# Chapter 4: Team Coordination and Risk Management

**Introduction**

This chapter addresses human error and risk based decision-making. Both greatly affect the safety of boat operations. Human error has been and continues to be a significant cause of boat mishaps. Ineffective risk management has placed many boats and crews at greater risk than necessary. Technical knowledge and skill alone cannot prevent mishaps. It also takes teamwork that recognizes, minimizes, and corrects human errors and a systematic process to continuously assess and manage safety risks.

Prudent seamen have exhibited and human factors researchers have described seven critical skills that reduce the potential for human error-induced mishaps (see *Section A* of this chapter). Within these skills are important processes that serve to control safety risks and improve team performance. These critical skills are collectively titled "Team Coordination". The process are risk management, crew briefing, and crew debriefing.

This chapter mandates the use of team coordination, risk management, crew briefing, and crew debriefing as part of standard bot operations. It describes the skills, performance standards, Vessel Officer (VO) responsibilities and training requirements for each. It also describes the risk management, crew briefing and crew debriefing processes. To promote these skills and processes, performance in team coordination shall be assessed as part of crew debriefings, ready for operations (RFO) inspections, and Standardization Team visits.

NOTE: Additional information concerning team coordination and risk management can be found within *Team Coordination Training Manual* and *Operational Risk Management Manual.*

**In This Chapter**

This chapter contains the following sections:

# Section A. Team Coordination

**Introduction**

A team is a collection of people that uses the technical abilities of its members to achieve a common mission. This section discusses how team coordination can:

- Control human error
- Manage safety risks
- Provide directions for continuous improvement in team performance

**A.1. Members of the Team**

The boat crew consisting of a Vessel Officer (or Boat Operator) and crewmembers is a team. But it also is part of a larger team. Boat crews often perform missions while interacting with other people. Members of this larger team are:

- Incident Commander (IC)
- Other assigned Parks assets (boats)
- Other state agency assets (state and local officers, aircraft, vessels)
- Commercial salvagers and Good Samaritans
- The "customer"

In this case the customer is the person or vessel which is the focus of the mission. The mission is the reason for getting the boat underway.

**A.2. Vessel Officer (VO)**

The VO wears two hats as:

- The person in charge of the boat team
- A member of the larger team

Because the majority of boat missions have inherent safety risks, effective coordination of the boat team and the larger team is a cornerstone for mishap prevention.

**A.3. Team Coordination Skills**

Proper use of team coordination tools requires team members, VO, and boat crew to routinely use all seven team coordination skills all the time. The skills are the good habits of exemplary leaders. They have been tested within complex missions, under ever changing conditions, and when crew stress and safety risks were high. Like the navigational rules of the road, when team coordination and risk management is properly used, and adequate safety margin for mission operations can be maintained.

The seven team coordination skills are:

| Skill | Description |
|---|---|
| Leadership | • Directing and guiding the activities of the boat<br>• Stimulating the crew to work together as a team<br>• Providing feedback to the crew regarding their performance |
| Mission Analysis | • Making plans<br>• Managing risks<br>• Organizing and briefing the crew<br>• Assigning tasks |

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| | • Monitoring mission effectiveness, including debriefing the crew |
| Adaptability and Flexibility | • Altering a course or action to meet changing demands<br>• Managing stress, workload and fatigue to maintain an optimal performance level<br>• Working effectively with others |
| Situational Awareness | Knowing at all times what is happening to:<br>• The boat<br>• The VO and crew, and<br>• The mission |
| Decision-Making | Applying logical and sound judgment based on the available information |
| Communication | Clearly and accurately sending and acknowledging information, instructions and commands, as well as providing useful feedback |
| Assertiveness | • Actively participating in problem-solving, by stating and maintaining a position until convinced by the facts that this position is wrong<br>• Speaking up and/or taking action when appropriate |

# Section B. Team Coordination Standards

**Introduction**
Team coordination standards identify expected behaviors among the mission coordinator, VO, and crew necessary to affect safe mission performance. These standards represent the expected performance in all missions.

VO responsibilities represent the minimum required actions of a VO to achieve team coordination and risk management. These standards and responsibilities shall be evaluated as part of crew debriefings, RFO inspections, and Standardization Team visits.

**In This Section**
This section contains the following information:



## Leadership Standard

**B.1. Boat Crew Responsibilities**
The following points outline the standards of leadership for a boat crew team:

- The boat crew respects each other. The climate is an open one, where the crew is free to talk and ask questions about the mission
- Regardless of assigned duties, the individual with the most information about the situation-at-hand is allowed to participate in mission decisions
- When disagreements arise, the VO and crew directly confront the issue over which the disagreements began
- The primary focus is on solutions to problems. The solutions are generally seen as reasonable. Problem resolution ends on a positive note with very little grumbling among the VO and crew.

