EFFECTIVE MISSION ANALYSIS

OBJECTIVES

To successfully complete this module, you must study the text and master the following objectives:

- List the steps that effective leaders use to develop safe and effective operational plans.
- List the three elements of the SPE (Severity, Probability, Exposure) risk assessment model and state what it is used to evaluate.
- List the six elements of the GAR (Green, Amber, Red) risk assessment model.
- List the steps of the risk management process
- State the purpose of a routine brief.
- State the purpose of a routine debrief.

HOW TO DEVELOP SAFE AND EFFECTIVE OPERATIONAL PLANS

Mission Analysis is the process by which the operating plan and contingency plans are developed. It includes organizing the team to meet the mission objectives, allocating resources to perform the critical tasks, and monitoring the team and the environment to adjust resources as necessary. To be effective we must:

- Define tasks based on mission requirements.
- Question data or ideas as they relate to mission accomplishment.
- Discuss long and short term plans for the mission.
- Identify the impact of potential hazards and unplanned events on the mission.
- Structure tasks, plans, and objectives related to the mission.
- Thoroughly critique existing plans for potential problems.

Define Required Tasks	A task analysis based on anticipated mission requirements is the first step in developing an operating plan.
Verify Data, Double Check The Work	Plans developed around incorrect information put the team at a disadvantage. Double check data, in particular environmental conditions and external control systems (e.g. traffic schemes and communications plans), before beginning a plan. Double checks must be independent computations that arrive at the same conclusion. Ineffective double checks contribute to mishaps.
Discuss Objectives	All team members need to understand the mission in terms of both the short term and long term objectives. By outlining all objectives the team can provide better input on how to best achieve them.
Assess Risk	This requires two steps: *safety risk identification* and *evaluation of the loss potential* (e.g. catastrophic to minor). Risk assessment is a key part of the risk management process, which is discussed later in this chapter.
Assemble the Plan	The mission needs, resources, and assessed risks are then assembled into a plan. Safety risks that are unacceptable to the Coast Guard, the unit, or the team are managed in the plan.
Critique the Plan	All team members should be empowered to question and provide feedback on the plan. No plan is perfect or can be designed to meet all contingencies.

MANAGING RISK

Risk management is a process by which we can maintain an *acceptable* level of safety during the conduct of our mission. Safety is defined as: "*The identification and control of risk.*" Risk management is the identification and control of risk, *according to a set of preconceived parameters.* The parameters and the acceptable limits vary with the type of operation. Rescue operations, buoy tending, ice breaking, law enforcement, etc., all have different risks. Controlling the risks means we eliminate, reduce, or manage hazards that can lead to mishaps.

Operational Risk Management

Operational Risk Management (ORM) does not only apply to operational units or operational missions in the usual sense that "operations" are defined. All Coast Guard Missions and daily activities, both on-duty and off-duty, require decisions that involve risk management. The term "operational" in ORM includes any military or civilian member of the Coast Guard who contributes to the overall goal of increasing unit effectiveness. All levels of the organization contribute, either directly or indirectly, to operational mission successes. Every individual is responsible for identifying potential risks and compensating accordingly. Therefore, the ORM target audience includes all those involved in operations, maintenance, and support activities.

A risk management program is used to encourage the making of safe decisions and stands behind those who make those decisions. The consistent application of risk management techniques can help modify team member attitudes and change motivational factors that have been known to put people at risk. Risk management philosophy is to increase mission success while reducing the risk to personnel and resources to an acceptable level.

Risk Management (Cont.)

As the Coast Guard continues to operate in a streamlined environment, preventing losses becomes even more critical to maintain mission readiness. Beyond preventing losses, ORM also provides a logical process to identify and exploit opportunities that provide the greatest return on our investment of time, dollars, and personnel.

PRINCIPLES OF OPERATIONAL RISK MANAGEMENT

These basic decision-making principles must be applied before any anticipated job, task, or mission is performed:

- Accept no unnecessary risk.
- Make risk decisions at the appropriate level.
- Accept risk when benefits outweigh the costs.
- Integrate ORM into Coast Guard doctrine and planning at all levels.

Accept no unnecessary risk

Unnecessary risk contributes no benefits to the safe accomplishment of a task or mission. The most logical choices for accomplishing a mission are those that meet all the mission requirements while exposing personnel and resources to the lowest possible risk.

