5
3	1	2	3	4	5
5	5	4	3	2	1
6	5	4	3	2	1
7	5	4	3	2	1
8	5	4	3	2	1
9	5	4	3	2	1
10	1	2	3	4	5
13	5	4	3	2	1
14	5	4	3	2	1

Add the circled items and place your score below:

COMMUNICATION: _____

SCORING KEY FOR PERSONAL LIMITATIONS

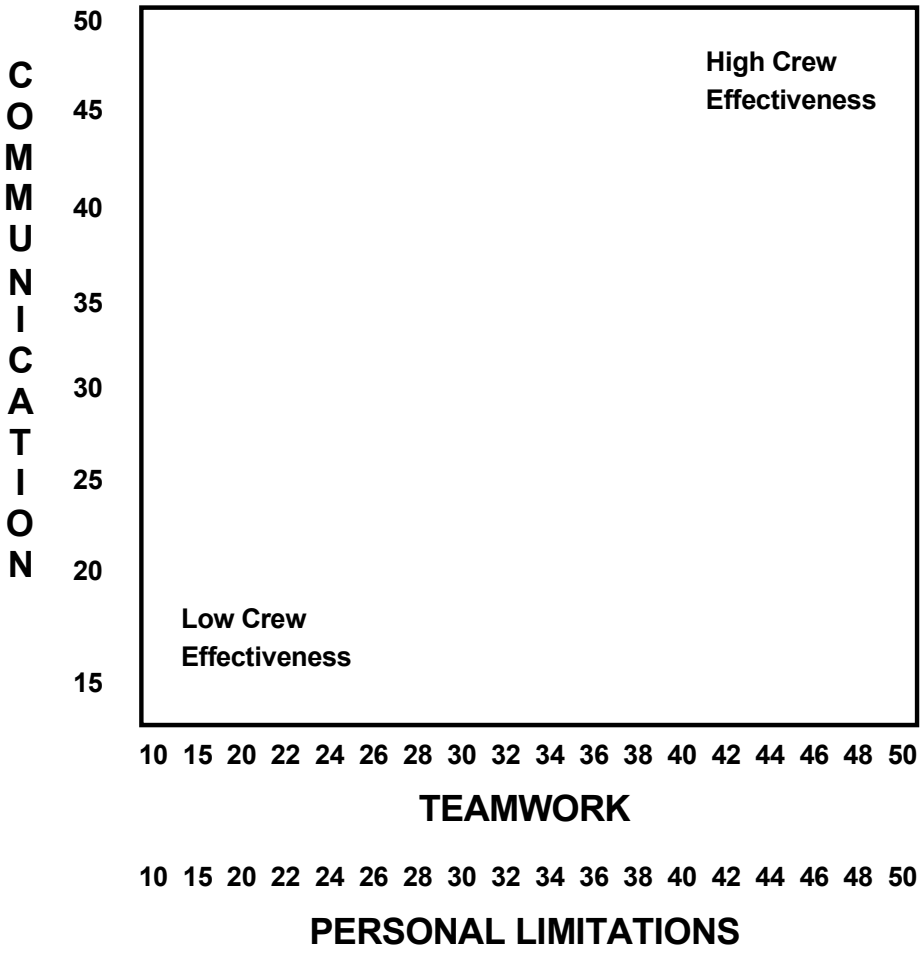
Scoring Instructions

Circle the score you obtained for each listed question. Question numbers are in the left column. Answers are in the top row. Find your answer for each question and circle the value in the corresponding row and column. For example, if your response to question "2" was "B" you would circle "4". Do this for each of the 10 questions below.

Question Number	A Always	B Often	C Occasionally	D Seldom	E Never
2	5	4	3	2	1
11	5	4	3	2	1
12	1	2	3	4	5
15	5	4	3	2	1
18	1	2	3	4	5
20	5	4	3	2	1
22	1	2	3	4	5
23	1	2	3	4	5
25	1	2	3	4	5
28	1	2	3	4	5

Add the circled items and place your score below:

PERSONAL LIMITATIONS: _____


COMMUNICATION
50
45
40
35
30
25
20
15
High Crew Effectiveness
Low Crew Effectiveness
10 15 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50
TEAMWORK
10 15 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50
PERSONAL LIMITATIONS

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MISSING AT SEA

Individual

You are adrift on a private yacht in the South Pacific. As a consequence of a fire of unknown origin, much of the yacht and its contents have been destroyed. The yacht is now slowly sinking. Your location is unclear because of the destruction of critical navigation equipment and because you and the crew were distracted trying to bring the fire under control. Your best estimate is that you are approximately one thousand miles south-southwest of the nearest land.

Below is a list of the fifteen items that are intact and undamaged after the fire. You also have a life raft and oars. The life raft is large enough to carry you, the crew, and all the items listed below. The total contents of all survivors' pockets are a pack of cigarettes, several books of matches, and five one-dollar bills.

Your task is to rank the fifteen items below in terms of importance. Place the number 1 by the most important item, the number 2 by the second most important, and so on through number 15, the least important.

_____ Sextant
_____ Shaving Mirror
_____ Five-gallon can of water
_____ Mosquito netting
_____ One case of U.S. Army C rations
_____ Maps of the Pacific Ocean
_____ Seat cushion (flotation device approved by the CG)
_____ Two-gallon can of oil-gas mixture
_____ Small transistor radio
_____ Shark repellent
_____ Twenty square feet of opaque plastic
_____ One quart of 160-proof Puerto Rican rum
_____ Fifteen feet of nylon rope
_____ Two boxes of chocolate bars
_____ Fishing kit

Missing At Sea Exercise
Adapted from:
Structured Experience Kit
UNIVERSITY ASSOCIATES Publishers, Inc., 1980

MISSING AT SEA
Group

Your group is to employ the group consensus method in reaching its decision. This means that each group member must agree upon the ranking for each of the 15 survival items. Consensus is difficult to reach. Not every ranking is expected to meet everyone's complete approval. Try to make each ranking one with which all group members can at least partially agree. Here are some guides to use in reaching consensus.

1. Avoid arguing for your own individual judgments. Approach the task with logic; keep emotions in check.

2. Avoid changing your mind if it is only to reach agreement. Support only solutions with which you are able to agree at least somewhat.

3. Avoid "conflict-reducing" techniques such as majority vote, averaging, or trading in reaching your decision.

4. View differences of opinions as a help rather than a hindrance in decision making.

_____ Sextant
_____ Shaving Mirror
_____ Five-gallon can of water
_____ Mosquito netting
_____ One case of U.S. Army C rations
_____ Maps of the Pacific Ocean
_____ Seat cushion (flotation device approved by the CG)
_____ Two-gallon can of oil-gas mixture
_____ Small transistor radio
_____ Shark repellent
_____ Twenty square feet of opaque plastic
_____ One quart of 160-proof Puerto Rican rum
_____ Fifteen feet of nylon rope
_____ Two boxes of chocolate bars
_____ Fishing kit

JUDGMENT EXERCISE

INSTRUCTIONS

1. Use the answer sheet on the next page for your responses.

2. Read each of the situations and the five choices given.

3. Each situation asks you to predict why a person chose a particular course of action. Decide on the most probable reason for the course of action selected by the person and place the number 5 in the space provided on the answer sheet.

4. Continue by placing the number 4 by the next most probable reason, and so on until you have filled all five blanks with ratings of 5, 4, 3, 2, and 1.

5. Remember, 5 indicates the most probable reason and 1 indicates the least probable reason.

6. Do all 10 situations and fill in each blank, even though you may disagree with the listed choices.

EXAMPLE A completed response should look like this:

Situation # 1

a. 1 (your least likely response)
b. 3
c. 5 (your most likely response)
d. 2
e. 4

SCORING SHEET

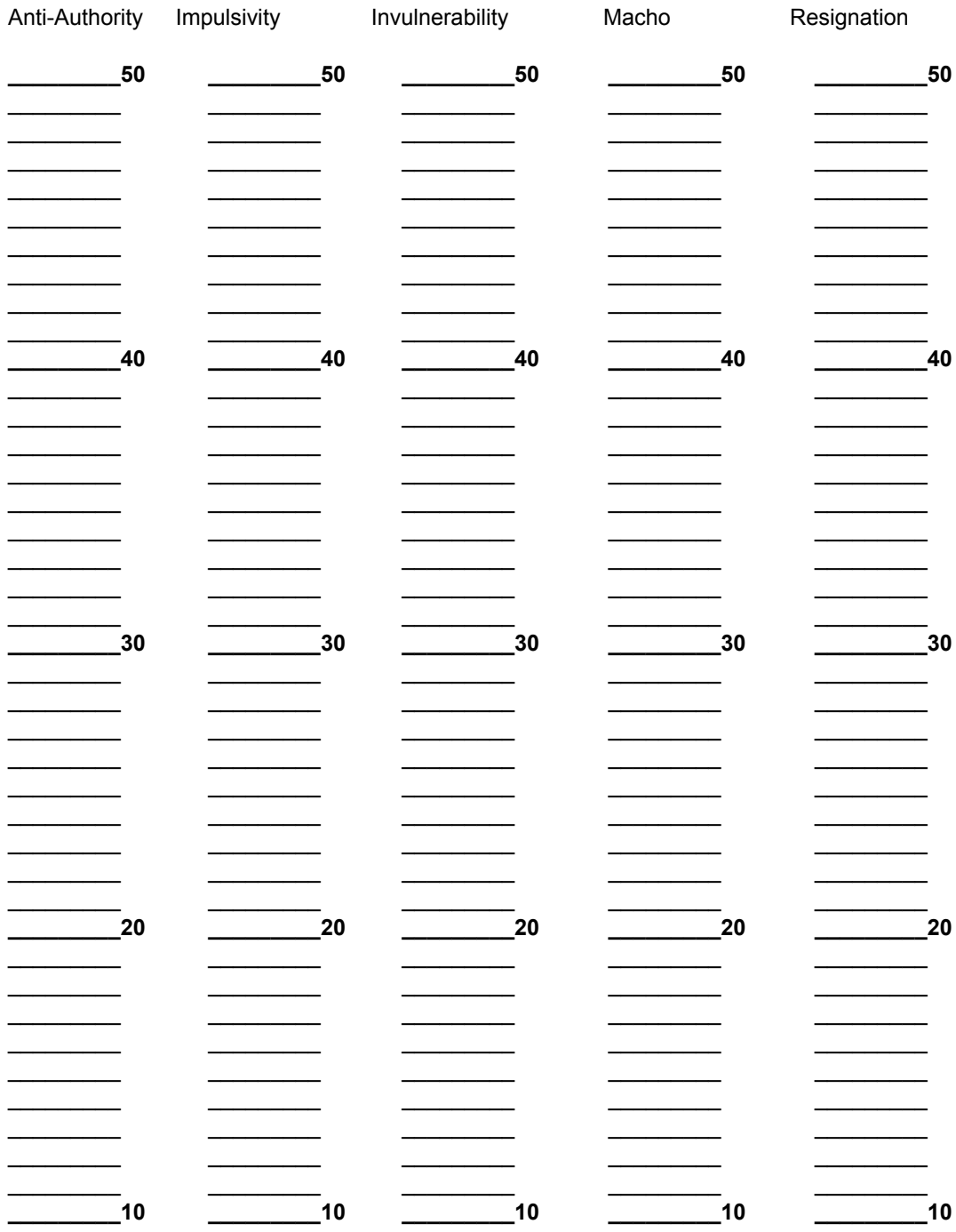
Write in the below table your number ranking for each alternative. Place your ranking number to the right of the letter. Sum the rankings for each column and enter at the bottom. These totals should then be marked on the profile sheet on the next page.

SITUATION	SCALE I	SCALE II	SCALE III	SCALE IV	SCALE V	TOTAL
1	a_____	d_____	e_____	b_____	c_____	15
2	d_____	c_____	b_____	a_____	e_____	15
3	c_____	b_____	e_____	d_____	a_____	15
4	b_____	a_____	c_____	d_____	e_____	15
5	c_____	d_____	b_____	a_____	e_____	15
6	d_____	a_____	b_____	c_____	e_____	15
7	b_____	d_____	c_____	a_____	e_____	15
8	d_____	a_____	e_____	b_____	c_____	15
9	e_____	d_____	a_____	b_____	c_____	15
10	b_____	e_____	c_____	a_____	d_____	15
Total	_____	_____	_____	_____	_____	150
	Anti-A	Impul	Invul	Macho	Resig	

The sum of the situation rankings across must be 15. If it is not, go back and make sure that you ranked the situation properly, transferred the scores correctly, and check your addition. The grand total should be 150.

PROFILE GRAPH

There are five columns, one for each of those on the preceding page. Place a line on each scale at the height that matches your score.



SITUATION 1:

Nearing the end of a long evolution, the CO of a 140' WTGB is busy preparing the vessel for docking. The destination port is reporting restricted visibility with fog, drizzle, high winds, and moderate swells. The CO has just heard a radio transmission from a vessel of similar size discussing the hazards and difficulty with a similar docking maneuver. The captain of the other ship has elected to delay his docking until weather improves. The CO elects to dock his vessel. Why do you think he would make this attempt?

a. Weather reports, even from other ships are often not accurate.
b. He feels he is more skilled than the captain who has just elected to delay the docking of his vessel.
c. He feels he might as well try since you can't change the weather.
d. He is tired and just wants to get his ship docked.
e. He feels he has always been able to complete docking maneuvers under similar conditions.

SITUATION 2:

The BM2 is a qualified heavy weather coxswain and is working weekends for a small company. This weekend he is scheduled to ferry a 48' Chris Craft with inoperable navigation and depth finding equipment through an area with shallow water and known shoals. The weather forecast calls for rain, reduced visibility and moderate winds. He decides to make the trip because...

a. He probably believes that he can adjust his track line to avoid the shoals.
b. He feels he has been in this situation many times and nothing has ever happened to him.
c. He feels he must get home in two hours and can't wait.
d. He feels he should not let an adverse weather forecast stop him; they're usually overly cautious anyway.
e. He feels there's nothing he can do about the weather anyway.

SITUATION 3:

The owner of a small pleasure boat and a friend get to the marina for a scheduled weekend outing. He quickly learns that his boat has a leaking fuel pump and will be unavailable for use until the first of the week. The marina owner offers him a substitute boat, for a nominal charge, that happens to be equipped with a fancy new marine radio, radar, and depth finding equipment that he has never used. He accepts the boat and leaves for the weekend with no additional briefing on the unfamiliar equipment. Why?

a. He feels that if the equipment were so difficult to operate, he would not have been offered the boat as a substitute.
b. He was probably in a hurry to get under way.
c. He feels that equipment checkouts are often not needed.
d. He probably does not want to admit to his friend or to the marina owner that he is not familiar with the equipment.
e. He probably won't need to use the fancy equipment anyway.

SITUATION 4:

A charter boat skipper arrives at his destination port on a quick turn-around trip. The marina operator is running behind time on refueling boats due to a personnel shortage. His prior calculation, before departing, indicated that he should have enough fuel to complete the trip with some in reserve. However, the winds for the first leg were greater than anticipated and he is not sure of the exact fuel usage for the trip, since his fuel quantity gauge is inoperable. He decides to head for home without refueling because:

a. He feels he can't waste time staying overnight because he has a charter first thing in the morning.
b. He feels that recognizing the need for fuel reserves is being overly conservative.
c. He feels the wind will probably die down for the return trip.
d. He probably does not want to admit his lack of planning in front of his passengers.
e. He feels it is not his fault the marina services are so slow; he will just have to try to make it home.

SITUATION 5:

A civilian boat owner has scheduled a Saturday outing to show a business client the local sights. On arriving at the marina, he learns that the weather forecast calls for deteriorating weather and the posting of small craft warnings. Why does he elect to proceed with his plans for the outing?

a. He probably feels he just wants to show his client his skill as a yachtsman, despite the distractions.
b. He has never had a problem in the past; and he feels that nothing is likely to go wrong.
c. He feels those "cautions" are for other, less experienced yachtsmen.
d. This boat ride around the local harbor should allow him to cement the "big deal" he's been working on and wants to get it completed.
e. Two other boats have already set out, so he feels it must be okay.

SITUATION 6:

A Coxswain on a 44' MLB is about to depart on a scheduled training evolution. As he maneuvers away from the dock he notices an abnormal engine vibration. He elects to continue without checking further. Why?

a. He has to be at his destination by five, and is already running late ; he probably feels he can have it checked there.
b. He has noticed this vibration before and nothing has ever come of it.
c. He probably does not want other crew members to think he cannot handle the boat, so he just disregards the vibration.
d. He feels that requirements for Coxswains to check minor vibrations are overly conservative.
e. The engineers just checked this boat yesterday; he feels they would have caught any real problem.

SITUATION 7:

The operator of a 42' yacht is maneuvering his vessel for docking in a congested marina. He notices another boat some distance away backing out of slip that is apparently unaware of his presence. Instead of reversing his engines, he makes a sharp turn to slip by on the port side. What was his reasoning?

a. He probably believes that a really good yachtsman can safely make it through the confined space.
b. He believes the procedures taught by the Coast Guard Auxiliary for collision avoidance are overly cautious.
c. He feels there will be no danger in making the corrections because he has done things like this in the past.
d. He knows he must avoid a collision, so he acts as soon as he can.
e. Encountering the unexpected boat is a bad break, but he knows, "you gotta stay flexible".

SITUATION 8:

The Coxswain of a 55' ANB is enroute to service a buoy when he receives a radio call requesting his position and status. He wonders why the sudden interest in his status. He is aware of heavy weather activity nearby, but there are no problems in the area where he is presently operating. He assumes he may be told to return to port until the storm passes and thinks. . .

a. His fuel is fine and he wants to complete this evolution quickly, before the storm hits.
b. He is close to port and believes he can return at any time, even in any storm that might come up.
c. He has to service the navigation aid anyway, and he can't do anything about the weather.
d. He is not going to let District tell him how to do his job.
e. He has a good crew and a fine vessel; what could possibly happen.

SITUATION 9:

Captain Jones from the Fluke Fishing Co. is on a one-day fishing trip. Immediately after putting to sea, his boat develops an electrical malfunction causing him to lose his radio, radar, and depth finder. Visibility is continually worsening and is forecast to be extremely poor on his return to port. He decides to continue the trip thinking . . .

a. The equipment is nice to have, but he has never <u>really</u> had to rely on it before.
b. He operates in marginal weather all the time and believes he can handle the weather.
c. He thinks, why worry about it, someone will help him out if he gets into trouble.
d. He feels that he had better keep going before things get so bad that has to turn around.
e. He feels that these systems are not needed for such a short trip.

SITUATION 10:

An operator of a private yacht is on the second day of a one-week cruise with some close friends when he is talked into diverting from his planned course to head for a remote island some distance away. His fuel gauge has been inoperative for about six months. Six hours into the diversion he realizes that he has not checked his fuel consumption. He does not complete the check. Why?

a. He feels that performing this check now might look like he is afraid; and he probably does not want to alarm his friends.
b. He probably feels the need to perform this check is too stringent for the situation.
c. Even though the fuel gauge is broken, he has never had a problem in the past when this check was not completed.
d. He probably feels what's the use, if you run out of fuel, you run out of fuel. Isn't that what the Coast Guard's for?
e. He probably feels he has to worry about other things and there's no time for it.

HOW MUCH STRESS IN YOUR LIFE?

To enhance your awareness about the sources of stress in your life, the following life change profile questionnaire is presented. Put the Life Change Unit (LCU) points in the "Your Score" column if you have experienced the event described in the last 12 months. Total your LCU score at the end of the questionnaire.

LIFE EVENT	LCU's	SCORE
1. Death of spouse	100	_____
2. Divorce	73	_____
3. Marital separation from mate	65	_____
4. Detention in jail or other institution	63	_____
5. Death of close family member	63	_____
6. Major personal injury or illness	53	_____
7. Marriage	50	_____
8. Being fired at work	47	_____
9. Marital reconciliation with mate	45	_____
10. Retirement from work	45	_____
11. Change in health or behavior of family member	44	_____
12. Pregnancy	40	_____
13. Sexual difficulties	39	_____
14. Gaining a new family member (e.g. through birth, adoption, oldster moving in, etc.)	39	_____
15. Major business readjustment (e.g. merger, reorganization, bankruptcy, etc.)	39	_____
16. Major change in financial state (e.g. a lot worse off, a lot better off than usual)	38	_____
17. Death of a close friend	37	_____
18. Change to a different line of work	36	_____
19. Major change in number of arguments with spouse (e.g. either a lot more or a lot less than usual regarding child rearing, personal habits, etc.)	35	_____
20. Taking out a major loan or mortgage (e.g. for a loan or business)	31	_____
21. Foreclosure of mortgage or loan	30	_____

LIFE EVENT	LCU's	SCORE
22. Major changes in responsibilities at work (e.g. promotion, demotion, lateral transfer)	29	_____
23. Son or daughter leaving home (e.g. marriage attending college, etc.)	29	_____
24. Trouble with in-laws	29	_____
25. Outstanding personal achievement	28	_____
26. Spouse begins or stops work	26	_____
27. Begin or end school	26	_____
28. Major change in living conditions (e.g. building a new home, remodeling, deterioration of home or neighborhood)	25	_____
29. Revision of personal habits (e.g. dress manners associations, etc.)	24	_____
30. Trouble with boss	23	_____
31. Major change in work hours or conditions	20	_____
32. Change in residence	20	_____
33. Change in schools	20	_____
34. Major change in type or amount of recreation	19	_____
35. Major change in church activities (e.g. a lot more or a lot less than usual)	19	_____
36. Major change in social activities (e.g. clubs dancing, movies, etc.)	18	_____
37. Taking mortgage or loan for lesser purchase (e.g. for a car freezer, TV, etc.)	17	_____
38. Major change in sleeping habits (e.g. a lot more or a lot less sleep, or change in part of day when asleep)	16	_____
39. Major change in number of family get-together (e.g. a lot more or a lot less than usual)	15	_____
40. Major change in eating habits (e.g. a lot more or a lot less food intake, or very different meal hours or surroundings)	15	_____
41. Vacation	13	_____
42. Christmas (the date of this survey is between 25 Nov - 1 Jan)	12	_____
43. Minor violations of the law (e.g. traffic tickets, jaywalking, disturbing the peace, etc.)	11	_____
TOTAL LCU's		_____

WHAT YOUR SCORE MAY MEAN

After studying the recent histories of people with medical problems, Homes and Holmes (1970) concluded that any number of illnesses, and not just commonly recognized psycho-physiological disorders, can be precipitated by the stress accompanying changes in one's life. To measure the impact of different kinds of changes, Holmes and Rahe (1967) developed the Social Readjustment Rating Scale, which rates each kind of potentially stressful event in terms of "Life Change Units" (LCU's).

In a recent study, it was found that of those persons who reported LCUs that totaled between 150 and 199 points, 37 percent had associated health changes within a 2-year period of such life crisis. Of those with between 200-299 LCUs, 51 percent reported health changes, and of those with over 300 LCUs, 79 percent had injuries or illnesses to report. On the average, health changes followed life crisis by one year.

EFFECTS OF STRESS IN YOUR LIFE

If you hope to succeed at reducing stress associated with crisis management at sea, or with your job, it is essential to begin by making a personal assessment of stress in all areas of your life. You may face major stressors such as a loss of income, serious illness, death of a family member, change in residence, or birth of a baby, plus a multitude of comparatively minor positive and negative stressors. These major and minor stressors, representing BOTH "positive" and "negative" life events, have a cumulative effect which constitutes your total stress-adaptation capability and which can vary from year to year.

Each of us has personal stress-adaptation limitations. When we exceed this level, stress overload may lead to poor health, illness, or errors in judgment. To avoid exceeding your personal limits, learn to recognize the warning signals from your body and mind telling you when stress levels are getting too high. In addition, monitor other team members for changes in their stress levels.

The Coast Guard's Work/Life Program, Employee Assistance Program, and Wellness Program can provide team members with tools/help to better manage these types of stressors.

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HIJACKING AT SEA

Drug runners have just hijacked your vessel. Your crew has been confined in separate compartments, but you can communicate with each other. You have just overheard the Drug Lord explain to his crew that:

1. Explosives have been placed on-board and will be detonated by remote control if there is any indication they have lost control of the cutter or it deviates from the planned track line.

2. A coastal freighter will approach the cutter in 30 minutes and request the transit time for the proposed trip. Time for the trip is the only information the freighter will accept. No other discussions will be permitted. The freighter will defuel the cutter and leave only sufficient fuel on board to complete the transit to a destination they select. They are aware of the capabilities of the cutter, and will compute the fuel required based on the transit time they provide. If the transit time is not exact, they will blow up the cutter.

3. The plan is to proceed from the freighter's current position to Lighthouse Point, to the buoy off Shark Point, to the dock at an isolated container yard. The information for the journey is on a stack of cards which is given to the navigator for computation.

4. In order to safeguard their plan the drug runners have converted to a new way of measuring distance and time.

Your Commanding Officer has just escaped and overcome the navigator. He hands each of you some of the cards to conceal and issues the following instructions:

1. I will be in control of the ship in exactly 20 minutes.
2. Compute the time for the journey, in the new system of measurement, and I will return for the answer in 20 minutes. We will give that information to the coastal freighter and complete the trip. Once we have docked we will evacuate the ship and be safe.
3. You can not reach the other cells to show what is on the cards but you can pass the information orally. Compute the time it will take to complete the trip as soon as possible and I will return every 10 minutes.
4. Get the time right or we will all die.

The exercise begins when all students have received their cards.

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INFORMATION PROCESSING

First read the sentence enclosed in the box below:

**FINISHED FILES ARE THE RE-
SULT OF YEARS OF SCIENTIF-
IC STUDY COMBINED WITH THE
EXPERIENCE OF MANY YEARS.**

Now count the F's in the sentence. Count them once and do not go back and count them again.

Number Counted: _____

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MURDER ONE

Instructions:

The threat of violence between various factions of organized crime, over the control of narcotics, imperils the tranquillity of your community. To combat this threat, the commissioner has directed a step-up in activity against criminal organizations within your community.

1. You are a group of top detectives who have been assigned to the Organized Crime Bureau within your department.
2. Charley "Poppa" Hasson's gang has been singled out for particular attention by your team.
3. Your task becomes complicated when murder occurs during your investigation.
4. Your task, as a group, is to single out one suspect from the members of the Hasson gang. Circumstantial evidence may be used to identify and arrest one member of the gang. The remaining six suspects must be cleared for a specific reason, which you as a group must declare at the termination of the activity. Data has been supplied regarding the suspects. Your team has all the information necessary for the solution of the case.

Assumptions:

1. Assume there is only one solution.
2. Assume that all data are correct.
3. You have forty-five minutes in which to determine a suspect.
4. Assume that today's date is July 7, 1977 and that all primary actions are taking place on this date.
5. There must be substantial agreement in your group that the problem is solved.
6. You must work the problem as a group.

MURDER ONE SUSPECT DATA SHEET

Viron, Benjamin ("Benjie") M-W-49
Height: 5'4" Weight: 220 Hair: Gray/Brown Eyes: Brown
Blood Type: B Shoe: 7½ D Tattoos: Right arm, "Mother"
Vehicle: 1973 Mercedes Dark Blue Sedan
Record: 17 arrests - Charges: Gambling, Loansharking, Extortion, Assault, Narcotics, Robbery, Rape.

Enopac, Alphonse ("Jumbo") M-W-52
Height: 5'7" Weight: 245 Hair: Black/Gray Eyes: Brown
Blood Type: A Shoe: 8 D Tattoos: Left arm, "Al & Eloise"
Vehicle: 1974 Lincoln Black Sedan
Record: 26 arrests - Charges: Gambling, Narcotics, Extortion, Assault, Statutory Rape, Homicide.

Ollag, Joseph ("Chills") M-W-52
Height: 5'7½" Weight: 180 Hair: Brown Eyes: Brown
Blood Type: A Shoe: 8 D Tattoos: None
Vehicle: 1972 Cadillac Black Sedan
Record: 20 arrests - Charges: Gambling, Narcotics, Assault, Extortion, Homicide.

Phelps, James ("Digger") M-W-52
Height: 5'7" Weight: 210 Hair: Black/Brown Eyes: Blue
Blood Type B Shoe: 7½ D Tattoos: Chest, "Blue Birds"
Vehicle: 1973 Cadillac Dark Green Sedan
Record: 30 arrests - Charges: Gambling, Narcotics, Assault, Robbery, Loansharking, Homicide.

Sutter, Edward ("Blue Eyes") M-W-51
Height: 5'7" Weight: 240 Hair: Black/Gray Eyes: Blue
Blood Type: B Shoe: 7½ D Tattoos: Right Arm, "For God & Country"
Vehicle: 1974 Chrysler Black Sedan
Record: 12 arrests - Charges: Gambling, Loansharking, Assault, Rape, Extortion.

Lagas, Franklin ("Hot Dog") M-W-50
Height: 5'7" Weight: 235 Hair: Black/Gray Eyes: Brown
Blood Type: B Shoe: 8 D Tattoos: None
Vehicle: 1973 Cadillac Black Sedan
Record: 19 arrests - Charges: Homicide, Robbery, Assault, Extortion, Narcotics, Gambling, Impairing Morals of a Minor.

Aifam, George ("Gypsy") M-W-39
Height: 5'7½" Weight: 245 Hair: Black Eyes: Brown
Blood Type: B Shoe: 8 D Tattoos: Left arm, "To Mother with Love"
Vehicle: 1973 Lincoln Black Sedan
Record: 23 arrests - Charges: Gambling, Loansharking, Assault, Extortion, Homicide.

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As a result of the threats, Poppa has been making himself scarce and rarely meets more than one gang member at a time. He has secluded himself in an apartment in a remote part of town, a relatively safe location unknown to the gang members. An informant has told your department about Hasson's hideout, and a legal wiretap has been installed on his telephone. Several days have gone by, and no action has been indicated by the tap. On July 7, at 7:03 p.m., Charley made a call to an undetermined public phone booth, and a taped conversation was recorded as follows:

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The Joint Task Force, having information confirming a big shipment to the city, swings into action at 9:00 p.m. this date and simultaneously rounds up suspects who might be involved. The sweep nets twenty suspects, including Johnny Blue Eyes, Harry Hinge, Bruce Comma, Benny Carato, Sam Perez, John Smith, Mike Crupa, Danny Skidmore, Frankie Todd, Sidney Hall, Jackie Leod, and Cary Crooke. All are known by the department to be actively engaged in illegal narcotics traffic. The stakeout at Poppa's house reports that he leaves at 9:30 p.m., but he loses the tail at about 10:00 p.m. on the other side of town. Other tails report in, and information about the members of Poppa's gang is compiled by the team. At 7:00 p.m., surveillance had disclosed that Jumbo and Benjie's whereabouts were unknown; Hot Dog and Gypsy were near an off-track betting office, Digger was at some meeting, and Chills and Blue Eyes were in the vicinity of a social club. Armed with this information, the team moves to 197 Kenmore Street.

At 10:15 p.m., the first unit of the team arrives and observes that the club door is ajar and Hasson's car is parked outside. The area seems deserted, and only one light flickers through the open door. It appears from the outside that someone is lying on the floor. A decision is made to move in for a better look. Closer scrutiny reveals Charley's body lying face down on the floor. He is bleeding profusely from head wounds - apparently gunshot wounds from a weapon found lying near an open window at the rear of the premises. The area is immediately sealed off, and the forensic unit is called to the scene. While awaiting the results of the lab unit, the team makes a door-to-door canvas in an attempt to locate a witness or persons who might have seen Charley "Poppa" with someone at the location. The search is apparently fruitless until one middle-aged man is found who observed two men entering the abandoned club while he was walking his dog. The frightened witness, who resides three blocks from the club, says he saw the two enter the building and then heard a loud argument, during which someone shouted "No! No!". At that time, he heard two shots, and the door of the club opened but no one came out. Then he saw a man fleeing from behind the building. The man was middle-aged, wore a white shirt and black trousers, was about average in height, and was heavy. The man fled in a dark sedan parked on the next block. The witness, fearful for his own life, ran home, and when a detective doing door-to-door interviews came to his house, the witness gave him the above information.

The forensic unit thoroughly searches the premises and comes up with prints belonging to Poppa; other prints are not distinguishable and cannot be classified. The weapon located at the scene is a .44 magnum of undetermined origin--no prints are obtained from the gun. Blood stains seem to indicate a fierce struggle, and apparently, Charley had almost made it to the door. The blood stains on the floor fall into two groupings: A and B. Charley had bled profusely; he had blood type A. Beneath his fingernails are tufts of hair. Further investigation reveals a footprint in the tomato patch below the window at the rear of the club. The print seems to be anywhere from a size 7 D to a size 8 D; it is somewhat distorted and was made by a man of greater-than-average weight. (This is determined by a mold made at the scene and a measurement of the height of the drop from the window to the ground.) Pressure from the hierarchy of the department demands a quick solution to this case, especially in view of the recent mass arrests made by the Joint Task Force. On the basis of the facts herein your team is directed to make a prompt arrest.

The most likely suspects are the members of Charley "Poppa" Hasson's gang. It would seem likely that Charley called a member of the gang and made an appointment with his killer. All the information available to your team can be culled from the Briefing Sheet. Your task is to identify the killer by using the facts available.

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Past information indicates the club to be the Starlight Hunting & Fishing Club at 197 Kenmore Street, a secluded place used in the past for gang meetings. Other persons have divulged that some heavyweight drugs have come into town. Thus, it appears that Poppa may be getting a slice of the action. With this in mind, your squad C.O. decides to cover the club and put a close surveillance on all suspects at the location.

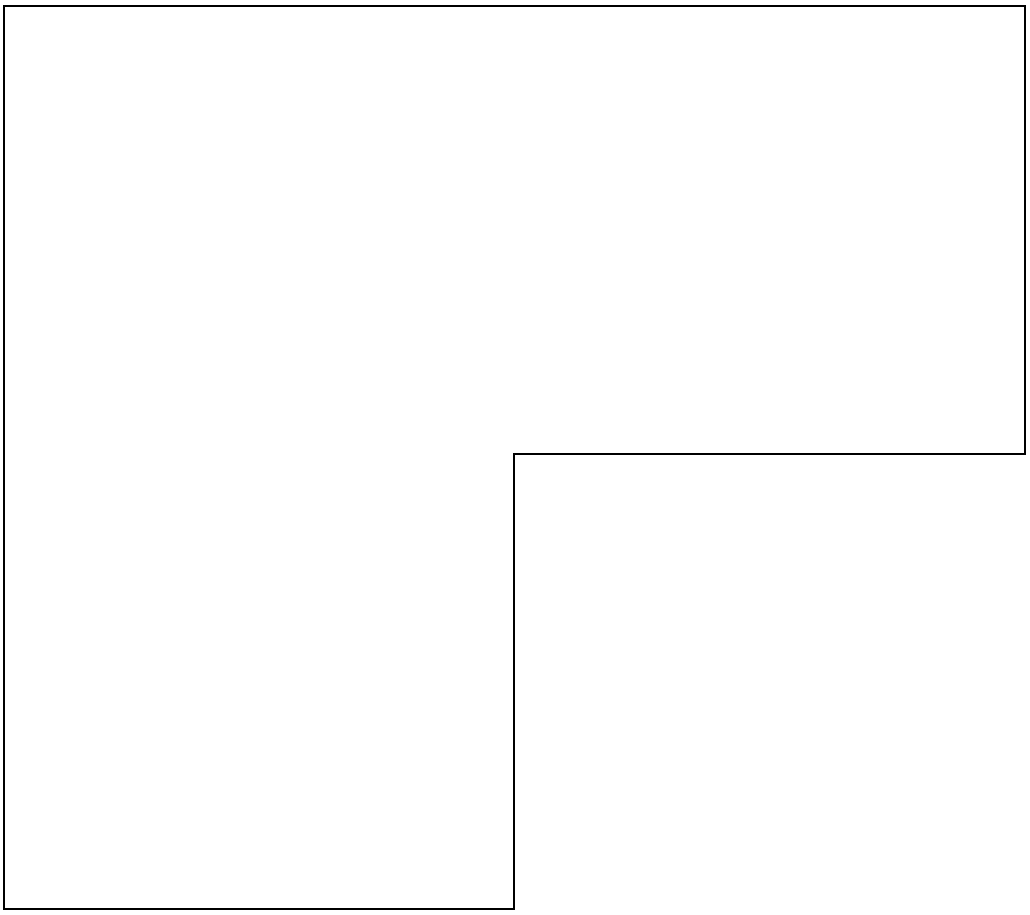
The Joint Task Force, having information confirming a big shipment to the city, swings into action at 9:00 p.m. this date and simultaneously rounds up suspects who might be involved. The sweep nets twenty suspects, including Johnny Blue Eyes, Harry Hinge, Bruce Comma, Benny Carato, Sam Perez, John Smith, Mike Crupa, Danny Skidmore, Frankie Todd, Sidney Hall, Jackie Leod, and Cary Crooke. All are known by the department to be actively engaged in illegal narcotics traffic. The stakeout at Poppa's house reports that he leaves at 9:30 p.m., but he loses the tail at about 10:00 p.m. on the other side of town. Other tails report in, and information about the members of Poppa's gang is compiled by the team. At 7:00 p.m., surveillance had disclosed that Jumbo and Benjie's whereabouts were unknown; Hot Dog and Gypsy were near an off-track betting office, Digger was conducting a union meeting, and Chills and Blue Eyes were in the vicinity of a social club. Armed with this information, the team moves to 197 Kenmore Street.

At 10:15 p.m., the first unit of the team arrives and observes that the club door is ajar and Hasson's car is parked outside. The area seems deserted, and only one light flickers through the open door. It appears from the outside that someone is lying on the floor. A decision is made to move in for a better look. Closer scrutiny reveals Charley's body lying face down on the floor. He is bleeding profusely from head wounds--apparently gunshot wounds from a weapon found lying near an open window at the rear of the premises. The area is immediately sealed off, and the forensic unit is called to the scene. While awaiting the results of the lab unit, the team makes a door-to-door canvas in an attempt to locate a witness or persons who might have seen Charley "Poppa" with someone at the location. The search is apparently fruitless until one middle-aged man is found who observed two men entering the abandoned club while he was walking his dog. The frightened witness, who resides three blocks from the club, says he saw the two enter the building and then heard a loud argument, during which someone shouted "No! No!" At that time, he heard two shots, and the door of the club opened but no one came out. Then he saw a man fleeing from behind the building. The man was middle-aged, wore a white shirt and black trousers, was about average in height, and was heavy. The man fled in a dark sedan parked on the next block. The witness, fearful for his own life, ran home, and when a detective doing door-to-door interviews came to his house, the witness gave him the above information.

The forensic unit thoroughly searches the premises and comes up with prints belonging to Poppa; other prints are not distinguishable and cannot be classified. The weapon located at the scene is a .44 magnum of undetermined origin--no prints are obtained from the gun. Blood stains seem to indicate a fierce struggle, and apparently, Charley had almost made it to the door. The blood stains on the floor fall into two groupings: A and B. Charley had bled profusely and beneath his fingernails are tufts of hair. Further investigation reveals a footprint in the tomato patch below the window at the rear of the club. The print seems to be anywhere from a size 7 D to a size 8 D; it is somewhat distorted and was made by a man of greater-than-average weight. (This is determined by a mold made at the scene and a measurement of the height of the drop from the window to the ground) Pressure from the hierarchy of the department demands a quick solution to this case, especially in view of the recent mass arrests made by the Joint Task Force. On the basis of the facts, herein your team is directed to make a prompt arrest.

The most likely suspects are the members of Charley "Poppa" Hasson's gang. It would seem likely that Charley called a member of the gang and made an appointment with his killer. All the information available to your team can be culled from the Briefing Sheet. Your task is to identify the killer by using the facts available.....

THE FARMER'S LAND



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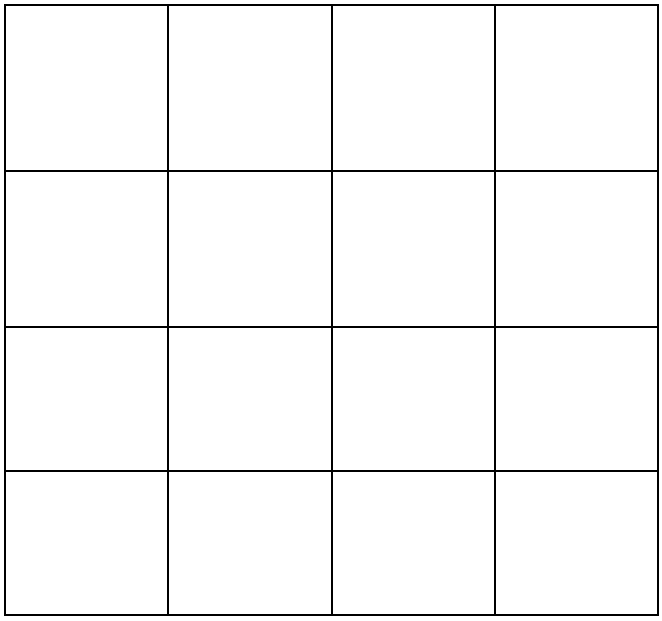
HIDDEN SQUARES FIGURE



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ARITHMETIC TEST

In the following simple arithmetic problems, a plus (+) sign means to multiply, a divide (÷) sign means to add, a minus (-) sign means to divide, and a times (x) sign means to subtract. Complete the problems following these directions.

8 + 2 =	14 - 7 =
9 + 11 =	6 x 5 =
4 x 3 =	8 + 3 =
6 ÷ 2 =	7 x 2 =
9 - 3 =	9 + 2 =
7 x 4 =	8 - 4 =
4 + 4 =	9 + 6 =
8 - 4 =	1 ÷ 1 =
12 x 2 =	8 x 7 =
20 - 10 =	13 - 1 =
9 - 1 =	16 - 4 =
5 + 6 =	8 x 2 =
2 x 1 =	9 ÷ 9 =
10 - 5 =	6 x 2 =
12 + 2 =	8 + 4 =

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THE FERRY BOAT STORY

There was a Ferry boat. It was 45 feet long and 15 feet wide. It carried 632 passengers and 275 cars. It was powered by twin Mercedes diesel engines capable of 6,000 horsepower each. The boat was painted pink with red stripes. It had three smokestacks, 11 feet tall. They were painted white with yellow polka dots. The ferryboat had 18 whitewall tires for bumpers. The Captain's name was Sally and the wife's name was Mitch.