**B.2. VO Responsibilities**

The VO shall:

- Be in charge and give clear and understandable direction to the boat crew.
- Monitor crew safety and progress. If unable to monitor safety, shall designate a safety observer
- Balance and monitor crew workload and manage crew stress
- Remain approachable and open to ideas and suggestions
- Update the crew on significant mission changes
- Provide to the crew timely, constructive feedback on performance
- Provide to the mission coordinator timely updates on boat status

# Mission Analysis Standard

**B.3. Boat Crew Responsibilities**

The following procedures outline the standards of mission analysis:

| Step | Procedure |
|---|---|
| 1 | The mission coordinator, VO, and crew know the mission objectives |
| 2 | The mission coordinator and VO discuss a plan for the mission |
| 3 | Potential problems are briefly discussed |
| 4 | Time is taken to:<br>• Assess risks<br>• Eliminate unnecessary risks<br>• Reduce unacceptable risks |
| 5 | The crew is briefed on the plan and may provide suggestions |
| 6 | Mission tasks are assigned to specific individuals |
| 7 | Contingency planning is accomplished by the mission coordinator and VO |
| 8 | As additional information becomes available, the plan is updated |
| 9 | Some discussion takes place to clarify actions in the event of unexpected problems |
| 10 | The VO reviews crew actions and conducts a debriefing of the mission |
| 11 | Strengths and weaknesses are identified; remedial actions are assigned to improve future performance |

**B.4. VO Responsibilities**

- Discuss mission objectives and hazards with the mission coordinator as part of planning before getting underway. Understand level of risk that the mission has and how much risk the VO is authorized to take

- Take no unnecessary risks and have contingencies to deal with unacceptable risks.
- Brief the crew on mission objectives and the plan. Permit open discussion to ensure that tasks are understood and crew ideas are considered
- Update plans based on changes in the situation and/or mission objectives
- Debrief the crew on mission performance; identify areas for improvement

## Adaptability and Flexibility Standard

**B.5. Boat Crew Responsibilities**

The following points outline the standards of adaptability and flexibility for a boat crew team:

- Most distractions are avoided. The crew polices each other for fixation; takes positive action to regain situation awareness
- The VO can decide what information and activities are mission essential. Most nonessential information is set aside.
- Crew tasks are prioritized to ensure safe performance. The boat crew is aware of each other's workload. When a crewmember appears overloaded, the workload is redistributed.
- The mission coordinator and VO are alert to possible crew fatigue, complacency, or high stress.

**B.6. VO Responsibilities**

The Vessel Officer shall:

- Remain aware of own stress and own hazardous thought patterns. Take positive action to counter subconscious tendencies to react to the excitement of the moment or arbitrarily discard information that conflicts with own perceptions.
- Implement cross-checks of VO and crew actions to combat the effects of fatigue for night missions or those that extend time awake beyond 18 hours.
- Remain alert to the effects of complacency and high stress on the crew. Take positive action to manage crew stress.
- Remain alert to work overload within the crew, and redistribute work as necessary.
- Notify the mission coordinator if the physiological condition of the crew becomes a safety concern.

## Situation Awareness Standard

**B.7. Boat Crew Responsibilities**

The following procedures outline the standards of situation awareness for a boat crew team:

| Step | Procedure |
|---|---|
| 1 | The VO provides the mission coordinator and the crew with mission status (e.g., current operations and/or perceived location). |
| 2 | Changes to situation awareness are verbalized |
| 3 | The crew or mission coordinator recognizes that a risk decision or action must be made and offers suggestions or information to the VO. The mission coordinator serves as a check of the VO's risk decisions. |
| 4 | If the mission coordinator perceives the boat or crew is taking unacceptable risks, positive |

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| | action is taken to control the situation (e.g., stopping or slowing boat activities and/or providing additional assets). |
| 5 | The boat crew checks each other's task performance for errors. Anyone who makes a mistake is informed and makes needed corrections. |
| 6 | The VO maintains an effective lookout |

**B.8. VO Responsibilities**
The Vessel Officer shall:

- Not get underway without an understanding of the mission objectives, the known risks, and a plan of action
- Ensure that the crew understands the mission plan and assigned tasks
- Remain alert to mistakes in planning and crew errors. Likewise, empower the crew to double-check the VO's decisions and actions.
- Remain vigilant to changes in the situation. Remain alert to conflicting or ambiguous information that may indicate that the perceived situation is different than the actual one.
- Periodically update the mission coordinator and the crew as to the perceived situation.