Make risk decisions at the appropriate level

Making risk decisions at the appropriate level establishes clear accountability. Those accountable for the success or failure of a mission must be included in the risk decision process. Supervisors at all levels must ensure subordinates know how much risk they can accept and when they must elevate the decision to a higher level.

Accept risk when benefits outweigh costs

Weighing risks against opportunities and benefits helps to maximize unit capability. Even high-risk endeavors may be undertaken when there is clear knowledge that the sum of the benefits exceeds the sum of the costs.

Integrate ORM into doctrine and planning

To effectively apply risk management, leaders at all levels must dedicate time and resources to incorporate risk management principles into the planning and execution phases of all operations. Integrating risk management into planning as early as possible provides the decision-maker with the greatest opportunity to apply ORM principles.

ASSUMPTIONS ABOUT RISK MANAGEMENT

The Operational Risk Management program assumes:

- Every event/evolution has some degree of risk exposure.
- All the risks will never be known.
- Every event/evolution requires managing risk by applying adequate risk controls.
- Resources available to identify and manage risk are limited.
- The goal is to eliminate all *unacceptable* risk in each event/evolution.

LEVELS OF RISK MANAGEMENT

While it would be preferable to perform an in-depth application of risk management for every task, time and other resource limitations apply. Therefore, risk management exists on three levels to meet an appropriate need:

- Time Critical.
- Deliberate.
- Strategic.

Time Critical

Time critical risk management is an "on-the-run" mental or verbal review of the situation using the basic risk management process without necessarily recording the information. This process is used to consider risk while making decisions in a time-compressed situation. It is particularly helpful for choosing the appropriate course of action when an unplanned event occurs during execution of a planned operation or daily routine.

Deliberate

Deliberate risk management is the application of the complete process. It primarily uses experience and brainstorming to identify hazards and develop controls and is therefore most effective when done in a group. Examples of Deliberate applications include planning operations, reviewing standard operating procedures, and damage control or disaster response planning.

Strategic

This is the deliberate process with more thorough hazard identification and risk assessment involving research of available data, use of diagram and analysis tools, formal testing, or long term tracking of hazards associated with the system or operation. It is used to study the hazards associated in a complex operation or system, or one in which the hazards and their associated risks are not well understood. Examples of Strategic applications include long-term planning of complex operations, design of new equipment, and major system overhaul or repair.

Operational Risk Management Steps

Every event requires that we manage risk to keep it within acceptable boundaries (e.g. slowing to a safe speed in fog,). How we keep risks in check is therefore very important. Figure 3-1 lists the steps to a systematic approach:

RISK MANAGEMENT STEPS

Figure 3-1

1. Define the Mission/Task

This step is accomplished by reviewing current and planned operations describing the mission at hand. To assist with this step, construct a list or chart depicting major phases of the operation or task. Break down the operation or task into "bite-size" pieces.

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2. Identify the Hazards

The key to successfully analyzing risk is the careful definition of the hazard. Hazard identification can be accomplished by one or more of the following methods:

1. Consideration of known sources of hazards usually identified by reviewing past accidents or losses.
2. Brainstorming by a team that understands all aspects of the system under consideration. List all hazards associated with major steps in the task formulated in Step One.

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2. Identify the Hazards (Cont.)

3. Identification of risk scenarios through personal observation, professional judgment, or task analysis.

Potential failures (things that can go wrong) can be equipment or operational in nature and can be both internal and external to the *team*. Examining each element of the "PEACE" Model (**P**lanning, **E**vent Complexity, **A**sset Selection, **C**ommunication (and supervision), and **E**nvironmental Conditions) will ensure effective hazard identification in each of the following three main categories:

- **Equipment:** Is the equipment functioning properly and can it be expected to function properly throughout the planned task or evolution?
- **Environment:** How will the weather, sea conditions, proximity to shoals, vessel traffic, and available light affect the task or event?
- **Personnel:** Is the team properly trained and capable of handling the demands of the mission? Are they fatigued, complacent, or suffering from the affects of physical or mental stress?

Example: Your vessel is constrained by draft to navigate within the channel. You are outbound. You receive a series of reports.

- A vessel is sighted inbound.
- The vessel is constrained by draft.
- The vessel is going to anchorage.
- It has to cross the outbound channel to get to its anchorage.
- At present course and speed, the crossing will have you close aboard.