Facts	Facts	Facts
1. Ferry Boat 2. 45 Feet long 3. 15 Feet Wide 4. 632 Passengers 5. 275 Cars 6. Twin Mercedes Diesel Engines 7. 6,000 Horsepower each 8. Boat was painted pink 9. Boat has red stripes 10. Boat has 3 smoke stacks 11. Smoke stacks were 11 feet tall 12. Smoke stacks painted white 13. Smoke stacks had yellow polka dots 14. Boat had 18 white wall tires for bumpers 15. Captain's name was Sally 16. Wife's name was Mitch	1. Ferry Boat 2. 45 Feet long 3. 15 Feet Wide 4. 632 Passengers 5. 275 Cars 6. Twin Mercedes Diesel Engines 7. 6,000 Horsepower each 8. Boat was painted pink 9. Boat has red stripes 10. Boat has 3 smoke stacks 11. Smoke stacks were 11 feet tall 12. Smoke stacks painted white 13. Smoke stacks had yellow polka dots 14. Boat had 18 white wall tires for bumpers 15. Captain's name was Sally 16. Wife's name was Mitch	1. Ferry Boat 2. 45 Feet long 3. 15 Feet Wide 4. 632 Passengers 5. 275 Cars 6. Twin Mercedes Diesel Engines 7. 6,000 Horsepower each 8. Boat was painted pink 9. Boat has red stripes 10. Boat has 3 smoke stacks 11. Smoke stacks were 11 feet tall 12. Smoke stacks painted white 13. Smoke stacks had yellow polka dots 14. Boat had 18 white wall tires for bumpers 15. Captain's name was Sally 16. Wife's name was Mitch

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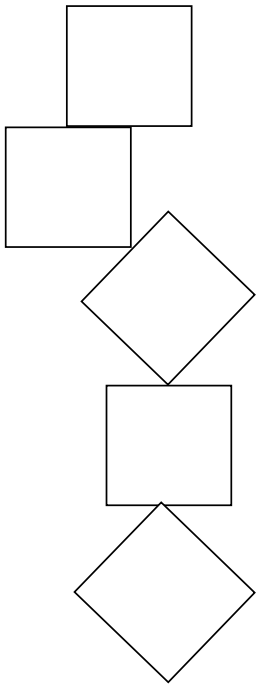
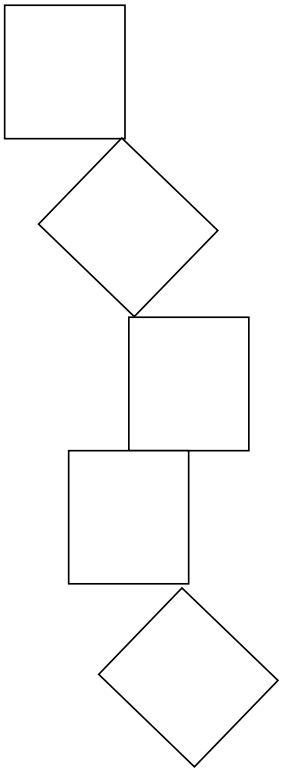
COMMUNICATIONS EXERCISE

Diagram 1



COMMUNICATIONS EXERCISE

Diagram 2



BROKEN SQUARES GROUP INSTRUCTION SHEET

1. Each of you has an envelope which contains pieces of cardboard for forming squares. When the facilitator gives the signal to begin, the task of your group is to form five squares of equal size. The task will not be completed until each individual has before him a perfect square of the same size as those in front of the other group members.

2. Specific limitations are imposed upon your group during this exercise.
   a. No member may speak.
   b. No member may ask another member for a piece or in any way signal that another person is to give him a piece. (Members may voluntarily give pieces to other members.)

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Section II: Case Studies

NOTE: These Case Studies are designed to provide the student with factual information based upon actual Coast Guard mishaps. They are for "Training Use Only" and should not be considered official documents.

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SKILLS DEMONSTRATED IN WRITTEN CASE STUDIES

(There are many skills demonstrated in each case study)

Case Study	Prominent Skill	Reference
F/V Sea King Capsizing	All	II – 5
Surfs Up (17' Whaler Mishap)	Mission Analysis	II – 21
41' UTB Grounding	Situational Awareness	II – 23
Dragging Anchor (UTB Mishap)	Communications	II – 25
Adrift & Taking On Water (Station SAR Mishap)	Mission Analysis	II – 29
Tugboat Dewatering (UTB Mishap)	Mission Analysis	II – 33
Derby Risks (Auxiliary Mishap)	Leadership	II – 39
Press On (Station MLE Mishap)	Decision-Making	II – 47
On Rocky Ground (44' MLB Mishap)	All	II – 51
Too Much To Hold (9mm incidental shooting)	Situational Awareness	II – 61
USCGC Mesquite (WLB Sinking)	All	II – 65
WLB Grounding	All	II – 71
WMEC Gun Mount Damage	Decision-Making	II – 77
WHEC Diesel Engine Casualty	Leadership	II – 81
WPB Grounding	Communications	II – 87
WPB Engine Room Fire	Situational Awareness	II – 91
Boiler Explosion	Mission Analysis	II – 97
Hit The Beach (180' WLB Mishap)	All	II – 103
Shift Colors (180' WLB Mishap)	Situational Awareness	II – 111
Yo-Yo A Go-Go (WMEC SAR Mishap)	Mission Analysis	II – 113
Where-Oh-Where (210' WMEC Fire)	Situational Awareness	II – 117
270' WMEC Grounding	Leadership	II – 119
WMEC Collision With Pier	Mission Analysis	II – 125
Bar Crossing (110' WPB Mishap)	Mission Analysis	II – 131
Buoy-Oh-Boy (110' WPB Mishap)	All	II – 133
110' WPB Hurricane Evasion	Situational Awareness	II – 141
WPB Hurricane Damage	Decision-Making	II – 145
You Will Be Towed (WPB Mishap)	Communications	II – 153
Keep Right (WPB Mishap)	Leadership	II – 155
Under Pressure (110' WPB Mishap)	Mission Analysis	II – 161
Stop Griping (WLM Load Securing Mishap)	Mission Analysis	II – 169
Ounce of Prevention (WLB Boom Mishap)	Mission Analysis	II – 177
So That's Catching Air! (RHIB Mishap)	Mission Analysis	II – 181
Rock and a Hard Place (Auxiliary Mishap)	Decision-Making	II – 185

SKILLS DEMONSTRATED IN THE VIDEO TITLED "WHO RESCUES THE COAST GUARD?"

(There are many skills demonstrated in each scenario)

Video Scenario	Prominent Skill
Overdue Clammer	All
On The Road	Communications
Break-In Training	Decision-Making
Engine Trials	Leadership
Boat On Fire	Mission Analysis
Distressed Tugboat (see Tugboat Dewatering)	Mission Analysis
Do Something	Mission Analysis
Memorial Day Swim	Mission Analysis
Rollover	Mission Analysis
Disabled P/C (see Adrift And Taking On Water)	Situational Awareness
Hoist Training	Situational Awareness
Man Overboard Drill	Situational Awareness
Near Collision	Communications
Very Well	Communications
A Narrow Passage	Leadership
Fog Nav (see Keep Right)	Situational Awareness
F/V Gambler (From tape "Coast Guard: The Series"	Mission Analysis

VESSEL CASE STUDY

F/V SEA KING CAPSIZING

HISTORY:

Events Preceding Accident

1. **Events Preceding First Attempt To Cross Bar.** Around 1600 on January 9, 1991, the SEA KING, a 76-foot stern trawler, departed Astoria, Oregon, for several days of fishing off the coast of Oregon and Washington. The four-man crew consisted of an operator and three deckhands. According to the operator, the next few days were uneventful. During the early morning hours of January 11, the vessel was en route to the Columbia River entrance near Astoria.

2. The operator stated that around 0500 on the morning of the accident, the vessel's steering began to malfunction, causing difficulty steering the vessel. Initially, he believed that the ice in the fish hold for icing fish might have reduced the viscosity of the hydraulic fluid in a portion of the hydraulic line, causing the steering to become erratic. However, moving the ice away from the line failed to improve the vessel's steering. Around 0600, a crewmember inspected the lazarette. Upon returning to the pilothouse, he reported to the operator that the lazarette's starboard hatch cover had not been properly secured and that the lazarette was full of seawater. He also reported that he had properly secured the hatch cover before returning to the pilothouse.

3. Soon after the operator learned that the lazarette had flooded, he ordered two crewmen to enter the fish hold and open the lazarette drainage valve. He stated that he had intended to drain the water from the lazarette into the engineroom where he planned to use the bilge pumps to pump the seawater over the side.

4. One of the two crewmen sent to open the valve later testified that after opening it, they learned that sediment and debris had collected in the bottom of the lazarette and was blocking the drainage of water through the valve. In order to clear the drain, the flexible hose was removed, and a welding rod was used to clear the line. The hose was not reattached. As a result, the seawater drained directly into the after end of the fish hold and later, as the level of water in the fish hold rose, leaked past the bulkhead into the engineroom. The operator later stated although he was aware that water was collecting in the fish hold, he made no effort to close the valve or otherwise monitor the amount of water involved.

About 0700, the flooding of the engineroom was first detected, and the vessel's bilge pumps were activated.

5. The operator stated that by 0800, it had become apparent that the bilge pumps would not be able to keep up with the flooding. An inspection of the fish hold had revealed that more than 4 feet of water and a large quantity of floating debris (fish, bin boards, and chunks of ice) were sweeping the length and breadth of the compartment. The operator said that he ordered a crewmember to enter the hold to close the lazarette drainage valve. However, all efforts to close the valve ceased when the operator, fearing that the crewman could be injured by the debris, floating chest high, ordered him out of the hold.

6. Initial Notification and Response. At 0839, (see figure 1) the operator notified the Coast Guard, Station Cape Disappointment that the vessel was taking on water and required assistance. The SEA KING was about 3.5 miles north-northwest of the entrance to the Columbia River.

7. About 5.5 miles away from the distressed vessel were four 44-foot motor lifeboats (MLBs) assigned to the National Motor Lifeboat (NMLB) School at Cape Disappointment. The MLBs, had been engaged in towing exercises near the mouth of the Columbia River when the distress call was received. They proceeded immediately to the scene. In addition, the Coast Guard sent an HH-65A helicopter (CG 6523) from nearby Air Station Astoria.

8. At 0844, Group Astoria notified the search and rescue (SAR) coordinator (SC) in Seattle, Washington, of the emergency. The Commanding Officer of, Group Astoria, was designated the SAR mission coordinator (SMC).

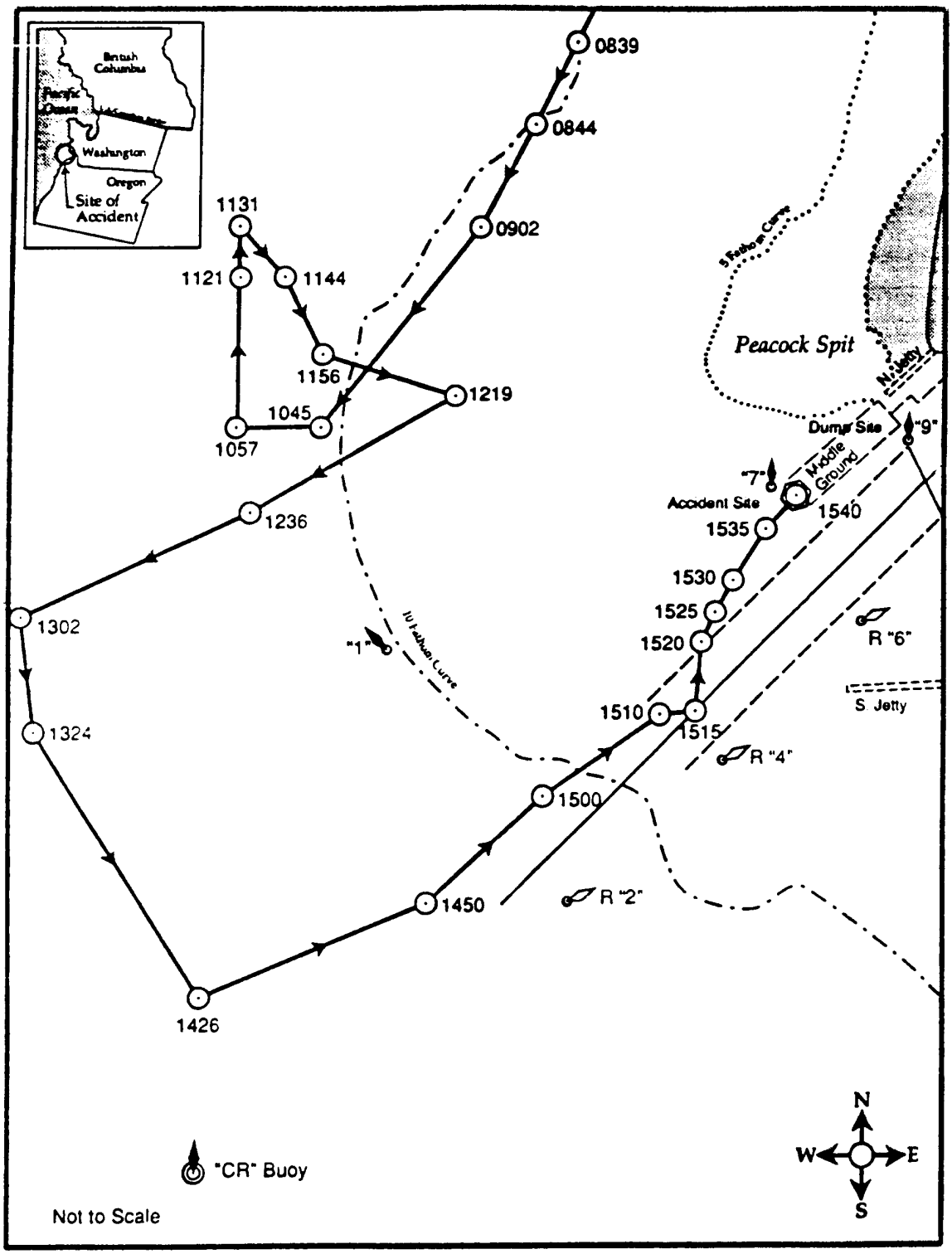

Figure 1. - Trackline Tow

9. While the Coast Guard search and rescue units (SRUs) were en route to the scene, the SEA KING reported that the flooding was originating from the lazarette with progression flooding into the engine room. This was the first indication that the Coast Guard had of what the source of the flooding might be and that the flooding had already spread from the lazarette to other parts of the vessel. The SEA KING did not, however, tell the Coast Guard that the fish hold was also flooding. The Coast Guard responded by advising the SEA KING's crewmembers to don their immersion suits. When the operator was later asked whether he had discussed the source of the flooding with the Coast Guard he stated:

> "I can't remember talking to any of them really about the flooding. I just told them, you know, it is coming into the engineroom, and we had to keep it (the engineroom) pumped out. I can't remember them asking me where it was coming from or nothing like that."

10. At 0902, the helicopter arrived and assumed the duties of on-scene commander (OSC). A few minutes later the four MLBs arrived. Shortly after their arrival, the SEA KING reported that the flooding of its lazarette was causing problems with its steering.

11. **Dewatering Efforts** At 0910, the helicopter lowered the first of four CG-P1A dewatering pumps to the SEA KING. The crew immediately prepared the pump to dewater the engineroom. At 0926, when the SEA KING reported trouble starting the pump, the helicopter lowered an aviation survivalman (ASM) to the vessel and left for Air Station Astoria to get more pumps. The departure of the OSC left only the four MLBs at the scene. Although he was never formally designated as OSC, the coxswain of MLB 44301, for all practical purposes, assumed the duties and responsibilities of OSC until departing the scene at 1415. Within minutes, the ASM reported that he too was having difficulty getting the pump started. In response, MLB 44301 transferred a second pump to the SEA KING.

12. At 0940, the OSC recommended to Station Cape Disappointment via VHF-FM radiotelephone that because of the sea conditions and the flooding, the SEA KING not be towed across the bar as long as its lazarette was flooded. According to a transcript of the conversation, the station's duty officer responded that because the weather forecasts were predicting winds in excess of 60 knots and 16-foot seas later that day, he was recommending that the SEA KING be brought across the bar as quickly as possible.

13. At 0951, the Commanding Officer, Station Cape Disappointment, told the OSC that seas at the Columbia River Bar were currently running between 4 and 6 feet high with an occasional 8-footer and recommended, as his duty officer had earlier, that the SEA KING be brought across the bar. Shortly thereafter, the helicopter returned and lowered two additional CG-PIA pumps to the SEA KING.

14. At 1003, the SEA KING reported to the Coast Guard that a clogged fuel oil filter had caused the vessel's main engine to stop. Because the hydraulic steering pump was powered by the engine, the vessel's steering was also inoperative. In addition, the ASM reported that he was still having trouble getting the CG-P1A pumps to take suction. At 1008, the SMC, concerned about the difficulty of dewatering the engineroom, ordered the helicopter to Station Cape Disappointment to pick up two Coast Guardsmen (a machinery technician, third class (MK3) and a boatswain mate, third class (BM3) who were to be lowered to the SEA KING so that they could help with the dewatering. Shortly after the helicopter left, the TRIUMPH, a 52-foot MLB, was ordered to the scene. At 1035, the SEA KING reported that its main engine had been restarted .

15. **Hoist Mishap** At 1031, the helicopter returned to the scene with the two Coast Guardsmen detailed from Station Cape Disappointment. According to the Coast Guard's account of the ensuing events, the intent was to turn the SEA KING into the oncoming sea and swell, lower the two Coast Guardsmen to the SEA KING, and by using a rescue basket, remove all unnecessary crewmembers from the vessel. The two men were lowered, and one of the SEA KING's crewmembers was hoisted without incident. However, at 1046, during the attempt to hoist a second crewman, the rescue basket became entangled in the vessel's rigging, causing the hoisting cable to part and the basket containing the crewman to drop about 15 feet onto the after main deck.

16. The helicopter pilot, fearing that the swinging end of the broken cable might have damaged the aircraft's rotor, immediately declared an emergency and returned to Air Station Astoria. The ASM, who was also a certified emergency medical technician (EMT), immediately began tending the injured crewman. His examination, however, was limited because the injured man was wearing an immersion suit and because the ASM was concerned that taking him out of the suit might cause additional injury.

17. Within minutes of the hoist mishap, the MLBs transferred a fourth Coast Guardsman (a machinery technician, first class (MK1) and a Stokes litter to the SEA KING. The MK1 later advised the Group Astoria flight surgeon at Air Station Astoria that the injured man was conscious, alert, and complaining of a

radiating pain in his left arm, all over his back, and through his hips. Because the extent of his injuries was unknown and because he might have sustained spinal injuries, he was strapped into the litter, covered with a sleeping bag for warmth, and placed on top of the main fish-hold hatch. Meanwhile, the SEA KING continued to have mechanical problems.

18. At 1057, the SEA KING reported that clogged fuel oil filters had, for the second time, rendered the main engine and steering system inoperative. The vessel quickly lost headway and was soon dead in the water. This time, however, the SEA KING reported that it was unlikely that the main engine could be restarted. About this time, Air Facility Newport dispatched a second helicopter CG 6514 to relieve CG 6523.

Accident

1. **Decision To Tow SEA KING.** The TRIUMPH arrived at 1109 and was ordered by the OSC to prepare to take the SEA KING in tow. According to the OSC, he decided to take the SEA KING in tow because he was concerned about the reliability of its main engine and steering system and because the flooding of the engineroom and lazarette had not yet been brought under control. By 1131, the TRlUMPH had taken the SEA KING in tow, using a towing bridle leading through the port and starboard bow chocks. Shortly after that, the SEA KING reported that the flooding of its engineroom was under control, that the engineroom was dried out, and that the dewatering effort was temporarily suspended. Although the operations duty officer at Air Station Astoria and the OSC had been told by the SEA KING that the flooding had originated in the vessel's lazarette, an effort to either inspect or dewater the compartment had not yet been undertaken.

2. **First Attempt To Cross the Bar.** According to the OSC, the condition of the injured crewmen and the deteriorating weather and sea conditions were factors in his decision to tow the SEA KING across the bar. In preparation for the attempt, he took the following precautions:

    - Had MLB 44369 stand by at the western edge of the bar near No. 7 buoy,
    - Discussed with the SEA KING the need to choose a course that favored the starboard, or red side, of the channel to allow for the possibility of the SEA KING being set by the wind, sea, and current toward Peacock Spit;
    - Notified the SEA KING of the procedures to follow if the TRlUMPH's towline parted or if the SEA KING had to be quickly abandoned; and
    - Positioned MLBs 44301, 44304, and 44381 around the SEA KING to act as safety boats in case the people on board the SEA KING were forced

into the water or the towline broke and it became necessary for one of the three MLBs to take the vessel in tow.

3. From the beginning, the tow was hindered by the SEA KlNG's mechanical problems (the main engine and steering remained inoperative) and by the weather and sea. At 1156, the OSC reported to Station Cape Disappointment that the tow appeared to be making little headway toward the bar. The station responded by suggesting that the tow, which was steering a course of about 155 degrees (magnetic), alter course to port to a course of 120 degrees (magnetic). According to reports from the TRIUMPH, the course change not only increased the speed of the tow, but also the SEA KlNG's rolling and pitching.

4. By 1205, the SEA KING's main engine was restarted. Shortly after, the tow crossed over the 10-fathom curve and headed toward the shallower water near the entrance to the river. As the vessel moved closer to shore, the tow encountered steeper swells. In addition, MLB 44369, which was standing by near buoy No. 7, reported that bar conditions were deteriorating. According to radio reports from the SEA KING, the increasing seas and swells had the following effects on it:

    - Dramatically increased its pitching and rolling;
    - Increased the number of waves breaking over its starboard bulwark;
    - Caused the injured crewman great discomfort;
    - Caused the engineroom to resume flooding; and
    - Caused the dewatering pumps, which had been reactivated to dewater the engineroom, to lose their prime.

5. About 1209, both the OSC and the coxswain of the TRIUMPH communicated to the Commanding Officer, Station Cape Disappointment, that they were having doubts that the SEA KING could be saved for the following reasons:

    - Increasing seas were causing both the TRIUMPH and the SEA KING to roll heavily (the TRIUMPH had just reported encountering breaking seas in excess of 12 feet);
    - Coast Guard personnel aboard the SEA KING were having difficulty keeping ahead of the flooding;
    - Weather conditions were quickly deteriorating;
    - The tow was no longer able to steer a course toward the bar; and
    - At the end of the discussion, they recommended that either the vessel be evacuated or the tow be moved offshore until sea conditions abated.

6. The coxswain of MLB 44301 later stated that they (he and the coxswain of the TRIUMPH) had arrived at the conclusion that the SEA KING could not be evacuated after the MLBs and the SEA KING were struck by breaking seas. The OSC's description of the incident is as follows:

   > "At one point we took two very large sea breaks; one of them knocked my boat over between 90 and 120 degrees. I was in the chair (the coxswain was strapped into a chair at the helm) and got wet, we went over so far. The boat came back up."
   >
   > "I had seen the SEA KING get hit just before it hit me, and the SEA KING just disappeared in a wave when it hit it."
   >
   > "At that point, I was very concerned about the boat (SEA KING). I knew it had low freeboard. We had seven people on there. I decided it was time to get the people off."

7. At 1213, the MK1 aboard the SEA KING reported that the seawater flowing into the engineroom appeared to be coming from a pipe between the engineroom and the fish hold. The MK1 also stated that he had been told by crewman that the water was coming from the fish hold. The OSC later stated that although he recalled hearing some discussion about the fish hold, he did not recall overhearing that it also was flooding or that it was the source of the flooding of the engineroom.

8. At 1219, the TRIUMPH reported that increasing seas had forced them and the SEA KING to reduce speed and alter course away from the bar. According to the coxswain of the TRIUMPH, the reduction in speed had been necessary to prevent the TRIUMPH from going "airborne." Shortly thereafter, Group Astoria was told that the SEA KING was encountering rough seas west of Peacock Spit and was in danger of foundering. The subsequent decision of the coxswain of the TRIUMPH to alter course into the sea and swell not only reduced the amount of pitching and rolling aboard the SEA KING, but also marked the end of the Coast Guard's first attempt to tow the vessel across the bar.

9. **Recommendation To Evacuate SEA KING.** Shortly after the attempt to tow the SEA KING across the bar was aborted, the on-scene MLBs, Station Cape Disappointment, and Air Station Astoria held several telephone and radio conversations about whether the SEA KING should be abandoned.

10. According to transcripts of telephone conversations between the Commanding Officer, Station Cape Disappointment, and the operations duty officer at Air Station Astoria between 1219 and 1222, both had agreed with the OSC and the coxswain of the TRIUMPH that the prospects for saving the SEA KING were bleak and that it was time to make preparations for the vessel's evacuation. As a result of these discussions and despite the fact that they were aware that the helicopter (CG 6514) was low on fuel and en route to the air station for refueling, the helicopter was ordered to return to the scene.

11. Immediately after the helicopter was ordered back to the scene, the Commanding Officer, Group Astoria, telephoned his operations duty officer for an update. He was told the following:

    - During the first attempt to tow the SEA KING across the bar, the TRIUMPH had encountered heavy seas, causing both vessels to take "huge rolls."
    - The TRIUMPH had since abandoned its efforts to tow the SEA KING across the bar and was currently towing it toward deeper and calmer waters offshore.
    - The coxswain of the TRIUMPH, the OSC, the Commanding Officer, Station Cape Disappointment, and the operations duty officer believed that they were probably going to lose the SEA KING, and they were recommending that the vessel be abandoned.
    - The helicopter, which had been en route to the station for refueling, had been ordered to return to the scene.

12. After the briefing the SMC asked about the location of the Coast Guard cutter IRIS. When the operations duty officer replied that he did not know, the SMC said:

    > "If we can move the IRIS out there, let's, you know, I don't, I don't disagree with the decision to evacuate, but if we can possibly save the vessel, we should try."

13. The operations duty officer then stated that he agreed with his commanding officer and that he would see what he could about getting the IRIS underway to the scene.

14. While the operations duty officer and the SMC spoke, the helicopter (CG 6514) returned to the scene. Its first order of business was to evaluate whether the injured crewmember should be MEDEVACed and whether the remaining people on board could be evacuated, either by helicopter hoist or by a boat-to-boat or

boat-to-water-to-boat transfer. It was soon discovered, however, that the injured crewmember's Stokes litter was not fitted with hoisting straps and that the basket used during the hoist mishap was damaged and unusable. As a result, his evacuation and those of the other people on board was postponed.

15. Meanwhile, the IRIS had just moored alongside its pier at Tongue Point after spending the entire morning underway tending buoys. At 1230 with the permission of the SC, operational control of the IRIS was transferred from the Thirteenth Coast Guard District to the SMC. Shortly thereafter, Station Cape Disappointment notified the OSC that the IRIS was being dispatched to the scene and that a second attempt to tow the SEA KING across the bar would be made before the next period of low water. By 1249, the IRIS was underway.

16. During the 2 hours it took for the IRIS to arrive, the following happened:

    - The helicopter (CG 6514) was ordered to return to Air Station Astoria to refuel and to pick up a Stokes litter fitted with hoisting straps;
    - The Commanding Officer, Station Cape Disappointment, ordered the TRIUMPH and tow to proceed to the "CR" buoy and await the IRIS (see figure 1);
    - MLBs 44304, 44369, and 44381 were ordered to return to Station Cape Disappointment, and
    - Plans were made to have a relief MLB (MLB 47200) dispatched to the scene to relieve MLB 44301.

17. Left at the scene to await the arrival of the IRIS were MLB 44301, the TRIUMPH, and the SEA KING.

18. **Decision To Make Second Attempt To Cross Bar.** At 1302, the tow was about a mile north of the "CR" buoy. Shortly thereafter, the SEA KING reported for the first time that its main fish-hold hatch was missing a number of its securing bolts and that seawater, which was washing across the after main deck, had been observed leaking past the hatch into the fish hold.

19. At 1312, the IRIS radioed the TRIUMPH for a briefing. The ensuing discussion covered the potential sources of the flooding, the circumstances surrounding the aborted attempt to tow the SEA KING across the bar, and the status of the injured crewmember. The IRIS was told the following:

    - Leaking hatch covers were believed to be the source of the flooding;

- The SEA KING had nearly foundered during the first attempt to tow it across the bar,
- The biggest obstacle encountered by the tow had been the breaking seas in excess of 14 feet that were located inshore of the 10-fathom curve;
- Sea conditions had measurably improved once the tow had been moved toward the deeper and calmer waters offshore,
- Following the aborted attempt to tow the SEA KING, the MLBs, with the exception of MLB 44301, had been recalled to Station Cape Disappointment;
- MLB 44301 (unlike the TRIUMPH) had been on scene monitoring the SAR mission from the very beginning;
- Four Coast Guardsmen were aboard the SEA KING. One was a paramedic and one was an EMT, they were caring for the injured crewmember; and
- A helicopter was en route to the scene with a hoistable litter to evacuate the in-injured crewman.

20. At 1324, the helicopter returned. Based on an evaluation of the weather and Sea, the arrangement of the standing rigging aboard the SEA KING, and the manner in which the vessel was yawing, pitching, and rolling, the pilot decided not to attempt to hoist the injured crewmember unless the situation became life threatening.

21. As the afternoon progressed, the weather and sea conditions in the vicinity of the bar continued to deteriorate. At 1338, the coxswain of MLB 44381, while en route to the station, reported that he was encountering 12-foot seas (no breaking waves) in the vicinity of the No. 9 buoy and that he did not believe that the SEA KING should be towed across the bar at that time.

22. At 1405, the commanding officer of the IRIS radioed the OSC for an update. The OSC informed the IRIS of the following:
    - Four Coast Guardsmen and three crewmen were aboard the SEA KING;
    - The main engine of the SEA KING, which had been shut down twice previously because of clogged fuel filters, was operational,
    - The SEA KING's steering system, which was powered by the main engine, was operational;
    - The injured crewmember was safely strapped into a Stokes litter;
    - MLB 47200 was en route to the scene to relieve MLB 44301; and

- The dewatering pumps had been shut down, and the SEA KING was dry.

23. The coxswain of MLB 44301 later stated that he had been told by the MK1 aboard the SEA KING (who had more than 19 years service in the Coast Guard) that the SEA KING was dry and that he took that to mean "dry stem to stern."

24. The OSC then told the IRIS about the risks associated with towing the SEA KING across the bar. Specifically, he expressed his concern about the amount of set and drift around the bar, the proximity of Peacock Spit, and the difficulties that would be encountered should the towline part or, for one reason or another, should the SEA KING have to be hastily abandoned and the people on board forced to enter the water. The commanding officer replied by saying that during the outbound crossing of the bar, the IRIS had encountered seas higher than 17 feet. The briefings provided by the TRIUMPH and the coxswain of MLB 44301 did not disclose to the IRIS the extent of the injured crewman's injuries, the fact that both the SEA KlNG's fish hold and lazarette had flooded, or that the seawater that had previously flooded the engineroom had been reported to have originated from the fish hold.

25. **Second Attempt To Cross Bar.** At 1426 immediately after the IRIS arrived on scene and its commanding officer became the OSC, the second attempt to tow the SEA KING across the bar began. Within minutes, the TRIUMPH, with the SEA KING in tow and flanked on either side by the IRIS and MLB 47200, had turned eastward and headed toward the mouth of the Columbia River. The OSC (the commanding of officer of the IRIS) later stated that he had decided to tow the SEA KING across the bar on the understanding that the flooding aboard the vessel had been brought under control and that its main engine was operational.

26. Around 1431, the pilot of CG 6514 and the OSC discussed plans for extracting people from the water should the SEA KING have to be quickly abandoned. They agreed that MLB 47200 would rescue the people and the helicopter would spot. The OSC also stated his willingness, if it became necessary, to launch the IRIS II.

27. During its return trip to Station Cape Disappointment, MLB 44301 reported that sea conditions in the vicinity of the bar were deteriorating. At 1440, the MLB reported that it was encountering 18-foot seas west of the No. 7 buoy. At 1500, when the MLB was abeam of the buoy, they reported 15-foot seas in the middle of the main shipping channel.

28. By 1506, the tow, which was reportedly making good a course about 50 degrees (magnetic) and a speed between 5 and 6 knots, was abeam of the No. 4 buoy and

in the process of lining up on the Columbia River Entrance Range. Once the tow was lined up on the range, the course necessary to remain aligned with the range was 045 degrees. According to the radio transcripts, the TRIUMPH was later forced to adjust the heading to remain on course.

29. At 1512, the SEA KING reported that the injured crewmember was being moved into the deckhouse. Survivors later stated that seas breaking over the SEA KlNG's port quarter had been drenching the man and that they feared his becoming hypothermic if he were not moved inside the protected deckhouse. Because of the space limitations and the amount of debris reportedly strewn about inside the deckhouse, the litter had to be balanced on a table in the galley, requiring that the injured crewman be attended by at least two persons at all times.

30. Shortly after the crewman was moved inside the deckhouse, difficulties with the tow recurred. Positions of the tow provided by the IRIS after the accident indicate that around 1515, the tow was being set by the wind and seas in a northerly direction. At 1521, the SEA KING reported that a clogged fuel oil filter had again caused the main engine to stop. Although the engine was inoperative for only a short period (1521 to 1524), the ability of the tow to maintain its course and speed was further reduced. About 1525, the coxswain of the TRIUMPH, concerned about the increasing height of the sea and swells, instructed the SEA KING to increase its speed if it appeared that it was about to take a big wave over its stern. Radio transcripts indicate that at 1523, the TRIUMPH was steering a course between 65 and 70 degrees (magnetic) toward the No 8 buoy. Despite the application of more than 20 degrees of correction, the tow was set in a northeasterly direction toward an area of shallow water near Peacock Spit, also known as the Middle Ground. It was in this area near No. 7 buoy where MLB 44301 had earlier reported 18-foot seas.

31. At 1533, the SEA KING reported that its after main deck was awash because a wave had just broken over its stern. They also reported that they were increasing speed to hasten the drainage of seawater through its freeing ports and over the side. The TRIUMPH responded by increasing speed as well.

32. At 1534, the tow was about 0.25 mile southwest of the Middle Ground. About a minute later, MLB 47200, which was stationed about 150 yards off the SEA KING's port quarter, reported that the SEA KING appeared to be riding lower in the water and that the vessel had resumed dewatering efforts.

33. The OSC in recalling his observations of the events that occurred immediately before the accident, stated:

> "She was reacting very nicely, riding very well as a matter of fact. I would say that she was rolling and pitching less than my ship was. I remember being very pleased at seeing how she was riding, that things looked good."

34. By 1539, the tow had passed about 100 yards south of No. 7 buoy and had entered the Middle Ground. Video footage recorded by an observer aboard MLB 47200 just moments before the accident show that sea conditions in the vicinity of the tow had deteriorated and that breakers were discernible. At 1540, the SEA KING rolled to port and submerged its port bulwark into the sea. With the bulwark submerged, the after main deck became awash and water began flowing past the aft weathertight doors into the deckhouse. Within moments, the vessel radioed that it was about to go over and that everyone aboard was abandoning ship. During the next 15 seconds, the vessel continued its roll to port, submerging or otherwise rendering the three port weathertight doors impassable. Within a few minutes, the vessel had sunk beneath the waves and disappeared from view. Meanwhile, the helmsman, the MK1, and the ASM tried to free the injured crewmember from the litter. Of the four persons in the deckhouse, only the ASM survived.

35. **Post-accident SAR.** Immediately after the SEA KING sank, MLB 47200, with the helicopter (CG 6514) spotting overhead, began searching for people in the water. Meanwhile, the TRIUMPH had marked the tow line with buoys, slipped it, and headed toward the spot where the SEA KING had last been seen. At 1543, the TRIUMPH radioed Station Cape Disappointment and asked for more MLBs. Meanwhile, the IRIS was preparing to launch the IRIS II to search for survivors.

36. **Deployment of IRIS II.** At 1544 as the IRIS II was launched with a crew of two. Breaking seas struck the boat's twin outboard engines, causing one of the engines to stall. Despite the loss of the engine, the boat's sea painter was released, and the boat, with only one working engine, moved away from the IRIS. Within moments, however, breaking seas had caused the second engine to stall. Repeated efforts to restart the engines were unsuccessful. Additionally, the walkie-talkies aboard the IRIS II were inoperative. Whether they were working when the vessel was first launched was not determined. With their engines inoperative and no way to communicate with the other search and rescue units, the crewmembers of the IRIS II did not know what steps, if any, were being taken to assist them. The OSC was aware that the IRIS II was without power, but unaware that the boat was also having communications difficulties. He decided that they were not in any immediate danger and focused

his attention on the search for missing people from the SEA KING. When he was later asked whether he had told any of his crewmembers to keep an eye on the IRIS II, he said that he had not.

37. By 1549, MLB 47200 had picked up five of the seven persons aboard the SEA KING. One of the persons recovered was the injured crewmember. According to the ASM, whom the MLB had rescued just moments before, the injured man was brought aboard unconscious and without a pulse. The crew of the MLB and the ASM immediately began cardiopulmonary resuscitation (CPR). At 1550, one crewmember (the helmsman) and one Coast Guardsman (the MK1) were still unaccounted for.

38. At 1553, MLB 47200 reported that the IRIS II had been swept by wind and sea into Peacock Spit. The OSC, later admitted having lost track of the IRIS II and not having been aware that the injured man was receiving CPR on the MLB. He ordered the MLB to recover the IRIS II and its crew and return them to the IRIS. Within a few minutes, the MLB had recovered the IRIS II and began towing it toward the IRIS. At 1557, the MLB called the OSC, expressed concern about the deteriorating condition of the injured crewman, and stressed the need to get him to a doctor as quickly as possible.

39. At 1558, Group Astoria recommended that the injured man be MEDEVACed to Air Station Astoria. The OSC agreed. It was then that MLB 47200 reported for the first time that the man was receiving CPR. The MLB recommended to the OSC that following the recovery of the IRIS II, it transport the injured crewmember directly to Station Cape Disappointment. The OSC agreed.

40. At 1600, MLB 47200 reported that they were not detecting any vital signs from the injured crewmember. By 1602, the MLB had returned the IRIS II and its crew to the IRIS and was en route to Station Cape Disappointment, where the injured crewman was transferred to a waiting ambulance and taken to Ocean Beach Community Hospital in Ilwaco, Washington. At 1819, he was pronounced dead. The cause of death was drowning. According to the ASM, the CPR had been interrupted for the 10 to 12 minutes that the MLB had spent recovering the IRIS II.

41. Search for Missing People. At 1633, MLB 44308 recovered the sixth person (the MK1), began CPR, and arranged to have him MEDEVACed ashore. About 1641, he was hoisted aboard a helicopter (CG 6551). He was transported to Air Station Astoria and later taken by ambulance to Columbia Memorial Hospital in Astoria. He was pronounced dead on arrival. The cause of death was drowning.

42. Shortly after 1730, the search for the seventh person (the SEA KING's helmsman) was discontinued until daylight. The subsequent search the next day failed to locate him; he was presumed dead.

Injuries to Persons

	Crew	Coast Guard	Total
Fatal	2	1	3
None	2	2	4
Total	4	3	7

VESSEL CASE STUDY

SURFS UP (17' Whaler Mishap)

SYNOPSIS

This mishap involved four USCG surfers stranded in a dangerous ocean current beyond a protected reef. The situation became even more perilous when three other crew members in a 17 ft small boat became injured and stranded in their attempt to rescue the surfers. The entire event lasted almost 6 hours, most of which was during darkness.

HISTORY

1. At approximately 1800 local time, five crew members attempted to go surfing. Within minutes of entering the water, four of the five surfers were swept out past a coral reef by strong rip currents and large breaking waves. One crewmember returned to the beach, rather than attempting to surf. In their ordeal, they were swept an estimated 400 feet beyond the reef. Large waves separated them from their surfboards and each other and they were then moved around in a large circular current while continuously attempting to swim back to shore.

2. The situation was first observed by the CO and ETC at around 1800 and rescue efforts began immediately. Three crew members launched a 17 ft Boston Whaler and proceeded to the closest point inside the lagoon to where the surfers were stranded. At this point, the Boston Whaler was overtaken by fierce rip currents and was forced over a sandbar into heavy surf where it capsized. The boast crew were wearing PFD's. During the capsizing and attempts to return to the boat, one crew member injured his hand between the outboard motor and transom and another injured his leg when the boat's hull landed on top of him in the surf.

3. Fortunately, the overturned Boston Whaler anchored itself with a towline or spare anchor just beyond the breaking surf outside the reef. Persons on-shore could still see four people holding a lifeline across the bottom of the hull. As the rescuers became the imperiled, the stranded surfers made their way to shore before dark with a change in tides.

4. The three crew members with the small boat were stranded for almost 6 hours until the reversing tides and heavy surf threw them dangerously over the reef

and within reach of personnel (forming a human chain) within the reef. In addition to their injuries, they suffered moderate hypothermia and nausea.

ADDITIONAL FACTS:

1. Unit instructions and regulations are clear on local hazards. However, specifically placing certain areas off limits was not addressed in the instructions. Maximum wave heights and weather conditions are specified. The emphasis has been on overall safety and the use of good judgment by each individual on board. The ocean and tidal rip currents are not well documented or understood by station personnel.

2. The crew of the Boston Whaler was ordered to standby in the general area by the CO. It is not an area the boat normally operates in. The situation where mistakes, if any, were made resulted directly from the urgent necessity to rescue fellow shipmates.

3. The water in the area of the mishap is usually turbulent with a visible strong current; particularly that day with an unusually high tide. The speed and power of the current carried them into the large vortex in a matter of minutes and they were unable to paddle their way back. The surf conditions at the reef separated them from their surfboards as they went over the reef.

4. The primary causal factor for the capsizing of the Boston Whaler was the operation of the boat in a dangerously shallow and very high rip current area and the lack of familiarity of the boat crew with that area. This led to engine failure and subsequent loss of control and capsizing.

VESSEL CASE STUDY

41' UTB GROUNDING

HISTORY

1. In the spring of 1992, at 2100, a 41' UTB departed its station on a routine law enforcement patrol. The crew consisted of a coxswain, engineer, and two crew members. All members held current certification IAW COMDTINST M16114.9 (series).

2. At 2225, the UTB received a call from the station to proceed to docks south of a local bridge to assist a vessel taking on water. The coxswain was at the helm. At 2240, the UTB was stood down from this case. The coxswain gave the helm to another crew member.

3. At 2250, the UTB received a call of a possible boating accident in the vicinity of a marina located in the nearby straits. The blue light was energized and the helmsman was directed to bring the boat to MAX-PRO speed (2650 RPM). The helmsman stated his concern for his ability to see through the windows of the UTB due to salt-water deposit build up. As the UTB headed towards the entrance to the straits, the helmsman asked the other crew members to be lookouts to help him find the entrance buoy. Seaman's eye was used to determine the vessel's position throughout the patrol.