## Decision-Making Standard

**B.9. Boat Crew Responsibilities**
The following points outline the standards of decision-making for a boat crew team:

- VO decisions reflect a willingness to use available information from all sources.
- Most decisions are timely, but may be affected by stress.
- Most decisions are appropriate for the situation; however, the crew may overlook options or discount risk.
- The boat crew does not exhibit hazardous thought patterns (e.g., anti-authority, invincibility, impulsiveness, machismo, or resignation).
- Before the VO decides and implements a change in objective, the situation may worsen; however, mission accomplishment is not affected and no loss occurs.

**B.10. VO Responsibilities**
The Vessel Officer shall:

- Assess current situation and available information to determine ability to meet mission objectives.
- Make use of available time to develop contingencies or alternative courses of actions.
- Consciously weigh the risks versus the gains. Implement the best contingency or action to address the situation.
- Monitor the situation to ensure the decision produces the desired outcome.

# Communication Standard

**B.11. Boat Crew Responsibilities**
The following points outline the standards of communication for a boat crew team:

- The boat crew and mission coordinator communicate about the mission as required. Standard terminology is used.
- Receivers acknowledge messages. Receivers ask questions when they do not understand.
- Senders usually pursue confirmation when no response is forthcoming and the message is important.
- When changes to crew tasks occur, all hands are aware. The VO states risk decisions to the mission coordinator and crew and, as time permits, inform the crew of the reasons and any adjustments they have to make.
- The mission coordinator and crew acknowledges their awareness of the risk decisions. Anyone may ask mission-related questions to clarify information.

**B.12. VO Responsibilities**
The Vessel Officer shall:

- Use standard terminology in giving commands to the crew and in conducting external communications.
- Ensure that information and orders conveyed to the crew are acknowledged by the intended receiver.
- Communicate intentions associated with risks to the mission coordinator and crew.

# Assertiveness Standard

**B.13. Boat Crew Responsibilities**
The following points outline the standards of assertiveness for a boat crew team:

- The mission coordinator, VO and/or crew occasionally raise questions about the plan or actions when they are either in doubt, or when they believe the boat is standing in danger. Most of these questions are relevant to risk decision-making.
- The VO alerts the crew or mission coordinator when input is needed to make risk decisions.
- The crew or mission coordinator responds to the VO's request with pertinent, brief, and timely information. Everyone remains open to questions about the mission.
- Suggestions are listened to without criticism.
- Requests for task assistance are made when overloaded.

**B.14. VO Responsibilities**
The Vessel Officer shall:

- Speak up when an error or poor judgment is perceived.
- Notify the mission coordinator when the VO perceives
    - Level of risk has changed
    - Mission is beyond the capabilities of the boat
    - Crew has become overloaded or overly fatigued
- Encourage input and feedback from the crew
- Treat questions and concerns of the crew with respect

# Section C. Risk Management Process

**Introduction**
Risk management shall be performed during the planning and execution of missions. Risk management is an element of the mission analysis skill and is a process to identify and control unacceptable safety risks. Every mission event (getting underway, transit, on-scene operations, and mooring) has some level of risk and not all of the risks are known. Every event requires that risks are kept within controls (safeguards) that have been designed to handle them.

Examples of these controls include the proper use of installed communications and navigation systems and proper execution of operating procedures. Effective risk management is highly dependent upon technical knowledge and experience.

**C.1. Four Rules of Risk Management**
To use the risk management process correctly, the team must follow four rules.

**C.1.a. Rule #1**
Integrate risk management into mission planning and execution.

- Risk management is a repetitive and continuous process
- Risk management is most effective when it is proactive. It requires that when new information on risks is received, the ability to control those risks is reviewed. It requires the VO and crew to remain vigilant and think safely until the boat is secured and the mission is over.

**C.1.b. Rule #2**
Accept no unnecessary risks.

- Unnecessary risk does not contribute to the safe accomplishment of the mission. It is operating beyond the know capabilities of the crew and/or boat without considering other alternatives.
- Unnecessary risks are often taken when decision-makers rationalize that the boat is the only alternative or that urgency is more important than safety.
- Unnecessary risk taking constitutes gambling with lives and government/private property.

**C.1.c Rule #3**
Make risk decisions at the appropriate level. Many times mishaps occur because the level of risk is not perceived by an individual.

- Understanding of risk is highly dependent upon technical knowledge and expertise. Therefore, risk decisions must be made by clear-thinking, technically competent people with an understanding of the situation.
- The mission coordinator and VO should work as a team in making risk decisions.

**C.1.d. Rule #4**
Accept risks if benefits outweigh costs. Eliminating unnecessary risk leaves risk that is either acceptable or unacceptable for mission accomplishment.

- He/she who owns the mission owns the risk.