Adequately defining the hazard often requires us to put many pieces of information together. The definition of the hazard will directly affect how you evaluate the level of risk. In the preceding example there are a number of actual and potential hazards. One hazard can be identified in the following manner:

Identified Hazard: Possible collision with inbound vessel as it crosses the outbound channel.

The more specific the hazard identification is, the more accurate will its risk assessment be and more thorough the development of risk control options. **In planning a mission or a task, anyone can miss or fail to recognize a hazard. It is important for the team to discuss hazards to prevent this mistake.**

3. Assess The Risk

Risk must be considered as it applies to the unit and the mission. Individual risk levels must be determined for each hazard identified. Risk assessment is conducted by evaluating specific elements or factors, that when combined, define risk. The level of risk must be understood as it applies to the team and/or the mission. *Two different methods to evaluate risk will be discussed later in this chapter.* They differ by the way they look at the hazards you identified in step #2.

1. **Specific hazards**, such as those involved in launching or recovering a small boat or the meeting of two vessels in a congested waterway, can be addressed by *the SPE Model.*
2. **General hazards:** The *GAR Model* can address more general risk concerns, which involve planning operations, or reassessing risks as we reach milestones within our plans.

THE RISK ASSESSMENT QUESTIONING TECHNIQUE

This simple technique employs the use of five questions that may be asked by anyone, anywhere, anytime. No documentation is required and this method can be applied quickly and easily. Use it to reduce risk in everything that you do. The five questions are:

1. ***Why*** am I doing it at all?
2. ***What*** could go wrong?
3. ***How*** will it affect others or me?
4. ***How*** likely is it to happen to me?
5. ***What*** can I do about it?

Example: You can promote this technique and encourage all employees to be aware of risk by distributing and wearing in the workplace tags inscribed with these five basic questions. It serves as a reminder to assess risk in all of our daily activities.

4. Identify the Options

A. Starting with the highest risk hazards as assessed in Step 3, identify as many risk control options as possible for all hazards that exceed an acceptable level of risk. Risk control options include:

- Spread out.
- Transfer.
- Avoid.
- Accept.
- Reduce.

Spread Out

Risk is commonly spread out by either increasing exposure distance or by lengthening the time between exposure events.

Transfer

Risk transference does not change probability or severity; however, possible losses or costs are shifted to another entity.

Avoid

Avoiding risk altogether requires canceling or delaying the job, mission, or operation, but is an option that is rarely exercised due to mission importance. However, it may be possible to avoid specific risks until conditions are more suitable.

Accept

Risk is accepted when the benefits clearly outweigh the costs, and only as much as necessary to accomplish the mission or task.

Reduce

Risk can be reduced. The overall goal of risk management is to plan missions or design systems that do not contain hazards. In complex systems, however, this is usually impractical or impossible. The easiest way to reduce risk is by increasing individual awareness of the hazard and its associated risk.

4. Identify the Options (Cont.)

B. *Brainstorm* a list of ways to reduce the risk levels that you considered acceptable in step #3.

C. *Determine the consequences* of each alternative on mission and/or team goals.

D. *Select the best alternative or combination of alternatives.* The mission priority and time criticality will often drive which option is chosen.

5. Evaluate Risk vs. Gain

Determine if the benefits of the operation now exceed the levels of risk that the operation presents, considering the cumulative risk of all the hazards and the long-term consequences of the decision. *Very high risk versus gain decisions require the concurrence of the appropriate level of command.* The Chain of Command shares responsibility for the risks taken by your *team* in the performance of the mission. This step also serves as a reality check to verify that the objective is still valid. However, it is important to note that expected value of a loss differs from person to person based on individual perceptions of risk. Therefore, one should consider the perceived value as well as the expected value of a loss when making risk decisions.

6. Execute the Decision

Take action! This may mean increasing, replacing, or reassigning unit or team resources (i.e. people, equipment, and/or information), and ensuring the risk controls are known by all and enforced.

Example: Posting additional lookouts will require added watchstanders. They have to be identified, notified regarding their duty, trained, and provided necessary gear and a means to communicate.

A high level of risk that cannot be effectively controlled should be reported through the Chain of Command to the appropriate leadership level!

7. Monitor The Situation

Are the controls and risks in balance? Are changes to the operation, equipment, environment, and/or people effective in lowering risk? It is important to remember that *risk management is a continuous process!* React to changes in the situation by returning to Step #1. At key points in the mission, it is important to assess risk. Figure 3-2 provides an example of a generic afloat mission showing where risk should be assessed.