4. Once inside the Straits, the helmsman was directed to steer for buoy #4. Upon arriving at "4", the helmsman was then given new steering instructions. The helmsman again commented on the lack of visibility. The coxswain was busy completing his 4100S Form on the chart table that places him facing aft. The engineer was standing with his back towards the port window looking starboard for debris in the water and the other crew member was facing aft looking out the door. All doors and windows were closed. While on this course, the UTB encountered a port to port passing with an outbound tug. This required no course change. About one to two minutes later, the UTB encountered a ferry and altered course to port to execute a starboard to starboard pass. Upon completing this pass, the helmsman turned to starboard to get back on the original course. Shortly after this course alteration, the UTB became high and dry on the rocks.

AIDS TO NAVIGATION

The following navigation equipment was onboard the 41' UTB and was working properly when the mishap occurred:

a. Marine Magnetic Compass

b. VHF-FM Polaris ADF radio

c. RAYNAV 750 Loran-C

d. NPS-66 Radar

ADDITIONAL FACTS:

1. The amount of training underway, other than when on L/E patrols or on actual cases, is low to not performed.

2. There were no voice agreements made with either of the two vessels encountered while proceeding through the straits.

3. The helmsman was placed in a position that he had never been in. This was the first time underway at night in a 41' UTB. He was directed to steer seaman's eye on objects he had not seen before at night. Although he passed his Area Fam Test with high regard, he had no practical experience.

4. Nighttime operations/training was practically nonexistent for this crew during the month leading up to the incident. The total night time underway hours for the four combined crewmembers was 6.7 hrs., with the helmsman and engineer each having zero.

5. The helmsman was making course changes without the knowledge or consent of the coxswain.

6. One crewmember had been up and about for 18 hours. This included a full day at work from 0715 to 1830 and the duties of having the watch.

VESSEL CASE STUDY

DRAGGING ANCHOR (UTB MISHAP)

HISTORY

1. At 0059 on 4 August 1993, the OPCEN received a call on channel 16 VHF-FM from the S/V MORNING SUN stating that he was experiencing some engine problems "out on the surf". The MORNING SUN was then shifted to channel 22A. Once shifted, the master reported his position and stated that he was the only person on board. He gave a description of his boat and when asked, stated that he would accept commercial assistance.

2. At 0100, the OPCEN received a telephone report from the police that there was a sailboat aground and listing 100 yards off the beach near the State Park Pier. This position did not correspond with the one provided by the MORNING SUN. The OPCEN considered the reports might be for the same boat, but had to assume that there were two separate distressed vessels. A MARB was issued at 0118 for the MORNING SUN and a 41' UTB got underway at 0118 to respond to the vessel reported by the police. The UTB's route to the grounded vessel off State Park Pier carried them very close to the MORNING SUN's reported position. They had planned to check the MORNING SUN to ensure that the vessel was in no immediate danger, then proceed to the grounded vessel. The OPCEN advised the MORNING SUN that a CG vessel was underway to respond to a more serious case and that a broadcasted request for commercial assistance had been issued. A 30 minute communication schedule was then established with the MORNING SUN.

3. At 0130, Marine Salvage, a local towing company, responded to the MARB and advised that they would be on scene in 30 minutes. The OPCEN passed this information to the MORNING SUN and advised him to stand by on CH 22 for Marine Salvage. MORNING SUN advised that he was now dragging anchor and being set towards the beach.

4. While en route to the grounded vessel the UTB searched for the MORNING SUN with negative results. With the shoreside help of the police, the UTB was vectored to the distressed vessel off State Park Pier. At 0200 the UTB reported to the OPCEN that they were approximately 200 yards from the subject vessel in 7 feet of water with seas running three to four feet. The UTB advised the OPCEN that they would attempt to get as close as possible; that the subject

vessel was "bobbing up and down pretty hard"; and, if the UTB couldn't get to the vessel's position, "he (subject vessel) would have to ride out the night."

5. As the UTB closed to within 40 or 50 feet, the master was seen on the bow awaiting a towline. He was not wearing a PFD. The vessel's anchor line was observed to be badly frayed and in danger of parting. Closing to within 40 or 50 feet, the coxswain passed towing instructions via the loudhailer. The coxswain passed towing instructions and advised the master to put on a PFD. The master responded affirmatively with a wave of the hand. On first pass the heaving line was successfully draped over the cockpit. With difficulty, caused by pitching and heaving, the master moved aft to retrieve the line, and literally crawled back to the bow to attach the tow line to the forward cleat. He then attempted to retrieve his anchor. Over the loudhailer, the coxswain instructed the master to forget the anchor and to return to the cockpit and hold on. The shallow water and steep waves on the outer edge of the surf line caused considerable amounts of spray over both vessels. Due to the severely limited visibility, the UTB crew was unable to see if the master made it back to the cockpit. He was last seen on the bow turning toward the stern of the vessel.

6. While searching for the MORNING SUN and listening to radio transmissions between the OPCEN and the UTB, Marine Salvage concluded that there was only one distressed vessel. They advised the OPCEN of their opinion and proceeded to the scene to offer assistance to the UTB. Once on scene they found the UTB moving away from the beach, out of the surf line into calmer water with the S/V in tow. The UTB asked Marine Salvage to circle around the S/V, check the name and look for the master as they had not seen him and had been unable to contact him via any means since setting tow. Marine Salvage verified that the distressed vessel was the MORNING SUN and there did not appear to be anyone aboard. As the UTB held the MORNING SUN bow to the seas, Marine Salvage put a crewman aboard the MORNING SUN and verified that the master was missing.

7. Marine Salvage and the UTB anchored the MORNING SUN and a multi-unit search was initiated using surface, air and shore resources. Shortly after dawn the police sighted the victim awash on the beach without a PFD. The local coroner was summoned shortly thereafter and verified the death.

ADDITIONAL FACTS

1. Neither the Radioman of the Watch nor the Operations Duty Officer had documentation to show they completed the watchstander qualifications required by COMDTINST M16120.7 (Group and Station Communications Watchstation

Qualifications Guide). One qualification addresses making channel changes and ascertaining the location of a distressed vessel.

2. When the Police reported a vessel aground and listing badly 100 yards off the beach, no attempt was made to contact the vessel nor was a UMIB issued by the Coast Guard.

3. The CDO and CO of the Coast Guard Group were not notified of a potentially dangerous SAR operation until 0305 and 0315 (after it occurred), thereby preempting any guidance they might have been able to provide.

PROBABLE CAUSE

1. The primary cause of this mishap was the deceased falling overboard and drowning in the surf. A contributing factor was that the deceased was not wearing a PFD.

LESSONS LEARNED

1. Watchstander training was apparently weak in appropriate communications and reporting of distressed vessels. Identification of on scene risks, fixing the position of distress, and directing self-help to minimize risks until assistance could be provided were critical concerns in such communications. Watchstanders must be aggressive, well trained, and have job aids. Time is of the essence; therefore, critical information must be quickly collected and guidance to those in distress must be quickly conveyed.

2. Communications between the UTB and the distressed vessel were also weak. During the transit to the scene the responding platform should attempt to establish communications so as to identify the level of distress and the safety of passengers. During such communications, the requirement to don PFDs and the acknowledgment of the distressed vessel that all passengers are wearing them is critical.

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VESSEL CASE STUDY

ADRIFT & TAKING ON WATER (STATION SAR MISHAP)

SYNOPSIS

At 1719 on 20 August 1993, the F/V MANTA RAY reported the P/C CRABBER, a 25' Welcraft trihull with five persons on board, disabled, adrift, and possibly taking on water near buoy 5A, just inside the bay entrance bar. A 44' MLB responded and transferred a CG crewman and a portable pump to the CRABBER. The CRABBER sank shortly after the CG crewman came aboard. The MLB deployed a surface swimmer to assist the persons that were washed free of the sunken vessel. Three passengers from the CRABBER, the surface swimmer, and the Coast Guard crewman were recovered. Two passengers of the CRABBER along with the vessel's hull were never found.

HISTORY

1. The CRABBER got underway for a day of crab fishing at just before T 1630 on 20 August 1993. On board were the Master, his wife, and three friends (one man and two women).

2. At 1630 the CRABBER began crabbing (with baited crab net rings) in the vicinity of buoys 5 and 5A. Shortly after putting out the rings, the boat experienced engine difficulties and was dead in the water. The CRABBER hailed the passing MANTA RAY and described their distress.

3. At 1719 the MANTA RAY relayed the distress and reported its position by VHF Channel 16 marine radiotelephone to a Coast Guard station. The station responded by: (1) taking pertinent SAR information, (2) requesting the MANTA RAY to instruct passengers on the CRABBER to don PFDs, and (3) getting the 44' MLB underway at 1721 and the RIB at 1734. Passengers of the CRABBER donned PFDs when requested to do so by the MANTA RAY. The MANTA RAY remained with the CRABBER until the MLB arrived.

4. While the MLB was en route, the master of the MANTA RAY made several reports to the CG Station that the CRABBER appeared low in the water and that he believed the vessel was taking on water. At the direction of the CG station, the MANTA RAY asked the CRABBER to check whether they were taking on water. The distressed vessel reported, "a little bit, not bad." Upon arrival of the MLB, the MANTA RAY departed inbound.

5. At 1731 the MLB arrived on scene and placed its boat engineer, (MK2) on board the CRABBER. There was no sense of alarm by the master or passengers aboard the vessel. The MK2 noticed the engine compartment hatch open and water underneath the engine but, did not inspect the full length of the boat or the bilge in the forward cabin. A CG-P6A pump was passed to the MK2 and preparations were made aboard the MLB for towing along side. The MK2 positioned himself on the starboard side aft and removed the lid of the pump barrel in preparation for dewatering. The master's wife and one of the other women were seated, facing forward, on the helm seat. The master was standing port-side aft. The other man and woman were on the starboard side-aft. All persons aboard were wearing type II or type III PFDs.

6. Less than three minutes after the MK2 boarded CRABBER, the vessel began to settle by the starboard quarter. The settling occurred after two waves broke over the transom and dumping water into the aft cockpit. At this point, the CRABBER sank by the stern to a near vertical position, leaving about 1-2 feet of the bow protruding above the water. The two women on the helm seat remained in the CRABBER, caught between the windshield, the canvas (Bimini) top, and the clear flexible side curtains. The other three persons were washed clear of the boat as it sank.

7. The MLB responded by throwing life rings in the vicinity of the persons in the water. With the coxswain's consent, the BM3 jumped untended into the water and immediately moved to assist one of the passengers. The "Rescue Toss" heaving line was thrown to him as he swam away from the sinking boat. With great difficulty, the BM3 and MK2 assisted the master and two others into the MLB. The MLB continued to search the debris field in the immediate vicinity of the CRABBER. At 1806 the RIB arrived and assisted in the search for the two missing women, who remained trapped inside the CRABBER.

8. The RIB had encountered heavy fog throughout its transit to the scene. At the time of departure, the crew believed the on scene position would be inside of the bar and had not put on protective clothing other than waist length float coats. When crossing the bar, the RIB encountered no breaking seas but reported unusually steep 6-8 foot waves with an occasional 10-foot wave passing underneath.

9. The MLB coxswain was gravely concerned about the condition of survivors. He made a decision to transfer the survivors to the RIB for quick transit ashore to awaiting medical assistance. The RIB coxswain expressed moderate concern about this decision in that he had experienced rough conditions outbound on the bar and visibility was still restricted.

10. At 1806, the CG station, having recalled sufficient crew, launched the 62' MLB and the 30' SRB en route to the scene.

11. Transfer of survivors to the RIB was accomplished without incident by 1807. The MLB coxswain assigned the SNBM to ride ashore in the RIB to assist with monitoring survivors' conditions. Just after the transfer of survivors to the RIB, the crews of the MLB and the RIB reported losing sight of the CRABBER and believed that it sank while their attention was on personnel transfer. The RIB departed the scene for 7 the CG station.

12. At 1814 an HH-65 arrived on scene and assumed On Scene Commander. At 1816, the RIB arrived at the station, survivors were immediately transferred to waiting ambulances.

13. Extensive search efforts continued until 2333, then at first light the following day. No debris or evidence of the missing vessel was sighted. The SAR Coordinator suspended all searching at 0810 on 21 August 1993.

ADDITIONAL FACTS

1. Using the RIB to transport survivors ashore in possible 10-foot seas and low visibility conditions was contrary to guidance in CCGD13 SOP. A 30' SRB and 52' MLB were only minutes from arriving on scene.

2. The 44' MLB coxswain was aware of other assets en route to the scene prior to survivor transfer to the RIB. The station was informed by the boats on scene that the RIB would transfer the survivors. The station did not object to that proposal.

3. Prior to getting underway, the coxswains of the 44' MLB and the RIB did not consider the relative state of the tide or the predicted velocity of the ebb, though each coxswain was aware that the tide was ebbing at the time. This information was not posted or readily available in the station's operations center. Neither coxswain requested this information while en route, nor was it passed to them. This data would have been very useful in estimating ETA and point of intercept.

CAUSE

1. The CRABBER sank because of unchecked progressive flooding of its bilge. This made the vessel susceptible to seas approaching from the stern and

eventually sank when two waves rolled across the transom filling the aft deck with water.

LESSONS LEARNED

1. The boating public may underestimate the severity of their condition. In this case, the boat was disabled, drifting at nearly three knots towards the bar and taking on water. A commercial fisherman had reported concern as to how low the disabled boat was riding in the water. The planned response was for a disabled boat; however, shortly after the SAR crew arrived, the boat was quickly overcome by the surf and sank.

2. Response planning must take into account the environment. The SAR Coordinator and On Scene Commander (OSC) must be aware of on scene weather and sea conditions. This includes the speed and direction of current.

3. As soon as possible after the OSC recognizes that the case is a distressed vice disabled vessel, safety risks to personnel must be determined. Saving lives must be the first priority.

4. Actions taken to rescue others must ensure that we do not jeopardize the safety of Coast Guard personnel by placing them in high-risk situations, especially if such risks are the result of judgments rationalized to save time.

VESSEL CASE STUDY

TUGBOAT DEWATERING (UTB MISHAP)

SYNOPSIS

At 0225 on 21 September 1993 a UTB was underway responding to a distress call from a commercial tug reported to be taking on water. The coxswain maneuvered the UTB along side the tug and had one mooring line secured to it. Two crewmen were put aboard the tug to assess the extent of the flooding and begin dewatering operations. In an attempt to assess the flooding, the Coast Guard crewmen were shown the door to the interior of the tugboat (which lead to the engineroom) by one of the tug's crewmembers. Both Coast Guard crewmen entered the compartment, shutting the door behind them. Almost immediately the tugboat rolled to port and sank stern first. One crewman was able to fight his was to the tug's bridge, break through a window and escape when the tug had slipped approximately thirty feet beneath the surface. He was recovered by the UTB and medivaced ,via CG HELO, to a local hospital. The body of the other crewman was found still inside the tugboat by divers, and recovered the next day.

HISTORY

1. On 20 September, the watch sections changed at 0745 and settled into a routine weekday work schedule. Seven people were in the duty section, with the BM3 in charge as OOD and boat coxswain. At 2337, the SAR alarm was sounded and the designated boat crew made the UTB ready for getting underway. Meanwhile the Coxswain/OOD gathered information from the communications watchstander about the location and details of the vessel in distress. The Coxswain requested that another station, approximately 23 miles to the West, also respond and asked for position updates to be radioed to him while en route to the scene. SNBM ONE was not in the designated boat crew but volunteered to go because it was a "big case." He was breaking in as Coxswain at the time. SNBM TWO also volunteered to go along. He was breaking in as Boat Crewman.

2. While en route to the tug, the Coxswain discussed the rescue and assist plan with his crew and originally ordered a FN and SNBM ONE to go aboard. SNBM ONE suggested to the Coxswain that since SNBM TWO had just come from a 110 foot WPB, his DC skills and experience were better than the FN's and that SNBM TWO should go instead. The Coxswain concurred.

3. Communications were not established directly between the UTB and tug until the UTB had made visual contact with the tug and came to about 1/4 mile from the scene. The Coxswain advised the tug's Captain to maintain course and speed. He also noticed the captain did not express concern about the safety of his vessel.

4. The tug was still making way through the water and had all electric circuits and lights operable including side lights when the UTB arrived on scene. The tug had also turned on all deck lights to aid in visual location. The Coxswain observed that the tug's two crewmen were on the bow in survival suits and the Captain was on the bridge in a life jacket. The tug appeared to be in a worse flooding condition than advised by radio, with water on/over the stern. However, the coxswain did not notice the tug to be rolling much, if at all, especially compared to the movement of the UTB. He advised his crew to get the pump onboard as soon as they were tied to the tug. At this point the tug was moving more slowly than the UTB's clutch speed. The coxswain maneuvered the UTB along the tug's port side. At 0021, he had a crewman pass a mooring line to the tug's crewman who made it fast to a cleat onboard the tug. The coxswain put his two-crewmen aboard the tug to make a quick assessment and told them to find the source of the water. They took the COMCO radio with them for communication. Once along side the tug, the coxswain had no further conversations with the its Captain or crew.

5. SNBM ONE and SNBM TWO boarded the tug and had a crewman show them the way to the engine room on the port side. As they boarded the tug they stepped into approximately 6 inches of water on the deck. Realizing that the water on deck was coming inside the passageway, they closed the door behind them. At 0025, Almost immediately after they entered the tug, it began to roll to port. They managed to climb up to the starboard side of the passageway as the tug was listing to port, but could go no further. SNBM ONE called for SNBM TWO to stay right behind him. SNBM ONE found an air pocket on the starboard side and was then hit by a door swinging open. Realizing he had to find a way out, he went around (beneath) the door and up through a passage way, finally reaching the bridge. Here, SNBM ONE found another air pocket and, because of the UTB's boat lights shining on the water's surface, recognized where the windows were. He managed to find something to break a window out and escaped through it to the surface.

6. When the tug rolled to port it struck the UTB. As it began to come back upright the Coxswain ordered the crew to remove the mooring line, then backed the UTB away while the tug rolled back to port again and sunk stern first. The UTB recovered the tug's two crewmen, then SNBM ONE, and continued the search

for SNBM TWO. SNBM ONE was medivaced. A second UTB arrived on scene just as the tug was going over and recovered the Captain.

7. Subsequently, Coast Guard State and local units searched through the night and the following day. SNBM TWO's body was recovered the following day in the passageway leading to the engineroom.

DAMAGE TO UNIT OR UNIT EQUIPMENT

The UTB sustained damage to components as follows when the tug rolled onto her and sunk: mast, destroyed radio antennas, crushed blue light, destroyed radar antenna, dented handrail on starboard side, hole and crack in main deck starboard side, top of cabin cracked at base of radar pedestal, front of cabin starboard side, several dents and scratches along starboard side, and carburetor broken off of the CG-P-1B pump.

ADDITIONAL FACTS

1. The Boat Crew was not experienced with commercial vessels. The Station had responded to only one other commercial vessel all season. All other cases were small pleasure craft.

2. There were numerous communications failures. Communications between the Tug boat and the UTB weren't good or used to the fullest. One Coast Guard crewman observed what he thought were conditions much more severe than expected and wondered how the Tug's captain remained so calm. However he did not communicate his concern to the Coxswain. The District OPCEN had information that the Tug's crew were prepared to abandon ship, but this may not have been passed to the UTB. The Tug's crew may have also led the Coast Guard crew astray when they failed to communicate their evaluation of conditions. In addition each crew, Tug and Coast Guard, thought the other was the expert and knew what to do.

3. The Station's OOD was also the coxswain. No experienced Petty Officer was left at the Station who could be consulted regarding conditions and actions to be taken in responding to the case and boarding the tug.

4. There were some danger signals that should have been recognized by the Coast Guard crew. These were: the Tug's crew on the bow in survival suits, and the Tug's rear deck awash causing the Coast Guard crew to step into approximately six inches of water on boarding. One tug crewman said he thought about

advising the Coast Guard crew not to go inside, but figured someone else was their boss and shouldn't interfere.

5. The tug had a starboard main deck door padlocked, an entrance to the fidley area and may possibly have served as a means of escape. This area was also blocked with line and other deck gear.
6. The Tug had stability problems in the past. Side tanks were added 7 at some time in the past to compensate for additions to its pilothouse. The Coast Guard personnel were inexperienced with the stability of a flooded vessel of this type.

7. The tug's installed bilge pumps were not activated and the portable pump was inoperative.

PROBABLE CAUSES

1. Personnel entered the interior of the sinking vessel and secured their exit behind them. In addition, the Coast Guard personnel did not have an adequate egress route planned.

2. In communicating with the master, the coxswain can develop an effective response plan to minimize the risks to his/her crew and boat. The coxswain did not ascertain a risk assessment from the master nor did the master offer one. No one should have entered the interior of the tugboat before talking with the master.

3. The sluggish movement of the Tug in the seaway was misinterpreted as a sign of the vessel's stability. It should have been recognized for what it really was, a condition resulting from extensive flooding. However, the crew's unfamiliarity with the characteristics of this type of commercial vessel probably contributed to the misinterpretation .

4. In an attempt to save property, these highly motivated personnel may have been overly complacent in their boarding and entering the interior of the sinking vessel. This mishap resulted in part from the Seamen entering the interior of the Tug, closing the door behind them, and eliminating this access way as a means of escape.

5. The boat crew did not feel it was necessary to seek higher level concurrence with their intended actions. Lack of communications between the OIC and coxswain was a possible contributing factor to the mishap.

LESSONS LEARNED

There is no routine SAR, especially with regard to distressed commercial vessels. Responders must be assertive in gathering information about the risks that they will face before taking action. When responding to a commercial vessel, the most effective means of assessment is communicating with the master. This is paramount when preparing to take action aboard a flooded vessel. When commercial crews are making preparations to abandon ship, responders should proceed with caution. No loss of life is justifiable in the saving or salvage of property.

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DERBY RISKS (AUXILIARY MISHAP)

SYNOPSIS

On 21 August 1994, the Coast Guard Auxiliary vessel POP-EYE was underway with two Auxiliarists and four passengers (including an active duty CPO). They were to first go fishing from 1200-1800 then patrol the annual Juneau Salmon Derby. Their mission (established in anticipation of increased SAR caseload) was to render assistance if required, to distressed boaters in their patrol area. On board an unnamed Questar boat numbered AK1974L, Mr. EVAN RUEDE and Mr. DARREL MCGINNIS, had caught their limit of fish and proceeded to the southern end of Shelter Island where they off-loaded them to the tender vessel KAMILAR. After off-loading, they cast off from the KAMILAR without starting their outboard motor. They drifted about 200-300 yards from KAMILAR while attempting to restart. The vessel's auxiliary motor was out of commission. Unable to start the engines, they flagged down a passing pleasure craft (P/C STRANGER). AK1974L had no radio and could not call for assistance directly. Around 1345 the crew of STRANGER towed AK1974L to the port side of KAMILAR. While alongside, Mr. MCGINNIS requested that STRANGER contact the Coast Guard. This was done with no success on Channel 16 (due to traffic density). However, at 1351, CPO HAND on board POP-EYE was able to contact STRANGER and COMMCEN Juneau, A Personnel at Coast Guard Station Juneau had overheard the voice transmissions and relayed data to the Group Ketchikan duty officer indicating that the distressed AK1974L was taken in tow by KAMILAR. At 1359 POP-EYE communicated to the COMMCEN that they (POP-EYE) could be on scene in an hour if their assistance was needed. Group Ketchikan responded in the affirmative for POP-EYE to proceed and assist. POP-EYE arrived on scene around 1430 and made up a tow with AK1974L. Just moments after commencement of the tow, waves came over the bow of AK1974L and imposed a bow-down attitude. The coxswain of CG256550 (already underway) and a BM2 at Station Juneau overheard "Slow down POP-EYE" several times over VHF-FM. At 1435, the KAMILAR reported that AK1974L had capsized. The transmission was followed by another from POP-EYE confirming the same. AK1974L had rolled rapidly to starboard trapping Mr. RUEDE in the wheelhouse. Around 1435, KAMILAR and POP-EYE reported people in the water. Several surface craft including CG256550 overheard these transmissions and set courses for the scene. All persons in the water were recovered by vessels on scene with the

exception of Mr. RUEDE who was still trapped. The KAMILAR, using a crane, was able to hoist AK1974L out of the water. Approximately 17 minutes had lapsed before Mr. RUEDE was recovered from the wheelhouse. SN HELPER from CG256550 and Mr. GEORGE of the M/V KAMILAR (vessels that had come to the scene to assist) immediately began CPR. BM3 STEPHEN, the coxswain of CG256550, had Mr. RUEDE transferred to CG256550 and got underway for Auke Bay; CPR continued. At 1525 CG256550 arrived pierside and delivered Mr. RUEDE to an awaiting ambulance. Mr. RUEDE did not recover consciousness, and at 2141, was pronounced dead at the hospital.

HISTORY

1. On 21 August 1994, at 0700, the Coast Guard Auxiliary vessel POP-EYE got underway with the qualified operator Mr. CANDU, a qualified crewman Mrs. CANDU, and passengers CPO HAND and his family, to first go fishing and then, from 1200-1800, patrol the annual Juneau Salmon Derby. Departing from Auke Bay, Alaska, their mission was to render assistance as required to boaters in distress in their patrol area of Point Louisa to the Northern derby boundary (Favorite Channel). The POP-EYE was following Group Ketchikan Operations Order (OPORDER) 008-94, issued 5 August 1994 in anticipation of the increased Search and Rescue (SAR) caseload.

2. The Golden North Salmon Derby is an annual event scheduled to occur between 19-21 August 1994, with approximately 1,000 recreational vessels participating.

3. On 21 August 1994, the POP-EYE was on patrol under the control of STA Juneau as detailed in the Memorandum from the FSO-OP, USCG Auxiliary Flotilla 17-1-1 dtd 5 August 1994, and in Group Ketchikan Operations Order No. 008-94. According to the memorandum, POP-EYE was "operating in the north from Auke Bay, but she will function primarily as a VIP platform, only available for duty in a serious emergency." Under Appendix I to Annex E of Group Ketchikan's SOP (Coast Guard Auxiliary), Paragraph 4, Auxiliary vessels are not to be used in severe or adverse conditions, and are normally restricted to "routine" towing situations. The SOP does not define "severe or adverse conditions".

4. According to the OPORD, Paragraph 3(c)(2), POP-EYE was to assist boaters in distress as directed by the Patrol Commander, STA Juneau Officer-in-Charge. Paragraph 3(a)(1) of the same OPORD indicates that Group Ketchikan would act as SAR Mission Coordinator (SMC) for the duration of the Golden North Salmon Derby. Paragraph (3)(b)(3) directed STA Juneau to provide assistance to boaters in distress using either Coast Guard or Auxiliary resources.

5. The unnamed 18' motorboat, AK1974L, departed Auke Bay at 0530 on the morning of 21 August 1994 with Mr. RUEDE and Mr. MCGINNIS aboard. They fished the entire morning, caught their limit, and proceeded to the southern end of Shelter Island on Lynn Canal, where they off-loaded their fish to the tender vessel KAMILAR.

6. After delivering their catch, Mr. RUEDE and Mr. MCGINNIS cast off from KAMILAR without starting the outboard engine on their vessel. They drifted approximately 200-300 yards from the KAMILAR while trying to restart the outboard. The vessel's auxiliary motor was out of commission.

7. Unable to restart the engines, Mr. RUEDE and Mr. MCGINNIS flagged down a passing pleasure craft, STRANGER. As AK1974L had no radio, they could not call for assistance directly. At approximately 1345, Mr. DEAN PATTON, owner/operator of STRANGER, took AK1974L in tow to the port side of KAMILAR.

8. While alongside the STRANGER, Mr. MCGINNIS requested Mr. PATTON contact the Coast Guard. He had seen the STA Juneau CG256550 earlier and had seen POP-EYE near Handtroller's cove. His specific request was for advice on what to do. Neither STA Juneau, COMMCEN Juneau, nor CG256550 heard this call. CG256550 was patrolling the area, and lying in a cove on Shelter Island on Saginaw Channel.

9. CPO HAND heard STRANGER's call with no Coast Guard response. He indicated that VHF channel 16 traffic was very difficult to hear because of the number of boaters using that channel. At 1351 CPO HAND contacted both STRANGER and COMMCEN Juneau, and requested they switch to channel 22A. They did so, and CPO HAND also shifted in order to monitor the conversation.

10. STRANGER reported AK1974L as a Questar, stating that it was adrift in pretty choppy waters, and inquired if assistance could be provided. COMMCEN Juneau requested the number of persons on board. STRANGER reported two persons on board and informed COMMCEN that they could tow AK1974L to KAMILAR. While waiting for a response, STRANGER took the vessel under tow to KAMILAR.

11. COMMCEN notified STA Juneau at 1353 (immediately after POP-EYE relayed the initial request for assistance). STA Juneau had heard the conversation on VHF-FM and contacted the COMMCEN to inquire about the case. COMMCEN logs document that they first notified Group Ketchikan at 1359 after STRANGER reported they had AK1974L in tow. At this time, the Group

assumed SAR Mission Coordinator (SMC). Weather recorded at the time showed winds southerly at 25-30 knots with 3 to 4 foot seas, 2 NM visibility.

12. COMMCEN radio transcript records POP-EYE calling COMMCEN: "Roger, if you guys can't find anybody we can be there in about an hour, or less than an hour". POP-EYE to COMMCEN further: "Yeah, Roger Dennis, we started up the other main. We're gonna run over there and go pick 'em [Questar] up. I'll coordinate with the STRANGER ok?" "This is Juneau COMMCEN, roger, I'll coordinate with the Group." COMMCEN requested POP-EYE standby the radio while the information was passed to Group Ketchikan. The COMMCEN later responded, informing POP-EYE to proceed.

13. At 1413, KAMILAR reported AK1974L was moored alongside. COMMCEN requested KAMILAR remain on a one hour communications schedule to monitor the situation.

14. At 1416, POP-EYE informed KAMILAR that they would be on scene in 15 minutes. At 1419, Group Ketchikan Duty Officer told the Assistant Operations Officer that the POP-EYE was en route to tow AK1974L and was on an hourly communications schedule.

15. Upon arriving at KAMILAR, POP-EYE came to KAMILAR's port side and made up to tow AK1974L. CPO HAND passed the towing line to Mr. MCGINNIS at the bow of AK1974L. Mr. MCGINNIS first made the line over AK1974L's railing. CPO HAND instructed him to pass the line under the railing, near the vessel's anchor slide. Mr. MCGINNIS informed CPO HAND that he was unable to make the line off using the D-ring. They agreed to take two turns off the tow line around the vessel's anchor windlass then make it fast to the cleat aft of the windlass. Because the cleat was small and the line diameter large, Mr. MCGINNIS took a round turn and tied a half hitch around the cleat.

16. CPO HAND indicated that before he passed the towing line to Mr. MCGINNIS he asked if all persons on board had life vests on. Mr. MCGINNIS stated that they did. A crewman aboard KAMILAR, Mr. SHANE DROLLINGER, instructed Mr. RUEDE to put on his PFD prior to POP-EYE's arrival, which he did. Mr. MCGINNIS was wearing a mustang work suit, and Mr. RUEDE was wearing a type III Coast Guard approved personal flotation device. CPO HAND later mentioned that he had not considered taking the persons off the vessel. Once the lines were made fast, CPO HAND asked Mr. MCGINNIS to go to the aft end of the vessel, which he did. Mr. RUEDE was in the wheelhouse with both doors closed.

17. POP-EYE towed the vessel away from KAMILAR heading east, then changed to a southeasterly heading to take the vessel's bow into the wind.

18. At 1433 POP-EYE contacted COMMCEN to report "We got that white Questar in tow at this time. We're going, we're leading them from the--we're gonna bring em into Auke Bay. I'll give you an update halfway across." COMMCEN to POP-EYE: "What's your ETA?" POP-EYE: "We haven't figured it out yet. We got to find out how fast we can go but we got to be taking it easy, right now it's kind of sloppy out here."

19. CG256550, (underway northwest of Favorite Reef) heard a boater on the VHF-FM set call on channel 16 saying "Slow down POP-EYE" just moments after the 1433 report. It is not known who made this report, and the POP-EYE does not recall hearing it. STA Juneau was monitoring VHF-FM and heard the call to slow down.

20. Almost as soon as AK1974L straightened up behind the POP-EYE on its southeasterly course, the vessel took a large wave over the bow causing the bow and wheelhouse to flood. The vessel immediately took on a bow down attitude. CPO HAND immediately called up to Mr. CANDU who throttled down. While the POP-EYE was losing headway, AK1974L took another wave over the bow and water flooded all the way aft. With the aft wheelhouse door now open, Mr. MCGINNIS reached into the wheelhouse to grab Mr. RUEDE. He touched Mr. RUEDE, but the force of water propelled him away and off the back of the vessel. CPO HAND and Mr. MCGINNIS report that the vessel rapidly rolled to starboard and capsized with Mr. RUEDE trapped in the wheelhouse.

21. At 1434 KAMILAR, still in visual range, reported to COMMCEN that AK1974L had capsized and that there were people in the water. At 1435 POP-EYE reported the same. In attempting to back down, POP-EYE fouled one of its twin screws with the towing line, and was adrift. At 1435 COMMCEN issued a Pan Pan broadcast describing the situation. CG256550 immediately changed course from northwest of Favorite Reef to the incident. At 1443, Group Ketchikan directed an AIRSTA Sitka helo to get underway for the scene.

22. At 1439 COMMCEN updated the SAR Controller on the case. Three pleasure craft as well as CG256550 had responded to the Urgent Marine Information Broadcasts. At 1441, Group Ketchikan contacted Station Juneau for on scene information.

23. After POP-EYE had fouled its screw, it was unable to pick up Mr. MCGINNIS. He was brought aboard a BayLiner (numbered 2452) that had come to the scene to assist. Mr. MCGINNIS later returned to Auke Bay aboard the BayLiner. The

POP-EYE cut the tow line, and passed it to Mr. GEORGE and Mr. HARRIS who had gotten underway to assist on a skiff from KAMILAR. The skiff delivered the tow line to KAMILAR where it was made off to a crane. They hoisted the bow of AK1974L out of the water. Mr. RUEDE, wearing a PFD was recovered at 1451. He had been trapped in the wheelhouse for approximately 17 minutes.

24. Mr. RUEDE was found floating face down in the vessel's wheelhouse with line entangled about his legs and waist. Mr. GEORGE and Mr. HARRIS pulled Mr. RUEDE to the deck of KAMILAR. At approximately 1451 CG256550 arrived at the scene. SA HELPER went aboard KAMILAR, CPO HAND was transported to CG256550 via a third boat, where he took the CG256550 controls while BM3 STEPHEN (coxswain) went on board the KAMILAR to evaluate the situation. SA HELPER and Mr. GEORGE immediately began CPR. Mr. GEORGE monitored the airway and SA HELPER began compressions, at a 5-1 ratio (compressions to breaths). Mr. RUEDE did not recover pulse or breathing at that time and skin pigmentation was discolored. At 1454, the operator of P/C COPESETIC reported that his wife (a registered nurse) was going to board CG256550 from COPESETIC and assist in giving CPR. CPR was effective in that BM3 STEPHEN could detect a pulse from their compressions. At this point, BM3 STEPHEN had the victim transferred to CG256550 for emergency evacuation.

25. At 1507, CG256550 reported to COMMCEN that they were en route to Auke Bay with Mr. RUEDE, and that crewmen were administering CPR. They requested that an ambulance meet them upon their arrival shoreside.

26. The helo requested from Air Station Sitka was stood down at 1511 without launch due to CG256550 being on scene.

27. At 1525 CG256550 arrived at the pier and delivered Mr. RUEDE to an ambulance. He was unconscious and had no pulse or respiration. He was immediately taken to Bartlett Memorial Hospital's Emergency Room for treatment. Mr. RUEDE did recover a pulse after 45 minutes of CPR in the emergency room. CPR had been administered for an hour prior to his arrival at the emergency room. He never stabilized and was listed in critical condition. At 2141 Mr. RUEDE was pronounced dead at the hospital.

CAUSE

1. The cause of the mishap was poor judgment of the mishap victim for taking AK1974L out in weather and sea conditions that were beyond the safe operating envelope for that boat design. The loading of the vessel and its marginal stability contributed to its capsizing when taken in tow.

2. The Auxiliarist in charge decided to take the vessel in tow, rather than leave the vessel safely moored.

3. The Auxiliarist in charge of the tow deferred to a guest's opinion in prosecuting the case.

4. The Auxiliarist did not comply with Coast Guard Auxiliary guest participation policy.

5. The guest had no authority to issue orders although he had longevity and seniority in the Coast Guard active duty forces. In this case, the guest was a chief radioman.

6. The decision to leave passengers aboard AK1974L during the tow contributed in that the extended wheelhouse on AK1974L trapped one man when the boat capsized.

LESSONS LEARNED

1. Double-checking the issues of weather/catch limits, boat design, and required safety equipment in the derby registration process to assess potential risk and establish countermeasures may be appropriate. This would occur as a partnership between the Coast Guard group or activity and the derby sponsors.

2. Protracted operations, like towing, should be planned with as much feedback as possible from the operator and/or owner. Past history, that was known only to the operator, could have alerted the responders that this boat was a high risk tow and beyond its operating capability.

3. Decisions to keep personnel aboard a towed vessel must weigh the risks to personnel safety. Have emergency egress plans in place before pursuing a tow.

4. Ensure personnel cannot be trapped by sudden flooding or capsizing of the vessel.

5. Rank and longevity in the Coast Guard does not take precedence over written policy and authorization to lead.

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PRESS ON (STATION MLE MISHAP)

SYNOPSIS

At about 0900, 9 January 1995, a 41' UTB from Station Sandy Beach, Florida, was underway on a law enforcement patrol. There was a television film crew on board to record the law enforcement activities. The UTB approached the 212' M/V PRINCESS TARRAH in the Sandy anchorage to conduct a boarding. MK3 J. D. BUTTONS, MK3 J. R. TOGGLE, and a video cameraman embarked on the vessel. During the boarding, MK3 TOGGLE entered into an unlighted cargo hold area to inspect the space. MK3 BUTTONS (the boarding officer) remained on the main deck. Several minutes later, MK3 BUTTONS also entered the cargo hold area of the vessel. Moments after entry, MK3 BUTTONS fell from the between deck to the bottom deck of the cargo hold. MK3 BUTTONS suffered severe head injuries as a result of the fall. First aid and CPR were administered to MK3 BUTTONS. He was evacuated to the nearest hospital where he was pronounced dead on arrival.

HISTORY

1. At around 0830 on 9 January 1995, Station Sandy Beach UTB 41400 got underway to provide opportunities for a crew to film law enforcement actions. The station OOD, MK1 BART, received tasking from a bulletin board which noted that he was to assign a UTB crew to support the video crew at 0800. MK1 BART chose BM2 SIMPSON as the UTB coxswain and tasked him to select a crew to make the Coast Guard look good. No further tasking or specifics were provided.

2. Shortly after departing the station, the coxswain was advised that the crew had forgotten the hand-held VHF radios for boarding team communications. The coxswain and boarding officer (MK3 BUTTONS) decided to proceed without the radios.

3. When the boarding team arrived at the Sandy Beach Anchorage area (around 0850), they did not find any vessels underway. The UTB then approached the anchored vessel

4. M/V PRINCESS TARRAH, a 212' coastal freighter. Before conducting the boarding, BM2 SIMPSON and MK3 BUTTONS discussed their concern with boarding the large vessel with only a two-man boarding team, but decided to proceed with the boarding. Also, MK3 TOGGLE expressed concern with boarding with two personnel, but would go on to carry out the boarding as planned.

5. Once the boarding team was on board, BM2 SIMPSON radioed Station Sandy Beach and requested additional personnel to assist with the boarding. BM2 SIMPSON was advised by the OOD that the second boat crew was not immediately available and that he should proceed as he thought most prudent given his limited resources.

6. The boarding team began a consensual inspection of the living spaces of the vessel in company with the master.

7. MK3 BUTTONS then directed MK3 TOGGLE to inspect the cargo hold area of the vessel. It was agreed at that time that MK3 TOGGLE would examine the hold area and MK3 BUTTONS would remain on deck and maintain security over the vessel crew. Since MK3 TOGGLE did not have a flashlight on his belt, he took an extra flashlight from the boarding kit. Finding that light dim, he requested the flashlight from MK3 BUTTONS's weapon belt. MK3 BUTTONS handed MK3 TOGGLE his flashlight and TOGGLE then proceeded into the cargo hold. The master of the vessel offered to open a corner of the hold cover for lighting but MK3 BUTTONS declined.

8. The video of the boarding evolution indicates that MK3 BUTTONS and the master of the vessel had a conversation, possibly regarding the layout of the cargo hold compartment. (This was prior to any of the boarding team entering that space.)

9. After about ten minutes, MK3 BUTTONS also entered the unlighted cargo hold area with a flashlight from the boarding kit. MK3 TOGGLE, then at the bottom deck of the cargo hold, heard MK3 BUTTONS yell that he was entering the hold. He saw MK3 BUTTONS's legs coming through the main deck scuttle. MK3 TOGGLE shouted "hold on" since he was coming out of the hold anyway. He then proceeded to climb from the lower deck to the between deck. When he completed his ascent, MK3 TOGGLE heard something hit the cargo deck and using his flashlight, observed a person lying on the deck. He climbed back down to the cargo deck, identified the person as MK3 BUTTONS and administered first aid before climbing to the main deck to inform the UTB crew of the incident. The boat crewman, SN CARTER, boarded the freighter to assist MK3 TOGGLE with first aid.

10. At 0918R, BM2 SIMPSON advised Station Sandy Beach of the incident via VHF radio. CG212520 was dispatched with a Coast Guard Health Services Technician (HS) on board. At 0930R, BM2 SIMPSON advised Station Sandy Beach that MK3 BUTTONS was unconscious and requested a helicopter evacuation. SN CARTER was recalled from the freighter to CG41400 to make preparations for a helicopter evacuation. At 0933R, CG212520 arrived on scene with the HS and additional personnel to render assistance to MK3 BUTTONS. At about 0940R, CGC POINT MARTIN, that had been operating in the area, arrived on scene having overheard the UTB distress call. At 0943R, Station Sandy Beach's UTB CG41459 delivered a hoistable litter to CGC POINT MARTIN for the helicopter evacuation. At 0950, CG6577 was on scene. At 0951R, MK3 BUTTONS was transferred to the CGC POINT MARTIN in a non-hoistable litter and placed in the hoistable litter on the forward deck of CGC POINT MARTIN. At 0956R, MK3 BUTTONS was hoisted to CG6577 and transported to Jackson Memorial Hospital. At 1004R, MK3 BUTTONS was delivered to the hospital where he was pronounced dead on arrival.