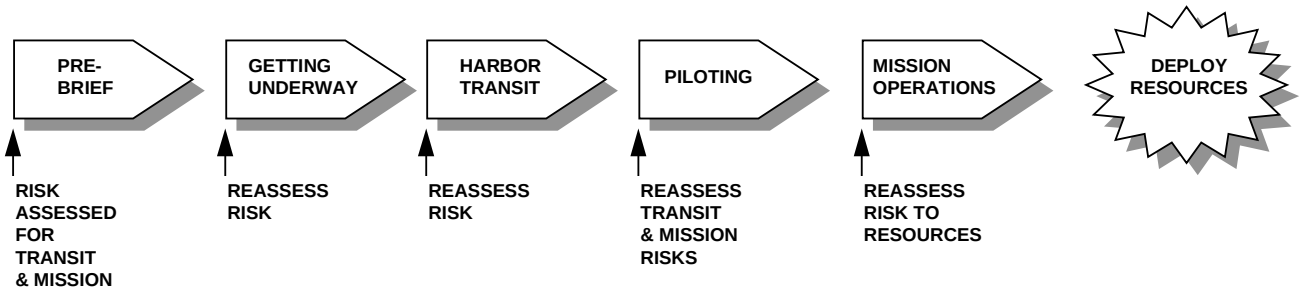

Figure 3-2

SPE MODEL

Risk for a specific hazard can be assessed using the SPE Model, computed as:

Risk = Severity X Probability X Exposure

Figure 3-3 presents the risk assessment process using the SPE Model.

SPE RISK ASSESSMENT MODEL

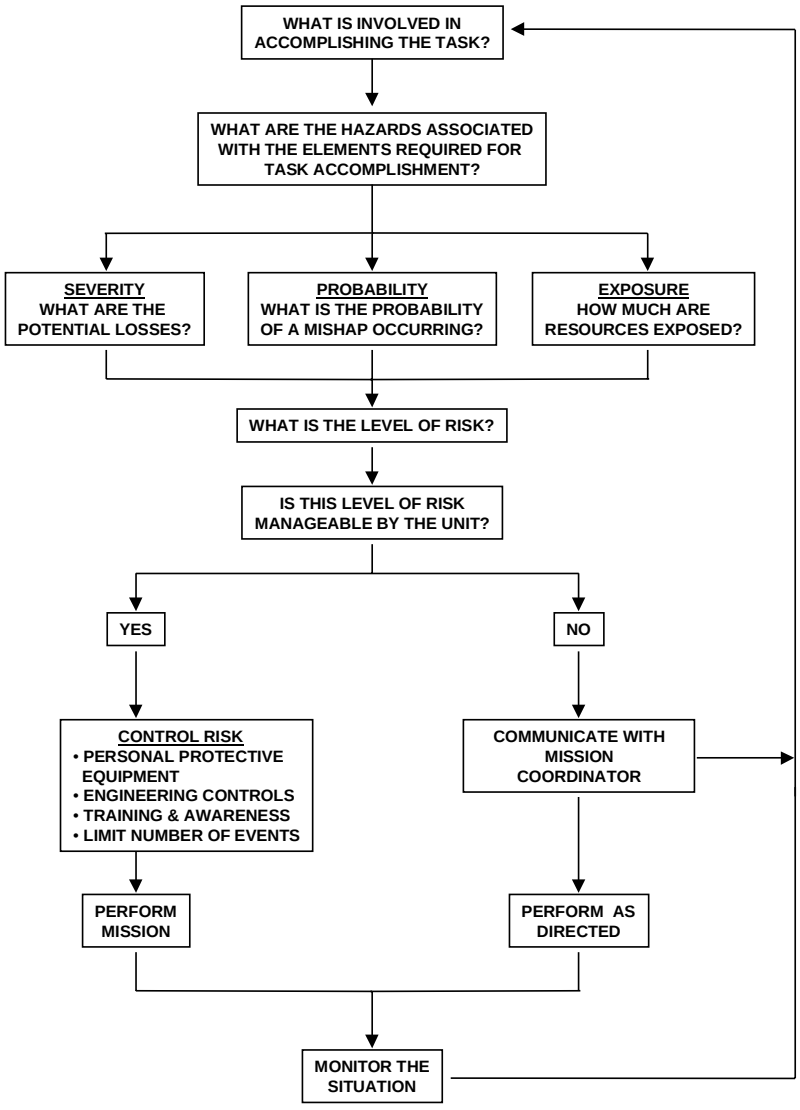

Figure 3-3

Severity

Describes the potential loss or consequences of a mishap. Should something go wrong, the results are likely to be found in the following areas:

- Injury, occupational illness or death.
- Equipment damage.
- Mission degradation.
- Reduced morale.
- Adverse publicity.
- Administrative and/or disciplinary actions

Severity can vary from 1 to 5.