CAUSE

The main cause of this mishap was the victim's entry into an unlighted space with which he had no familiarity and the subsequent fall off the between deck.

ADDITIONAL FACTORS

1. A significant deficiency in station staffing which created a climate that greatly challenged command ability to maintain acceptable levels of training and perform all operational tasking.

2. Unclear tasking and priority given for this mission. The crew was under pressure beyond the mission for which they were trained. They were tasked to provide a video film crew the opportunity to record Coast Guard work in a manner that would reflect favorably on the service. No briefing was performed prior to departure.

3. Upon finding a ship-of-opportunity, commencing a boarding without the minimum resources to safely perform the mission as required by MLE Manual. This included the lack of radio communications for the boarding team, insufficient illumination for all boarding team members, and based on the size of the vessel, insufficient number of team members to conduct a boarding.

4. Executing a boarding that separated team members, placing them in hazardous areas of the ship without a buddy and without means of communicating with each other.

5. Declining the master's offer to open the cover of the hold to allow sunlight to illuminate it before personnel entered and entering the unlighted hold without adequate portable illumination.

LESSONS LEARNED

1. Command briefings are very important to ensure that mission priority is understood, tasks necessary to achieve the goals are clear , resources are adequate, and safety concerns are discussed. In these discussions, it is important that risks are assessed.

2. During this incident, the petty officers often questioned continuing the mission for lack of resources. This was a mistake in planning and preparation for the mission. The anxiety of the moment, and desire to appear in control to the film crew, may have clouded their decision-making, and they pressed on. It is best to proceed at a deliberate, safe operational tempo. When mistakes occur, correct them before proceeding.

3. Inspection of cargo holds is inherently dangerous. Holds are not designed for human occupation, meaning exposure to hazardous atmospheres, obstructions and protrusions are all.

ON ROCKY GROUND (44' MLB MISHAP)

SYNOPSIS

1. In the early morning hours of 12 February 1997, the station crew were awakened by the SAR alarm and were underway at 0034U to respond to a distressed S/V outside the mouth of the river. The four crewmen included a BM2 coxswain (not surfman qualified), MK3 engineer, SN crewman, and SA crewmember who was under training. No crew briefing was conducted. All wore anti-exposure suits and survival vests. No one wore their helmet. Everyone wore their heavy weather safety harnesses and all, except the coxswain, fastened themselves to the D-ring attachment points on the boat with the restraining clips of their safety harnesses.

2. During their transit, they encountered driving rain, 25-40 knot winds, 6-8' seas near the river mouth, 10-15' seas as they crossed the bar, and 16-20' ocean swells. Neither Dayboard #3 nor the wash rocks, which are the two primary navigational landmarks going out to the bar, were identified by the SA who was assigned to look for them from his position on the starboard side. At 0045U, the coxswain reported to the station that the MLB had crossed the bar. At about 0047U, the SA called out a rock just off the starboard bow, and almost instantly the boat struck something. Simultaneously, a large wave hit the port side of the MLB rolling it completely over. Everyone survived the rollover and the coxswain reported via radio that they had experienced a rollover and the crew was disoriented. Very shortly thereafter, the MLB rolled/pitchpoled, hitting the rocks. Following this second rollover, only the SA and the engineer remained on board. The coxswain, the SN and a large portion of the coxswain's flat were missing. The SA unbuckled his safety belt, but the engineer told him to keep it on and stay with the boat. Shortly thereafter, a third rollover occurred leaving the SA alone on board. The MLB remained afloat and upright with engines running while repeatedly being slammed against the rocks as it was tossed about by the waves inside the cove.

3. The SA floated with the MLB for approximately 25 minutes, using the illumination provided by the MLB's stern light to monitor his progress toward the shoreline of the cove. During this time, he shot five Mark 80 "pen gun" flares skyward and two toward the shore for further illumination. Upon seeing a strobe light floating in the cove, he activated his own. The engines remained running during most of this period, finally stopping when the MLB grounded on the Eastern shore of the cove. The SA detached his heavy weather safety belt,

jumped from the MLB, waded ashore and proceeded to climb up the steep Northeast incline of the cove.

4. Some time shortly thereafter, the SA found a comfortable position on the incline. He saw the lights of a helicopter and expended the night signal from his Mark 124 day/night flare. The helicopter saw the signal but could not relocate it. Later the SA's strobe light was spotted by another helicopter whose copilot was using night vision goggles. As the helicopter investigated the strobe sighting, they saw reflective material 25-35 feet above the surf line, but could not confirm the presence of a survivor as they were unable to get low enough due to terrain and turbulence. A High Angle Rescue Team (HART) from the Sheriff's Department was requested. The helicopter stayed on scene, periodically illuminating the survivor while continuing to search the cove for other survivors. They saw two sets of reflective material floating in the middle of the cove during this time, and suspected that two persons were floating in the water, but were unable to effect a rescue.

5. The HART was brought to the island by a CG helicopter, retrieving the SA from the side of the cliff at 0819U. He was hoisted and flown to the station, treated for minor lacerations to his nose and face before being transferred to the hospital for definitive care.

6. The two people aboard the distressed S/V were rescued by a CG helicopter as their boat was being dashed upon the rocks just south of the river bar.

DAMAGE AND INJURIES :

1. The MLB was determined to be a total loss.

2. Deceased personnel included the coxswain, the engineer and the SN.

FACTUAL INFORMATION :

1. 110800U Feb 97: The duty boat crew at CG Station Ebb consisted of a BM2 coxswain, MK3 engineer, SN crewmen, and a SA crewmen under training.

2. 1730U: The last bar condition report during daylight hours. The XPO and the coxswain/OOD checked the conditions together and reported the winds from the south at 15-20 kts, a 4-6 foot swell on the bar and seas outside the bar at 8 to 10 feet.

3. 2130U: Weather conditions as reported in the Station Weather Log : rain, WSW wind at 25 KTS, seas 7' w/8 sec period, visibility-unobserved, air temp 46 degrees F. Supplemental remarks reported by the watchstander indicated a gale warning as stated in the following National Weather Service forecasts: 440PM

PST TUE FEB 11 1997 forecast of "...Gale Warning...tonight...wind shifting to NW 35 KT with gusts to 40 KT...combined seas building to 14 ft...rain changing to showers."; 830PM PST TUE FEB 11 1997 forecast of "...Gale Warning...tonight...NW wind 35 KT...seas building to 18 ft...showers."

4. 2200U: The coxswain contacted the XPO and passed that the winds had increased to 20-25 knots and the sea conditions had not changed.

5. 2200U: The decision made jointly by the Duty Surfman and the coxswain during a telephone conversation not to have the duty Surfman recalled. This decision was made with an inaccurate estimation of the weather conditions by the coxswain who did not completely convey reported and forecast weather conditions as noted in the 2130U station weather log entry. The coxswain merely commented to the XPO that the only thing that had changed from the earlier weather evaluation was that the wind had increased to 20-25 KTS.

6. 2330U: The S/V ROCKER attempted to call Station Ebb to ascertain the condition of the bar. They made several attempts to establish contact with no success.

7. 120010U Feb 97: The Mean Tide for 12 Feb was 4.4'. The tide at 0045 would have been approx. 5.3'.

8. 0015U: Group Rip Tide reported hearing the S/V ROCKER attempting to contact the Coast Guard. Communications were loud and clear off the Station Ebb high site. 0019U, Group Rip Tide instructed the Station Ebb communication watchstander to pass the most recent weather and bar conditions. The watchstander then provided the following to the S/V ROCKER : WSW wind at 25 KTS, seas 7' w/8 sec period, visibility-unobserved, air temp 46 degrees F .

9. 0019U: The Station Ebb watchstander was awakened by the S/V ROCKER calling the "Coast Guard." The watchstander noted that the wind was gusting up to 50 MPH. The watchstander passed this information along to the coxswain. The coxswain then called the XPO to brief him on the S/V ROCKER. After briefing the XPO, the XPO told the coxswain to get more information (direction of travel, position, nature of problem). The coxswain then tried to contact the S/V ROCKER. Approximately two minutes later the coxswain returned to tell the XPO the S/V was taking on water. The XPO told him to contact the OINC and that he, the XPO, was on his way.

10. 0021U: S/V ROCKER, in response to an inquiry from Station Ebb, says that they were attempting entrance "right now." At 0026U, Station Ebb and Group Rip Tide received a MAYDAY call from the S/V ROCKER, indicating they were in some sort of distress. At 0029U Group Rip Tide received second and third MAYDAY calls that were weak and broken. During the third MAYDAY, the S/V

ROCKER indicated they were taking on water. This information was passed to Station Ebb and the Search and Rescue alarm was activated.

11. 0031U: The crew for the Station backup boat was recalled.

12. When the S/V ROCKER rolled over, the antenna was torn off. After this point, communication between the S/V and Station Ebb was nonexistent.
13. The crew of the MLB proceeded to the boat and donned their anti-exposure coveralls. The coxswain was very upset that everyone didn't get to the boat before him. The crew put on survival vests and heavy weather safety belts were broken out. The SA and the SN put on their heavy weather safety belts. The SN "Latched in" with his restraining hooks.

14. The SA took the starboard crew position, the SN was at the port crew position, and the engineer was near the door on the port side. The engineer verbally checked to see that everyone had their safety belts on.

15. 120034U FEB 97: The MLB reported underway from Station Ebb with the duty crew.

16. The engineer placed a boat crew safety belt on the coxswain while he was sitting in the coxswain chair as the MLB was on the way out to the wash rock on the island. The coxswain seemed to be upset that the engineer put the boat crew safety belt on him. The SN and the SA had their boat crew safety belts clipped into vents and coxswain screens. The SA could not tell if the coxswain or the engineer had their belts clipped in.

17. There was no formal or informal crew briefing done.

18. The SA had never been across the bar before at night.

19. The SA turned the radar on. The engineer tuned the radar. It was raining very hard; "couldn't see past the bull nose". At 0044U, the SA was told by the coxswain to use the spotlight to look out to starboard and watch for the "wash rocks" about 10 minutes after they got underway.

20. It was pitch black out with no moon or stars. There was a 4' swell, coming across the rock dike ruins near the mouth of the river; swells of 10-12' were passing over the wash rock, 12-14' swells existed outside the wash rock, and 16-18' seas were experienced on the west side of the island; winds were 20-25 KTS, gusts to 35 KTS. The engineer made the remark while going outbound "We gotta get the heck out of here!" or words to that affect. Following the engineer's remark, the coxswain said "Screw this," "gunned it" and went into the seas.

21. The OINC of Station Ebb was attempting to call the MLB to advise them that the group thought the distress call might be a hoax and for them to stand by in the river. The OINC transmitted no more than "MLB - Station" when the coxswain came back with "Stand by." The OINC took this to mean that he was attempting a bar crossing and that he was encountering some breaking sea conditions. The OINC decided to head to the over-look in an attempt to see the MLB crossing the bar.

22. 0045U: Station Ebb received a report from the MLB that they were across the bar. Shortly thereafter, the coxswain reported 16' seas.
23. Prior to arriving at the over-look, the OINC overheard the report from the MLB that they had crossed the bar.

24. The MLB passed lighted dayboard #3 and went past the first "wash rocks," an important navigational reference. The MLB came to a westerly heading transiting close to the island.

25. 0047U: The SA reported seeing a rock on the starboard bow. Shortly thereafter the boat struck a submerged object, prompting the coxswain to say, "What the heck was that?" The SA then heard a scream and realized a wave struck the port side, immediately causing a rollover to starboard. All four crewmen remained onboard after the boat righted itself.

26. The coxswain didn't count heads.

27. The engineer said, "we're still on the bar" because the lights of the city were still in sight.

28. The MLB turned towards the island and the coxswain said, "Find me dayboard #3!"

29. 0048U: The coxswain reported on the radio that they had just rolled over and were disoriented. The OINC only heard a weak transmission that sounded like the coxswain saying "we rolled" or "they rolled" and tried to clarify whether he meant the MLB or the S/V ROCKER had rolled.

30. The starboard spotlight was inoperable after the first rollover. The mast was bent over flat, towards the bow to port. The radar was out.

31. The OINC called the station to ensure that a helicopter was launched and that the second boat should be launched as soon as they could. Minutes later the OINC was requested to return to the station to call the group.

32. Upon arriving at the station, the OINC spoke with the coxswain of the second MLB to inform him of what was seen.

33. The MLB righted with all crew aboard. The MLB, with weigh on, then turned with the bow pointing towards the island. It was struck on the stern by another wave carrying the boat into the rocks at the south entrance of the island. The bow of the MLB hit the rocks, its stern carried over the bow in a pitchpole to starboard, and the coxswain flat overhead was crushed and pushed to the port side of the MLB.

34. The second rollover occurred at least 30 seconds after the first. It didn't seem to take as long and was also to starboard. After the second rollover, the engines seemed to be running as if the boat was out of the water, on the rocks. The SA lost both of his gloves, and the coxswain screen was missing.
35. The MLB recovered from the second roll resting upon the rocks, right side up with the stern pointing east towards the entrance of the cove on the island. The MLB rested on the rocks, dry with engines running, through several sets of incoming waves. At this time, the coxswain and the SN were missing.

36. The engineer asked "Is everybody OK?"

37. As the boat pitchpoled to starboard on the second rollover, The SN was propelled from his port side station across the MLB and into the water. His body was recovered on the beach, suggesting that he was thrown into the sea further to the southeast than the coxswain, who was likely driven into the overhead as the MLB pitchpoled, and rolled onto the overhead of the coxswain flat. The coxswain's body was recovered in the cove on the island near the MLB.

38. The SA detached his surf belt to get off the boat, but the engineer told him to put it back on and stay with the boat.

39. The radio was not working after the second rollover. The engineer asked the SA to give him the radio and he was attempting to contact the station. The engineer said "We've got to try to get inside the boat," just before another wave hit hard.

40. The boat was right up against the rocks just as the third rollover or partial rollover occurred to starboard. After the third rollover the engineer was gone. The engineer was carried away with the port engine compartment vent when the MLB rolled onto the cliff face. His body was recovered in the cove of the island.

41. The boat had been jarred free of the rocks and was backing into the cove next to a wall of rocks. The MLB was then washed from the rocks with its stern still pointing east into the cove of the island. The MLB was then hit on the port side by another wave rolling the boat to starboard and into the cliff located on the north corner of the island. This sheared off the port engine compartment vent and bent the port stanchion (frame 14) 90 degrees to port. Upon righting, the

engineer, was missing. Only the SA remained, belted to the engine room compartment vent on the starboard side.

42. Missing from the boat were both liferings, the coxswain flat and the mast. The pump and the tow reel were in the well deck. The boat was inside the island cove with waves washing it onto the rocks.

43. The SA shot five of his MK80 pen gun flares skyward and two flares towards the shore to determine his position within the cove. The SA tried to get below decks, but could not get the water tight door open leading to the messdeck.

44. It was a very dark night and the moon and stars were not visible.

45. 0055U: Station Ebb personnel report seeing flares. The flares were thought to have been lit off by the S/V ROCKER.

46. 0058U: A second MLB got underway and the XPO reported 10-12' swells passing over the wash rock, 12-14' swell with occasional breaking sluff outside the wash rock and in the channel, and 14-16' sluffing breaks on the west side of the island with 16-18' breaks on the series. Winds were 20-25 kts with gusts to 35 kts. While exiting the boat basin, the coxswain of the second MLB saw a flare coming from the west side of the island.

47. Sometime after the third roll, while floating in the cove, the SA looked at his watch and it indicated 0107U.

48. The SA used the stern light to orient his position relative to the shore. The SA unhooked from one remaining D-ring on the starboard side near the air vent (the other came unhooked when the coxswain screen washed overboard) and departed when he could see rocks between waves. The MLB came to rest on the rocky beach at the east end of the cove on the island where the SA jumped from the MLB, waded ashore and climbed to high ground.

49. The MLB was then carried by incoming seas along the north face of the cove, sustaining major damage below and above the waterline from striking rocks as waves flooded and receded.

50. The SA ran and climbed up the hill and found a spot where he could sit. From his vantagepoint, he could see the MLB out at sea and a helicopter. The SA expended the night end of his MK-124 day-night distress flare to try and get the attention of the helicopter. The SA moved up higher on the hill using his strobe light to illuminate the terrain as he went.

51. At 0146U and 0152U, Station Ebb personnel again reported seeing flares. They are believed to have been lit off by the SA.

52. Helicopter pilots on scene at 0200U and 0240U reported winds 240M between 30 and 50 kts.

CAUSES

1. There was a combined disregard of risk assessment by elements of the Search and Rescue Response system during mission planning, crew selection, and environmental evaluations. This is evidenced by the lack of adequate briefings to evaluate the nature of the distress, the on-scene weather, and the capabilities of the potential response platform prior to launching the response asset.

2. The coxswain lost situational awareness. He failed to ascertain the weather as that requiring a surfman, and failed to identify/confirm adequate navigational references during the transit out of the river. Indications were that the coxswain never knew the position of the boat in relation to the surrounding hazards at any time following the river transit. After turning to the west, he drove the MLB too close to the island.

3. The coxswain exhibited poor judgment by not recognizing that the situation was beyond his capabilities and experience, and yet proceeded to transit the bar when his experience, lack of rough weather and night training, the current heavy weather, and the lack of visual references should have prompted him to return for a surfman. He also used an ineffective decision strategy by moralizing the urgency of the search and rescue case without adequately weighing the risk.

LESSONS LEARNED

1. The importance of conducting proper risk assessment and using risk management skills cannot be overstated. Utilizing these tools at the command and control and coxswain/crew level is paramount to ensuring effective analysis and safe, successful missions.

2. This mishap took place within a station and group known for its emphasis on risk management. During this case, risk management was actively pursued at the station and group, but these actions were either not well timed or effectively communicated to the coxswain when it was most important. The misaligned actions combined to permit a disregard for risk at the boat level. The coxswain's actions implied moralizing judgments. Moralizing judgments do not consider safety risks, and are best embodied in the statement, "You have to go out." Unchecked, the coxswain pressed on beyond a point of no return.

3. Semper Paratus is a two-edge sword. The ability to have ready assets launch immediately can be both life saving and life threatening. To be able to perform a

mission, you must get there safely and understand what the mission is. In this case, the MLB launched without an appreciation of the risks and without a plan.

4. During this decade many of our major boat mishaps have been related to poor risk management. Between January 1991 and February 1997, there have been five Class A/B mishaps related to ineffective risk management. The 13 April 1994 National Transportation Safety Board (NTSB) Safety Recommendation to "provide risk assessment training to all Coast Guard personnel directly involved in search and rescue missions" reiterated key Coast Guard mishap board recommendations. The NTSB recommendations are being addressed in part by service-wide "Team Coordination and Risk Management" training. However, training without safeguards and routine enforcement at all levels within the organization can and most likely will continue to produce similar outcomes.

5. All elements of the Search and Rescue System, especially coxswains, must understand and respect the limitations of their personal abilities based on their own level of knowledge and experience, as well as the limitations of the resources with which they are responding. Exceeding those limitations without properly weighing risk versus gain invites disaster.

6. Survival skills, training, and equipment, when used, work under even the most catastrophic circumstances.

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TOO MUCH TO HOLD (9MM INCIDENTAL SHOOTING)

SYNOPSIS

1. A station 41' UTB returned to the station at 1052 on 7 December 1996 after completing a routine boat crew check ride for a petty officer not involved in this mishap. The weather was clear and dry; the temperature was moderate. The three crew members that carried weapons (BM2, BM3 and MK3) disembarked and proceeded to the weapons clearing station at the end of the dock. The weapons clearing station was constructed, labeled and maintained per Commandant guidelines. It was less than one month old. Each crewmember cleared his 9mm pistol per the Small Arms Manual, COMDTINST M8370.11A.

2. The BM2 and MK3 then walked from the dock approximately one hundred yards to the Station administration building where the Communications Center (COMCEN) was located. The MK3 stated that his pockets were blocked by law enforcement gear. While walking, he reinserted his pistol magazine, still containing 15 rounds of 9mm ammunition, into the magazine well of his holstered M9. The magazine was not fully inserted at that time; it was only partially inserted for the purpose of carrying it back to the weapons storage area in the COMCEN.

3. Once in the COMCEN, the MK3 started to sit down at the OOD computer station to await the arrival of the OOD to open the weapons racks and ready service ammunition box to secure his weapon. Unknown to the MK3, the M9 magazine was now fully seated in the magazine well and locked into position, thus making ammunition available to be chambered. (Locking of the magazine into the magazine well occurred at some point between the clearing station and the COMCEN.)

4. The mishap victim, a SA, was standing to the MK3's right, next to the OOD station. As the MK3 took his seat, he drew the M9 from his holster and operated the slide and slide stop to lock the action to the rear (open), intending to present a "cleared" weapon to the OOD. He fumbled the manipulation of the slide action and failed to engage the slide stop. Without the slide stop engaged, the M9 recoil spring pressure snapped the slide to the forward (closed) position, stripping a 9mm round from the magazine in the process and chambering it. The safety decocking lever was not in the safe position. He tightened his grip on the weapon in reaction to the unexpected closing of the slide. His finger, already placed inside the trigger guard, pressed the trigger. The M9, not pointed in a

safe direction, functioned as designed and discharged one 9mm round into the left leg of the SA.

5. The MK3 dropped the M9 in surprise, summoned assistance, and began first aid for the SA until relieved by Station personnel from an adjacent room. A local ambulance was summoned immediately, arrived on scene within five minutes (along with the police department), and departed with the victim 20 minutes later. The ambulance arrived at a local trauma center approximately 20 minutes later, with the patient in serious condition. The patient had a complex fracture of his left thigh, but no damage to the major artery. He had surgery three days later to stabilize the fracture site, and was discharged from the hospital seven days after admission. He has improved as expected over the three weeks following hospital discharge. He will probably make a full recovery, but it is possible he may have some permanent partial disability resulting from his injury.

DAMAGE AND INJURIES : The only injury is the left leg injury to the SA.

FACTUAL INFORMATION :

1. 071052 Dec 96 a UTB duty section crew returned from a routine sortie to its station.

2. After helping secure the UTB, the three crew members that were outfitted with standard LE gear and armed with the 9mm M9 PDW proceeded to the weapons clearing station to clear their weapons prior to having the OOD secure the 9mm and ammunition.

3. After properly clearing the 9mm, the Boarding Officer (MK3), partially reinserted the loaded magazine into the holstered 9mm magazine well while walking away from the weapons clearing station in order to free up his hands to carry other gear from the UTB.

4. The MK3 stated that his other pockets were blocked by LE gear on the web belt and only placed the third magazine back in the 9mm well to carry it back to the Station (only two magazine pouches are worn on the web belt, both pouches contain magazines loaded with 15 rounds each).

5. At approximately 1100, the MK3 went into the COMCEN to wait for the OOD to secure his weapon.

6. A radio watch and one other person (SA) were in the COMCEN at the time.

7. As the MK3 started to take a seat, he withdrew his 9mm from the holster to set it on the desk for the OOD. While the MK3 attempted to lock the slide action to

the rear, he fumbled in his manipulation of the mechanism that allowed the slide to snap forward unexpectedly. The Safety Decocking Lever was in the fire position and his finger was already inadvertently inside the trigger housing. The startled MK3 squeezed the trigger of the 9mm when the slide snapped forward discharging a round into the left leg of the SA, who was leaning against the desk next to him.

CAUSES: The primary cause of this mishap is the flagrant disregard for weapon safety, created by a chain of errors, including:

1. Not leaving the slide in the rear position after clearing the weapon;

2. Leaving the safety off;

3. Inserting a loaded magazine into the magazine well of the weapon;

4. Not keeping the weapon pointed in a safe direction at all times; and

5. Putting a finger inside the trigger guard. If any one of these mistakes had not occurred, the chain of errors would have been broken and the mishap would have been averted.

LESSONS LEARNED:

1. Strict adherence to weapon safety procedures is first and foremost when dealing with weapons. Succumbing to the temptation of taking procedural shortcuts and not following proper safety procedures, either out of convenience or because of perceived low risk, invites disaster. If any one of the mistakes made by the boarding crewmember in this case had not occurred, the chain of errors would have been broken and the mishap would have been avoided.

2. Following proper weapons loading, cleaning and handling procedures shall receive as much, if not more, emphasis than being able to accurately fire at a target. Increased situational awareness for weapons handling at all levels within the chain of command is imperative.

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VESSEL CASE STUDY

USCGC MESQUITE (WLB Sinking)

HISTORY: At 0210, 4 December 1989, MESQUITE went aground off Keweenaw Point in Lake Superior. The casualty occurred after completing buoy operations. The MESQUITE had never worked this area before and was working the aids for the CGC SUNDEW. The following sequence of events took place.

1. Phase I. Grounding: After lifting the sinker of Keweenaw Point LB1 off the bottom and putting it to the water's edge, MESQUITE was free to drift with the wind. No fix was taken from approximately 0122 until 0208. Buoy stations were secured and MESQUITE prepared to continue its trip. The OOD was still using the original danger range to Keweenaw Point they established to work the buoy and did not realize, as the actual range diminished from 640 to 500 yards that the proposed track was cutting inside the buoy's AP. Given the scale of the best chart available for the area, any mismeasurement of 1/32 inch on the chart would consume this margin...and it did.

2. Phase II. Stranding: The ship was not aggressively lightened by removing the deck load and pumping off the liquid load. There was also a failure to coordinate the weight removal action with a steady attempt to back the vessel away from the shoal.

3. Phase III. Uncontrolled Flooding: After three hours of slamming against the rocks, the bottom plate began to fatigue and split along the hinge points (and hard spots) of its flexing.

4. Phase IV. Abandon Ship/Rescue: Following the abandon ship order preparations were quiet and orderly. Musters were properly taken.

WEATHER: The following weather at 0200 is from the ship's logs:

1. Winds 190/16 KTS
2. Visibility 10 miles
3. Temperature 25 degrees

4. Waves 190/1-2 feet.
5. Light Conditions: Dark night, overcast, no moon visible.

Phase I

1. MESQUITE was working an unfamiliar aid belonging to SUNDEW.

2. They worked the aid at night, eliminating any visual references. They routinely "worked" buoys at night (about 40% of their buoys were worked at night.

3. The routine at-sea watch was set. This consisted of the CO, in command, the OOD (performing the duties of both the Conning Officer and Deck), the QMOW (maintaining the log, assisting in ship navigation), the helmsman, and the lookout. The ATON bill required that the OPS and the XO to be on the bridge; both were allowed to be asleep while this aid was being worked. In the engine room was the EWO assisted by the oiler.

4. The bridge crew was technically competent to perform routine tasks. The OOD had qualified as a DWO two weeks before this grounding.

5. The following is an assessment of the available navigational aids.
   a. Visual bearing to Gull Rock Light - Extinguished, not visible at night.
   b. Visible bearings to land tangents - Not visible at night.
   c. Global Positioning System - No 24 hour service yet.
   d. LORAN - Deemed inaccurate.
   e. Sextant angles to land tangents - Not visible at night.
   f. Sextant angles to benchmarks - Not visible at night.
   g. RADAR - Point of radar return from land was unknown.
   h. Visual ranges of trees on the beach to check drift - Not visible at night.
   i. Coast Pilot - Available but not used.
   j. Chart - Improper scale, however, best one available and used.
   k. Radar Grid - Made by ship and used

6. Chart scale (1:120,000) was ineffective for accurate navigation around the areas shoals; a 1/32 inch (Pencil width) measurement equals 104.2 yards on the chart. (NOTE: The chart was, however, the best scale available for the

area.) No danger bearings were established or used. They used limited aids to navigation to fix their position before, during, and after buoy operations.

7. The only position fixing equipment used was the radar. The smallest measurable increment was 10 yards on the 3/4 mile scale. From the land/water mark on the chart to the tree line is 25 to 35 yards. There is evidence that the radar echo returned from the tree line and not from the shoreline/water mark.

8. A radar error of 10 yards plus an additional 35 yards to the trees plus a 40 yard error noted on the positioning grid while decommissioning the buoy puts the vessel at a range of 415 yards to the charted beach. Upon test, only the QMOW on watch plotted a danger range of less than 415 yards. Three other watchstanders plotted a longer range.

9. The OOD failed to adequately review the latest fix information and confirm the fix data before establishing the ship's trackline after buoy operations. The proposed trackline had been put on the chart prior to working the Keweenaw Point buoy. The OOD failed to recognize and act on the fact that the course the WLB would come to, put them crossing between the buoy's charted position and the shoal it marked. The CO's quick glance at the proposed trackline was taken as non-verbal consent by the OOD.

10. The radar operator misinterpreted the radar ranges. Different radar scales were being used in measuring the ranges.

11. The buoy deck lights used for work on deck, inhibited night vision. There was no lookout on the flying bridge who may have seen or heard the seas washing across the shoal.

Phase II

1. Shortly after the 0210 impact, all spaces below the second deck between frames 74 and 92 were flooded (reefer flats and magazines).

2. General Quarters was set. The CO was in charge; the XO assumed OOD. DC Central was located in the wardroom, led by the EO. The Engine Room was manned by the EWO, throttleman, and oiler.

3. Engineering analysis shows the draft increased by about 1 foot after grounding. At 0251, soundings showed readings of less than 11 feet forward and 17 feet aft.

4. The EO and CO had never studied the ship's Stability and Loading Booklet and claim they had never seen it onboard. Neither understood how to compute the vessel's stability. Analysis showed that if the buoy deck was off-loaded and boats, anchors and anchor chain jettisoned, a resulting draft of fwd 11.01, 12.67 amidships, and aft 14.33 aft would have been likely.

5. A partial off-loading of the Buoy Deck resulted in raising the bow but it forced down the after section in the vicinity of the flooded space below After Berthing. The center forward tank was pumped down about 18 inches. The peak tank, and forward and aft fresh water tanks were never emptied. The anchors and chains were never jettisoned. The fuel oil was never jettisoned.

6. Engines were run astern after the soundings were made till 0331. The CO never exceeded 150 SRPM astern and only used his backing bell for 5 minutes. No additional efforts were made to use engines to move the WLB off the shoal.
   a. Using the bow thruster to push the bow to port would have helped to throw the bow away from the shoal.
   b. A strong continuous backing bell would have helped the ship back to port, away from the shoal.

7. No anchors were initially dropped to maintain the vessel's position on the shoal. The southerly wind and seas kept pushing the WLB further onto the reef as weight was removed.

8. The MCB was not used to locate good (deeper) water; nor was the MCB used to put a strain on the stern as the WLB tried backing.

9. No request was ever made for another vessel to pull the WLB off the shoal.

10. The WLB maintained sufficient buoyancy to allow it to float when the 2-3 foot seas swept over the shoal. However, when the seas passed, the hull would slam down hard on the rocks, impacting the starboard harder than the port side

11. The initial impact of the grounding, followed by the intense shuddering throughout the ship, created great anxiety and fear. As the ship slammed against the shoal, there was a constant pounding and terrifying noise from the metal hull. A crewmember left his post as flood watch in dry stores, thereby allowing flooding in that compartment to go unchecked. Pumping it

out later was unsuccessful due to debris being drawn against the intake screen basket.

12. The EO gave erroneous information on the cutter's condition. The EO was in a panic condition while in charge of DC Central. The EO kept running to the bridge and talking with the CO personally without using established Damage Control procedures and communications network. The EO's extreme fear of drowning/dying affected his recommendations to the CO.

13. The CO apparently became dependent upon the EO's advice. The CO did not consult the other officers on the bridge; the XO and OPS. The EO contradicted recommendations from the bridge (i.e. use the bow thruster) due to personal panic and fear that the ship would sink. He incited the crew by displaying his fear and rushing to his abandon ship station.

14. The crew was ordered to their Abandon Ship stations about two hours after the grounding and one-hour before the uncontrolled flooding occurred.

Phase III

1. General Quarters was remanned. The EO was incapacitated, so the OPS Officer assumed the duties of DCA, and the CO appointed the MKC as acting EO.

2. As the pounding continued, damage reports showed that the hull plate had mushroomed out along the turn of the bilge. The bottom plates in rooms along the keel plate at the turn of the bilge were splitting. Flooding occurred.

3. The crew did not concentrate their de-watering efforts in the Engine Room to keep power to the ship. The Engine Room crew was ordered to abandon that space before they were able to secure the machinery. A crew member mistakenly read a site glass for hydraulic fluid as the amount of fuel remaining for SSDG No. 3. The generator's day tank actually had about 6-8 hours of fuel remaining. The ship's boiler continued to operate until the ship's electric power was secured.

4. The WLB requested no additional pumps, and the responding helicopter(s) did not bring any with them.

5. The CO feared the WLB would either roll over or slip off the ledge into deep water and sink, thereby injuring the crew. He gave the final order to abandon ship.

Phase IV

1. The M/V MANGAL DESAI had responded to the WLB's call and was standing-by at the scene.

2. The cargo nets had frozen on deck and could not be dropped to load life rafts. The survival suits were stiff due to their earlier removal from storage areas and subsequent failure to re-stow them between calls to abandon ship. The stiff suits delayed their eventual use. The cold weather and water greatly increased fear of survival. When the crew abandoned ship two life rafts were loaded on the windward side of the ship. After the crew abandoned ship to the freighter, some of the crew were not re-suited with appropriate gear before being hoisted to a Coast Guard helicopter. One crewmember lacked shirt and socks before being airlifted, increasing possibility of hypothermia.

VESSEL CASE STUDY

WLB GROUNDING

HISTORY

1. Around 0700, 05 November 1993 CGC ROSEBUSH got underway from Northtown en route Creekville. During the course of this transit ROSEBUSH was to pass through Anglers Reach and proceed to the AMC pier in Snow Bay to load a 40 foot container. After taking on this cargo they planned to travel back to Creekville and moor for the evening. The Senior QM conducted a Navigation brief at 0615 for all OODs, QMOWs, break-in bridge personnel, and Nav team members. The CO and XO attended this comprehensive brief that covered the transit from Northtown to the AMC pier, then the ship's movement to the fuel pier in Creekville. Charts, tracklines, tides, currents, hazards to navigation, etc. were reviewed at this brief. Additional information was collected from CG personnel homeported in Creekville and a former Coast Guardsman (QM1) who was stationed in the area.

2. The transit from Northtown to the AMC pier in Snow Bay was uneventful. At 1130 the BMC assumed the OOD and an Ensign assumed the Conn as a break-in for the 1200 to 1600 watch. At approximately 1545, after setting the Special Sea Detail for the transit of Anglers Reach to Snow Bay, the BMC relieved the Conning Officer. This was done to allow the Ensign to observe the transit with the expectation that he would Conn the ship back to the fuel pier in Creekville from the AMC pier. High tide was predicted to occur at 1556 and observed current was negligible during the southbound transit. Radio contact (VHF-FM) was made with the M/V COWBOY, who was standing off the AMC pier with a barge in tow, once ROSEBUSH turned off of the over the shoulder southbound range heading into Snow Bay. The COWBOY planned to moor its tow at the AMC pier once ROSEBUSH had completed the container onload and had cleared the pier. During this conversation ROSEBUSH was warned of a sunken barge to the north of the pier and shoaling to the north and south of the pier. M/V COWBOY also warned that the current could be a problem alongside the pier with a strong northerly set during the ebb that was just beginning. At 1640 ROSEBUSH moored port side to the AMC pier using two lines from the pier and two of their own mooring lines. At 1650 the XO relieved the BMC of the OOD to allow him to lay below and supervise the onload of the container. While the

loading evolution was taking place mooring stations remained set, relaxed on stations.

3. At 1714, following the loading of the container, the BMC returned to the bridge to relieve the XO of the deck. As planned, the Ensign relieved the Conn for the transit back to Creekville. The XO and Conning Officer discussed the maneuver to clear the pier given the shoals and expected current. The Conning Officer was also questioned by the CO in a separate conversation regarding his plan of attack for the transit. The CO warned of the shoal to the north (extending off Round Point) and advised the Conning Officer to take it slow and easy. A number of individual conversations among the Bridge team, concerning the best method to clear the pier, took place prior to getting underway. No full team brief of the evolution was held immediately prior to movement. It was the general consensus that the ROSEBUSH would proceed out on a course to stand well clear of the shoal to the north and once 400 yds from the pier would commence a turn to starboard to gain the charted standard track. It was extremely dark when ROSEBUSH left the pier at 1726; sunset had occurred at 1559 and the weather was overcast with patchy fog and intermittent showers. Visibility was approximately 2 miles. The CO was in his chair on the starboard side of the bridge. The OOD (BMC) and Conning Officer (Ensign) were midships inside the pilot house and the XO was roving the bridge checking input and progress, staying mainly on the port side of the pilot house close to the shipping radar and scanning sonar. No turn bearings, turn ranges or danger ranges were plotted nor was a radar operator assigned to monitor a turn range or danger ranges. The Conning Officer spent several minutes jockeying the ship to allow the placement of the pier's mooring lines back on the pilings as a courtesy to the COWBOY, who was planning to use these lines to moor her tow. Once clear of the pier a course of 240 T was ordered by Conning Officer, based on a recommendation from the Nav Evaluator. The Conning Officer adjusted the ship's speed to 80 SRPM, turning for 5.6 knots. The Nav Plotter and Evaluator both assumed the ship was proceeding at a speed of 4.0 kts and laid out their DR's based on a SOG of 4.0 kts. The 1735 DR was plotted approximately 400 yds from the pier. Based on advance and transfer of the ship, a standard turn would have put them close to the intended trackline.

4. At 1733 a fix was plotted showing ROSEBUSH well ahead of DR and a turn to 330 T was recommended. At 1734 the XO observed the radar picture in the shipping radar (port side of Bridge) showing ROSEBUSH further along the 240 T track than he expected. Because this didn't agree with his expectations, he hesitated 15 - 30 seconds while attempting to sort out this

new information in his own mind. He did not call this discrepancy to anyone's attention, rather he thought of grabbing a chart and checking it against the radar picture. Before he could accomplish this, his attention was directed to the scanning sonar by the QMOW who saw a large contact ahead on the side scanning sonar. The XO, believing the sonar was out of adjustment and anticipating the ship coming up to speed once on base course of 338 T, secured power to the sonar and housed the transducer.

5. At 1735, the rudder was ordered to right standard by the Conning Officer. After two or three passings were reported by the helmsman, he was told to steady up on course 330 T. Immediately after the rudder command the Helmsman asked for the white light over the chart table to be secured in the hope that he could see the horizon and monitor his rate of turn. This proved impossible due to darkness and interference with visibility from the boom shack lights that had been inadvertently left on. The Helmsman monitored the turn with the helm gyro.

6. Upon laying down the first two lines of the 1735 fix the Nav Plotter recognized that the ship was almost to the turn point. The Nav Evaluator recommended a course of 338 T based on this fix. At this time the ship's head was swinging to the right under the influence of the right standard rudder applied earlier.

7. After the 1735 fix the CO observed by radar that the ship was well left of track. The OOD observed that the ship was coming right very slowly. The CO recognized the danger of running aground and instructed the Conning Officer to come to due north; the rudder was increased to right full to comply with this command. About 10 seconds later the ship grounded. The OOD brought the throttle to all stop, moved to the port bridge wing and commenced backing and thrusting to starboard. At 1737 the CO ordered an immediate fix, proceeded to the port bridge wing and instructed the OOD to back full. The fix showed the ROSEBUSH 200 yds into shoal water.

8. Extensive action was taken to lighten the ship by pumping water tanks and offloading ATON equipment. The M/V COWBOY then attempted to pull ROSEBUSH off with no success. Refloating attempts were then aborted until the next high tide. At 0437 the next day the ROSEBUSH was refloated with assistance from M/V COWBOY. Damage to the hull was limited to only scraped bottom paint.

ADDITIONAL FACTS

1. Currents were predicted to be setting to the north, generally following the channel. From analysis of ship's final aground position (taking into account ship's turning characteristics) it is probable that a significant east to west cross current existed at the time of the mishap.

2. The Side Scan Sonar was tuned prior to departing the AMC pier for use during the transit of an area with numerous shoals.

3. The Nav team used poor navigational practices to recommend the turn. Cross checks by the Navigator and Nav Evaluator to ensure that the "planned" turn was properly labeled on the chart were not completed.

PROBABLE CAUSES

1. Failure to plot and use turn and danger bearings and ranges in accordance with COMDTINST 3530.2. The shipping radar was not used as a full time resource to monitor traffic, ship's head, danger ranges/bearings and cross check Navigation team recommendations.

2. There was no brief prior to the ship departing the AMC pier. New information was obtained from the M/V COWBOY that resulted in the decision to depart the pier on a course of 240 T and turn at 400 yds from the pier.

3. Loss of situational awareness by the CO, XO, OOD, Conning Officer, Nav Evaluator and Nav Plotter caused by poor navigational practices that caused a "change" in plan to turn 400 yds from the pier.

4. Poor communications between the Conning Officer and his Nav team regarding speed became a critical error. When the turn was recommended it was based on a DR that was fundamentally flawed based on the DR speed of 4.0 kts and a cross current component from astern. The cross current was a factor that could not be accounted for by the Nav team, given the information they had available at the time of sailing. The one force that the team should have known about, the ship's speed, was assumed and was in error.

5. Poor judgment by the Nav Evaluator and Nav Plotter in recommending a turn based on old information (inherent delay in plotting and passing information) and a DR position rather than a turn bearing or range resulted in a late turn.

6. Lack of questioning when the CO, XO, OOD and Conning Officer did not hear the walk-down of the turn.

7. A lower than optimum stress level existed as ROSEBUSH was merely retracing its earlier transit heading back to Creekville for a night of liberty. The ship had just successfully completed this inbound transit without incident. With the stop at the AMC pier, the Bridge team had lost their edge.

8. Lack of constant monitoring of progress of the ship before and during the turn. Little input was available to monitor the turn visually due to darkness. Failure to secure unnecessary lights that may have further restricted their visibility. Radar-ranges and constant monitoring of the relative bearing of Lt 52, the one aid to navigation visible, could have alerted the Bridge Team of something amiss before the grounding. The CO and XO were monitoring the radars intermittently. A full time resource (the XO or another qualified OOD) should have been monitoring the ship's head and danger ranges to ensure the turn was going as planned.

LESSONS LEARNED

Inadequate monitoring of ship's progress left the ship at risk. Without visual or electronic information available or used the Conning Officer had no way of knowing he was standing into danger. In every shiphandling situation the Conning Officer must make decisions based on input from a number of sources. The Nav team recommendations are only one part of this input. In this case, there was too much reliance on the Nav team for ship control and a lack of cross checking by other Bridge team members. Total dependence on the nav plot while ignoring real time information available by using the shipping radar to cross check information and recommendations passed by the Nav team left the ship in a precarious situation. Given the expected currents, lack of visibility, proximity of shoal water, and relative lack of familiarity with the area, more care than was exercised would normally be expected of the prudent mariner. In piloting waters, adjustments to turns are often necessary based on effects of wind, seas, and currents to execute a maneuver safely. This basic tenant of safe shiphandling was ignored in this case. By not plotting danger ranges or bearings information necessary to ensure safe navigation was lost. Because of the failure to know exactly when and where to turn and failing to monitor the progress of the turn, positive control of ROSEBUSH was surrendered for a critical 5 minutes.