1 = None or slight
2 = Minimal
3 = Significant
4 = Major
5 = Catastrophic

Risk Control: Protective devices, engineering controls, and personal protective equipment are used to control Severity.

Probability

The likelihood that given exposure, the projected consequences will occur. Probability can vary from 1 to 5.

1 = Impossible or remote under any conditions
2 = Unlikely under normal conditions
3 = About 50-50
4 = Greater than 50%
5 = Very likely to happen

Risk Control: Training, awareness, attitude change, etc., are used to control Probability.

Exposure

The amount of time, number of cycles, number of people involved, and/or amount of equipment involved. Exposure can vary from 1 to 4.

1 = None or below average
2 = Average
3 = Above average
4 = Great

Risk Control: Exposure is usually controlled by reducing the number of people involved, the number of events, cycles, evolutions, etc.

Calculating Risk Using SPE Model

By computing the level of risk, the effectiveness of mission and execution can be evaluated. For the formula R = S x P x E, those risks that are substantial to very high need to be controlled.

Values	Risk Level	Action
80-100	Very High	Discontinue, Stop
60-79	High	Immediate Correction
40-59	Substantial	Correction Required
20-39	Possible	Attention Needed
1-19	Slight	Possibly Acceptable

After computing the risk levels for each hazard identified, those hazards can be rank ordered from the highest to the lowest risk. This allows you to focus on the areas of most concern first under conditions of limited resources.

GAR MODEL

More general risk concerns that involve operations planning or reassessing risks as milestones are achieved can be addressed using the GAR Model. A survey of Coast Guard accidents identified 6 elements that affect risk in operations.

- Supervision.
- Planning.
- Team Selection.
- Team Fitness.
- Environment.
- Task Complexity.

These elements are incorporated into the *GAR* (Green, Amber, Red) Risk Assessment Model (Figure 3-4). This model provides the team with another way of assessing risk and may be used as an alternative to the SPE Model.