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VESSEL CASE STUDY
WMEC GUN MOUNT DAMAGE

HISTORY

1. The Ship had completed a patrol and was enroute to home port. The Ship was traveling at 15.7 knots in moderate seas with southerly winds. Throughout the day the winds veered to the north and the seas became confused until the wind steadied at 320T at a sustained 30+ knots. The steadying of the wind direction began to build the seas up towards 20 feet as predicted in the weather forecasts. The Ship was ballasted and prepared in accordance with their heavy weather bill.

2. The Ship began to ride rough through the building seas until it was pounding. The bow was burying into the waves approximately once every five minutes and taking large amounts of spray onto the forecastle. The spray hitting the forward portion of the gun weather shield was leaking into the gun mount and raining down into the magazine. This leakage had previously occurred in heavy weather during the transit south at the beginning of the patrol. At that time, the Commanding Officer, Operations Officer, and Weapons Officer determined that training the gun 090R would alleviate the leakage problem and that this would be done in future heavy weather. At 1830, 27 November, the gun was trained 090R.

3. At 0050, 28 November 1993, the Ship rose and plunged into a wave with greater force than was encountered to this point and the bridge windows were awash from the spray of the wave. When the windows cleared, a large hole on the left side of the gun weather shield was discovered. The OOD slowed the Ship to 5.5 knots and ran downwind to protect the damaged gun. Survey of the damaged area revealed approximately 1.5 feet of water on deck in the magazine. The dewatering effort began when the Gunner's Mates entered the magazine and attempted to drain the water through a deck drain in the starboard aft corner of the magazine. The deck drain was difficult to operate as it is under the raised deck plates behind an ammunition rack. Once the drain was opened, water did not drain due to a clog in the piping. The space was dewatered with a Peri-Jet eductor.

4. The gun was trained 270R to protect the damaged portion of the gun from weather and a tarp was stretched across the opening in the left side of the

gun weather shield to further protect it from the elements. The Commanding Officer discussed with the XO and OPS the possibility of diverting to an alternate port to wait out the storm and begin repairs. The distance to the closest alternative was only 100 miles less than the distance to home port and the trackline to the alternate port would take the Ship more directly into the seas so no benefit was apparent. The decision was made to proceed home at a speed of 10 knots.

5. Through the night the seas gradually decreased in size as the wind velocity decreased, making the Ship's ride more comfortable. When the CO made his morning round of the bridge, he noticed the decrease in wind and seas and was happy with the ride of the Ship. At 1130 the OOD called the CO and asked permission to increase speed to 13.7 knots. The CO authorized the speed change and made a round of the Ship. He was satisfied with the Ship's condition at the new speed, there was no significant pitching or pounding through the waves. At 1330 the OOD again contacted the CO and after confirming that the sea conditions were improving asked permission to increase speed to 15.7 knots. The CO authorized the speed increase and again made a round of the Ship and was satisfied with the Ship's condition.

6. At 1458 the Ship came across a set of three large waves causing it to rise and plunge into the waves three times. When the bridge windows cleared the OOD noticed the tarp coming off the gun and slowed to 6.9 knots and turned downwind. The OOD called the CO and informed him that a large wave had knocked the tarp off and he changed course and speed to correct it. When the CO arrived on the bridge, he was informed that, in addition, the wave caved in the right side of the gun weather shield.

7. The magazine was again flooded to the deckplates and the Peri-Jet eductor was rigged to dewater the space. A second tarp was used to cover the right side of the gun weather shield and the gun was trained 000R, its normal stowed position. This configuration held until the Ship reached Boston a day later.

DAMAGE TO UNIT

Wave forces damaged the 76MM gun mount by collapsing the left side of the weather shield resulting in a 4 FT by 2.5 FT hole in the shield, a bent mount carriage, and dented rocking arm guards. 1.5 FT of water entered the forward magazine damaging bulkhead insulation. Two stanchions and lifelines along with a sound-powered phonebox were destroyed. In addition, subsequent wave forces collapsed the right side of the shield. Repair costs were $1,150,000.00.

CAUSAL FACTORS

1. COURSE/SPEED. Excessive speed for the environmental conditions. Course and/or speed should have been adjusted to reduce pitching.

2. 76MM GUN STOWAGE. Proper gun storage at "ready surface" (000 degrees R) will prevent recurrence. Any other position results in a weaker profile presented to a head sea.

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VESSEL CASE STUDY

WHEC DIESEL ENGINE CASUALTY

HISTORY

Pre-Mishap Procedures. The EOSS (Engineering Operating Sequence Systems) is a document purchased from the US Naval Ships Systems Engineering Station. It provides step by step procedures to be followed by the EOW or watchstanders to prepare the machinery plant to be ready to answer bells or to respond to machinery casualties. The EOSS Component Procedures for aligning, starting, operating and securing the main diesel engines (MDE) contains detailed instructions with corresponding line diagrams for aligning the various MDE systems. Among them are instructions for aligning the lubricating oil system. This includes a listing of all valves to be opened with a corresponding diagram. Each underway engineering watch position, with the exception of the security watch, is provided with laminated copies of those sections of the EOSS related to the duties of that watch. A particular event for the EOW is to order the mains watch to "align main diesel engines for operation."

Pre-Mishap Equipment Status. Valves are installed on the upstream and downstream side of the lubricating oil filter and strainer of each MDE. The valves are equipped with locking mechanisms. The lubricating oil strainer outlet valve on #2 MDE was missing the spring loaded device on the handle. It could not be locked into any position. The lubricating oil filter inlet valve on #2 MDE was missing the springs from the device on the valve handle and the latch piece that would lock into the teeth was bent so that the handle could not be locked in any position.

1. The oil had been changed recently and maintenance had been performed on the lubricating oil strainer outlet valve. At that time, the MPA was aware of the inoperative condition of the "locking mechanisms" on both valves. Due to parts not aboard, or money not available to buy parts, the "locking mechanisms" were not repaired. Additionally, the valves were not wired open since the "locking mechanisms" were inoperative.

2. The EOWs relieved as scheduled and the Light Off Check Off list was passed. The check list requires that the MDE be operated 72 hours prior to Scheduled Sea Detail (SSD). The off-going EOW passed that the engines were run

about 96 hours prior to scheduled SSD. Prior to departing the engineering spaces, the off-going EOW also passed that the engines were in 30 minute standby and advised that a 0500 light off would have the plant ready in time for SSD.

3. At 0500, the EOW entered the engine room control booth and reviewed the light off plans with the watchstander (MK3). The plans were to light off both SSDGs and both MDEs, warm up and secure the mains, and then shift power. Both SSDGs were started at 0512, and both mains were blown down at 0515. Following the blow down, the MK3 was directed by the EOW to set up the mains for light off. As the MK3 departed the control booth he remarked, "I hope I remember how to do this." Hearing this, the EOW was uneasy, but felt confident that the MK3 could take the engines out of 30 minute standby. A second watchstander (MK2) entered the control booth and was directed by the EOW to help the MK3 set up the mains and check to insure that they were ready for light off. When the MK2 entered the engineroom, the MK3 advised him that both mains were ready for light off. The MK2 took him at his word and one of them signaled the EOW that the #1 MDE was ready for light off. Immediately upon start up the #l MDE came to 840 rpm which is abnormally high. The EOW could not obtain control or secure the engine from the console. About that time, the MK2 notified the EOW of a jacket water leak on #1 MDE. The EOW sent him to secure the engine, using the emergency stop, and repair the jacket water leak. As the jacket water leak was being repaired, the MK3 signaled that #2 MDE was ready for light off. It was started and logged on line at 0525. Shortly afterwards the jacket water repairs were completed on #1 MDE. #1 MDE was restarted at 0537, and again idled abnormally at 840 rpm. The MK3 noticed that clipboards had fallen against the Morse controls pushing them forward. He moved the clipboards, pulled the control back and the rpm dropped to 350.

4. Immediately following #2 MDE start up, the lubricating oil audible alarm sounded and the red lubricating oil warning light in the control booth illuminated. The control booth lubricating oil pressure gauge which reads pump pressure, not actual engine oil pressure, indicated 80 psi. Although the normal parameters for this pump are 15-35 psi, the EOW determined that 80 psi was caused by cold oil. The MK3 was directed to check the lubricating oil pressure gauge on the local board that senses oil pressure at the upper header and indicates the engine oil pressure. He reported 75 psi. Normal operating pressures are 626 psi. It should be noted at this point that the lubricating oil pressure gauge on the local board is located next to a water temperature gauge. Discussing this situation with the MK2, the EOW

assumed that sufficient oil was being supplied to the engines and the alarms were not functioning properly. MDE operations were assumed to be normal, and under the direction of the EOW, the watch section shifted power from shore to ship with the load on the #l SSDG. Attempts to parallel the load with the #2 SSDG were delayed as the #2 switchboard would not hold an electrical load. While raising the voltage on the #2 board, an unusual popping noise was heard coming from the #2 MDE. The watch section initially felt that the #12 cylinder was getting too much fuel. The EOW secured the engine at 0605.

5. After securing the engine the MPA, who was the previous EOW, was recalled to the engine room for an opinion. When the MPA arrived in the control booth he briefly discussed the situation with the EOW. The EOW advised the MPA of the #2 MDE noise but did not advise him of the low lubrication oil alarm. Attempts to restart the engine from the control booth failed, so the engine was manually started. The engine ran approximately 6 minutes before seizing. Engine repair costs alone exceeded $275,000.

CAUSAL FACTORS

1. The primary cause of the mishap was the watch section's failure to properly align the valves in the #2 MDE lubrication oil supply system, and their disregard of subsequent alarm systems.

2. The watch section was under manned. Lighting off the main plant is a transition condition from a cold iron plant to all machinery running as in an underway condition where four watchstanders are required to be in the engine room.
3. The EOW was task saturated.
   a. The Light Off checklist requires that the SSDGs be started and power shifted six hours prior to SSD. The Check List also requires the watch section to start and run MDE for 20 minutes, three hours before SSD. The EOW entered the engine room control booth at 0500, two hours prior to scheduled SSD. This allowed 2 hours to complete 6 hours of check off's.
   b. The #1 MDE suffered a water jacket leak and was idling higher than normal. He was unable to shut down or control the engine from the control booth. He instructed the watchstander to secure the engine using the emergency stop. The rpms were high because a clipboard had

fallen against the Morse controls that had not been checked prior to light off.

c. The #2 MDE lubricating oil alarms were activating and the gauge readings were misinterpreted and/or misreported.

d. The #2 switchboard would not hold the load and problems were encountered while attempting to parallel the generators.

4. The section was minimally qualified.

   a. This light off was the first that the EOW had performed by himself.

   b. After being directed to set up the mains for light off, the MK3 remarked, "I hope I remember how to do this. This was his 3rd light off as a qualified watchstander.

5. The EOW did not or was unable (due to unfamiliarity and lack of experience) to critically analyze the information that was available...#2 MDE low lubricating oil alarm light remaining on, high lubricating oil pump discharge pressure when the engine was reportedly in 30 minute standby, a report of 75 psi lubricating oil pressure at the local gauge board that should not have made sense, EOSS Casualty Control Procedures...and determine that #2 MDE had a low lubricating oil problem rather than a bad alarm circuit.

6. Poor communications between the MPA and the EOW. The MPA misrepresented the state of the engineering plant to the oncoming the EOW. The engines were not in 30 minute standby.

7. The Naval Engineering Manual (NEM) requires the Engineering Officer to provide a Night Order Book. Contrary to the NEM The Engineering Officer had delegated this duty in port to the EOW. The EO delegated tasks that good engineering practice would reserve for personal action by the EO.

CONTRIBUTING FACTORS

1. The watch composition was left to the discretion of the EOW and was not prescribed in writing by the EO in his standing orders. There are no existing requirements for the engineering watch composition for lighting off the machinery plant from a cold iron plant (receiving shore services) to being underway. This is left to the discretion of the EOW using the engineering personnel available in the duty section.

2. The Naval Engineering Manual (NEM) requires the Engineering Officer to provide a Night Order Book to be read and initialed by the EOW each night at sea and in port. Contrary to the NEM, the Engineering Officer had delegated this duty in port to the EOW.

3. None of the gauges on the local board can be read from the control booth. Upper header pressure is not displayed on a gauge in the control booth (upper header pressure is displayed in the control booth on some 378s).
4. The investigation, subsequent reviews, comments and endorsements expressed concern regarding the possibility that the placement of the low-pressure alarm switch was a contributing factor. COMDT (G-ENE), via immediate message, to all WHEC's, addressed this issue and provided clear direction regarding the placement or relocation of the low LO pressure alarm switch. Of similar concern is the reference to the locking requirement in Shipalt 378-B-103 and whether the latching mechanism on the butterfly valve handle meets the requirement. The above referenced message clearly addresses the same issue.
5. The Preventive Maintenance Procedure Cards for both the MDE lubricating oil filter and strainer do not require or suggest wiring the oil filter inlet valve and the oil strainer outlet valve open when maintenance on the filter or strainer is completed.
6. Another cutter recently suffered a similar casualty and released a message to <u>all cutters</u> recommending that:
7. "All cutters ensure their engineers are aware of the contents of this MISREP so they can learn from our mistakes. Ensure all lube oil supply valves, and other vital supply valves, are locked open with locking wires or similar devices which will prevent accidental closure, but can be removed quickly in an emergency."

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VESSEL CASE STUDY

WPB GROUNDING

HISTORY

1. In the winter of 1989, a 110-foot WPB departed its homeport to conduct a seven-day LE patrol. Prior to getting underway, the crew conducted satisfactory tests of the ship's steering system, whistle and emergency alarms. All ships clocks were synchronized, the gyro error was determined to be 0 degrees, and the radar range error was logged as zero on the 0.75 and 1.5 nm scales. The cutter's drafts were logged as 5'-9" forward, and 7'-0" aft. During the first day of the patrol, the ship conducted drills and instruction in abandon ship and man overboard.

2. As the cutter proceeded north it passed through a series of straits and passages. During this time the bridge watchstanders took fixes at intervals of 15 minutes or less over the entire route. When the WPB prepared to pass through the last passage the CO modified the special sea detail as follows: the 04-08 JOOD and helmsman were to act as the anchor detail and the 04-08 OOD was to assist the 08-12 watch on the bridge. Consequently, all the personnel normally assigned to the piloting detail were not present on the bridge. Neither the phone talker/bearing log recorder nor bridge bearing taker positions were manned.

3. When the passage began, the CO asked the OOD if he had "conned" through the passage before. The OOD, having gone through as a radar operator, misunderstood the question and replied in the affirmative. When the cutter was one mile from the entrance to the passage, a high lube oil temperature alarm on #1 MDE sounded. The engine was secured and the engineers went to work on the problem. While repairs were being completed the CO ordered the boarding party away to a nearby vessel. At this time the WPB maneuvered alongside the vessel being boarded. During the boarding the repairs were finished and the boarding party returned to the cutter. By this time, no fix had been taken for almost an hour. The last navigation log entry, also an hour earlier, noted a course change and a slowing of speed from 12 knots to 9 knots.

4. With the boarding party back aboard, both engines were placed on line and the cutter headed toward the passage at a speed of 9 knots. Since no fix had been taken prior to making way, no track line from the cutters present position was laid down on the chart. The OOD had the conn and the CO was on the bridge. The JOOD was designated as the Nav Plot. The XPO/Navigator was on the bridge as an advisor to the JOOD. He was originally planned to act as the Radar Operator, but the OOD stated he would perform those duties himself.

5. At approximately 0945 local, the WPB entered the passage. The OOD's plan was to conn the ship via radar to determine headings; mark turn points, and maintain pre-computed distances off of identifiable points of land. He determined a course from the cutter's position using the Radar's Electronic Bearing Line (EBL). He did not pass any range information to NAV Plot, therefore no fixes were plotted and the Nav Plot was reduced to passing generic information such as next course, turn ranges, danger ranges, and soundings.

6. As the cutter reached a turn range of 0.12 nm the OOD ordered a turn to starboard. The JOOD reported to the OOD that the course into the entrance was 064T. As the WPB steadied up on 031T, the planned turn range was met and the OOD ordered a course to 064T. The helmsman later said he thought the order was to turn to 061T. After he steadied up on 061T he noted that buoy #28 was 000R at about 300 feet. Instead of sounding off with this information, he looked around the bridge to see if anyone else had noticed. He noted that the OOD was looking into the radar hood and the XPO and JOOD were looking aft and down at the chart. The CO was looking out the starboard bridge window. As the helmsman decided to make a report on the buoy the OOD looked up from the radar and took over the helm by moving the auto pilot knob to starboard. He then ordered the helmsman to call out headings as they passed the buoy. The helmsman later said he thought the buoy passed the port side 20 feet away while the JOOD said it was 20 yards away. The last heading called out by the helmsman was 071T. As the JOOD saw the buoy pass he called out a fathometer reading of 10 feet. In the time it took the helmsman to look from the buoy to the fathometer, the sounding dropped to 5 feet and the bow struck bottom. The final heading after the cutter grounded was 082T.

7. The cutter was holed at seven different locations. There were several different deformations as well as bent frames and longitudinals. There were no fires or injuries to personnel. Due to the extent of the damage, extra damage control personnel were flown out to the cutter via helicopter.

ADDITIONAL FACTS

1. The CO later stated he considered stopping and or turning the ship around but was reluctant to step in and order either because he thought the OOD would execute a turn at any moment and he wanted to demonstrate confidence in the OOD.

2. Visibility was 8 nm and clear.

3. All personnel had sufficient rest prior to the transit although none had navigated this area as OOD or JOOD.

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VESSEL CASE STUDY

WPB ENGINE ROOM FIRE

SYNOPSIS

On 22 July 1993, a Coast Guard WPB was underway enroute its homeport . The vessel had both MDE's on the line and was operating at 1800 RPM's (28 kts). Around 0340, a fire was discovered by the Engineer of the Watch (EOW) in the aft portion of the engineroom. Bridge personnel sounded the General Alarm and at 0345, activated the halon fire suppression system. At 0353, one P-1 pump and the P 250 fire fighting pump were energized and the crew commenced external cooling of the vessel's soft-patch above the engineroom. Over the next 8-10 minute period, a fire from the starboard exhaust port alternately diminished and reflashed. Some time after 0405, with flames still visible from the starboard exhaust port, the soft-patch hatch (QAWTH 1-27-1) was accessed and two hoses charged with foam were placed directly inside. At 0432, when flames continued to be visible from the starboard exhaust port, two repair party members entered the engineroom to fight the fire. At 0434, it was reported that the fire was out, but that the NR. 1 MDE was still operating. After a number of different means failed to secure the engine, two crewmembers grabbed and hung on to the cable above the engine which was for the emergency shut off pull handles (air shutdown system), and the NR. 1 MDE finally secured. Throughout the remainder of the morning, crewmembers were MEDEVAC'd for smoke inhalation and burns. The cutter was taken in tow by another WPB and safely moored.

DAMAGE TO UNIT

The cutter suffered major heat and smoke damage to the engineroom. The NR. 1 MDE exhaust system was destroyed and the engine was damaged internally. Throughout the engine room, plastic components of electrical switching and controlling equipment melted from heat as did electrical, thermal, and acoustical insulation. The NR. 1 Ships service diesel generator (SSDG) was extensively damaged due to its proximity to the extreme heat. Repair costs have exceeded $1,000,000. The WPB was out of service for 220 days before undergoing sea trails.

HISTORY

1. At 0300, the BM1, who was the Officer of the Deck (OOD), heard a difference in the vessel's engine noise that he described as being louder and of a higher pitch. He notified the EM1, (EOW), who immediately made a round of the engineroom. Upon completion of his round, he informed the OOD that all machinery was operating normally and that he did not notice anything out of the ordinary.

2. At approximately 0340, the MK3 who had relieved the EM1 as EOW, heard a loud metallic bang followed by a decrease in engine speed and the sounding of the engineroom trouble alarm. On the bridge, where the watch relief was in progress, the fire alarm sounded and the bridge alarm panel showed a fire in the engineroom.

3. The EOW departed the messdeck and entered the forward sound locker and began to open the Quick Acting Water Tight Door (QAWTD) into the engineroom. Upon seeing a bright orange flame in the aft portion of the engineroom and feeling a blast of intense heat, He immediately closed the QAWTD and proceeded to the messdeck where he contacted the bridge and informed them of the fire.

4. At 0343, the QM1 who was the oncoming OOD sounded the General Alarm, made repeated pipes on the ships 1-MC and proceeded to contact a Coast Guard Group on 5320 MHz. The BM1, slowed the engines down to approximately 13-15 knots, then called the Group on channel 16 VHF/FM. The commanding officer (CO) then arrived on the bridge, saw a 20-25 foot flame shooting from the starboard exhaust port, and asked if the halon fire suppression system had been energized. The BM1 said no and departed the bridge to locate the Engineering Petty Officer (EPO). The BM1 located the EPO immediately and asked him if the halon should be energized. The EPO stated "Yes."

5. At 0345, the halon system was energized from the bridge by the QM1. Prior to the halon system being energized, the EM1 had entered the battery space and opened the valve that bypassed the 60-second time delay for the halon system. Following this, the EM1 went to the forward sound locker and secured the NR.2 SSDG using the 460 VAC emergency shutdown (NR.1 SSDG was not on the line). At that time, the EM1 stated he heard the halon system energize. Also during this time, the MK2 went to the athwartships passageway and secured the emergency fuel cutoff valves to the port and starboard engines.

6. The Group received the initial report of this incident from the WPB at 0345 via channel 16 VHF/FM. The WPB reported a main space fire and gave their position. They also reported energizing the halon system and requested extra fire fighting pumps and AFFF.

7. At some time after 0345, the QM1 put the engine throttles in neutral and attempted to secure the engines electrically from the bridge console. Since the bridge tachometers still showed engine RPM's, the QM1 then attempted to secure the engines using the emergency pull handles on the bridge. The QM1 stated that he did not look at the RPM gauge after using the pull handles, but thought that both engines or possibly only one engine was still operating because he could still hear engine noise. The bridge emergency pull handles were used three additional times during the casualty but bridge personnel were never sure if the engines were secured due to noise from the P-250 fire fighting pump.

8. At 0347, all hands were accounted for and material condition Zebra was set. At 0349, fire boundaries were set. At 0353R, one P-1 pump and the P-250 fire fighting pump were energized and the crew commenced external cooling of the vessel's soft-patch above the engineroom.

9. In accounts from various crewmembers, over the next 8-10 minute period, the fire from the starboard exhaust port alternately diminished and reflashed. Additionally during this time period, the EM1 was burned on the back of his head and neck by a flame from the center engineroom exhaust vent as he attempted to undog the pyro locker from its mounting.

10. At 0405R, the unit's Emergency Position Indicating Radio Beacon was energized. Some time after this, the EPO directed the nozzlemen to continue cooling the soft-patch, but also to spray water into the two engineroom supply vents. With flames still visible from the starboard exhaust port, the EPO ordered the soft-patch hatch to be opened into the engineroom. Once this hatch was accessed, two hoses charged with foam were placed directly inside the hatch and a third hose was directed over the side of the vessel to cool the starboard side hull near the exhaust port. At 041R, the WPB made a broadcast over channel requesting assistance from any vessels in the vicinity. At 0416, more flames were observed from the starboard exhaust port. At 0417, a 200-foot cargo ship that was carrying explosives arrived on scene and offered assistance. Around this time, white smoke was visible coming from both engineroom supply vents and flames coming from the starboard exhaust port of the WPB. With this information, the EPO made the decision to enter the engineroom to fight the fire directly.

11. At 0432, the BM1 and the BM2 entered the engineroom by going through the aft berthing compartment, aft sound locker, and then through a watertight door which accesses the engineroom. Upon entering the engineroom (foam and water were still being sprayed into the engineroom from the soft-patch hatch at this time), the BM1 and BM2 used a fire hose charged with foam to spray the engineroom concentrating their efforts on the NR. 1 MDE.

12. At 0434, the BM1 reported that the fire was out but that the NR. 1 MDE was still operating. The BM1 and MK2 then went and pulled on the emergency shut off pull handles in the forward sound locker to secure the engine but got negative results. The EPO had personnel check the emergency fuel shut off valves (they were found closed) and directed the spraying of water and PKP into the engine. When these attempts failed to stop the NR. 1 MDE, the BM1 and EM1 both grabbed and hung on to the cable above the engine for the emergency shut off pull handles. The NR. 1 MDE finally secured.

13. At 0450, a muster was held to account for all personnel. At 0451, the unit commenced desmoking using natural ventilation, and dewatering using a peri-jet eductor (highest water level was just below the deck plates).

14. At 0455, the EPO reported to the CO that the cause of the fire was an explosion in the NR. 1 MDE turbocharger. At approximately 0507, a fire watch reported that NR. 1 MDE was turning over and trying to restart. A crewmember (SN) was sent into the engineroom with a fire ax to cut the cables to the NR. 1 MDE starter. The engine then stopped attempting to restart. At the same time, the EM1 disconnected the cables to the batteries to prevent any chance of the NR. 1 MDE restarting. As a result, Cutter lost emergency power and had to rely on hand-held COMCO's to communicate with other units.

ADDITIONAL FACTS

1. MDE Emergency Shut off System: The emergency shut off handle system (backup mechanical system), was ineffective in securing the NR. 1 MDE. This system was ineffective because the aluminum sheave that the cable runs through on the block of the engine melted and prevented manual actuation of the air shutdown. The fire was funneled up and projected onto only this sheave (chimney effect). The sheave melted shortly after the fire was discovered.

2. Fire Suppression System: The installed fire suppression system exceeds the amount of halon necessary if the engines are first secured, making the

covering of the vents redundant. The halon was ineffective because the NR. 1 MDE was still operating, ingesting and exhausting the halon.

3. NR. 1 MDE electrical shutdown: The cutter experienced a fault in the electrical shutdown circuit for the NR. 1 MDE the day prior to this mishap. The unit was aware of this casualty, and had experienced this problem in the past. However, engineering personnel were unable to immediately correct the casualty due to the heavy pace of operations. The system was not tagged out. The casualty prevented bridge personnel from being able to secure the engine electrically from the bridge console. It also prevented the halon system from securing the engine once the system was activated.

LESSONS LEARNED

1. The internal fire within the NR. 1 MDE may have been less severe or even extinguished if the EOW and/or the bridge had immediately taken action to secure the engine. Upon the initial discovery of the fire, the EOW immediately informed the bridge, but never attempted to use the emergency shut off handle system in the forward sound locker to secure the engines. Bridge personnel correctly sounded the General Alarm and made a pipe to inform other personnel, but did not attempt to secure the engines until after making repeated calls to the Group to inform them of the situation. Initially, the bridge crew attempted to secure the NR. 1 MDE by using the remote electrical shutdown located on the bridge.

   NOTE: Per Chapter 8 of COMDTINST M9555.1A, Machinery Space Firefighting Doctrine (MSFD), systems or machinery which have the potential to feed the fire should be secured/isolated. The EOW should have attempted to secure the engine immediately upon discovering the fire, then reported the fire and his actions to the bridge.

   NOTE: Per Chapter 7 of the MSFD, ventilation is automatically secured upon activation of the installed halon flooding system. This refers to forced air systems that will be secured by automated interruption of electrical power.

2. Valuable time was lost because an emergency control system that had sustained a casualty was not tagged out. Approximately five minutes elapsed before the bridge personnel determined that the engine was not secured. Numerous attempts were then made to secure the engine by the emergency handle shut off system. By that time the aluminum sheave had melted.

NOTE: Per Chapter 77-G of COMDTINST M9000.6B, Naval Engineering Manual, tag-out procedures shall be employed when a system is isolated or in an abnormal condition due to preventative maintenance or casualty.

VESSEL CASE STUDY

BOILER EXPLOSION

HISTORY

1. At 0240, 18 JAN 1994, the #1 ships service boiler (#1 SSB) aboard a WAGB exploded. The boiler is the starboard of two boilers located in compartment 2-119-O-E. The compartment is bounded by frames 119 forward, 137 aft, between the second and 0l decks. The boiler is a Seattle Packaged Steam Boiler Model SDW 350M manufactured by Seattle Boiler Works. The boiler control system is a Cleaver Brooks CB-70 Computerized Burner Control installed in June 1992. The boiler controller conducted 15 different but overlapping safety routines, conducting more than 400 safety checks per second. It performs a safety shutdown if any of 18 conditions exists. #1 SSB was on "hot standby" at the time of the explosion. The WAGB was moored in homeport. “Hot standby” is defined as the boiler running with the steam stop closed.

2. The Engineering Security Watchstander was an MK2. The MK2 had 14 years active duty service, with broken service, and five years sea time with engineering assignments afloat on a WMEC and a WLB. He reported aboard in FEB 1993 and qualified for engineering security watches on 20 AUG 93. The MK2 is assigned to the Fuels Division and serves as the Fuel & Water King.

3. The MK2 relieved the engineering security watch at 2345, 17 JAN 94. At 0230, 18 JAN, #1 SSB trip alarm sounded in Main Control. The MK2 silenced the alarm in Main Control and proceeded to the Boiler Room. On arrival in the Boiler Room, the MK2 noted the alarm code F-30 on the control panel and then silenced the alarm in the boiler room. Alarm code F-30 indicates Pilot Flame Failure. Troubleshooting techniques include checking the pilot and valve operation, pilot fuel supply, and ignition transformer and electrode, flame detector, flame detector sighting, and flame signal amplifier. Unit casualty control procedures call for the space watchstander to use the code chart and clean probes (igniters). Unit practice is for the watchstander to remove the probe, install a ready for service probe, restart the boiler, and

then make the removed probe ready for service by cleaning it and resetting the electrode spacings. The MK2 demonstrated his ability to clean boiler probes as part of his inport auxiliary watch qualifications. The procedure for checking and cleaning a probe is to scrape/brush off carbon buildup on the nozzle and reset the electrode gap. The gap must be set to provide an arcing space of 3/16" and be positioned properly within the nozzle spray pattern. Watchstanders are shown proper gap setting procedures but there are no job aids posted or provided in the Boiler Room.

4. The MK2 reset the boiler and recycled it through the start cycle. The boiler again failed to light. He then secured the ignition, feed, alarm, and fuel switches on the front of the panel. The MK2 pulled the igniter nozzle and probes. This required him to disconnect the igniter fuel line to the nozzle and electrical lines to the electrodes located between the outer shell and the burn chamber. He then had to remove two screws holding the igniter assembly in the burner assembly. When he examined the nozzle he found it badly fouled. The carbon fouling appeared moist. The MK2 installed a spare igniter nozzle and probe, then closed the boiler door. He then reset the controller switches.

5. The MK2 did not see any fuel indicating a leak in either the flare nut on the fuel line or flow through the closed solenoid valve in the igniter fuel line. He did not notice any significant smell of fuel beyond what would be noticeable from the disconnected fuel line. He could not see into the burn box in the vicinity of the burner nozzle due to line of sight restrictions.

6. When the MK2 pressed the reset button to start the boiler, the boiler feed water pump energized to add feed water and the burner air blower started. It took a minute to replenish the boiler feed water. Then the boiler controller started its start-up cycle. The start-up cycle consists of:

   - 30 second purge, during which air is blown though the main burner fuel line and nozzle to clear the nozzle of fuel.

   - Ignition trial, during which the ignition transformer and pilot valve are energized. If a flame is not detected within the 10 second period, a safety shutdown will occur.

   - Main flame establishing period during which the main fuel valve is energized and the ignition transformer and pilot valve are de-energized.

- RUN period during which the modulating controller controls the firing rate motor.

7. The MK2 heard the burner fan operate during the purge cycle. The MK2 heard the purge cycle end and positioned himself at the sight glass outboard of the outer enclosure door where he could watch the probe. When the probe electrodes energized at the beginning of the ignition trial, the boiler exploded. There was no visible flame from the igniter nozzle. The boiler was burning a combination of JP5 marine fuel and F-76 Marine Diesel Fuel. Flash points were tested at 150 F and 176 F respectively. The fuel mixture proportions were unknown.

8. The MK2 immediately exited the Boiler Room through the port door and hit the boiler fuel oil cut-out switch. This stopped the flow of fuel oil into the boiler room. The Gangway Petty Officer sounded the General Emergency Alarm immediately after the explosion. He coordinated with both the Main Gate watch and Group Seattle Operations Center to get Seattle Fire Department assistance. The watch sounded the General Emergency alarm and piped the nature of the emergency three times within four minutes. Personnel arrived at Repair 2 and established communications within 3 minutes of the first GE. alarm.

9. Power and fuel were secured to the scene. Fire boundaries were set forward and aft of the Boiler Room. An investigator, On Scene Leader (OSL), Fire Team Leader, and fire team responded to the scene. Communications flowed from the OSL to Repair 2 and on to the Quarterdeck. Seattle Fire Department arrived within 9 minutes. They investigated the port side access to the Boiler Room and prepared to enter the space. The cutter's fire team entered into the Boiler Room 14 minutes after General Emergency was sounded and found no fire or smoke. Power was restored to the scene. The crew secured from General Emergency stations.

10. The Seattle Fire Department crew secured their equipment and departed the scene 25 minutes after the explosion. #2 SSB remained secured until it could be examined for potential damage; no unusual conditions were found. #2 SSB was then placed on the line. #1 SSB was restored to full operation at 1450, Jan 18.

ADDITIONAL FACTS

1. The firebox has two sources of fuel. The igniter nozzle is fed via a ¼" copper tube. Fuel control is exercised by a 3-way valve and an ASCO model 8262D20 solenoid actuated valve. This valve was last replaced in DEC 1991. The solenoid valve is controlled by the CB-70 control panel. A bypass line with a manual valve had been removed sometime in the past. The burner nozzle was fed through a 3/8" line with two separate paths of flow controlled by a manual 3-way valve. The normal path is through two ITT model K-1O solenoid actuated valves in series. The alternate path is through a manual gate valve. Both paths feed through a Hauck micro-metering valve. The solenoid valves and the micro-metering valve are controlled by the CB-70 control panel. There is no fuel flow detector/ interlock safety between the fuel valves and the burner nozzle. Purge air is fed from either ship's service air or an installed air compressor to the nozzle through the burner fuel line and a 3/8" line controlled by a solenoid actuated valve. Atomizing air is fed to the main flame nozzle by separate air line using the same air source. The cutter used ship's service air as the principal source of air for the burner.

2. The #1 SSB Machinery History shows major inspections and repairs in MAY 1987, FEB 1991, MAY 1992, and OCT 1993. The Machinery History did not document accomplishment of all annual or biennial PMS procedures. Boiler PMS records were incomplete. There were two daily PMS procedures, 1 weekly procedure, 2 semiannual procedures, 3 annual procedures, and 2 biennial procedures. DEC 93 and JAN 94 PMS records reflect an 85% daily and 75% weekly boiler PMS accomplishment. The Engineer Officer reviews PMS accomplishments to ensure that no weekly or monthly procedures are left undone for consecutive performance cycles. None of the PMS procedures require inspection of the boiler fuel valves. Ship's force performed Maintenance Procedure Card (MPC) A-A-019 for annual boiler fireside inspection in OCT 1993. MPC A-C-034 for biennial waterjet cleaning and fireside inspection by a certified boiler inspector was conducted in FEB 1991. A commercial contractor performed major boiler repairs including tube replacement, brick work renewal, main steam stop valve replacement, and hydro-testing in MAY 1992.

CAUSE

1. The explosion in #1 SSB resulted from excess fuel, which had been atomized by a combination of forced air and purge air, being ignited during the programmed pre-ignition cycle.

2. The most likely source of excess fuel was failure of the burner fuel line solenoid valves to fully close. This failure could have been caused by foreign material caught in the valve seats.

CONTRIBUTING FACTORS

1. Boiler PMS was focused toward prevention of waterside failures. It has not considered catastrophic failure modes in the fireside portion of the boiler, particularly in the fuel supply system.

2. The Clever Brooks CB-70 boiler controller functioned properly; however, it could not prevent this explosion due to the lack of a fuel flow sensor/interlock safety function.

3. Boiler PMS does not consistently meet the frequency criteria of governing MPCs. However, the cutter did ensure that no MPC is left undone between consecutive intervals.

LESSONS LEARNED

1. Revise this cutter's boiler PMS to inspect boiler fuel valves on a periodic basis. The inspection could be done in conjunction with either MPC A-A-019 (annually) or A-C-034 (biennially).

2. Post or provide a job aid in the boiler room to help watchstanders adjust probe electrode spacing.

3. Review and modify the boiler casualty control procedures to reflect Clever Brooks troubleshooting recommendations for indicated trouble codes.

4. Conduct a catastrophic failure mode analysis of systems on board our cutters as a cross check of PMS. This type of failure, had it occurred during an Antarctic deployment, would have severely impacted the unit's ability to complete its mission.

5. Work with Clever Brooks to modify the CB-70 controller to incorporate a fuel flow detector safety interlock between the modulating valve and the burner. This interlock would stop the pre-ignition stage if fuel flow were detected when the solenoid valves were supposedly closed.

VESSEL CASE STUDY

HIT THE BEACH (180' WLB MISHAP)

SYNOPSIS

On 12 December 1995, CGC SPEAR was engaged in a joint operation with a Connecticut Air National Guard's (CANO). The Chinook helicopter was to retrieve two buoys that had broken their moorings and grounded on nearby islands off the east coast of Maine during a winter storm. At 1127R, SPEAR anchored in Head Harbor, Isle au Haut, to begin operations with the CANO helicopter. A mechanical problem with the helicopter delayed the operation several hours. At 1502R, SPEAR attempted to land a work party on Isle au Haut, Maine, using a rigid inflatable boat (RIB) to prepare a grounded buoy for airlifting. On 29 November under different environmental conditions, SPEAR had made a successful small boat landing on the beach. As SPEAR 2 approached the rocky beach, it struck a submerged rock bending the propeller and stalling the engine. Without power, the SPEAR 2 was driven ashore by the one to two foot wave action. All crewmembers made it safely to shore without any injuries. At 1543R, the SPEAR 1 launched to assist SPEAR 2, but determined that they could offer no assistance. At 1557R, sunset was observed; the CANO helicopter arrived on scene with one of the recovered buoys. SPEAR 1 was diverted to tow the drifting buoy back to SPEAR, but stalled her engine during the tow. SPEAR 1 could not restart her engine, had no tool kit or paddles onboard, and could not deploy the anchor because it was encased in frozen water within the forward compartment. SPEAR asked for assistance from the CANO helicopter. The helicopter recovered SPEAR 2 and returned it to the vicinity of SPEAR. The helicopter then had to depart the scene. SPEAR weighed anchor to assist SPEAR 1. The CO conned because SPEAR's pilot house control was temporarily out of commission. SPEAR positioned herself so SPEAR 1 was on the port side and the buoy was on the starboard side. The buoy deck crew then secured both with cage lines to SPEAR. The CO gave permission to break the tow from SPEAR 1 to the buoy. Confusion about the order resulted in all lines being released. SPEAR 1 and the buoy drifted toward the shoals, set by wind and current. SPEAR had to back away to safer water. SPEAR 1 soon drifted onto the rocks off the southwestern tip of Eastern Head, Isle au Haut. The boat crew jumped into the water and onto the rocks as the RIB crashed ashore.

There were no personnel injuries. Coast Guard Croup Southwest Harbor alerted residents of Isle au Haut and dispatched a 44 MLB to transport personnel back to SPEAR. Crews of SPEAR 1 and 2 were quickly located and returned that evening to SPEAR.

HISTORY

1. On 29 November 1995, CGC SPEAR conducted local familiarization between Western and Eastern Head, Isle au Haut, Maine to identify any potential hazards prior to conducting joint operations with a Connecticut Air National Guard's (CANG) Chinook helicopter scheduled for 12 December. Environmental conditions for this operation were: offshore wind 015T/10 kt; visibility 7 miles; air 24F; seas 030T/1 ft.; and swells 090T ft. The operation occurred between 1040R and 1200R which was just after low tide (between 1 and 3 ft.). The ship's RIB was deployed with BM2 Berry as the coxswain. He successfully landed a shore party on the west side of a point where one buoy was located. SPEAR deemed the procedure safe.

2. On 12 December 1995, the CANG Chinook helicopter and CGC SPEAR began a joint operation to retrieve two grounded buoys, Turtle Island #2 (a 9'x20' buoy 30NM away) and another on shore at Isle au Haut. A detailed briefing was held in the wardroom that morning to discuss the entire buoy recovery evolution. The SPEAR's objective was to prepare the buoy on Isle au Haut for lifting. The CANG helicopter was scheduled to arrive on scene at 1100R to commence operations. At 1127R, SPEAR anchored in Head Harbor, Isle au Haut, ready to commence recovery operations. See Figure 1. At 1200, environmental conditions were: onshore wind 290T/14 kt; visibility 10 miles; air 25F; seas 290T/1 ft.; swells 230T/4 ft. Tide was estimated at 5 ft. with high tide predicted at 1350R (9 ft.). After discussions between the CO and 1ST LT, SPEAR decided to attempt a small boat landing in the same spot as done on 29 November.

3. At 0715, the EM3 boat engineer completed the checkoff list for both small boats. SPEAR 1 would not start and was not CASREP'd. No water was noted in either of the RIB's bilges. Temperatures before dawn were in the low teens and rose to 28 degrees by 1400R.

4. The CANG helicopter was delayed due to a mechanical problem. At 1436, SPEAR received an update that indicated that the helicopter would be on scene at 1530R. At 1502R, SPEAR 2 (SPEAR's 6.4m RIB) was launched with 7 POB including BM2 Berry as coxswain to prepare the buoy grounded on Isle au Haut for airlifting. Once underway and nearing shore, the coxswain started watching the depth sounder. He also tasked two members to take soundings forward with oars prior to arriving on shore.

5. At 1511R, SPEAR 2 grounded by striking a submerged rock. The bent propeller caused the engine to stall. The coxswain tried to restart the engine without success. Without propulsion, he RIB was driven onto the rocks by 1 to 2 foot wave action and left there by a falling tide. All 7 POB were able to disembark without injury.

6. At 1543R, SPEAR 1, a 6.4m RIB on loan from LANTAREA (Aof), was launched with 3 POB to assist SPEAR 2. SPEAR 1's coxswain was BMC Cole. After arriving on scene, SPEAR 1 determined that the recovery of SPEAR 2 was not feasible at that time.

7. At 1557R, sunset observed. The CANG helicopter arrived on scene with the Turtle Island #2 buoy and dropped it about 200 yards off the port side of SPEAR. SPEAR 1 was diverted to tow Turtle Island #2 buoy back to SPEAR for loading on deck. The helicopter proceeded to the buoy on Isle au Haut to begin recovery operations. The helicopter soon determined that it would be unsafe to hoist the buoy because of its position near trees.

8. At 1608R, SPEAR 1's engine developed a fuel pressure problem that caused it to stall with the Turtle Island buoy #2 buoy in tow. SPEAR 1 was approximately 50 yards off the port beam of SPEAR. It had a history of mechanical and electrical problems after arriving on SPEAR. Numerous attempts were made to restart the engine but were unsuccessful. No tool kit or any spare parts to effect repairs were onboard. The forward gear compartment was frozen shut. The coxswain and boat crewman beat the access cover open with a shackle. The compartment was full of frozen water which encased the anchor and anchor line. The boat crew looked for other methods to slow their set and drift. Their attempts failed. SPEAR tried to use a heaving line and line throwing gun from the fantail as SPEAR 1 drifted by at approximately 20 to 30 yards. All attempts were unsuccessful.

9. The CANG helicopter was contacted by SPEAR to determine if they could tow or otherwise assist SPEAR 1. The helicopter could not. SPEAR then asked if the helicopter could hoist SPEAR 2 and put it in the water. The helicopter agreed to recover SPEAR 2 but would have to depart immediately after dropping it off because of darkness.

10. Recognizing the seriousness of the situation, SPEAR prepared to weigh anchor and steam to assist SPEAR 1. CANG was unable to assist. At 1617R, SPEAR conducted an unsuccessful test of pilot house control, and the engines remained in engine room control. The bridge control was inoperative due to a frozen air control line. The CO assumed the CONN due to the casualty and the inherent risks of the operation. QM1 manned the 1JV to pass engine commands. The 1JV circuit had Main Control and the forecastle on line. The XO was on authorized leave. The 1ST LT was in charge of deck operations on the forecastle. The BM1 was assisting on the buoy deck.

11. SPEAR 2's boat crew prepared the RIB for airlift by attaching lifting straps for CANG. At approximately 1620, CANG airlifted SPEAR 2 from the beach of Isle au Haut and set it 500-700 yards from SPEAR's port beam.

12. At 1634R, SPEAR had SPEAR 1 on the port side and the buoy on the starboard side. Cage lines were passed and secured to both. SPEAR 1 still had a tow line to the buoy. There was a concern by the BMC that SPEAR would entangle the tow line and cause SPEAR 1 to capsize. Permission was granted for the tow line to be dropped. The tow line was released from SPEAR 1. However, during this process, the 1ST LT and line handlers on SPEAR became confused over the order and all lines were released. This action set SPEAR 1 and the buoy adrift. After another approach attempt, SPEAR was now in the danger zone and approaching the safe navigational draft of 18 ft. There was no time to attempt another ship recovery. Members on deck tried numerous times to pass a heaving line and 2 more attempts with line throwing gun. All attempts failed as SPEAR backed away. The combination of wind, current, and 3 to 4 foot waves set SPEAR 1 toward the rocky shore.

13. SPEAR 1's crew (BMC, MK2, SN) unsuccessfully used their helmets as paddles to moor back to the buoy and/or lobster pot buoys in the area. SPEAR 1 passed through nearby rocks and breakers without grounding or capsizing. The RIB then hit the rocky shore bow first. A big breaking wave picked up the stern moving it to starboard and crashed it onto the rocks with the crew still onboard. The crew disembarked and made it through the remaining white water and rocks to shore. No personnel were injured. At 1659R the RIB was stranded on the rocks off the southwestern tip of Eastern Head, Isle au Haut (44-00-47 N by 068-37-09 W).

14. SPEAR established a 15-minute communications schedule between both marooned boat crews and SPEAR. SPEAR experienced westerly winds of 18 knots, 1 foot seas and 2 foot swells. BMC Cole reported waves exceeding 3 feet on the beach.

15. At approximately 1700, SPEAR recovered SPEAR 2. The RIB was repaired and placed in Bravo status on 13 December. Damages to SPEAR 2 consisted of a bent propeller and minor gel-coat damage.

16. At 1659R, SPEAR requested assistance from Group Southwest Harbor, Maine to retrieve crewmembers stranded on Isle au Haut. The Group dispatched CG-44365 to the ferry landing on Isle au Haut and notified Isle au Haut residents to search for and assist the crewmembers. At 1844R, all crewmembers had been located. They embarked CG-44365 at 1950R. At 2226R, SPEAR moored port side to at CG Station Rockland, Maine. All stranded crewmembers returned to SPEAR at 2300R.

17. The constant wave and surf action during the night resulted in the total destruction of SPEAR 1. After recovering what remained of SPEAR 1 on 13 December, the crew returned to Portland, Maine. SPEAR 1 was found high and dry. The stern was full of water and the port sponson was torn free from the fiberglass hull. The hull had a 10-inch wide and 24-inch long hole forward and more hull damage aft.

INJURIES TO PERSONNEL. No personnel casualties or injuries occurred during this mishap.

DAMAGE TO UNIT OR UNIT EQUIPMENT. SPEAR 1, a 6.4 meter RIB, CG-210109, was a total loss. Some salvage value in scrap iron or engine parts existed. Total cost for a new replacement RIB was $60,000. SPEAR 2 sustained minor gel-coat and propeller damage resulting in approximately $1000 worth of repairs.

BOAT INFORMATION SPEAR 1 (CG-210109) was a 6.4 meter Hurricane Zodiac type H64010 RIB, serial number XDC64001J091 with a Volvo Penta AQAD 31-A four cylinder diesel engine installed. Total weight was 3400 lbs., weight capacity was 5460 lbs., and maximum number of persons 13, and maximum horsepower was 150. First assignment was to CGC TAMAROA 3 May 1991. A Racor fuel filter Model R265 (with a 2 micron filter) was installed as the primary filter. A Hot start was installed to keep the engine warm. The anchor compartment was sealed using a flush Freeman quick acting hatch Model 15. SPEAR 2 also was a 6.4 meter RIB with similar construction and was in good working order.

METEOROLOGICAL INFORMATION. The weather observations were logged as follows 12 December 1995:

1. Wind: 270T/13K; Sea: 300T/1ft; Swell: 220T/3ft; Vis: 10NM; Weax: scattered clouds; Baro: 30.21; Temp: 22F dry.

2. Wind: 270T/12K; Sea: 290T/1ft; Swell: 220T/3ft; Vis: 10NM; Weax: scattered clouds; Baro: 30.24; Temp: 20F dry.

3. Wind: 270T/18K; Sea: 220T/1ft; Swell: 220T/2ft; Vis: 10NM; Weax: scattered clouds; Baro: 30.29; Temp: 19F dry.

4. High tide: 0146R, 8.47' Low tide: 0740R, 1.34'
   High tide: 1350R, 9.08' Low tide: 2010R, 0.57'

CAUSE

1. The primary cause of the mishap was the inadvertent release of the line securing SPEAR 1 to the tender. This action was because of a breakdown in team coordination.

2. Contributing to this mishap was the lack of the RIB checkoff list to target for inspection both engineering and deck items, and an established boat outfit list to ensure emergency equipment was aboard. An incomplete boat inspection and the failure to check the boats outfit before getting underway, also contributed to this mishap.

LESSONS LEARNED

1. The best overall landing method and craft are dependent upon the on scene environmental conditions and resource availability. Units must familiarize themselves with the area of operations and assess the risks that each method of transportation affords. Beach landings in rocky terrain are inherently risky, so all options for alternative personnel transport should be considered.

2. Clear communications and situational awareness are critical. As conditions deteriorate, evolutions should be simplified or slowed down to prevent confusion. In such cases, someone has to continue to focus on the "big picture" as the safety observer for the evolution.

3. Minimum preventive maintenance system must include more than a manufacturer's maintenance program and should be formalized to ensure completeness and adequacy. Unit programs are critical for nonstandard boats. Such programs must include input from both Engineering and Deck Departments.

4. Boat checkoff lists and outfitting are the shared responsibility of the Engineering and Deck Departments. A proper boat outfit must have emergency equipment accessible and in working order. Duty coxswains and duty boat engineers should perform daily boat checks and notify the OOD of the status of the boats.

5. While "dry runs" are an excellent way to prepare for an operation and investigate potential problems, personnel should be aware that what works the first time might not work in every case, especially in different weather conditions.

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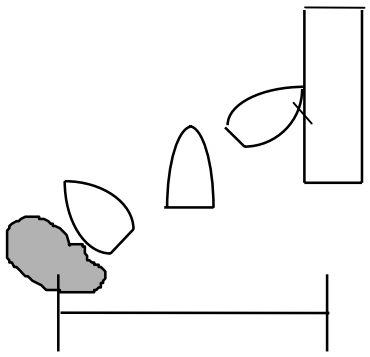
VESSEL CASE STUDY

SHIFT COLORS (180' WLB MISHAP)

HISTORY

The CGC SPEAR was moored portside to Station Portsmouth harbor, getting underway at 0730. This vessel often moors at Station Portsmouth and has gotten underway numerous times under similar conditions. The current was ebbing at 1.5 knots with the WLB facing into the current. The WLB sprung out on line two to an approximate angle of 50 degrees from the pier. The conning officer commenced backing out with full right rudder. The combination of the current and the normal backing to port forces were stronger than anticipated and the bow thruster was engaged to port to stop the swing of the stern towards the shoal. The maneuver had little effect and the WLB was now parallel with pier moving sideways towards shoal. The CO assumed conn and shifted the rudder to left full and gave shot ahead to kick the stern away from the shoal. SPEAR grounded itself portside amidships. Due to the effect of the current pushing the WLB on the shoal, the CO made decision to immediately drive the WLB off the shoal, rather than risk becoming hard aground. SPEAR returned to port and moored at Station Portsmouth at 0740. A diver determined the damage to be 40 ft crease in hull between frames 81 and 116 with a 16 inch split seam 1/4 inch wide at frame 98.



50 yards

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VESSEL CASE STUDY

YO-YO A GO-GO (WMEC SAR MISHAP)

SYNOPSIS

On the night of 11 SEP 93, the CGC PICKUP was participating in Operation Able Manner in waters off the northern claw of Haiti. As directed, PICKUP proceeded to a position approximately 12.3 NM northwest of Isle De La Tortue, Haiti to investigate a radar contact. Upon approach, PICKUP sighted a 25' wooden S/V. The S/V's sail was torn and the boat was adrift. As the S/V drifted toward the territorial sea of Haiti, PICKUP dispatched a small boat with a boarding party and Creole interpreter to it to determine the nature of the its voyage. Through verbal communications with the passengers, the boarding team determined the people to be Haitian migrants en route to Miami, Florida, and that they were in fear for their lives because of the condition of their vessel. The S/V was extremely overloaded, having 46 aboard. It's sail was badly torn and its rudder was broken. Additionally, a strong frontal system was approaching the area from the east. Based on these concerns, PICKUP's CO assessed that the S/V was in danger from the perils of the sea and chose to immediately evacuate the people to PICKUP. During the course of this operation (as a result of the combined effects of wind, seas, and excessive loading of the vessel), the S/V capsized. The immediate efforts of PICKUP saved 25 people from the water; a total of 37 people were rescued from the vessel. During subsequent salvage efforts by another cutter, three deceased persons were recovered and two were observed to float out the hull and sink immediately. Four persons remain unaccounted for, and are presumed to have drowned.

HISTORY

1. At 2130 on 11 September 1993, PICKUP was directed to intercept and identify a radar contact approximately northwest of Isle De La Tortue, Haiti. At 2230, PICKUP intercepted a 25 foot wooden single-masted sailing vessel of traditional Haitian design, modified with a small cabin aft.

2. PICKUP observed a larger number of people on deck than is reasonably expected for a vessel this size. Exercising authority under right of approach, PICKUP launched its RIB at 2240 with a boarding officer, assistant boarding officer, coxswain, crewman, and INS. Creole interpreter to establish communications with the vessel and determine the nature of their voyage. They determined that the vessel was en route Miami, Florida, that there was no master aboard, that the vessel's rudder was broken, and that the sail was torn out and unusable. The vessel had one foot of freeboard. The people aboard the S/V also expressed fear for their lives due to the condition of the boat.

3. The PICKUP's CO determined that the vessel was in immediate peril, and at 2248, set the AMIO bill to take the people aboard the ship. At 2340, the boarding officer and the interpreter had embarked the S/V, and commenced the transfer of the people.

4. At 2348, the MSB returned to PICKUP transporting 12 migrants, with the ship's RIB standing by the S/V. As these 12 migrants were embarking PICKUP, the S/V was struck by 2 large waves and capsized, throwing its topside passengers, including the boarding officer and interpreter, into the sea and trapping an unknown number of people inside the cabin.

5. After being recovered by the RIB, the boarding officer and the interpreter reentered the water to assist migrants. Subsequent efforts by them and the cutter's two rescue swimmers resulted in 25 people being recovered from the water. At 0037, 12 September, one of the rescue swimmers extracted the last person from the overturned hull of the vessel that was now awash.

6. The boarding officer and RIB coxswain observed the seas to be approximately 4ft, swells 4-6 ft, occasionally larger. Both wind and seas were increasing with an approaching squall line from the east. There was no moon.

7. Communications with boarding officer, MSB and RIB Coxswains were with VHF-FM hand held radio - MX 300. On PICKUP's bridge the MX 1000 master station was used. Communications from the initial approach until the

final rescue were hampered by on scene conditions. The coxswains used remote microphones attached to their lifejackets but could not use the voice activated option. That would have resulted in a constant key due to the engine noise. The push to talk button was used which requires removing one hand from the steering controls to speak. With background noise and difficult conditions, communications were achieved only with significant concentration and many repeats by the radio telephone talkers. At one point the RIB coxswain's radio lost its secure code when dampened by a wave. This was overcome by switching to clear mode. A second wave rendered the radio useless.

8. Sufficient illumination during intercept was provided by PICKUP's search light. However, constant manual slewing to keep the light directed onto S/V was necessary. An outstanding casualty to the AN/SVD- 1 optical surveillance system (055) required the searchlight to be operated in the gyro bypass/manual mode. This casualty was also complicated by the on scene weather and the increased roll of PICKUP at slow speeds. The physical limits of train and azimuth of the light required the CO to hold the ship approximately 100 yards from the capsized S/V to maximize illumination of the scene. M127A1 parachute flares were used. Seeing the capsized hull was difficult.

9. PICKUP had sufficient extra PFDs to perform AMIO duties. However, the extra PFDs were not fitted with retro-reflective tape.

CAUSE

The S/V was in a damaged condition with a torn sail and a broken rudder that rendered it uncontrollable. The vessel was also grossly overloaded. Even after many were already transferred to the cutter and out of danger brought on by rough seas, there were still people in peril awaiting transfer.

LESSONS LEARNED

Cutters deploying on AMIO patrols must ensure that they have the additional equipment (e.g. lifefloats and PFDs) aboard to facilitate embarkation of large numbers of people. Upon arriving on scene, the On Scene Commander (OSC) must attempt to outfit passengers of the distressed vessel with PFDs. All PFDs should be marked with retro-reflective tape. The OSC must ensure that risks to our people as well as to those assisted are rescuing are assessed and managed throughout the course of the effort.

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VESSEL CASE STUDY

WHERE-OH-WHERE (210' WMEC FIRE)

HISTORY

1. At about 0219, 1 June 1989, the engineroom auxiliary watchstander aboard a 210' WMEC discovered white smoke in a passageway while making a normal round. He secured the passageway door to prevent the spread of smoke and reported a fire in the reefer flats to the EWO. The OOD received the report from the EWO, sounded GQ and piped that the fire was located in the reefer machinery space, also known as the JP5 pump room.

2. At 0232 all stations were manned and ready with condition Zebra set. The fire team from Repair Party 2 accessed the affected passageway and encountered heavy white smoke. The fire team put a blanket of water on the deck and then chopped a hole into the ventilation ducting to spray aqueous film forming foam (AFFF) into the JP5 pump room where the fire had been reported over the 1MC. The fire team eventually accessed the JP5 pump room and the dry stores areas and found no fire. The fire party advanced along the passageway to engineer's stores. The Navy Infrared Thermal Imager (NIFTI) was used but heat was so intense that the screen "whited out" making the NIFTI ineffective at pinpointing the heat source. The fire team attacked the exhaust stack tube in the compartment but had to shift efforts to the overhead where tremendous heat and steam were coming. The delay in locating the fire in engineer's stores and its intensity ignited a fire directly above.

3. The fire spread by conduction into commissary stores, and further spread through the expanded metal door into the galley. This fire went undetected until the fire was located below. Another repair party member noticed blistering on the bulkhead outside of the galley and cooled it down. Black smoke was also reported coming from the galley. Investigators eventually made entry to fight the fire in the galley, but had to back out due to the intense heat. They were wearing flash gear and long sleeved jerseys. At 0325 the fire in engineering stores was reported out. After the reflash watch was set in engineer's stores, the main fire party remanned topside to fight

the galley fire. Investigators had been unable to enter the galley immediately because the access door was locked after GQ was sounded (a practice that was done during fire drills). The fire party put the galley fire out in about five minutes after entering the space. Oxygen, explosive and toxic gas tests were completed at 0455. Dewatering and desmoking of the ship was completed at 0511. All hands stood down from GQ at 0700.

CAUSE

Stored paper products were ignited by faulty electrical wiring; most probably a fluorescent light in engineer's stores.

CONTRIBUTING FACTORS

The initial report of the fire did not include the compartment number. Investigators ignored locked spaces, as was standard practice in drills. Normal sound powered phone circuits were destroyed by fire. Fire boundaries were not effectively set around and above the fire. Ship's service air was isolated during GQ. A silver brazed joint melted during the fire allowing ship's service air to supply the fire with oxygen. Zebra was not maintained; also a standard drill practice. Doors opened, to cool spaces down not near the fire, allowed smoke to spread unnecessarily, and forced the evacuation of DC Central and the primary repair locker.

VESSEL CASE STUDY

270' WMEC GROUNDING

HISTORY

1. Pre Mishap: The Cutter returned to Key West in the first week of August after completing a highly successful refresher training. Due to operational requirement, the in-port period was cut short two weeks. The Cutter sailed on 2 September 1993.

2. The Optical Sight was not operational and the Cutter navigated in Mode 3 (without COMDAC, manual plot). COMDAC, however, was otherwise fully operational. After clearing the channel, the Cutter conducted General Quarters, Man Overboard and Abandon Ship training evolutions.

3. The ship control team on the bridge for special events underway is the CO, XO, OPS, OOD, QM1, and QMOW. The CO and XO are involved with ship functions. One is directly involved in directing the movements of the vessel with the OOD and the other is a detached safety observer. OPS is involved working the case (LE or SAR). The OOD is responsible for conning (or if a conning officer is present, coaching as needed), getting boats in the water and in general, controlling the evolution. The QM1's primary focus is the navigation picture with assistance from the QMOW who also takes care of the ship's log.

4. On the morning of the mishap, the bridge watch section included the OOD; a break-in conning officer; a QM2 as break-in QMOW; and the QM1 as QMOW. Approximately one hour prior to the mishap, the CO went to the bridge. He was followed by OPS.

5. OPS referred to the DMA Catalog that identified Chart 28557 to be the best chart for the local area. On Chart 28557, the Slow Boat passage was outlined in purple with a note to refer to Chart 27936. "27936" was crossed out indicating that it was discontinued. Although discontinued, the OPS felt that it offered the best scale navigation picture of the Big Island area. Chart

27936 was also not corrected as it was not on the Cutter's required-to-be-corrected list. Two copies of this chart were used, one for the bridge and one for CIC. Post mishap research by OPS revealed that the DMA Catalog incorrectly identified Chart 28557 as most suitable for the area. Chart 27943 would have been the best choice for the Big Island area.

6. Just minutes before the mishap, the XO was called to the bridge. Notes to wake up the CO and XO were not in the wake up log, but were written on a chart. The time for the wake up calls was when the watch relief was in process and just prior to the point where the charts were shifted. The CO had arrived on the bridge without the section having to give him a wake up call. The off-going and oncoming sections both perceived that the other had called the XO.

7. The permanently assigned QM2 and a key member of the navigation team did not sail with the Cutter due to a previously scheduled training requirement. He was well known for his vocal and aggressive stance in maintaining the navigation picture, and his assertiveness in making this information known to the CO, OOD and Conning Officer. Team expectations were that this team member would keep the remainder of the team well informed if difficulties in navigation arose. This was a critical absence, as the opposite response was received from the TAD QM2. The normal response was not present, but was not readily identified as being absent. These issues were not recognized by the command group.

8. Mishap: At 0036R 04 September 1993, the Cutter was diverted to assist a 50 meter freighter, off Big Island, southwest of Little Island. Information available to the Cutter indicated a need for urgency. The distressed vessel was in serious condition. It was reported to have been out of fuel, dragging anchor towards shoal water with crew in life jackets. The Cutter proceeded towards the disabled vessel's position at 17.5 knots with an estimated time of arrival at 0500R.

9. The initial position of the D/V was southeast of Big Island in good water. The course line established along the transit and from 0400R would have placed the Cutter southeast of this initial position. At 0140R a revised position was passed. At 0217R, a third position was received from rescue aircraft on scene that placed the vessel on land east of South Bluff on Little Island. At 0300R, a fourth position was obtained, this one from the D/V. This fourth position placed the D/V in shoal water between Little Island and Big Island.

10. Arriving on the bridge around 0400, the CO became involved with managing the operation that would soon take place. The 0400-0800 watch had just relieved prior to the top of the hour with two break-in watchstanders (Conning Officer and QMOW) as members of the watch team. The CO conversed with the OOD about ship specific operations, navigation, distressed vessel location, and personnel. He conversed with OPS about the SAR problem, the Cutter approach and intentions, navigation, and distressed vessel location. The CO decided not to set the navigation detail because of his intentions to remain sufficiently offshore and send a boat and boarding team to the vessel in distress. Also, service wide exams were scheduled for the next morning and he did not wish to awaken anyone unnecessarily. As the ship proceeded, his focus became largely on determining the position of the vessel in distress. Although he intermittently reviewed the chart, it was primarily for purposes of ascertaining the position of the vessel in distress. He reviewed the nav plot and charted track and felt comfortable with proceeding as planned. He was unaware that the plotter, the TAD QM2, was not complying with existing requirements to use standard navigation procedures, including: plotting, and labeling symbology; not using all available means to ascertain position; not taking and recording soundings with each fix; and not computing set and drift information.

11. During the entire approach (0400 until grounding), bridge personnel involved in directing the ship movements were the CO, OOD, Conning Officer (break-in), QMOW and break-in QMOW. A position report was heard over radio at 0420R that plotted in the same position as the 0300R position; however, further transmissions by the Master of the D/V indicated his GPS was not working and that he was located south of Big Island (same location as the 0119R fix). At 0425R a meeting was held at the chart table which included the CO, OPS and the OOD. The location of the D/V was discussed, and the meeting temporarily broke up reconvening at 0434R. At this time the CO established PT "M", a point at which he wanted to commence operations to assist the vessel, and drew a line on the chart that designated a danger range to Big Island. As the CO, OPS, and OOD clustered around the chart table, the conning officer moved to the front of the bridge. He participated in neither of the meetings and was not aware of the navigation picture, the plan, or the significance of point “M”. Based on past expectations, there was also a presumption that the OOD was monitoring the actions of the Conning Officer. There is some indication that the plan was not fully known to all team members. OPS and the OOD were aware of PT “M”, but the QM1 and QM2 did not fully appreciate its significance.

12. The CO believed that the XO had been called and was on the bridge, that assignment of team members to key billets (radar watch) was being accomplished and that the ship's navigation was providing the necessary input (i.e. danger range, fix accuracy) that allowed him to concentrate on the mission. The key assumption was that the XO was present on the bridge to act as a safety observer and a team monitor.

13. Throughout this period the QM2 break-in watchstander was unable to get to the chart table to plot the 0430R fix. Following the meeting OPS laid out a danger bearing to Big Island Light and the danger range. The danger range was drawn on the chart at 3000+ yards but erroneously labeled 1500 yards by the QM1 who had been present only for the latter part of the meeting. The CO moved off with the OOD and directed that the radar be continuously manned to monitor the closest point of approach to land, correlate radar and GPS fix information, and notify him if the Cutter came inside the danger range. Neither he nor the OOD specifically identified or directed anyone to man the radar. From the meeting until just after the turn onto the D/V, the CO became heavily involved in locating the D/V and doesn't recall noticing that the radar was not being manned continuously, but expected that it was. The QM1 should have been manning the radar but was instead moving in and out of the bridge using the night goggles and the SRD-22 RDF in an attempt to locate the D/V. OPS was in CSC talking with the D/V. The OOD was coordinating small boat operations, getting radios, calling personnel, and trying to locate the D/V. The Conning Officer stood in front of the console and was generally detached from the operation. He later stated that he was uncomfortable with the situation, but was hesitant to speak up. The QM2 (on board for only two days and not familiar with the general functioning of the bridge team) was the only person involved in navigating the Cutter. The D/V was identified and located visually (not geographically) at approximately 0447R after it flashed its lights upon request of the Cutter. Throughout this segment of the evolution, the Cutter's position was not fixed and the danger range and bearing were not observed. With the exception of the conning officer, the bridge team was fixated on locating the D/V. With the CO, OPS, and OOD on the bridge, the break-in conning officer assumed the role of middle man simply parroting commands to the helmsman. The QM2 was playing catch up on his fixes and, although a competent QM, he was not in his comfort zone and failed to speak up and advise any other bridge team members that he was behind.

14. Following identification of the D/V, the CO directed the Conning Officer to turn towards the vessel. The Cutter slowed to 13.5 knots to launch the rigid hull inflatable with a boarding team. In the few minutes following the turn, the Commanding Officer recognized the Cutter standing into danger and took action to bring the Cutter back into safe waters. During the latter part of these actions, with a 3 foot swell in approximately 17 feet of water, the Cutter's propellers and rudders touched bottom twice before moving out of danger. Approximate time of grounding was 0458R. There were no personnel injuries involved with this mishap.

DAMAGE TO UNIT

All eight blades (four each propeller) were damaged and were replaced in dry-dock between 21-26 April 1993. Repair costs exceeded $200,000.

CAUSAL FACTORS

1. There was no team coordination in place at the time of the incident. The bridge was ineffectively organized.
2. There was poor communication between watchstanders.
3. This is not a causal factor, but it bears comment regarding the constant need to identify the impacts on team performance when key personnel are not present. This factor is the continued loss of personnel due to incomplete pipeline training on arrival at the unit, thereby requiring the unit to obtain the training and lose key personnel to this effort while underway. Each sailing requires a concerted effort to recognize the loss of these members, and the impact each loss has on the effectiveness of the team. This factor requires corrective action.
4. Lack of COMDAC related digitized charts was not a direct causal factor in this mishap, but its availability and resultant use could have helped prevent the mishap. The 270 MEC is equipped with an excellent command and control system. To make it fully effective for its intended purpose, digitized charts must be made available that cover the 270 MEC operational area. This is an information tool that can provide integrated data to the team to allow them to make a more informed decision. The level of this action is beyond the ability of the 270 fleet and COMDAC Support Facility. This factor requires corrective action.
5. The roll and heave of the Cutter in the seaway increased the draft of the vessel. Even though the Cutter may have been in 18 feet of water

(navigational draft), the increase in draft was sufficient enough to cause grounding.

VESSEL CASE STUDY

WMEC COLLISION WITH PIER

HISTORY

1. On 13 July 1992, a Coast Guard Cutter collided with a city pier extension supporting a harbor breakwater light. The ship was damaged just above the main deck from frame 56 to frame 67 and the light and its platform were sheared from the extension. There were no injuries to personnel.

2. The Cutter anchored at 1132 local, 13 July 1992 in straits outside the harbor just off the city pier. Shore visits were conducted using both small boats until early afternoon. With the RHI still underway, Special Sea Detail was set without mooring stations and the ship got underway at 1456 to conduct shiphandling practice for new conning officers alongside the city pier. See diagram of the ships movements relating to this mishap.

3. Posted tides were incorrect. Daylight savings time was not taken into account. The tide was actually approaching maximum high water at 1517 rather than 1417. The correct current had not been calculated. The crew believed there would be an ebb flowing out of the harbor when in reality there was almost a half knot current to the south and into the harbor. Weather was good with a 12 knot wind from 320 degrees True, almost perpendicular to and onto the pier and towards the entrance to the harbor.

4. A portside landing was accomplished without incident as the ship was brought to all stop alongside the pier with no weigh on (ship position 1). No mooring lines were used. A newly reported deck watch officer (unqualified) relieved the Conn to get the ship underway under instruction of the Commanding Officer. After discussing possible forward and astern maneuvers for departing the pier, the astern maneuver was selected. The ship was first operated full ahead with left full rudder to kick the stern away from the pier and provide an angle on the pier for backing out. With approximately a 15-20 degree angle, the rudder was shifted to right full and backed out at a 1/3 bell.

5. The ship was not backed out into the wind, as the maneuver strategy anticipated; with current believed to be either slack or assisting movement from the pier. As the ship backed and moved away from the pier, an unanticipated set towards the harbor entrance was encountered (ship position 2). In an attempt to avoid being set into the entrance and harbor breakwater north, now directly to port, the Conning Officer, under the direction of both the Commanding Officer and the Operations Officer (who was acting as coach), attempted to "cast" the vessel to starboard keeping right full rudder and shifting three to four times from high power astern to ahead (ship position 3).

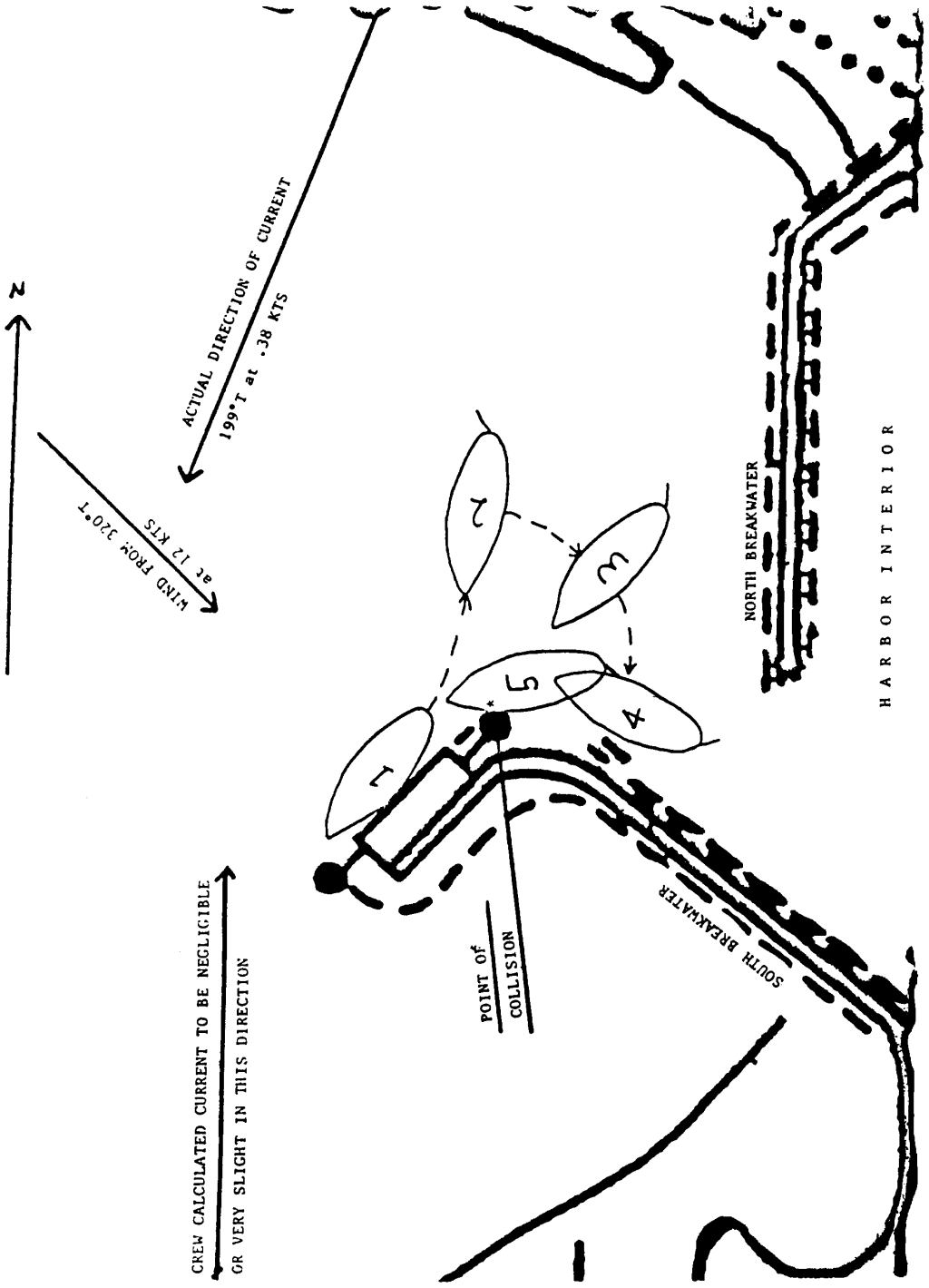
6. While the ship's head did swing to starboard, the stern swung to port and the ship drew parallel and towards the city pier breakwater (south) and continued to be set to port. To prevent the stern from grounding on the south breakwater, the rudder was shifted to left full and engines ahead full to kick the stern out. This was unsuccessful. The RHI was also called alongside to port and attempted to assist pushing the bow to starboard (ship position 4).

7. Although the Commanding Officer believed there was maneuvering room aft and called out for a backing bell, he was not heard from his position aft of the bridge (watching the ship's proximity to the breakwater). The ship gained headway, turned to port and struck the pier extension shearing a two foot section of pipe and a harbor light (LLNR), which was mounted at the end (ship position 5).

8. Following impact, the momentum carried the ship clear and she was subsequently anchored approximately 400 yards west of the harbor. The ship recovered the damaged structure and established a temporary structure within five hours of the incident. The damaged area of the ship was repaired by ship's force within 48 hours and the ship resumed patrol on 17 July 1992.

ADDITIONAL FACTS:

1. Tides calculated and posted in error by one hour because daylight savings time was not considered when making calculations.
2. Currents not calculated but were assumed to be slack on flooding (favorable) due to error in tide calculation.
3. Stack noise interfered with the CO's ability to communicate with Conning Officer and coach immediately prior to mishap from his position aft.
4. No fantail phone talker.
5. The ship had just completed REFTRA and numerous shiphandling opportunities were experienced by most OOD's. An entire afternoon was devoted to approaches and mooring to a pier during REFTRA.
6. The standard navigation brief for entering port was not held in accordance with COMDTINST 3530.2 (series) and the specific outline (checklist).
7. The Commanding Officer, Operations Officer, and the OOD had completed HEART and/or Vessel Resource Management training.


N
ACTUAL DIRECTION OF CURRENT
199°T at .38 KTS
WIND FROM 320°T
at 12 KTS
CREW CALCULATED CURRENT TO BE NEGLIGIBLE
OR VERY SLIGHT IN THIS DIRECTION
POINT OF COLLISION
NORTH BREAKWATER
SOUTH BREAKWATER
HARBOR INTERIOR
1
2
3
4
5

CAUSE: Substandard Practices

1. Mooring lines were not used. Both Knight's Modern Seamanship and excerpts from an old Aids to Navigation Manual, CG222, aboard the ship advise using extreme precaution when a single screw ship is attempting to clear a pier from a portside to position while being set on. It cautions not to get underway without a tug or outlying anchor and recommends waiting for more favorable conditions.
2. The collision with the pier was caused by those in control being unaware of the tidal current conditions and, in conjunction with an unfavorable on-pier wind, the effect on the maneuverability of the ship. This resulted in taking incorrect or inadequate measures to maneuver the ship initially upon getting underway and subsequently when the ship was not reacting as anticipated and found itself in a hazardous situation.
3. Special Sea Detail was not fully set. Without the line handlers, caused by the decision not to use mooring lines, the fantail phone talker and deck supervisor were also eliminated. Hence, distance to hazards to navigation astern could not be readily relayed to Conn causing the CO to leave the bridge and go aft to determine maneuvering room. This effectively removed him from control of the ship and created a situation where the Conning Officer could not hear the CO's backing order.

CAUSE: Substandard Conditions

1. Prevailing wind and current conditions were highly unfavorable for the maneuver selected.
2. Close proximity of hazards to navigation did not make this an ideal pier to use for the new Conning Officer. The CO made a decision to come alongside the pier from the north due to knowledge of shoal water to the south. This set up the alternative of a portside moored single screw ship getting underway with on setting weather, the most unfavorable condition.

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VESSEL CASE STUDY

BAR CROSSING (110' WPB MISHAP)

HISTORY

1. In Jan 1995, a WPB was attempting to cross a northwestern river bar en route dry-dock availability. The assigned Navigation detail was set with the engine room manned. All hands were up and about. Material condition Zebra was set throughout the ship, natural ventilation covers to the engine room were installed (on the soft patch), and weather decks secured with the exception of the open bridge. BM1 had Deck and Conn. He, the CO and the XO were on the flying bridge. A 44' MLB and 47' MLB were standing by.

2. The cutter monitored bar conditions for over two hours from ebb to slack to flood. Bar conditions were series of 10-12 ft breaking surf with 4-8 foot rolling swells during lull between series, and lulls lasting approximately 5 minutes in duration. The speed of waves was timed at 18 kts. The CO, XO and OOD discussed their comfort level and concurred that conditions were favorable to cross. Wind was 040T at 6 knots; air temperature was 52F, visibility was 6 NM.

3. At 1140 local, the WPB moved into a position about 200-300 yards from the entrance buoy to wait for a lull. Once the lull began, the OOD increased speed to ride the back of an estimated 6 foot swell across the bar; the Doppler speed log showed 18 kts. Once across the bar and approximately half way down the length of the south jetty, a swell which appeared to have refracted off shoals near the north jetty struck the WPB on the port quarter, causing the ship to surf to starboard and head towards the south jetty. The OOD initially placed rudders hard to left and reduced ahead turns on both shafts. The OOD stopped the port shaft with no correcting effect. Shafts were then opposed (starboard ahead, port back), also with no effect. Both shafts were then fully backed. The collision alarm was sounded and the WPB bow collided with the south jetty at a near perpendicular angle.

4. At the time of collision, the port engine had been engaged astern full and the starboard engine had yet to answer the backing command; estimated speed

at collision was 2-4 kts. The starboard engine then answered the backing command. The ship backed away from the jetty, twisted to port and continued its transit into the river. General quarters was set. The flooding alarm sounded in fore peak. Initial assessment indicated damage and flooding was limited to the fore peak. A plug was applied to a 1" hole near frame 6 port side and the ship continued its transit to yard.

5. A subsequent diver investigation revealed a 10" split weld on the stem. The estimated repair cost was $10,000. No operational days were lost due to the coinciding yard availability. An MK2 sustained a laceration on his leg during the damage control efforts that required 3 sutures to close.

ADDITIONAL FACTS

1. Crossing this river bar carries an inherent risk of transiting 50-60 yards off the south jetty. Prior preparation for the evolution included overflights, boat transits across the bar and observation of the bar from a shoreside overlook, as well as consulting various individuals with knowledge/experience crossing this particular bar. Weather was monitored for over a week.

2. The cutter got underway on the previous day to attempt a bar crossing that was subsequently canceled due to bar conditions. The ship remained underway overnight to observe condition at the morning slack from ebb to flood.

3. The conditions observed the next morning were good for the time of year and considered adequate for a safe transit.

4. The OOD who took the ship across the bar was the most experienced OOD on board and had prior coxswain experience crossing rough bars in the district.

VESSEL CASE STUDY

BUOY-OH-BOY (110' WPB MISHAP)

HISTORY

1. At 0820 on 7 SEP 94, CGC CONTACT changed operational status from B-12 to B-2. At 0930, District directed CONTACT to get U/W to search for the F/V Italian Gold on Georges Bank. At 0945, CONTACT initiated crew recall but was unable to get U/W due to an alignment error with the ship's radar that Group ET's were troubleshooting. At 1015, the EOW recorded drafts after taking on potable water as 6'5" fwd and 7'0" aft. At 1310, CONTACT granted liberty to the crew while the radar troubleshooting continued. At 1500, CONTACT experienced #1 MDE fuel system problems while completing compression tests. At 1810, #1 MDE tested satisfactory. The crew was again recalled. At 2010, CONTACT set the special sea detail. During light-offs the #1 SSDG tripped off line. At 2020, the CO (LT) discussed CONTACT's readiness for sailing with the Group Operations Officer, then with the Group Commander. At 2045, with encouragement of the Group Commander, the CO agreed to get underway.

2. Individual crewmembers were physically located in the following general locations:
   Bridge: CO, XPO, QM1, QM3, MKC
   Forecastle: BM1, GN2, SN (1) and SN (2)
   Fantail: EM1, BM3, FN, SN (3)
   Engineroom: MK2, MK3
   Galley: SS2

3. Special sea detail during the evening of 7 SEP 94 was:

Name	WQSB	Duty At Time of Collision
Lt	Command	CONN/DECK (bridge)
QMCS	OOD/CONN	Safety Observer
QM1	Helm/Colors	Shipping Radar
QM3	Bridge	Navigation plot
GM2	Line #2	Securing from SSD
SA	Line #1	Lookout
BM1	In Charge fwd	Securing from SSD
BM3	In Charge aft	Securing from SSD
SN	Line #3	Lookout
MKC	EOW	EOW

4. At 2055, CONTACT got underway from Group Woods Hole standing out of Little Harbor, MA. The CO was on the flying bridge with the XPO and the QM3 who was operating the search light just forward of the flying bridge. The QM1 was monitoring shipping on the bridge radar. The CO was steering the ship manually due to recent problems experienced with the autopilot on 6 SEP.

5. At 2058, the QM1 contacted an inbound Martha's Vineyard ferry and arranged for a two whistle (starboard to starboard) passing. At 2100, when CONTACT was in the vicinity of green buoy #1, the CO shifted his watch to the pilothouse. The XPO shifted control from the flying bridge to the pilothouse. The CO came left to steady on base course of 123T. At 2101, the search light operated by the QM3 was secured. At 2103, CONTACT was transiting eastbound in Vineyard Sound, approaching Nantucket Sound at 12 knots (both engines clutched ahead). CONTACT was at Special Sea Detail, the Navigation Detail had not been set. The QM1 obtained radar ranges using four points of land. The QM3 plotted the radar fix using the first three radar ranges taken by QM1 which placed CONTACT on track approaching Nobska Point lighted bell buoy #26 in Nantucket Sound. The QM1 visually sighted buoy #26 off the port bow at 340R. The CO asked for his next course and the XPO replied 107T. At 2104, the XPO warned the CO that he needed to come right to avoid buoy #26.