GAR RISK ASSESSMENT MODEL

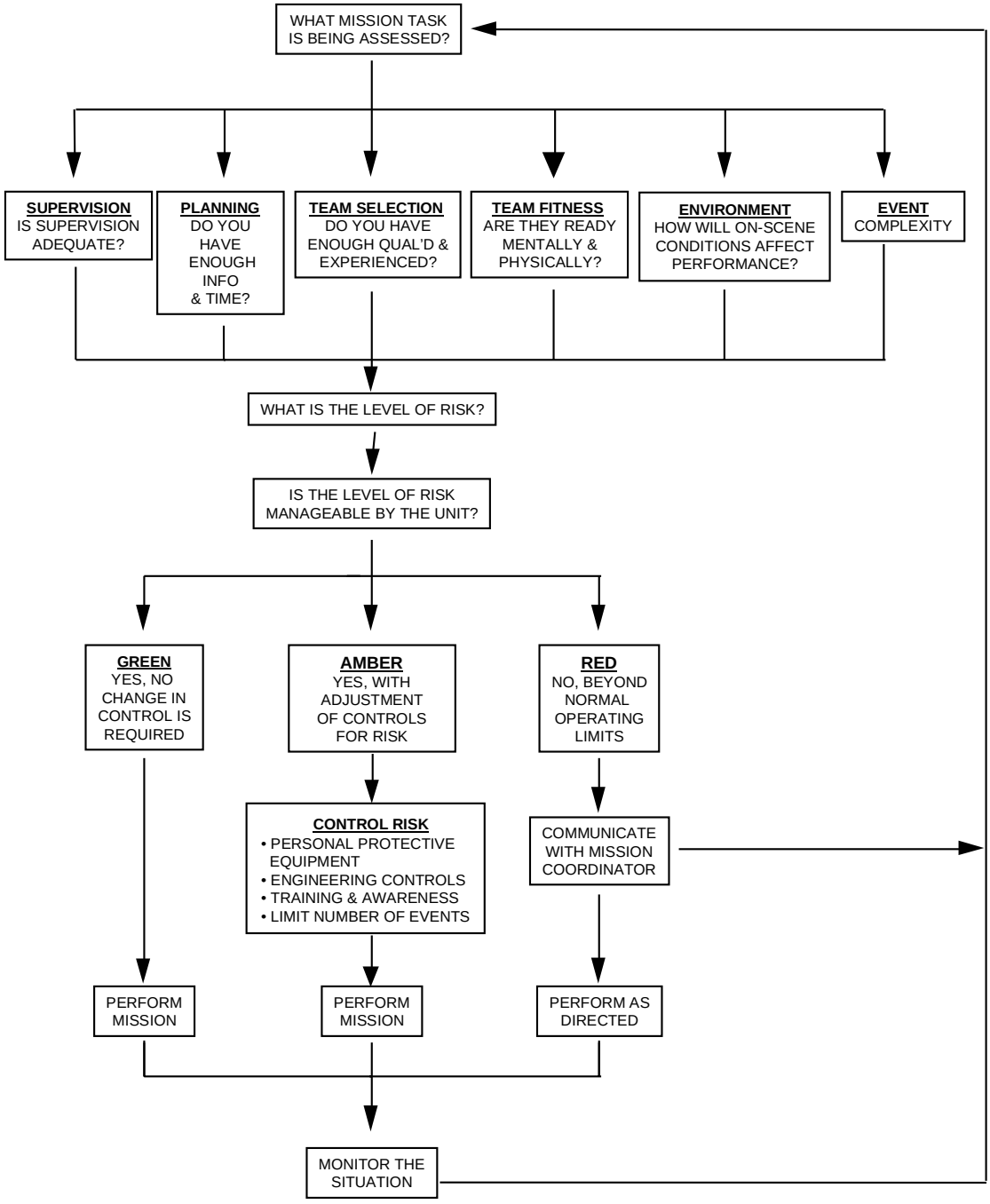

Figure 3-4

Supervision

Supervisory Control considers how qualified the supervisor is and whether effective supervision is taking place. Even if a person is qualified to perform a task, supervision acts as a control to minimize risk. This may simply be someone checking what is being done to ensure it is being done correctly. The higher the risk, the more the supervisor needs to be focused on observing and checking.

A supervisor who is actively involved in a task (doing something) is easily distracted and should not be considered an effective safety observer in moderate to high-risk conditions.

Planning

Planning and preparation should consider how much information you have, how clear it is, and how much time you have to plan the evolution or evaluate the situation.

Team Selection

Team selection should consider the qualifications and experience level of the individuals used for the specific event/evolution. Individuals may need to be replaced during the event/evolution and the experience level of the new team members should be assessed.

Team Fitness

Team fitness should consider the physical and mental state of the crew. This is a function of the amount and quality of rest a crewmember has had. Quality of rest should consider how the ship rides, its habitability, potential sleep length, and any interruptions.

Fatigue normally becomes a factor after 18 hours without rest; however, lack of quality sleep builds a deficit that worsens the effects of fatigue.

Environment

Environment should consider factors affecting personnel performance as well as the performance of the asset or resource. This includes, but is not limited to, time of day, temperature, humidity, precipitation, wind and sea conditions, proximity of aerial/navigational hazards and other exposures (e.g., oxygen deficiency, toxic chemicals, and/or injury from falls and sharp objects).

Event or Evolution Complexity

Event/Evolution complexity should consider both the required time and the situation. Generally, the longer one is exposed to a hazard, the greater are the risks. However, each circumstance is unique. For example, more iterations of an evolution can increase the opportunity for a loss to occur, but may have the positive effect of improving the proficiency of the team, thus possibly decreasing the chance of error. This would depend upon the experience level of the team. The situation includes considering how long the environmental conditions will remain stable and the complexity of the work.

Calculating Risk Using GAR Model

To compute the total level of risk for each hazard previously identified, assign a risk code of 0 (For No Risk) through 10 (For Maximum Risk) to each of the six elements. This is your personal estimate of the risk. Add the risk scores to come up with a Total Risk Score for each hazard. See Figure 3-5.