6. The CO altered course to starboard ten degrees to open the CPA to the buoy. The CO used hard right rudder to swing the bow away from the buoy, then hard left rudder to kick CONTACT's stern away from the buoy. At 2105, CONTACT struck the Nobska Point lighted-bell buoy #26, just forward of amidships (frame 23) on the port side.

7. The MK2 in the engineroom saw and heard a stream of water forward of the outboard part of #2 MDE and initiated damage control response with the MK3. CONTACT came to all stop. At 2106, the QM3 piped General Quarters and sounded the alarm in response to a report of flooding in the engineroom. At 2107, CONTACT notified Group Woods Hole of the collision. The QM1 piped General Emergency (GE) the second time and sounded the alarm. At 2108, the QM3 departed the bridge to assume his GE billet. The QM1 contacted Group Woods Hole and requested assistance. The XPO operated the bridge sound powered phones, acting as DCC in communication on the bridge with the engineroom. The CO shifted his watch back to the flying bridge and headed CONTACT back to port towards Group Woods Hole.

8. The BM1 directed one of the seamen to check spaces aft from the messdeck to the engineroom. The BM1 checked aft berthing. The BM3 checked aft steering and the engineroom. At 2110, the QM1 plotted a fix by GPS and recommended a course of 310T to the CO to get the ship pointed towards buoy #1. The GM2 reported material condition Zebra was set aft to the bridge (DCC). CONTACT began damage control efforts.

9. The following billets were assigned/manned during general emergency:

Name	WQSB	Duty At Time of Collision
LT	Command	CONN/DECK (bridge)
QMCS	OOD/CONN	DC Plot/SPP
QM1	DC plot/SPP	Fix/Nav Asst
GM3	SPP/Msgr	Msgr/Asst DC efforts
BM3	OSL	OSL/set z aft
GM2	Inv/Z aft	Z aft/Asst pumps
SA	Inv/Eductor	Eductor/Asst shoring/pumps
BM1	shoring	Asst OSL/DC equip
SN	plug/patch	Inv aft/DC equip
SN	pumps	provided pumps/DC equip
SS2	P-250	set up P-250
MKC	I/C, DC Book	I/C, DC Book
EM1	electrician	B aft/electrician
MK3	op P-250	EOW, SPP w/bridge, P-250
MK2	EOW	plugged hole
FN	Inv/Z fwd	plug/patch kit to E/R

10. The EPO who was down in the engineroom with the MK2, stuck his foot in the hole to slow the flooding. At 2111, the EPO and MK2 stuffed a lifejacket that slowed the flooding rate to half. Station Woods Hole UTB 41320 was underway from Group Woods Hole to assist.

11. At 2112, the EM1 secured power in vicinity of the rising water level. That cut power to the grey water pumps, #2 MDE pre-lube pump, #2 exhaust controller and the rest of the pumps below the deck plates. The MK3 reported concerns of water level rising and the need for emergency lighting to the bridge via sound powered phones.

12. At 2115, UTB 41320 was on scene. The QM1 requested UTB 41320 to lead CONTACT back to the Group Woods Hole pier. CGC BITTERSWEET was notified by Station Woods hole that CONTACT was taking on water and needed assistance. BITTERSWEET set their Rescue and Assistance (R&A) detail and proceeded to assist CONTACT in mooring. The FN assisted the MK2 with plugging and shoring under supervision of the EPO. The EM1 informed the EPO that when the water reached the SSDGs or KVA transformer, he would secure power to the ship. At 2118, CONTACT's P-1 pump was energized in the engineroom and began dewatering. At 2119, after the crew was unable to start the P-250, the EM1 directed personnel on the main deck to attach an eductor to the fire main. At 2120, the QM1 started using the bridge DC checkoff list. At 2121, CONTACT's #1 fire pump was energized and the crew started pumping out the engine room using an eductor. The bilge pumps remained secured due to water in the engineroom was starting to cover the pumps. At 2124, tug CIGANA offered to assist with diver services.

13. At 2126, CONTACT moored starboard side at Group Woods Hole. The water level in the engineroom was almost to the base of the engine blocks (4 ft). The bridge secured the MDEs but DCC or the OSL did not alert the engineroom that the ship was moored. BITTERSWEET and Station Woods Hole personnel met the ship upon arrival to handle lines and provide DC assistance. Tug CIGANA came alongside CONTACT. At 2130, the UTB 41320 moored at Station Woods Hole. CONTACT released liferafts 1 & 3 in an attempt to bring the hole above the waterline.

14. At 2132, a P-1 pump discharge hose, which had been tied off to a stanchion on the starboard side, broke free and fell down a hatch into the engineroom and tripped the breakers, securing the 440V main switchboard. Three personnel standing in the engineroom partially filled with water received an electrical shock when water from the P-1 discharge hose shorted out the breaker on the #1 SSDG. At 2132, both SSDGs were secured by remote emergency stops (starboard stop by the MK3 and port stop by a Station Woods Hole MK2) located on the main deck.

15. At 2143, Falmouth Fire department was on scene and started dewatering efforts using suction from a fire truck. At 2145, Station Woods Hole UTB 41320 moored alongside CONTACT. At 2145, BITTERSWEET R & A team energized their P-250 Mod-l pump and began pumping out CONTACT's engineroom using three suction hoses. BITTERSWEET's R & A team was unable to get suction from their first P-250 pump. A second P-250 pump was

brought on-line along with one of three P-5 pumps. A commercial diver placed rubber matting on the exterior of the hull to slow the flooding.

16. At 2147, BITTERSWEET initiated a ship recall to assist CONTACT. By 2200, CONTACT had settled evenly by 1.5 feet. Two BITTERSWEET P-5 pumps were on CONTACT along with 2 eductors. The BITTERSWEET's CO boarded CONTACT to assist Group Woods Hole engineers and CONTACT's CO in damage control and stability planning. BITTERSWEET's XO coordinated efforts and DC gear distribution from the pier. Flooding determined to be at 75 gpm.

17. At 2208, a Falmouth Fire Department large capacity pump truck (rated for 1250 gpm) arrived and started dewatering using one of the eductors. At 2212, Group Woods Hole Operations Center contracted for an underwater welder. The P-5 pumps were secured because of a fear of carbon monoxide buildup in the engineroom. At 2213, the CIGANA diver completed securing a box patch to the outside of the hull with wedges. CONTACT EOW made fuel soundings. All tanks were found to be intact. At 2230, CONTACT contacted Group Woods Hole and requested an HS to examine personnel who received an electrical shock. At 2231, the progressive flooding was stopped. At 2239, the flooding rate was determined to be 10-15 gpm.

18. At 2240, Group Woods Hole Operations Center recalled ANT Woods Hole to conduct a check of aids to navigation. At 2248, the flooding rate was determined to be 5 gpm. At 2309, Group Woods Hole Operations Center notified MSO Providence of situation, and requested a boom to secure the area around CONTACT. At 2315, the Dl command center and CO NESU Boston were briefed on the situation. At 2320, the flooding watch was initiated in engineroom.

19. The Group Engineers along with BITTERSWEET's CO and EO reviewed the CONTACT's stability book with CONTACT's CO. Group Woods Hole Operations Center recalled the HSC to treat the three personnel who received electrical shock. At 2330, Group Woods Hole Operations Center requested Station Woods Hole provided a government vehicle and driver to escort the three WPB personal to a local hospital for an EKG.

20. At 2334, Group engineers placed 12,000 lbs of buoy sinkers on CONTACT's starboard side (4,000 on the bow and 8,000 on the stern) to increase its starboard list. After placing the sinkers aboard, the hole was located one foot below the waterline. At 2356, the Falmouth Fire Department and BITTERSWEET's R & A team were released. At 0012 on 8 September the Mobile One response trailer and containment boom arrived on scene. At 0019, Station Woods Hole 210524 was underway to deploy boom to contain any residuals. At 0033, the tug Jaguar arrived on scene. At 0040, MSO Providence personal arrived on scene to deploy containment boom.

21. At 0048, UTB 41320 departed relieved by Station Woods Hole MLB 44339. At 0132, a diver, who specialized in underwater welding, commenced caulking around the box patch to slow leaks. At 0225, the three electric shock victims were taken by the HSC to Falmouth Hospital for an EKG. At 0305, the diver completed caulking on the box patch. At 0308, the box patch was restored, slowing the rate to less than 5 gpm. MLB 44339 continued dewatering as needed to keep bilges dry. At 0332, all non CONTACT personnel departed CONTACT. The three electric shock victims returned to the CONTACT fit for full duty. At 0343, the flow rate was down to a trickle and MLB 44339 secured dewatering.

CONTRIBUTING FACTORS

1. The Commanding Officer and crew were fatigued and reluctant to sail. Fatigue could have affected their ability to see clearly, slowed their mental processes, and distorted perceptions.

2. The conn did not promote two way communications with the bridge team, he did not verbalize his maneuvering intentions.

3. The conn did not compensate for actual meteorological conditions by adjusting course to account for set and drift (crab angle). No set and drift was computed.

4. The trackline passed too close to the LBB #26, creating an unnecessary risk of collision.

5. The navigational detail was not set. The radar operator did not track the LBB #26, either by manual means or by using ARPA, to determine CPA and risk of collision.

6. The XPO was not familiar with the harbor and the cutter. This lack of knowledge limited his abilities as a safety observer.

7. CONTACT should have conducted pierside training including the manning of vital stations and walk-through drills (a FAST cruise) prior to sailing from Boston. No navigation exercises had recently been conducted.

VESSEL CASE STUDY

110' WPB HURRICANE EVASION

HISTORY

1. FIRE ISLAND was underway in the Gulf of Mexico, 100nm west of Sanibel Island, on 4 October 1995, attempting to evade Hurricane OPAL. She was transiting to Key West, FL as recommended by the Navy Meteorological and Oceanography Center and approved by Group and District. FIRE ISLAND's departure from homeport had been delayed by 2-3 hours while waiting to gain clearance from the Group to execute the emergency sortie. FIRE ISLAND was further delayed another 2-3 hours in transit when FIRE ISLAND was diverted by District into Tampa Bay. FIRE ISLAND was released from that tasking when the hurricane's track veered northeast and temporarily threatened Florida's west coast.

2. Prior to FIRE ISLAND departing homeport, the projected landfall of Hurricane OPAL was forecasted to be between Mobile, AL and Steinhatchee, FL. Upon departure from Panama City seas were 3-4 ft and continued to build to 8-10 ft. FIRE ISLAND started its transit to Key West travelling at 23kts. After considerable pounding from heading directly into the seas, FIRE ISLAND slowed to l8kts. SAR procedures state that 110' WPBs should operate at speeds between 5-10 kts in 8-10 ft sea state when being considered for emergent SAR operations. The distance involved in transiting to Key West, the projected path of the hurricane and the information that said that the hurricane was accelerating and strengthening rapidly made the crew feel compelled to maintain a high speed transit. They felt that they could safely cross in front of the hurricane and avoid building winds and seas. This judgment was reinforced by Navy information that indicated that seas would begin to subside while continuing along the "Optimum Track Ship Routing (OTSR)" track. The constant pounding greatly weakened the aluminum structure and internal components of the WPB.

3. FIRE ISLAND experienced considerable sea spray due to heading directly into the sea. Zero visibility was experienced in strong rain squalls while en route Tampa Bay. Port windshield wipers broke shortly after departure from port further limiting visibility.

4. As soon as she was out of VHF range, FIRE ISLAND stopped receiving coastal weather reports. Shortly after getting underway, the #1 HF coupler failed. They took down HFDL lot maintain HF voice communications on the bridge. Weather updates they received via HF voice were identical to National Weather Service reports they had received hours earlier. They did not receive any weather messages or hurricane advisories via INMARSAT C during the entire transit. Since she was not receiving real-time information on the location and progress of the hurricane, FIRE ISLAND felt an even greater urgency to expediently move along the her track to gain safe waters.

5. At 0242R, FIRE ISLAND's air-conditioning (a/c) cooling discharge hose ruptured causing the battery space to flood. Because the battery space was flooded, both battery banks sustained damage and caused grounds in FIRE ISLAND's 24v system. It is unknown whether the pounding worked the hose free or if some other system problem caused back pressure in the system causing the hose to rupture. PMS was current on system but a relief valve was found corroded shut upon later inspection. Flooding of the battery space had been experience by several 110' WPBs in the fleet. This was the second time this year FIRE ISLAND had her a/c cooling discharge hose rupture and flood the battery space. FIRE ISLAND was moored in homeport the first time it occurred. Fire island was advised by her NESU that a SHIPALT was proposed to eliminate a design flaw in the system but it was not yet approved. As a result of this mishap, an emergency SHIPALT was ordered for all 110' WPBs.

6. Shortly after becoming aware of the damage in the battery space, the bridge experienced steering difficulties. The repair party found that the shelving in after steering had broken free and severed a hydraulic line to the steering system. Prior to rigging emergency steering, FIRE ISLAND was unable to steer effectively down swell with engines alone. 14 AFFF canisters fell to the deck, broke open and spilt into the bilge. The structural failure of shelving in after steering also had been a common problem in the 110' fleet. The EPO had added additional structural support members to the shelving. FIRE ISLAND's training program required steering and changing courses with emergency steering rigged. This training minimized the confusion in initially manning after steering and aided the subsequent effectiveness of maintaining course in a rough sea. Emergency steering was rigged and operated in excess of 22 hours.

7. Other damage occurred either due to salt water intrusion or from pounding in seaway. She experienced significant water intrusion to the flying bridge control station and thru the gayload hood water washdown vent just aft of the flying bridge. This caused additional grounds in the 24v/440v systems. By the she moored, all three throttle control stations were operating unreliably due to the number of grounds in the system. Problems with the electronic control systems on the "C" class 110's are commonplace.

8. The flooding alarm system aboard was very sensitive. In any appreciable seaway various flooding sensors throughout the cutter activated despite no emergency being present. Continual alarms were being given for spaces that had no damage present. After they experienced numerous grounds throughout the cutter, all alarm systems became ineffective. After the initial damage was under control, FIRE ISLAND broke a potable water line in the forward auxiliary space. 1.5 feet of water was found in the space. Since the alarm was disabled, they didn't discover this additional damage until an investigator happened upon it.

9. FIRE ISLAND had turned down swell to provide a smoother ride for Damage Control efforts and to expedite a rendezvous with COURAGEOUS. COURAGEOUS was about 110 nm north of FIRE ISLAND. The crew feared that FIRE ISLAND could go dead ship at any time due to the battery/battery charger damage. This led FIRE ISLAND ultimately into rougher sea/wind conditions. At the time of the casualty, winds were southerly 25-30kts; seas were southerly at 8-10ft with an occasional swell to 12ft. Sea and air temperature was 77F. Without air conditioning condensation on bridge windows developed to the point that it was nearly impossible to see out them. They couldn't open windows/doors for ventilation due to the rain and spray. Winds later increased to more than 35 kts with gusts to 60kts in squalls. FIRE ISLAND's anemometer stopped showing wind speed earlier in the transit. Seas built to 18-20ft with occasional swells nearing 25ft.

10. FIRE ISLAND's 406 EPIRB was out of commission prior to the incident. She used her INMARSAT C automated distress communications. The District was notified within 15 minutes of activation.

11. While dewatering, a miscommunication between the OOD and the onscene leader resulted in the P250 suction hose bring sucked into the starboard propeller. The OOD was engrossed with trying to get #1 MDE back on line and get the cutter out of the trough. At the same time the onscene leader was initiating his attempt to dewater the battery space. They were very fortunate not to disable the stbd shaft in this incident; it satisfactorily functioned until she moored.

12. The remainder of damage control efforts were correctly and calmly executed.

13. FIRE ISLAND was ultimately towed into Tampa Bay by an '82 WPB. She was unable to steer through the ship channel due to quartering seas. FIRE ISLAND transited Bayboro Harbor Channel on own power and moored at Station St Pertersburg.

DAMAGE AND INJURIES:

1. FIRE ISLAND was out of service for 17 days; repairs cost about $150,000.

2. The EPO fell and struck his head on the ship's bell on the bridge when the ship lurched from a swell and the EPO was engaged in making reports to the CO on the status of damage control. He sustained a mild concussion, with no lost work. He also had his wrist punctured during DC efforts. It required first aid attention.

3. The crew was very fatigued from sea sickness and dehydration. When the air-conditioning failed, the interior of ship rose above 95F.

4. All damage control personnel who entered either aftersteering or the battery space developed a rash or blisters on their hands, arms, and/or face. Battery acid was present in the battery space, and AFFF and automatic transmission fluid were in aftersteering where people were working.

VESSEL CASE STUDY

WPB HURRICANE DAMAGE

HISTORY

1. **-7.5DAYS**: At 081300 September 95 CGC MATTERHORN returned to homeport after hurricane evasion and related SAR and resumed a scheduled CHARLIE maintenance status. The cutter was underway for approximately four days with a brief stop in a foreign port for fuel. There were no mechanical problems with the vessel during this period but it did experience degraded HF communications (limited range) and inoperative feet indication on the fathometer. The surface radar experienced the loss of range rings, the variable Range Marker (VRM) and a poor quality picture. GROUP's Electronics division was briefed upon the cutter's return to homeport and a technical assist visit was scheduled for 12 September. No CASREP message traffic was initiated and notifications to GROUP command staff were not made.

2. **-3DAYS**: On 12 September GROUP Electronic Technicians (ET) arrived as scheduled. Fathometer and HF communication degradations were repaired. Troubleshooting on the radar continued.

3. **-42HR 20MIN**: At 140640 GROUP directed MATTERHORN to assume Hurricane Condition Three.

4. At 140800 MATTERHORN initiated an oil change that included both main diesel engines, reduction gear and ship service generators.

5. **-40HR 02MIN**: At 140858 MATTERHORN reported to GROUP that Hurricane Condition Three was set, meaning the cutter had assumed a BRAVO-2 status. The oil change was still in progress.

6. At 141400 the HURRIWARNLANT (141800Z) Storm forecast position for 160200 local was 18.7N 65.8w, 20 NM east of San Juan, PR with maximum sustained winds at 80 knots and gusts to 95 knots. The storm track continued to be revised to the east.

7. At 141500 GROUP ETs depart MATTERHORN. A three-hour operational test of the radar was completed and determined to be fully functional.

8. **-33HR 45MIN**: At 141515 GROUP (ole) ordered the Commanding Officer of CGC MATTERHORN (via phonecon) to get underway as soon as possible in accordance with a recently promulgated hurricane evasion tasking message and proceed directly to Base San Juan, PR for fuel and further storm avoidance tasking. GROUP had not been briefed concerning the ongoing oil change. The MATTERHORN CO expressed his desire to remain at homeport. GROUP again directs him to get underway.

9. **-33HR 10MIN**: At 141550, the MATTERHORN CO advised GROUP OPCEN that his estimated time of departure from homeport would be 142000. The reason given for the delay in departing was the need for crewmembers to gather personal effects. The GROUP OPCEN watchstander understood 2000 to be MATTERHORN's ETA Base San Juan and arranged for refueling at that time. No mention of the ongoing oil change was made during this phone conversation.

10. At 142000 MATTERHORN was at Special Sea Detail. The oil change was completed at 1700 and sunset was observed at 1825. The radar display suddenly vanished and a burning smell was noted in the athwartships passageway. The MK1 indicated that the smell could be the result of the recently completed oil change. There were no obvious indications on the radar control unit of electrical damage although the CO believed it was a burning smell associated with a CHARLIE class fire. The radar unit was not opened for inspection.

11. **-28HR 30MIN**: At 142030, the first in a series of phone calls between MATTERHORN and duty officers at GROUP are initiated with the report of the radar casualty. The CO expressed desire to remain in homeport overnight due to safety related concerns of making a nighttime transit to Base San Juan without an operational radar. The GROUP Command Duty Officer (CDO) coordinated a plan to have a 110' WPB, underway in the vicinity, escort MATTERHORN to Base San Juan. The GROUP Commander was briefed by the CDO and concurred with the plan. He directed the CDO to brief MATTERHORN that it was with "his strong recommendation that the cutter depart under escort but that the ultimate decision remained with MATTERHORN." MATTERHORN declined to get underway, citing the concern that the escort vessel could be diverted for SAR during escort. The GROUP Commander was briefed on MATTERHORN's decision.

12. At that point the GROUP Commander considered relieving the MATTERHORN CO with either the current CO of the nearby 110' WPB or one of his OPCEN duty officers that had previous 82' WPB experience. The 110' WPB CO relief was ruled out and the OPCEN controller option was also dismissed, as there was not sufficient time to safely transport him from San Juan to MATTERHORN. A direct order was not given to MATTERHORN to proceed to Base San Juan under escort.

13. MATTERHORN then expressed the desire to moor at a cruise ship mooring buoy located in the local harbor and remain there as the storm passed. The decision was made by GROUP that MATTERHORN would get underway at 150600 and proceed directly to Base San Juan.

14. **-19HR 00MIN**: At 150600 the MATTERHORN CO arrived aboard and at 0615 contacted the GROUP CDO. He again expressed his desire and ability to safely remain in homeport based on his evaluation of storm forecast data. The CDO reviewed the hurricane pattern and, based on his best case estimate of a 0800 departure time for MATTERHORN, advised the GROUP Commander that MATTERHORN could be overrun by the storm due to its 2-hour delayed departure and no vessels would be in a position to assist MATTERHORN if she suffered a mechanical casualty. The duty officer saw the only option remaining was for MATTERHORN to ride the storm out on a cruise ship mooring buoy as recommended by MATTERHORN. The GROUP Commander concurred and MATTERHORN was directed to remain in homeport.

15. At 150910 MATTERHORN was secured to a Coast Guard mooring buoy in an anchorage about 300 yards from the town seawall. The radar was fully operational when the cutter departed the pier at 0845.

16. The EPO was not onboard. The Commanding officer had previously approved his scheduled 151320 departure on TAD orders. The flight was cancelled on the morning of the 15th but the EPO did not make any attempt to return to the ship or notify them that he was remaining at home.

17. **-14HR 00MIN**: At 151100 the GROUP's Commander, OPS Officer, Law Enforcement Officer and CDO were in conference discussing hurricane status. The OPCEN CDO contacted MATTERHORN via cellular phone for a status update and determined that MATTERHORN was not at the cruise ship mooring buoy. Close proximity of shoals at the cruise ship buoy made MATTERHORN select the Coast Guard mooring buoy.

18. The GROUP ATON Officer was directed to gather all available data on the mooring buoy. A letter from a WLB dated 27 July 95 is presented to GROUP Commander which contains an opinion that neither the sinker nor chain is designed to hold a ship the size of an 82' WPB in anything other than light weather conditions. The WLB was contacted but did not provide any amplifying data other than a fax of the most recent aid positioning data sheet and maintenance results.

19. The GROUP considered the option of taking the entire crew off the vessel and briefed the MATTERHORN. With input from MATTERHORN, GROUP's final decision was to have the crew remain aboard.

20. Specific tasking as to securing the cutter to the anchor chain vice buoy and placement of an additional anchor to be used as a tension indicator was passed to MATTERHORN and complied with. A 5" three strand line with 40 feet at the forward bit was secured to the mooring chain using the unit rescue swimmer deployed from the RHI. The anchor was set 20° to port with 100 feet of line at the bit. Strain was equal on both lines and the cutter's heading was 090°magnetic. A second, standby anchor was rigged on the focsle. The small towing hawser was used for this anchor and was rigged forward from the main hold and pushed under the ammunition boxes but not lashed down.

21. **-04HR 30MIN**: At 152030, both main diesel engines were placed on-line. The crew was mustered to reset chaffing gear. Estimated winds were 080/75 knots. (anemometer inoperative prior to getting underway)

22. At 152300 generators are placed in parallel. MATTERHORN sighted numerous vessels breaking mooring/dragging anchor, some in close proximity to the ship.

23. At 160041 the CO sounds the collision alarm as a sailing vessel was approaching close aboard to port. The XPO successfully avoided the collision by utilizing both throttles and rudders. Based on a VHF conversation with the M/V LADY SALVOR, also anchored in the harbor, wind velocity was estimated at 100+ knots and shifting to the south.

24. **ZERO HR**. At 160100 MATTERHORN heard a marked difference in wind noise. It was observed by the CO and XPO that the Coast Guard Pier, being utilized as a danger range reference point and marked with the VRM, was moving within the danger circle. All hands are piped topside to cut lines. The BM2 and SA are directed to discontinue putting on safety harnesses and

tending lines and proceed immediately to the focsle to cut the anchor line and line attached to the mooring buoy.

25. The vessel continues to be pushed to the northwest as the bridge is reluctant to come ahead until they can confirm that both lines have been cut. The XPO attempts to keep the bow into the winds and seas.

26. During station keeping and prior to lines being cut the XPO loses the starboard engine. Just prior to receiving the report of the engine casualty the MKl, stationed on the fantail, observed a capsized, submerged 15' by 7' blue hulled P/C go under the starboard quarter. He laid to the engine room and was able to restart the starboard engine immediately, noting a grinding noise and the thud of something hitting the hull on the starboard side under the cutter.

27. Thirty seconds later the XPO reported the loss of the port engine to the MK1 who returns to the engine room. Post event examination confirmed one of the cutter's lines was fouled in the port prop. A backup anchor line rigged but not secured on the focsle most likely fell over port side when MATTERHORN started taking heavier roles after becoming detached from the mooring buoy.

28. During this time the BM2 and SA made their way to the focsle. The line to the mooring buoy has already parted and the BM2 cuts the anchor line free. MATTERHORN immediately falls beam to the wind and four-foot seas. The XPO attempted to move the cutter's bow through the wind by utilizing the starboard shaft. His interpretation of the radar picture is that the Cutter was 150 yards west of the west end of the Coast Guard Pier.

29. Just seconds after the anchor line is cut and the port engine is put back on line by the MKl, MATTERHORN impacts the southwest end of the Coast Guard Pier and takes an estimated 45°-50°role to port. personnel are located on the bridge, on the focsle, in the engine room, in the athwartships passageway or clinging to the port side lifelines or handrail on the superstructure. The forward third of the Cutter impacted the pier prior to being pushed back to a more upright position on the north side of the pier face.

30. Storm surge continued to drive MATTERHORN until it came to its final resting place on top of the harbor's waterfront pier. Both engines and generators were still on line after MATTERHORN came to this final position.

CAUSE

The cause of this mishap was a failure to get under-way on one of several recommended opportunities, displaying a chain of poor judgments which also included the selection of a mooring buoy system which was incapable of handling a vessel the size of the MATTERHORN in anything other than light winds.

CONTRIBUTING FACTORS

1. The loss of the port engine while attempting to maneuver to keep the bow into the wind and seas. The standby anchor line, which was faked down on the forecastle but not lashed down, washed over the side and became entangled in the port screw.

2. The failure to use the main diesel engines to ease the strain on the line to the mooring buoy chain and to keep station once it had become apparent that the ship was dragging the buoy toward the shoreline.

LESSONS LEARNED

1. Notify OPCON of any mission critical casualties, especially during a hurricane condition status, so that they have all information available to make operational decisions.

2. When mission critical casualties are suspected or first reported, validate plant status. In this case, a radar casualty was assumed without additional testing, which influenced a series of decisions not to get underway.

3. Hurricane weather forecasting is not an exact science. Positional accuracy is at best +/- 150NM and 36 hours. Units must have an understanding of what forecast services provide and be aware of regional effects that can modify the actual weather. In this case, the forecast was accurate but did not account for storm intensification as it approached St. Thomas. The topography of the island further intensified the wind effect within the harbor.

4. Early warning and prompt action is paramount in storm evasion. Few harbors are safe for cutters during hurricanes; they limit contingencies. The prudent mariner puts to sea. If a cutter's only option is to moor, the capability of the mooring buoy system must be known.

5. Command leadership must consider the experience level of subordinate commands. Critical actions may warrant direct orders vice recommendations from higher authority.

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VESSEL CASE STUDY

YOU WILL BE TOWED (WPB MISHAP)

SYNOPSIS

CGC PEDESTAL had a minor collision with a 42' S/V while attempting to take the vessel in tow during heavy weather. PEDESTAL arrived O/S late in the afternoon and was unable to take the S/V in tow. The S/V remained adrift overnight with PEDESTAL maintaining station 75 yards astern. A successful delivery of a drogue was completed the following morning. During the subsequent approach to deliver the tow, PEDESTAL and the S/V collided.

HISTORY

1. On 15 Jul 95, at 0957,the S/V hailed the Group and reported herself disabled & adrift ("lost rudder, on sea anchor") 60NM's southwest of Crescent City in 50kt winds & 15-20ft seas. The S/V also stated she had rigged an emergency tiller but wanted to advise the Coast Guard of her position/situation and obtain 24-36 hr weather forecast.

2. At 1006, Group placed PEDESTAL on standby and relayed above information. At 1027, Group advised the S/V that the forecast called for continued Gale Warnings in the area, and put the S/V on a 1 hour communication schedule. At 1050, Group directed PEDESTAL to get underway, in case assistance became necessary. At 1105, Group notified the S/V that worsening weather was forecasted, and advised that if a tow would be required, they should take advantage of daylight. The S/V reported that she was riding well on sea-anchor & 100 feet anchor chain. At 1120, she requested CG assistance.

3. At 1538, PEDESTAL was on scene. On scene weather was 10ft swells, S-10 foot seas, 35-40 knot winds. The S/V's sea-anchor and anchor chain were tangled/fouled, chaffing, and could not be hauled in. She also was unable to secure a towline to the bow with the anchor chain deployed. At 1716, the CO took the conn to attempt to deliver the drogue. The sea swell were over 20 feet, and winds were over 35 knots. The CO determined the risk of collision too great and ordered the approach aborted. Because the S/V was riding well

and improved weather was forecasted, the CO decided to wait until morning to attempt another approach. At 1720, the S/V remained adrift, bow to weather, without chafing gear on the sea-anchor. PEDESTAL maintained station 75yds astern the S/V throughout the night in case the sea-anchor parted, and waited for the weather to moderate.

4. On 16 Jul 95 at 0825 the winds were 20kts. A successful approach and delivery of the drogue was made via a heaving line. The S/V released its sea anchor, deployed the drogue, and surprised PEDESTAL by hoisting her jib in an effort to improve her ride. The S/V rode well downwind. PEDESTAL advised the S/V that she could not be taken in tow with the jib up. The S/V lowered her jib.

5. At 0933, the winds were 25-30kts. An approach to pass the tow was begun with the S/V adrift, riding poorly in the trough, occasionally making way under bare poles and surfing down the face of waves. The approach seemed adequate. The CO again had the conn and provided advisories to his team when he perceived the S/V closing rapidly. He utilized information from his team to adjust the approach. When the S/V was abeam PEDESTAL's port side and at a distance 30-40ft to throw a heaving line, the S/V was lifted by a wave and lunged forward. The CO attempted to abort the approach and even tried to swing the stern away. He engaged both engines at greater than clutch speed and applied left full rudder. The S/V bow sprit collided with PEDESTAL's port taff rail.

6. The S/V declined further attempts of assistance, got under sail, and arrived safely at her next port of call. PEDESTAL was released from the case and returned to port.

CONTRIBUTING FACTORS

1. The Group duty officer misinterpreted the S/V's initial report of having rigged an emergency tiller as a jury rigged device; vice the very capable, if less comfortable, steering mechanism it is.

2. PEDESTAL did not confirm the status of the S/V's ability to affect repairs and make way on her own. Had better communication been maintained along with asking for an assessment of the S/V status, the tow may have been declined.

3. PEDESTAL rode poorly overnight while maintaining station on the S/V. No one aboard was well rested. The fatigue slows mental processes.

VESSEL CASE STUDY

KEEP RIGHT (WPB MISHAP)

HISTORY

1. At 1210Q on Wednesday 15 June 1994, CGC WHER-AR-WEE departed Support Center Boston bound for sea to conduct a First District Georges Banks patrol. Mooring stations were secured at 1220Q at which time the Special Sea Detail was set. Weather conditions at sailing time: Winds-Calm, Visibility-8 NM. Chart 13272 was being used by the Conn and Nav plot and was corrected to date. Tracklines were labeled (the 129T course should have been marked 130T and the 130T course should have been marked 132T), turn bearings/ranges were not labeled, objects for fixing positions were not designated on the chart, advance and transfer were not used in turns, and danger bearings/ranges were not used.

2. A Navigation brief was not conducted prior to sailing.

3. Tides were correctly computed and posted on the bridge. Currents were computed and posted, but the designation of an Ebb current for l337Q was incorrect and should have indicated a Flood. The tide state at the time of the grounding was +3 feet above MLLW. The current at the time of the grounding was flooding at 0.5 knots in the direction of 303T.

4. Subsequent to sailing, gyro error was determined to be 0 by triangulation and radar error was determined to be 25 yards by triangulation. Group Boston's ET's conducted PMS and tuned WHER-AR-WEE's radar on 28 April 1994.

5. The DC Closure Log was not being maintained. On 15 June 1994, material condition Yoke was set from 0000Q to 0510Q; that status was recorded in the ship's smooth log. Material condition X-ray was set at 0510 and recorded in the ship's smooth log. Although not logged, material condition Yoke was set before sailing time on 15 June 1994. WHER-AR-WEE had drafts recorded subsequent to sailing as follows: 5' 6" Forward and 6' 11" Aft. The navigational draft for CGC WHER-AR-WEE was 12'.

6. **INVOLVED PERSONNEL**

a. The PXO, who reported aboard 6 June 1994, was the conning officer. This was his first opportunity to conn WHER-AR-WEE and he was unfamiliar with the Boston Harbor area. Prior to this assignment, he served two years as a DWO at a CGDSEVEN unit.

b. The XO, who reported aboard 4 May 1992, had the Deck from 1220Q to 1228Q. He was familiar with the Boston Harbor area. His normal duty during Special Sea Detail and Low Vis Nav Detail was OOD/CONN. At 1228Q, he assumed the duties of Radar Operator for navigation and shipping.

c. The CO, who reported aboard 19 May 1994, assumed the Deck at 1228Q. His normal duty during Special Sea Detail and Low Vis Nav Detail is Bridge Command. Prior to this assignment, he served as a DWO, 378 WHEC, and CO, 95 WPB. He was familiar with the Boston Harbor area.

d. The QM3, who reported aboard 17 April 1994 and was serving in his first QM billet following QM "A" school and change in rate from RD2, was QMOW/Nav Plot/Evaluator. This was his fifth time while aboard this WPB that he assumed the duties of Nav Plot/Evaluator. His normal duty during Special Sea Detail and Low Vis Nav Detail is Radar Operator. He was not familiar with the Boston Harbor area.

e. A SN, who reported aboard 5 October 1992, was the Bearing Recorder. His normal duty during Special Sea Detail was on the Anchor Detail. His normal duty during Low Vis Nav Detail was Leadsman. Approximately twelve months prior to this incident, the SN did fill the billet of Bearing Recorder for Special Sea Detail and Low Vis Nav Detail.

f. Another SN, who reported aboard 24 September 1992, was the Bearing Taker. His normal duty during Special Sea Detail was Bridge Lookout. His normal duty on the WQSB during Low Vis Nav Detail was Helmsman; however this billet was not typically utilized. Standard operating procedure aboard WHER-AR-WEE was that the conning officer serves as Helmsman while maneuvering this ship and auto pilot is used all other times.

g. The QM1, the ship's Navigator, who reported aboard 18 October 1992, was on regular leave and did not make the trip. His normal duty during

Special Sea Detail and Low Vis Nav Detail was Nav Plot/Evaluator. He was familiar with the Boston Harbor area.

h. The RD3 was on leave en route PCS orders. His duty during Special Sea Detail was Bearing Recorder. His duty during Low Vis Nav Detail was Forecastle Lookout.

i. The GM2 was TAD to CG Group Boston awaiting disciplinary action. His duty during Special Sea Detail was Bearing Taker. His duty during Low Vis Nav Detail was Bridge Recorder.

7. It is standard practice that before switching from "manual steering" on the flying bridge to "auto pilot" in the pilot house, the conning officer calls down to Nav Plot and gives a course to dial in and to set steering on "auto pilot" before departing the flying bridge.

8. Two high quality visual fixes using three objects were obtained at 1234Q and 1236Q. Radar ranges were not used in conjunction with the visual fixes. Depth was not recorded for each fix, ship's head was not marked and objects were not designated by name in the Bearing Book. A DR plot was not maintained through a minimum of two planned fix intervals. Set and drift was not determined every second fix. New tracklines were not drawn following fixes to bring the ship back to desired course. The 1236Q fix was originally labeled as l238Q in the Bearing Book, but was plotted as 1236Q on the chart.

9. Following the 1236Q fix, visibility rapidly decreased to approximately 100-200 yards. The XO energized the ship's fog signal and the QM3 energized the navigational lights. The Low Vis Nav Detail was not set. However, the SN did switch roles from Bearing Taker to Flying Bridge Lookout and the BM2 assumed the Forecastle Lookout. The 1236Q fix held the ship 100 yards right of track. At that time, the CO went up to the flying bridge where the PXO was conning the ship. He was steering a course of 130T (base course was labeled 129T) and was at clutch speed ahead with both shafts turning; SOA was 9 knots.

10. The CO discussed the deteriorating visibility and the fact that the ship was right of intended track with the PXO. The PXO asked permission to slow the ship and he and the CO agreed to 7 knots (clutch ahead on one shaft). The PXO put the starboard engine in neutral. The CO went below to check the radar in the pilot house and confirmed his belief that the ship was right of

track. The CO then yelled up to the flying bridge and instructed the PXO to come left 10. The PXO came to course 120T.

11. The CO then checked the 1238Q fix. This was a radar fix and it held the ship 40 yards left of track. The objects used were not accurately labeled on the chart and were not specifically identified in the Bearing Book.

12. The CO and the XO did not concur with the fix as the ship's position was clearly right of track on the radar screen. The CO then went to the flying bridge and had the PXO shift the conn to the pilot house. The PXO arrived in the pilot house 10 seconds later. The CO went immediately to the radar and saw that the ship was considerably right of track nearing the edge of the channel. The PXO appeared flustered as he switched engine control to the lower bridge. The ship's head had swung to starboard somewhere between 145T and 150T. The PXO realized the swing was caused by operating only on the port shaft.

13. The XO recommended 120T, but when ordered, the ship did not respond. The XO realized the ship steering system was left in a manual remote steering mode for the flying bridge. The XO immediately switched the helm control in the pilot house to automatic and dialed in 120T.

14. As the ship's head began swinging to the left, the PXO saw a fishing and a sailing vessel 200 yards off his port bow. He stopped the course change to port. The XO observed a tug boat in bound off the port bow.

15. At 1240Q, as the vessels passed, the PXO switched steering to manual and put the rudder over to left full. As the ship's heading passed 125T, all hands felt the ship shudder. The CO ordered all stop. The CO observed that the fathometer read zero feet below the keel. The CO then gave the order to back down. The XO took both throttles and applied astern turns. Four seconds later, there was another shudder throughout the ship and the CO realized the ship was aground. The CO ordered all stop. The CO then saw green buoy #7 off the port bow. Several other crew members saw the green buoy just before the grounding.

16. At 1241Q, GQ was sounded and material condition Zebra set. Inspections of all spaces were conducted by members of the crew. The Damage Control Assistant, the MKC, advised the CO that preliminary inspections of the ship revealed no apparent damage or flooding and that soundings were being taken to access damage to the fuel tanks. The CO believed the ship was aground by the bow and engaged the starboard shaft, clutch astern in troll

mode, hoping to keep the stern from going into the shoal. At 1250Q the anchor was let go. The XO ordered the QM3 to fix the ship's position. The position was recorded as 42-20'-14" N 071-00'-25"W, bottom type mud, charted depth 3 feet at MLLW.

17. The XO immediately informed Group Boston of the situation on Channel 81 VHF. The tug MISS YVETTE was in the immediate vicinity and offered assistance. The CO had MISS YVETTE pass a tow line to the WPB's towing bit to prevent the stern from going aground. The CO called the Deputy Group Commander to get a second opinion on tug assistance. The CO was told to use the tug at his discretion. The CO decided to have the tug slowly pull WPB's stern into the channel. WHER-AR-WEE was refloated at 1313Q. MISS YVETTE stood by while WHER-AR-WEE tested shafts and rudders. At 1326Q, WHER-AR-WEE secured from GQ and set the Special Sea Detail to return to Support Center Boston. WHER-AR-WEE returned under its own power.

CAUSE AND CONTRIBUTING FACTORS

1. Navigation procedures outlined in the Cutter Navigation Standards and Procedures, COMDTINST 3530.2, Navigation Standards for WHER-AR-WEE, and general practices of prudent seamanship were not followed.

2. Reduced visibility and traffic congestion in Boston Harbor

3. Newly assigned and/or inexperienced personnel were filling critical billets while underway. The CO and PXO were not familiar with the handling characteristics of the ship operating on one engine. The PXO was not familiar with the bridge equipment in that he failed to switch manual steering from the flying bridge to auto pilot in the pilot house in a timely manner.

4. Personnel were filling the wrong billets for the existing conditions. Considering the XO's experience, expertise and judgment, the command should have been used in a role other than Radar Operator. The CO failed to replace the PXO with a qualified conning Officer when the fog set in.

5. WHER-AR-WEE was not being steered manually or by auto pilot for at least a period of ten seconds. Substandard operating procedures permitted the posting of no Helmsman during the transit.

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VESSEL CASE STUDY

UNDER PRESSURE (110' WPB MISHAP)

SYNOPSIS

1. On the morning of 3 October 1996, the CGC UNDER PRESSURE was returning to homeport after a 24-day deployment. The vessel was on course 060T with both Main Diesel Engines (MDE) on line at 1500 rpm, making 22 knots. The weather consisted of a broken cloud cover with a 20 knot wind coming from 060. The seas were coming from the same direction at 6-7 feet. At 0742R, the Engineering Petty Officer (EPO) was on the bridge after relieving the Engineer of the Watch (EOW). An engineering security round, which included the engine room, had been completed minutes earlier.

2. Sometime between the engineering security round and 0742, an intake poppet valve in the No. 9 cylinder of No. 1 MDE broke off at the stem and caused catastrophic damage to the other valves and fuel injector in that cylinder. The loose valve then penetrated the piston head and entered the crankcase. The hole in the piston head allowed the other 15 cylinders to pressurize the crankcase via the exhaust manifold and (now permanently) open valves in the No. 9 cylinder. The resulting over-pressure in the crankcase caused the explosion covers to release, dispensing lubricating oil, vaporized fuel and oil and exhaust smoke into the engine room. The vapor and smoke in the atmosphere of the engine room activated the fire alarm that sounded on the bridge and mess deck.