Color Coding Risk

The mission risk can be visualized using the colors of a traffic light. If the total risk value falls in the *GREEN ZONE* (1-23), risk is rated as low. If the total risk value falls in the *AMBER ZONE* (24-44), risk is moderate and you should consider adopting procedures to minimize the risk. If the total value falls in the *RED ZONE* (45-60), you should implement measures to reduce the risk prior to starting the event or evolution. See Figure 3-5.

Risk Calculation Worksheet

Supervision	_____
Planning	_____
Team Selection	_____
Team Fitness	_____
Environment	_____
Event/Evolution Complexity	_____
Total Risk Score	_____

GAR Evaluation Scale
For Color Coding the Level of Risk

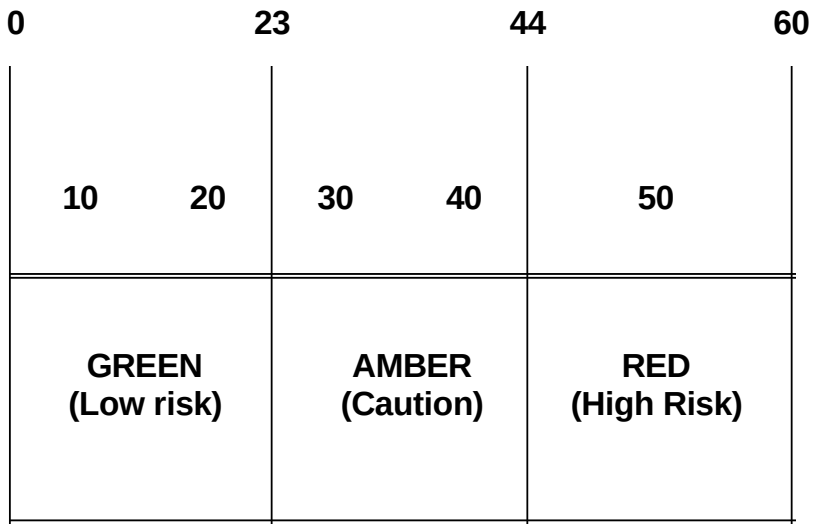

Figure 3-5

The GAR Model is good for a general assessment of a task or mission. If there is a concern for high risk levels in one or more of the above elements, a second assessment using the SPE Model should be done for each element of concern, since the SPE Model is designed for more specific assessments. As with the SPE Model, all hazards should be rank ordered from the highest to the lowest risk levels to target areas of greatest concern first.

The ability to assign numerical values or "color codes" to hazards using either the SPE or the GAR Model is not the most important part of risk assessment. What is critical to this step in the ORM process is team discussions leading to an understanding of the risks and how they will be managed.

RISK RATINGS

Different operational communities within the Coast Guard have adopted the GAR Model, but can have different interpretations for "Green," "Amber," and "Red." The following chart illustrates some of these differences:

AFLOAT	AVIATION	LAW ENF.	MAR. SAFETY
Green	Low	N/A	Low
Amber	Medium	Medium	Medium
Red	High	High	High

Because a Low/Medium/High scale is a widely used standard throughout the safety industry, risk level discussions between various Coast Guard activities should be in terms of Low, Medium, and High to facilitate communications during joint operations. However, each community will define the meaning of Low, Medium, and High risk in terms that are meaningful to their personnel.

BRIEFINGS

The briefing includes not only what you will be doing, but also how it will be done. The success of the plan is often determined by the quality of the briefing process. Briefings fall into two categories: Brief and Debrief.

BRIEF

The Brief sets the stage for what is to follow. It clarifies expectations for team members and establishes the ground rules for the task. Make the following process part of your routine Brief:

- Specify desired results.
- Set expectations.

BRIEF (Cont.)

- Clarify responsibilities.
- Identify available resources.
- Establish a climate for learning.
- Accept/encourage input from team members.
- Maintain a positive attitude.
- Define accountability.

Specify Desired Results

What is the desired result or objective? What do you want in terms of quality and quantity?

Example: "It's important that we arrive at our destination such that the first line is on the pier by 0900. We have to be sharp in our final approach because the City Fathers will be waiting on the pier to greet us to their city."

Set Expectations

Explain what you expect from other team members and what they can expect from you, as well as from the mission. This is also your opportunity to ensure that your expectations of fellow team members are accurate and that there have been no changes in personnel, equipment, etc. that will affect the outcome of the mission.