3. When the fire alarm sounded on the bridge, the EPO immediately went below to investigate while the Executive Officer, who was the Officer of the Deck (OOD), throttled down and de-clutched both MDE's. Two off-watch EOW's on the mess deck heard the alarm and entered the sound void forward of the engine room to investigate. One EOW cracked open the forward door of the engine room and observed white smoke and a large amount of lube oil in front of No. 1 MDE. The other EOW saw the smoke and oil and directed the first EOW to shut and dog the door while he pulled the local emergency engine stop cables located in the sound void. After exiting the sound void, both EOW's informed the EPO, who had just arrived, that there was a major lube oil leak in No. 1 MDE. The EPO then called the bridge to report the lube oil leak.

4. When the engine throttle was brought back and de-clutched, an over-speed of the No. 1 MDE tripped another alarm on the bridge. At 0745, the OOD pushed the engine stop buttons on the bridge console as the Commanding Officer (CO) simultaneously pulled the remote emergency stop cables in the aft part of the bridge. These actions secured No. 2 MDE, but No. 1 continued to run on fuel and air entering the cylinders as a result of either the damage to No. 9 piston, the hole left by the damaged fuel injector, or the fuel rack that was bent when the fuel injector was jammed. At 0746, General Emergency was piped over the 1MC and the Main Space Fire Bill was set.

5. The main space fire doctrine was executed as the No. 1 MDE continued to run at sub-idle even though normal fuel and air supply had been tripped. Neither the soft patch nor the aft access door to the engine room were hot, a definite fire indication, so Halon was not discharged. As the hose team prepared to enter the engine room to secure the engine manually, a wave broke over the fantail causing the P-250 pump to fail, eliminating the only source of fire fighting water. Prior to taking the wave, the pump was working satisfactorily. Two P-1 pumps were running and available to provide cooling water if necessary, but could not have provided fire fighting water. At 0813, the No. 1 MDE was clutched in and the resulting torque successfully overcame its ability to produce power and the engine quit running. A visual inspection of the engine room was then performed from the escape hatch in the soft patch which revealed large amounts of oil on the deck plates; however, with no fire fighting water available, the CO elected not to allow entry to the space to apply aqueous film forming foam (AFFF).

6. When power was secured during the initial actions required by the Main Space Fire Doctrine, the UNDER PRESSURE lost HF communications and was unable to notify Group SOUTHERN. However, a MAYDAY call on CH 16 VHF prompted responses from the USNS Atlantis, M/V Chevron Arizona, and M/V Fast Supporter. USNS Atlantis was able to relay the initial report to Group SOUTHERN via INMARSAT. USNS Atlantis arrived on scene first but could not supply fire fighting water. At 0901, the M/V Fast Supporter arrived and took UNDER PRESSURE in tow to facilitate supplying fire fighting water from their own fire pump. At 1004, fire fighting water was available from hoses supplied by the M/V Fast Supporter and M/V Chevron Arizona. Hose team No. 1 entered the engine room and washed the oil from the deck plates into the bilge, and applied one-inch of AFFF over the oil/water mixture.

7. At 1018, the hose supplied by M/V Fast Supporter ruptured in aft berthing and approximately 100 gallons of sea water was pumped into the compartment before the water supply could be secured. A replacement hose restored UNDER PRESSURE's fire fighting capability. At 1127, oxygen and

explosive air tests were performed with satisfactory results. At 1137, CG-1234 arrived and lowered a P-250 pump. After a closer inspection of the engine room by the EPO, 24 Volt power was restored at 1145. At 1150, CG-5678 arrived with another P-250 pump. Full electrical power was restored at 1212 when the No. 2 SSDG was started. At 1217, the engine room bilges were pumped over the side. At 1224, General Emergency was secured, and the No. 2 MDE was started. At 1323, M/V Fast Supporter broke the tow and departed the scene. UNDER PRESSURE then transited to homeport under her own power.

HISTORY

1. On 02OCT96 UNDER PRESSURE was underway en route to Port Isabel, TX. It was the last day of a 24-day patrol. At 1100 the UNDER PRESSURE experienced a gyro casualty. At 1105, the gyro repeater switch was found in the off position; gyro was then restored..

2. At 1126 UNDER PRESSURE experienced a minor fuel oil leak on the #1 MDE and secured it for repairs. At 1245 the fuel oil leak on the #1 MDE was repaired, #1 MDE was lit off and tested satisfactory.

3. At 030742OCT96, the XO assumed the deck and the conn. At 0745, he received a report of smoke coming from the engine. He pushed both stops for MDE's on bridge control panel. Around 0746, the #2 MDE was off line, but the #1 MDE continued to run. General quarters sounded and the Main Space Fire Doctrine (MSFD) was set. At 0749, supply and exhaust vent covers were in place and the fuel supply cut out secured. All personnel were present and accounted for.

4. At 0750, the power was secured throughout the ship with the exception of the 24 volt system. Material condition Zebra set. At 0751, fire boundaries were set as follows: primary forward - frame 22, primary aft - frame 28; secondary forward - frame 17, secondary aft - frame 31.5.

5. At 0755, called CG GRU SOUTHERN, AL with no joy. At 0756, sent MAYDAY via channel 16 in position 29-08N 087-36.5W requesting assistance. The R/V Atlantis and the M/V Fast Supporter responded and headed towards the UNDER PRESSURE.

6. At 0804, the P-250 was on line. At 0813, clutched in #1 MDE; #1 MDE off line. The P-250 went off line. At 0814, the P-250 was restarted.

7. At 0819, passed phone number for GRU SOUTHERN to R/V Atlantis to update our situation.
8. At 0832, a wave broke over the fantail causing the P-250 to go off line. At 0833, the 110 volt AC system feeding the bridge equipment was lost.

9. At 0901, R/V Atlantis, M/V Chevron Arizona, and M/V Fast Supporter were all on scene. At 0902, CG 9999 arrived on scene. At 0909, CG 9999 dropped a P-5 pump, and was on board UNDER PRESSURE minutes later.

10. At 0940, UNDER PRESSURE passed a heaving line attached to her anchor line attached to M/V Fast Supporter. The anchor line was made off to the M/V Fast Supporter's starboard bit, and she began towing UNDER PRESSURE 75' astern of her.

11. At 0954, M/V Fast Supporter passed a heaving line and fire hose to UNDER PRESSURE. At 0957, M/V Fast Supporter energized their fire pump and energized the fire hose to UNDER PRESSURE.

12. At 1000, the on scene leader requested permission to access the engine room. At 1002, #1 fire team accessed aft berthing. At 1003, #1 fire team accessed the aft engine room door. At 1004, the fire team applied AFFF to the engine room bilge. At 1014 one inch of AFFF was in the engine room bilge. At 1014, the overhaul kit was passed down to the #1 fire team.

13. At 1018, the fire hose ruptured and the fire team backed out. At 1019, the M/V Fast Supporter secured the fire pump and replaced the rupture.

14. At 1033, the M/V Fast Supporter again energized the fire hose to UNDER PRESSURE, and the #1 fire team re-entered the engine room.

15. At 1040, the overhaul was completed, no hot spots were found. Reflash watch set. At 1057, the #1 fire team left the engine room. At 1059, the P-250 was back on line supplying fire fighting water to the ship.

INJURIES TO PERSONNEL. No personnel casualties or injuries occurred during this mishap.

DAMAGE TO UNIT

1. Engine Room:

    a. No. 1 Main Diesel Engine suffered catastrophic failure. Disassembly of cylinder No. 9 revealed three poppet valve heads separated from the stems and one poppet valve lodged within the valve port. No. 9 piston

revealed a three inch hole completely through the crown. Lubricating oil was found throughout the intake and exhaust manifolds of the engine. The excess lubricating oil or engine debris caused three hydraulic locks during attempts to bar over the engine. The bridge adjusting nut and rocker adjusting nut were tight and intact. All other fasteners were intact. The valve train components of No. 9 cylinder revealed no abnormal cracks, breakdown or wear; connections appeared normal, well lubricated and properly adjusted. This was the first occurrence of a cylinder valve penetrating the piston crown.

b. No. 1 Ships Service Diesel Generator mounting stud separated from longitudinal.

c. No. 1 Reduction Gear control box mounting stud sheared.

d. No. 1 Reduction Gear oil cooler o-rings leaked.

2. Aft Berthing:

a. Deck insulation soaked with fire fighting water.

b. Mattresses soaked with fire fighting water.

c. Alarm Detection Head malfunctioned.

3. Damage Control Equipment:

a. One Oxygen Breathing Apparatus intake hose torn.

b. One Oxygen Breathing Apparatus bail assembly damaged.

VESSEL INFORMATION

1. CGC UNDER PRESSURE was commissioned in June 1991. The vessel is a "C" class 110-WPB Island Class cutter manufactured at Bollinger Marine Shipyard in Lockport, Louisiana.

2. The vessel is a longitudinal-strengthened, welded mild steel (BS 4360) with aluminum superstructure. No. 1 MDE is a Caterpillar 3516 DITA, Serial Number 5MJ00029 (Arrangement 5R9850).

3. At the moment of casualty, there were no outstanding CASREPs for No. 1 MDE. Preventive Maintenance was current with the exception of the

Overspeed Trip Devices. The Diesel Engine Maintenance Program System (DEMPS) was not current in accordance with the Naval Engineering Manual COMDTINST M9000.6 (series) Chapter 233.

4. CGC UNDER PRESSURE suffered a main space fire that destroyed No. 1 Main Diesel Engine in June 1993. No. 1 Main Diesel Engine was replaced with an Engineering Logistics Center (ELC) supplied engine. Additionally, No. 2 Main Diesel Engine was overhauled.

5. No. 1 MDE has accumulated 3,901 operating engine hours since installation in 1993.

6. UNDER PRESSURE had accumulated 2,031 underway operating hours for FY-96.

7. The last recorded full power trial was in September 1994.

METEOROLOGICAL INFORMATION

1. Sky: Broken
2. Visibility: 6 NM in haze.
3. Winds: 060T/30 knots
4. Air Temperature: 60-63 degrees F
5. Sea Temperature: 58 F.
6. Seas: 060T/6-7 feet.

CAUSES

1. The bulk of the evidence from follow-on analysis by Caterpillar, the Coast Guard Yard, and an independent testing laboratory appeared to point toward a material or manufacturing defect within the valves of the engine.

2. Contributing factors to this engineering failure could be the corrosive effect of the high sulfur deposits found on the intake valve during independent laboratory testing, or the redepositing of material lost from valve face pitting creating sufficient misalignment to generate the localized stress necessary to weaken the valve stem.

LESSONS LEARNED

1. Although not a factor in this mishap, Commandant (G-SEN) has made improvements in the training procedures for setting valves and has determined that the Coast Guard training standards are sufficient.

2. Proper training and experience proved critical to successfully coordinating effective damage control and response efforts during such a catastrophic casualty under arduous conditions.

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VESSEL CASE STUDY

STOP GRIPING (WLM Load Securing Mishap)

HISTORY

1. On the evening of 23 February 1982, the ROSEWOOD duty section loaded a 6x20 LR buoy onto the buoy deck. The 6x20 LR was intended as a relief buoy for Cape May West Entrance Approach Light Buoy 4 (LLNR 2119). (Hereafter this buoy will be referred to as BUOY 4).

2. BUOY 4 was loaded fore and aft in the after port section of the buoy deck, with the counterweight forward. BUOY 4 was laid in a cradle, and a headblock was put in place. It was griped down to the deck with a single length of 3/8 in. chain passed across the lower (tube) part of the buoy. The chain was secured with a steamboat (turnbuckle style) jack on one end and a scissors jack (spring type) on the other end.

3. ROSEWOOD departed CG BASE on the morning of 24 February, and proceeded to BRANDYWINE LIGHT. ROSEWOOD delivered approximately 1200 gallons of diesel fuel to BRANDYWINE LIGHT. ROSEWOOD then proceeded to CG TRACEN, and arrived on the evening of that same day.

4. On the evening of 24 February, the ROSEWOOD duty section loaded an 8x26 LRB buoy onto the buoy deck. The 8x26 LRB was intended as an establishment buoy for Cape May Canal West Entrance Approach Lighted Bell Buoy 8 (LLNR 2122). (Hereafter this buoy will be referred to as BUOY 8).

5. BUOY 8 was loaded athwartships at the buoy ports, with the counterweight to port and the cage of the buoy to starboard. BUOY 8 was laid in a cradle, and a headblock was put in place. It was griped down to the deck with a single length of 3/8 in. chain passed across the lower (tube) part of the buoy. The chain was secured with a steamboat jack on each end. A 1 1/2 in. double-braided nylon line was secured to the top of the buoy cage, and ran to a cleat on the starboard gunwale. The BMC supervised loading and securing of BUOY 8, with the BM1 and several non-rated personnel assisting.

6. The Deck Department Underway Check-Off List for 25 February showed that the deck spaces had been secured for sea, and that the boom and rigging had been inspected.

7. Besides BUOY 4 and BUOY 8, ROSEWOOD's deck load consisted of one 12,000-lb. sinker placed forward amidships, between BUOY 8 and the forecastle. This sinker was griped down with two steamboat jacks. There was also an assortment of various sized chains on the after portion of the buoy deck, amidships.

8. Prior to departing TRACEN, the CO listened to a weather report for the day. The report predicted clear skies, winds from the NW at 20-30 kts, and seas 3-6 feet. ROSEWOOD departed TRACEN at 0709. The 1st LT (CWO) was the OOD. The weather was as predicted, except seas were lower in height.

9. ROSEWOOD steadied on a base course of 214T, the first leg of the trip, at a speed of 11 kts. As ROSEWOOD proceeded, the wind increased to 25-30 kts, and the seas, running from the northwest, increased to 4-6 feet.

10. At 0800 the CO and the OOD, noticed that BUOY 4 was starting to move slightly. The OOD turned ROSEWOOD to port putting the seas to stern, and slowed. The ATON detail was piped to the buoy deck. The BMC, BM1, BM2, SA #1, and SA #2 reported to the buoy deck directly.

11. The BM1 was the first person to arrive at the buoy deck, and found BUOY 4 swinging in an arc, still held by the griping chain. The BM1 made an unsuccessful attempt to secure BUOY 4 by placing another headlock under the buoy. ROSEWOOD started taking rolls in excess of 20 degrees, and the act of putting the seas on the stern did not ease the rolls.

12. At CO's recommendation, the OOD brought ROSEWOOD around to starboard, and headed into the seas. At approximately 0830, ROSEWOOD proceeded on a course of approximately 310T, at approximately 3 kts.

13. BUOY 4's motion continued to worsen, and the buoy finally fell out of its cradle and began swinging in a wider arc, while still held by the gripes. During the course of its movement on deck, BUOY 4 struck a hydraulic line on the lower side of the boom, causing a hydraulic leak on the return side of the system.

14. BM1 and SA #1 tried to secure BUOY 4, using head blocks and the hydraulic crossdeck winches. Buoy deck personnel were able to get the port side forward and after crossdeck winchlines on BUOY 4, but the motion of BUOY 4 caused the after winchline to part and the forward winchline to become dislodged.

15. As BUOY 4's motion continued to get more severe, the scissorjack parted and the buoy became completely free. As BUOY 4 moved about on the deck, it struck against BUOY 8 several times, causing BUOY 8 to become dislodged from its cradle. As BUOY 8 became dislodged, it began to roll from side to side, and eventually broke free of its gripes and the nylon line.

16. At approximately 0830, both BUOY 4 and BUOY 8 were free on deck, and the deck was slick with a combination of seawater and hydraulic fluid. All personnel were cleared off the buoy deck.

17. The OOD continued to make course corrections to ease the rolling, but was unsuccessful. ROSEWOOD continued to experience rolls in excess of 20 degrees.

18. At approximately 0845, BUOY 4 finally came to rest in the pile of chain in the after part of the buoy deck. BUOY 8 continued to roll uncontrollably, and swung into a fore and aft perspective on the starboard side of the buoy deck, tube forward.

19. An attempt was made to secure BUOY 8 by the starboard side crossdeck winches. The forward winchline was secured to the buoy, but the winchline parted. There were no extra steamboat jacks to attempt to gripe down the loose buoys. At 0858, the BMC and BM2 secured the starboard side bull chain around the tube and bridle of BUOY 8.

20. As ROSEWOOD rolled, BUOY 8 continued to pound against the starboard bulwark, just aft of the buoy port. BUOY 8 finally rolled out the buoy port, and the cage portion fell over the side. BUOY 8 was held in an inverted position by the bull chain wrapped around the tube and bridle.

21. At approximately O900, with BUOY 4 lodged under the boom and BUOY 8 hung inverted over the starboard side, ROSEWOOD proceeded north up the Cape May Channel toward calm seas at the west entrance of the Cape May Canal.

22. At approximately 0913, the BMC complained of an injured knee, which he sustained in the course of attempting to secure the buoys. An EMT gave him first aid.

23. At 1010, the CO departed the bridge. As ROSEWOOD proceeded toward calm water, the XO conducted an inspection of the interior of the vessel and found the ship in a general state of disarray.

24. At approximately 1149, the Special Sea Detail was set with the exception of the forecastle personnel. The CO assumed the OOD. At 1201 the Special Sea Detail was set on the forecastle.

25. As ROSEWOOD stood off the west entrance to the Cape May Canal. BUOY 4 was secured on deck, and BUOY 8 was brought aboard and secured on deck. As the boom was used to secure the buoys, hydraulic fluid continued to leak from the damaged hydraulic line. Engineering personnel monitored the supply of hydraulic fluid as the buoy operation continued.

26. At 1242, the GROUP was contacted/requested to dispatch a boat to MEDEVAC the BMC. At 1300, BMC was evacuated by a UTB.

27. At 1350, both BUOY 4 and BUOY 8 were secure on deck, and ROSEWOOD proceeded to CG BASE. While en route CG BASE, ROSEWOOD's engineering personnel repaired the damaged hydraulic line. During the transit ROSEWOOD also serviced two buoys that were reported extinguished. ROSEWOOD arrived at CG BASE at 0019, 26 February.

REPORTED DAMAGE AND INJURY

1. The following damage was sustained by ROSEWOOD as a result of the buoys breaking free. Considering the rolling that ROSEWOOD experiencing, the size and weight of the buoys that broke free, and the length of time that they were free on the buoy deck, the extent of damage was relatively minor.

   - The bulwark just aft the starboard buoy port had a tear approximately 1 foot in length. This tear was 1 foot above the buoy deck, and the bulwark above the tear was twisted and bent severely outboard.

   - The triparm assembly of the starboard chain stopper was bent to the right (aft), thus preventing a smooth operation of the chain stopper.

   - The starboard chain stopper pedestal was cracked slightly.

- Two deck padeyes on the starboard side of the buoy deck were bent and crushed.
- A ventilation gooseneck at the starboard side forward buoy deck was bent and crushed.
- The bulwark, port side aft of the buoy port was bent outboard.
- Two steamboat jacks were bent slightly out of alignment, and one scissors jack was broken into two pieces.

2. BUOY 4 had several large dents in the body, as well as superficial scrapes in the paint.

3. BUOY 8 had several large dents in the body, as well as a large crack in the weld joining the body and the tube.

4. The BMC suffered a severe bruise of the kneecap. He was not fit for duty for two weeks.

ADDITIONAL INFORMATION

1. WLMs do not operate very often in a heavy sea state, or have 8x26 buoys on deck when such seas are encountered.

2. The CO reported aboard ROSEWOOD seven months before the incident. Since reporting aboard, he had transited the Cape May area once before the incident. He had attended the ATON School (Officer Basic Course) seven years ago.

3. The XO reported aboard ROSEWOOD one year seven months before the incident. He had transited the Cape May area three before the incident. On only one of the prior occasions did ROSEWOOD have a buoy on deck. The seas on that occasion were calm. He had attended the ATON Basic course three years ago.

4. The OOD reported aboard ROSEWOOD two years before the incident. He had transited the area four times prior to the incident. He had attended the ATON Basic course one year ago.

5. The BMC reported aboard ROSEWOOD 2.7 years before the incident. He had attended the ATON School Minor Aids Course 2.7 year ago.

6. The BM1 reported aboard ROSEWOOD two years before the incident. He had attended the Minor Aids and the Advanced Minor Aids courses a year ago.

7. The BM2 had just reported aboard ROSEWOOD and had completed the Minor Aids course.

8. SA #1 reported aboard ROSEWOOD two years before the incident. He had attended but failed the Minor Aids course. SA#2 had reported to ROSEWOOD around the same time and had not attended any ATON courses.

9. Buoy griping procedures have been normally taught only in the Officer Basic Course. Since November 1981, griping procedures were included in the-Advanced Minor Aids Course. The BM1 had not received this additional training.

10. The ATON School had not offered a Buoy Deck Supervisor Course before this incident.

11. The District Operational Training Team had visited ROSEWOOD on 1-3 December 1981. During this visit, buoy-positioning procedures, buoy hardware, and underway drills were covered. Buoy handling or griping procedures were not reviewed.

12. The Deck Department training record was void of any indication of buoy handling procedures/griping being reviewed.

LESSONS LEARNED

1. In a confused sea state, the normal procedures of turning into the primary swell is ineffective in subduing the rolls. Although an increasing speed into the seas may have helped to reduce rolling, the shoal water ahead of the cutter made this action inadvisable.

2. Once BUOY 4 and BUOY 8 started to move, the actions of the OOD and CO were prudent. The deck force personnel acted reasonably in their attempts to secure the buoys after they began to move. The decision to evacuate the buoy deck and head for calm water at West Cape May was prudent.

3. A qualified safety officer (someone with ATON Officer Basic training) should have inspected the gripes prior to departing TRACEN on 25 February. BUOY 4 and BUOY 8 were improperly griped down for the forecasted and actual sea conditions. The chain used to gripe down the buoys was too small in diameter, particularly for BUOY 8. Strong gripes to the upper body of the buoys were necessary to prevent the buoys from moving.

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VESSEL CASE STUDY

OUNCE OF PREVENTION (WLB Boom Mishap)

HISTORY

1. January 1983 was THORNBUSH's first underway day since 15 December 1982. THORNBUSH was 85-88% capacity on fuel, topped off with water, and carrying no buoy or sinker load. THORNBUSH got underway at 0809, 25 January, from Grand Haven for training and to provide a platform for a NOAA bottom-sampling project.

2. At 0915 THORNBUSH hove to 5100 yards South Southwest of Grand Haven Breakwater South Jetty, 3800 yards off the beach. They did this to take bottom and water samples for the NOAA project.

3. The BMC was the buoy deck supervisor. SN #1 was the boom operator. Both were qualified.

4. The wind was from 330°T at 18 knots, with gusts to 25 knots. Seas were from 290°T at 5 to 8 feet, with occasional larger waves. No boom preventor was in use. Neither the CO nor the BMC felt that the conditions warranted the use of a preventor. Prior to spotting the boom, THORNBUSH turned bow into the seas.

5. At 0915, the BMC spotted the boom at 35 to 45° angle of elevation with the auxiliary winch block vertically over the after end of the port buoy port. The lead from the auxiliary winch to the deck was slightly inboard of the side of the vessel. They then began taking samples for the project.

6. The bottom samples were taken with a Ponar sampler. Its weight empty is 40 pounds. The Ponar sampler was tied to .25 inch three-strand wound nylon that was rigged to the auxiliary winch, located on the vang-operated boom. When not in use the Ponar sampler was left to rest in the “open” position on the deck near the after end of the buoy port. It is very stable in this position.

7. The water sampler was a Niskin bottle, weighting 20 pounds. NOAA personnel had numerous containers on deck in which, to store their samples. The containers were not lashed in place.

8. NOAA personnel onboard THORNBUSH that day were the Master of a NOAA R/V (referred to as DAVE), the Chief Engineer of a NOAA R/V (referred to as JOHN), and three NOAA scientists (referred to as TOM, DICK, and HARRY).

9. At 0945, ENS KNOWSOME relieved the Conn; ENS LEARNEDSOME had the Deck.

10. Several bottom and water samples were taken and the operation at this particular station continued until 1010. The boom was left spotted in the position described in paragraph 5. At 1010, the BMC secured his buoy deck personnel and the boom operator to take a break, while the vessel traveled to the next station.

11. THORNBUSH proceeded to the next station on course 330°T at 10 knots.

12. At 1020, the CO had the Conn bring the ship's course to 040°T and reduce speed to 6 knots. Seas were from 300 to 320°T at 4 to 8 feet, choppy with occasional larger waves. The wind was from 330°T at 20 knots. THORNBUSH was rolling 20 to 30°. The weather and seas were such that THORNBUSH might have worked a buoy and had done so in comparable conditions.

13. Visibility had decreased from 10 miles to 4 miles or less. The CO indicated that at this point, his greatest concern was the visibility and remaining a safe distance from the Grand Haven Breakwater South Jetty. NOAA personnel wanted samples taken at a station about 600 yards South of the South Jetty and 100 yards off the beach. Due to decreasing visibility, The CO decided to use a station 1,000 yards South of the jetty and 1500 to 1800 yards from the beach.

14. The CO, XO, Conn, 1st LT, and DAVE (NOAA) were on the port bridge wing. The buoy deck was clear with the exception of TOM, DICK, and HARRY, who were forward under the focsle overhang. As the shipped made its approach on the second station, the Deck, ENS LEARNEDSOME, was inside the pilothouse using the radar to take fixes every five minutes. SN #3 was inside the pilothouse standing QMOW. The helm was manned by a QM3.

15. The BMC and JOHN (NOAA) were on the mess deck between 1010 and 1030. The BMC had a conversation with the MKC regarding when a boom preventor should be used. The BMC felt that the present conditions did not warrant the use of a preventor, but he would use one if he got the slightest indication that the boom might move. Prior to going out on deck, the BMC had sent the boom operator back to the boom shack to operate the auxiliary winch. At 1030 BMC, followed by JOHN, went out onto the aft port buoy deck.

16. At 1032 THORNBUSH took a 42° roll to starboard. The wave that caused the roll was larger than the majority of the seas that day. JOHN was coming out of the door as THORNBUSH rolled. He reached for the boom to steady himself, but the boom rose away from him. He dived under the ladder on the port side. The ladder ran from the O1 deck to the buoy deck. On the bridge, personnel had to hold on to the ship to remain standing.

17. The boom operator was on the starboard ladder from the 01 deck to the boom shack when the ship rolled to starboard. He saw the boom rise less than 10 feet.

18. As the THORNBUSH rolled back to port, the boom swinging to port, returned to its original spotting position. When the CO realized the boom was swinging, he ordered left full rudder to come up into the sea. As the boom returned to its original spotting position the starboard hanger strap parted, allowing the boom to slew uncontrollably to port.

19. The boom came to rest against the port cross deck motor, bending the boom approximately 20° to port. The boom smashed the ladder from the 01 deck to the buoy deck on the port side. No one was injured.

20. The starboard vang was 51 feet from the starboard topping sheave to the after end of the forward vang triple block. The forward starboard vang block fell striking the main purchase hoister located on the top of the boom base. It cracked the main purchase gear case, and dented the port side of the turtle back before ending up on the starboard buoy deck aft. The starboard bridge wing spray shield was badly scraped and covered with lubricant from the starboard vang. The black semi-circular guard on the bridge facing also had been scarred.

21. The force experienced on THORNBUSH's starboard vang as it slammed back into the vee upon rolling to port was in the neighborhood of 215 tons. The breaking strength of the cable was 30.6 tons. The vang was a 7-part purchase; one part did fray at the upper block.

22. The broken hanger strap had been tested to 50,000 pounds in September 1982. The test had also included taking the part down to bare metal and dye penetrant testing. Visual inspection of the damaged hanger strap indicated no previous flaws that might have gone undetected.

23. The Ponar sampler remained attached to the 0.25-inch wound nylon and ended up dangling in the water from THORNBUSH's auxiliary winch. The NOAA supplies on the buoy deck did not move.

LESSONS LEARNED

1. The type of wave which caused a 42° roll on THORNBUSH shows that a buoy tender may take a much larger than normal roll due to unusual phenomenon which may occur in any operating area. The forces measured in this mishap could have been countered by a preventor on the boom. The solution is to recognize the probability of the unusual phenomenon and to routinely prepare the vessel for that eventuality, rather than try to guess when something unexpected might occur. A preventor (in this case the whip) could have been hooked into a padeye on the deck forward of the buoy port or into a padeye on the port bulkhead forward of the buoy port.

2. The manner in which the use of the preventors was presented in the Seamanship Section of the ATON Manual is sketchy, vague, incomplete, without visual aids, and thus inadequate as a reference.

VESSEL CASE STUDY

SO THAT'S CATCHING AIR!

HISTORY

1. On 04 October 1998 at 1023, CG213520 departed its Coast Guard Station berth to investigate a boat reportedly taking on water approximately 2NM north of the jetty. Three persons on board (POB) reportedly swam ashore. Weather conditions consisted of clear skies, winds at 15-20 kts, seas at 4-6 foot and surf breaking 1500 yards off the beach. The patrol boat crew consisted of a BM3 (coxswain) and an MK3 (boat engineer).

2. Prior to departure the crew donned life jackets (but not pyro vests), and conducted a cursory crew brief while en route to the scene. The daily engineering boat check, however, had not been completed prior to getting underway.

3. Proceeding to the scene the BM3 positioned the RHIB parallel to the third bar approximately one mile off the beach. Once on scene the crew began a shoreline search for the sinking vessel and POB, while keeping outside the third bar. Due to the sea condition, the crew could not see much from their position, and the BM3 brought the RHIB to approximately 1500 yards off the beach. The BM3 then contacted the station and requested air support. Shortly thereafter, the crew spotted a beached boat with several people standing nearby. Unable to confirm whether this was the distressed vessel and POB, the BM3 decided to put the MK3 ashore at the North Jetty Pier to investigate. CG213520's position was with the port quarter to the sea.

4. The BM3 then noticed a change in engine performance, studied the RPM gauges and observed a drop in power on the port engine. Looking up from the console the BM3 observed a wave breaking over the RHIB's port quarter. He applied full throttle, with only the starboard engine responding. Running with the surf the BM3 regained control of the RHIB and moved ahead of the breaking wave. Now facing shore, the RHIB's transom was covered by whitewater. The BM3 advised the MK3 of the port engine's status and turned starboard in order to face the wave they'd just outrun.

5. The wave struck the RHIB on the starboard bow. The RHIB was pushed back towards shore while riding over the top of the breaking surf. The BM3 recovered and applied ¾ throttle to the starboard engine while steering head on into the next wave. This caused the RHIB's angle of attack to alter nearly 90 degrees vertical. For fear of pitch-poling CG213520, the BM3 reduced throttle. The RHIB slid back down the wave and both engines submerged in the base of the wave.

6. The starboard engine stalled. While attempting to restart both engines the BM3 advised the MK3 of both engines' status. The next wave lifted and turned the powerless RHIB to port. As CG213520 slid down the wave, base surge spilled over the port sponson. This action, combined with the momentum of the wave and the RHIB's angle of list to port, caused the boat to roll over to port.

7. Both crewmembers remained with the RHIB and found themselves in air pockets under the hull. Neither, however, was immediately aware of the other's location. Both crewmembers swam to the surface, located each other visually, and swam to the beach together. Once on shore the MK3 used a borrowed cell phone to notify the station of the situation.

8. CG41386 departed the station at 1054 with 7 POB and proceeded to the North Jetty to pick up the RHIB crew.

9. A civilian salvage boat was dispatched at 1110 to help recover the RHIB. Due to weather conditions and shoaling, salvage operations were suspended.

10. On 08 October 1998, a CG H-60 helicopter hoisted and repositioned CG213520, which was then towed back to the station via a 41-foot UTB.

11. Both crewmembers suffered minor bumps and bruises.

ADDITIONAL FACTS

1. Neither crewmember had received surf training at their present command nor had experience in surf operations.

PROBABLE CAUSES

1. A breakdown in the district/group/station decision-making process to coordinate a response.

2. Inadequate consideration in the decision-making process to allocate resources for this case (several reports indicated that all POB were safely on the beach).

3. Loss of situational awareness of the boat's position in the surf while focusing on the people on the beach.

4. Incorrect decision making and subsequent actions while attempting to clear the surf line, due to insufficient training and experience.

LESSONS LEARNED

1. This mishap highlights the results of a combined lack of adequate oversight and personal involvement in operational decision-making and mission analysis by all elements of the Search and Rescue Response system. All components of this system must understand and respect the limitations of their personal abilities, as well as the limitations of the resources with which they are responding. Evaluation and communication of the "Rick vs. Gain" step in the operational risk management process was vital in this case as a "reality check" to prevent deploying resources to rescue survivors who were, in fact, already ashore. As a result of missing this step, Coast Guard personnel narrowly escaped tragedy, a boat was severely damaged and a unit's readiness was temporarily degraded.

2. The unit was not properly following the Boat Crew Training Program. To assume that a member qualified on a standard boat is automatically qualified on smaller non-standard boats is neither prudent nor acceptable. Type specific performance qualifications are in place due to the unique operating procedures and handling characteristics of our various platforms. The command shall ensure that when qualifying, certifying, re-certifying and maintaining currency requirements for all boat crewmembers, the procedures and tasks listed in the Boat Crew Training Manual and the Boat Crew Qualifications Guide, Vol. I, II, and IV are followed precisely, especially with regards to boat types. Regardless of the recertification status of command personnel, all those in a leadership position should be actively involved in the unit training program. This involvement is especially critical to help prepare coxswains who are inexperienced to handle certain boat types in certain

conditions. Additionally, conducting training alone, regardless of the frequency, does not guarantee that those principles learned are applied to the job. This is a responsibility of supervisors and senior leadership.

3. Situational awareness is paramount in any search and rescue mission, especially in environments that are unfamiliar to the operator. In this case, the coxswain and crew, not completely familiar with the bar hazard area, became engrossed in searching the shoreline. As a result, they did not realize that they had drifted into the surf zone until it was too late.

4. Lack of training and experience combined with confidence and enthusiasm makes for a deadly combination during inherently hazardous situations.

VESSEL CASE STUDY
ROCK AND A HARD PLACE

HISTORY

1. On 20 July 1997 at approximately 1600, CG Auxiliary vessel PLOWBOY conducted a safety patrol under Coast Guard orders, in Blind Pass, Sanibel Island. The crew of the PLOWBOY consisted of a coxswain and two crewmen (A and B). The weather on scene had winds from the southwest at 8 kts, with seas 1-2 feet, sea temperature 88 F, and visibility 8 NM.

2. During the patrol, the coxswain decided to familiarize his crew with the navigation aids located in Dinken Bayou without authorization. As a result, the PLOWBOY deviated from its scheduled patrol route, went through Roosevelt Channel and into Blind Pass, approximately 2 NM west of the closest point of the scheduled route. The scheduled route PLOWBOY was to follow was from Marker 101 up the ICW to Marker 50 and back to home port in Cape Coral, FL.

3. PLOWBOY proceeded into Blind Pass from Roosevelt Channel en route Dinken Bayou and ran hard aground on a shoal. Charts indicated 1 foot of water at the junction of Blind Pass and Roosevelt Channel and 1 foot to 6 inches of water at Dinken Bayou. The coxswain did not recall the fathometer reading prior to the grounding.

4. The coxswain attempted to free the vessel until noticing the engine overheating and emitting black smoke. The coxswain then made an unauthorized entry into the water (approximately 4 feet deep), to transfer a line to a dock 150 feet away, where three good samaritans awaited to assist. The attempt to pull the vessel free failed.

5. According to a 1716 Auxiliary Radio log entry, the PLOWBOY reported operations normal, when in fact the PLOWBOY had been grounded for over an hour.

6. Other attempts to free the PLOWBOY with the assistance of a 13-foot speedboat nearby also failed. Finally a crewmember from the speedboat entered the water and attempted to push the bow of the PLOWBOY free,

while the PLOWBOY's crew rocked it back and forth. Having no success, crewman A from the PLOWBOY made an unauthorized entry into the water and assisted in freeing the PLOWBOY, where it was pulled to the dock and secured. Crewman A from the PLOWBOY and the civilian remained stranded on the shoal, which was visible above the water. The civilian reboarded the 13-foot speed boat, however, crewman A from the PLOWBOY remained on the shoal.

7. After the PLOWBOY was made ready for sea, the coxswain decided on a starboard side pickup for crewman A on the shoal, because water on the port side began ebbing at 2-3 knots. The coxswain told crewman A his intentions and instructed her to walk out three feet and grab a line being tossed to her to bring her aboard.

8. Crewman A decided on her own to swim out farther, cross the bow of the PLOWBOY and drift back with the line to be brought aboard on the port side ladder. This placed her dangerously close to the vessel's engine and engaged screw (due to station keeping against the ebbing tide). The 2-3 knot current caused difficulty for crewman B on the PLOWBOY to pull crewman A to the boarding ladder. By the time she was brought to the boarding ladder, crewman A appeared incoherent and semiconscious.

9. When she could not be brought aboard, the coxswain decided to drift the PLOWBOY back to the dock and get further assistance from the three good samaritans. The good samaritans and crewman B pulled crewman A on to the PLOWBOY, while emergency medical services were contacted. EMS arrived 13 minutes later, treating Crewman A for near drowning and the coxswain for an existing heart condition.

10. A 1756 Auxiliary Radio Log entry indicates the PLOWBOY to be at a dock in Blind Pass with a "sick" crewman, and 911 being contacted.

11. A civilian medivac helicopter flew crewman A to Lee Memorial Health Center where she remained three days before release. EMS released the coxswain at the scene.

12. A 1822 Auxiliary Radio Log entry indicates a Coast Guard station being contacted via land line and documents the PLOWBOY's location in Blind Pass with a sick crewman. This is the only confirmed contact with a Coast Guard station during the entire incident.

ADDITIONAL FACTS

1. Local Coast Guard Group policy states, "Auxiliarists shall adhere to the time, date, and patrol areas as shown on their Division/Flotilla schedule."

2. The Auxiliary Operations Manual states in part, "Auxiliarists under orders may not enter the water during rescue missions."

PROBABLE CAUSES

1. Disregarding standing orders, deviating from the scheduled patrol area, and venturing into unfamiliar waters began a chain of errors that contributed to the grounding.

2. The decision and communication processes demonstrated by the PLOW BOY's coxswain were inadequate, thus preventing the assistance by better equipped resources.

3. Disregarding the coxswain's orders and entering the water put crewman A in a precarious position on a shoal. Disregarding the coxswain's orders a second time placed the same crewmember in a life-threatening situation, either by the PLOWBOY's screw, or by drowning.

LESSONS LEARNED

1. The error chain for this incident appears extensive. The coxswain made many inappropriate decisions throughout the event. He allowed himself and one of his crewmembers to enter the water (albeit with life jackets on), and into harms way. The Auxiliary vessel's communications with the parent CG Station were inadequate and inaccurate. The coxswain attempted direct communications with the CG station one time during and after the events. The CG Auxiliary base station reported to the CG station only once during this case. Neither the coxswain nor the Auxiliary base station attempted to obtain commercial or CG assistance. Neglect of proper risk management procedures contributed to threatening the coxswain and crewmember's safety. Two CG Auxiliary members were needlessly exposed to an ebb tide current of 3 knots in a misguided attempt to refloat an auxiliary vessel on their own. These actions, decisions and lack of communications resulted in the stranding and near drowning of one Auxiliary crewmember.

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CASE STUDY WORKSHEET

1. DESCRIBE WHAT HAPPENED. Give a short narrative of what happened during the mishap. Use a timeline to identify key decision points and team activities that played a part in the mishap history. Identify information that is lacking from the case study; things that would have been important to know to help you determine the cause or may have helped the team avoid the mishap.

2. HOW WELL DID THEY PLAN? Did they have adequate time to plan; did they use it effectively? Were preparations double-checked? Was a pre-evolution briefing conducted? Who was involved? Were objectives and responsibilities discussed? Did discussions include risk management?

3. WHAT WAS THE RISK AT THE BEGINNING OF THE EVOLUTION? Show on the timeline when the risk was assessed. What hazards did you see? What was the hazard most unacceptable to you? What risk categories had unacceptable levels? What did you rate the risk? How did they (the people who had the mishap) control this risk? How would you have controlled the risk?

4. WHAT WAS THE RISK JUST PRIOR TO THE MISHAP? This risk assessment should be for the moment in time when the last judgment is made by the leader and/or action taken based on that judgment. What hazards did you see? What was the hazard most unacceptable to you? What risk categories had unacceptable levels? What did you rate the risk? How did they (the people who had the mishap) control this risk? How would you have controlled the risk?

5. WHAT SLIPS, MISTAKES, AND/OR ERRORS WERE MADE along the timeline and by whom? Were any of these trapped, and who did it? For those that were not trapped, was there any reason for the oversight? What preventive measures could have been taken?

6. WHAT DECISION STRATEGIES WERE USED along the timeline and by whom? Were any decisions made under high stress, and if so, how did the decision-maker cope (e.g. ignore, avoid, minimize, etc)? Which strategies were associated with poor judgments? Did poor judgment chains form? Was there any attempt to break the chains? When a chain was broken, how was it broken and by whom?

7. WHAT WAS THE SITUATIONAL AWARENESS OF KEY PERSONNEL along the timeline? What clued you to the times situational awareness was lost? If situational awareness was momentarily lost, who lost if and how was it regained?

8. HOW EFFECTIVE WAS TEAM COMMUNICATION along the timeline? What factors reduced the effectiveness of communication? What principles for message content, sending, receiving, and/or feedback were not followed?

9. HOW WELL DID TEAM MEMBERS ADAPT? What signs of stress were present in whom? Was there any action taken to lower stress and what was it? What was the task load for the key people (i.e. underload, moderate, high, or overload)? What signs of fatigue were present in whom? If none were present, could fatigue have been a major contributor and why? Did fixation, distraction, team structure, or team cohesiveness contribute to the mishap; how? Which, if any, hazardous thought patterns were observed? How did those people, who exhibited hazardous thought patterns, affect the situation?

10. WHAT BEHAVIOR (i.e. PASSIVE, AGGRESSIVE, ASSERTIVE) WAS EXHIBITED BY KEY PERSONS? Who confronted ambiguities or conflicting information? Who was involved in suggesting courses of action?

11. WAS THERE A LEADERSHIP BREAKDOWN? Were objectives translated into tasks? Were assignments thoughtfully made and workload balanced? Was information gathering coordinated? Did the team appear motivated, focused, well informed, and current with the progress of the evolution? Did the team leader act as, or have someone who acted as, the team safety observer? Did the mission coordinator contribute to this mishap?

12. WHAT FACTORS OTHER THAN HUMAN CONTRIBUTED TO THE MISHAP?