Clarify Responsibilities

Discuss with the team whatever principles, policies, and procedures are considered essential to achieving the desired results. Review lessons learned to determine critical tasks and "No-No's". When identifying "No-No's", also identify what level of initiative is expected from specific team members (i.e. Wait until told; Ask whenever there is a question; Always provide a recommended course of action; Do it and report your actions immediately; or, Report back routinely).

Clarify Responsibilities	**Example:** "It is highly important that we stay alert to traffic communications since we will be mooring at a blind bend in the river. The OOD is to keep me abreast of all communications between traffic within one mile of us."
Identify Available Resources	Ensure the team has all applicable information and that equipment capability is understood. Ensure all personnel who have a need to know have been included in the team planning process. For major evolutions, that means several shipboard teams need to be represented at planning briefs.
Establish a Climate for Learning	There is a learning opportunity available during each and every task or evolution. Create a climate for learning by ensuring that all team members understand this is an objective and take advantage of the opportunities as they arise.
Accept/Encourage Input	If you truly want team members to be assertive, you must give them permission to do so. The time you spend encouraging and accepting input during the Brief will set the stage for the rest of the mission.
Maintain a Positive Attitude	Your attitude as a team leader is contagious. A positive attitude demonstrated by the leader will lead to positive attitudes by all team members. This is especially critical during high risk, high stress missions.

Make Your Team Accountable	Ensure team members understand the standards for performance (e.g. Navigation Standards, Standing Orders, SOPs, Training Assessment/Ready For Operations Checklists etc.) that will be used in evaluating the results. Set aside a specific time when you will debrief the team.
DEBRIEF	The Debrief provides an opportunity to evaluate and recognize teams or individuals for their performance. This includes identifying areas where performance needs improvement. It is a feedback session. Make the following behaviors part of your routine Debrief: • Conduct self-critique. • Accept/encourage feedback and suggestions. • Focus on process. • Demonstrate consistency.
Conduct Self Critique	Openly critique your actions and determine what you can learn from them. Encourage similar behavior on the part of other team members. This should be approached as an opportunity to learn from recent experience. Unless you are aware of your performance, you cannot know what you should continue doing or what you should change.
Encourage Feedback	Be open to feedback and actively solicit it.

Focus On Process

It is important that the team understands its effectiveness in the process. Doing things right is only half way to effective team coordination. Doing "*the right thing right*" is the ultimate goal. In describing process, address: what, why, how, when, where, as well as who. When evaluating individuals or teams, apply the principles of Effective Feedback.

Demonstrate Consistency

Make debriefs a routine part of the job. They are critical to continuous improvement and doing "*the right thing right*." Make time for the debriefing process!

SELF-QUIZ #2

1. What are the steps that effective leaders use to develop safe and effective operational plans?

   a. _____

   b. _____

   c. _____

   d. _____

   e. _____

   f. _____

2. What are the three elements of the SPE Risk Assessment Model?

   a. _____

   b. _____

   c. _____

3. What are the six elements of the GAR Risk Assessment Model?

   a. _____

   b. _____

   c. _____

   d. _____

   e. _____

   f. _____

SELF-QUIZ #2 (continued)

4. What are the seven steps in the risk management process?

   a. _____

   b. _____

   c. _____

   d. _____

   e. _____

   f. _____

   g. _____

5. What is the purpose of a routine Brief?

_____

_____

6. What is the purpose of a routine Debrief?

_____

_____

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ANSWERS TO SELF QUIZ #2

Question	Answer	Reference
1.	a. Define required tasks. b. Verify data, double-check the work. c. Discuss objectives. d. Assess risk. e. Assemble the plan. f. Critique the plan.	3-1
2.	a. Severity. b. Probability. c. Exposure.	3-14
3.	a. Supervision. b. Planning. c. Team selection. d. Team fitness. e. Environment. f. Event/Evolution complexity.	3-19
4.	a. Define mission/task. b. Identify hazards. c. Assess the risk. d. Identify options. e. Evaluate risk vs. gain. f. Execute the decision. g. Monitor the situation.	3-7
5.	The Brief sets the stage for what is to follow. It clarifies expectations for team members and establishes the ground rules for the mission.	3-22
6.	The Debrief provides an opportunity to evaluate and recognize teams or individuals for their performance.	3-25

Student Notes

Student Notes

Student Notes

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