- In some cases, mission directives outline what is acceptable (like sustaining personnel injury and equipment damage to save lives). However, in high stress situations, the line between acceptable and unacceptable may become fuzzy.
- Again, clear-thinking, technically competent people with an understanding of the situation must be involved in the risk decision.
- Again, the mission coordinator and VO should work as a team in making risk versus gain decisions.

**C.2. Risk Management Process**

Continuous risk management during the course of boat operations requires cycling through the following seven steps:

**C.2.a. Step 1**

Define the mission objective and tasks.

**C.2.b Step 2**

Identify possible hazards to the boat and the crew. Hazards include anything that could go wrong with the equipment, the environment, or the team.

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

To ensure that few hazards are missed, they must be discussed within the crew and between the VO and mission coordinator. The following risk categories should be used to facilitate discussion:

| Risk Category | Description |
|---|---|
| Planning | Is there adequate time and information to develop a good plan? As the planning time increases and more information becomes available, the risk is reduced. As mission complexity increases, the time for planning should also increase. |
| Event Complexity | The mission is made up of a chain of events. How complex are these events? Do they require significant know-how to perform? Many routine events are complex. As the event requires more know-how and attention to perform correctly, the possibility that something could go wrong increases. Event complexity can greatly increase by darkness, which in turns increases risk. |
| Asset Selection | Is the boat and this VO and crew best suited to perform this mission? Is the rescue boat the right boat? The capability and readiness condition of the boat along with the qualifications, experience, and physiological condition (health and alertness) of the VO and crew must be compared to the event complexity and environmental conditions. |
| Communication and Supervision | • External communications and supervision – Will the boat be able to maintain good communications with the mission coordinator and other on-scene units? Will the mission coordinator be able to provide real-time oversight of boat activities as a double-check for safety? The less capable |

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|---|---|
| | the communications, the higher possibility that relevant information will not reach decision-makers. Risk control may be less effective, double-checks will be more difficult.<br>• Communications within the boat – Can the crew hear orders over the ambient noise? Are they assertively communicating through accurate, bold, and concise statements?<br>• Supervision of the boat crew – Even if the boat crew is qualified to perform tasks, supervision by the VO can act as a control to further minimize risk. The higher the safety risk, the more the VO needs to be focused on observing and checking. When VOs are actively involved in doing tasks, they can be easily distracted and should not be considered effective safety observers in moderate to high risk conditions. |
| Environmental Conditions | • Are the current and forecasted conditions, in transit and on-scene, within the capability of the boat and the crew? As the environment changes, risk controls need to be updated. |

**C.2.c. Step 3**

Risk is a function of severity, probability and exposure.

- Severity describes the potential loss. Should something go wrong, what would be the injury to personnel or damage to equipment.
- Probability is the likelihood that the consequences described above will happen.
- Exposure is the amount of time people or equipment will be exposed to the hazard.

Each risk category must be examined in terms of severity, probability, and exposure to arrive at a subjective rating of risk. Again, it is useful to discuss individual perceptions of risk among the crew and between the VO and mission coordinator

| Risk Category | Description |
|---|---|
| High Risk | • Risks cannot be managed with constant control<br>• Loss in terms of personnel injury or equipment damage is expected<br>• The boat and/or crew is operating beyond their capability<br>• Whether this risk is acceptable or not is dependent upon the mission objective<br>• High risk must be communicated to the mission coordinator |
| Medium Risk | • Risks are manageable with constant control<br>• Loss is not expected if the situation remains stable, the crew adheres to all standard operating procedures, and boat systems respond as designed<br>• The boat and/or crew are operating at their capability |
| Low Risk | • Risks are manageable with control as required<br>• Loss is not expected because the mission has established margins of safety in place and the objective will be modified if the margins are reduced<br>• The boat and/or crew are operating within their capability<br>• An example is transit of a familiar area at a safe speed, during the day, in good visibility, with a full, qualified crew aboard |

**C.2.d. Step 4**
Unnecessary risk has to be eliminated. What changes can be made to reduce risks to an acceptable level without changing the mission objective? This can be done by examining:

- Changes to the planned Op tempo (ex. Slowing)
- Command and control (ex. More guidance and/or supervision)
- Mission tasks (ex. Simplifying)
- Timing of tasks
- Boat requirements (ex. More capable) or crew qualifications (ex. More experienced)
- Number of assigned boats (ex. Standby) and/or crew (ex. additional members)
- Required equipment and/or protective equipment

If the discussion of options is limited to those that can be provided by the boat, few are available. This step needs to evaluate the options the larger team can recommend to reduce risk. The larger team may have additional resources. The larger team may be able to spread out the risk among responders or transfer the risk to more capable assets.

**C.2.e. Step 5**
Did the mission coordinator validate that the risk assumed by the VO is worth the mission objective? If risks seem unacceptable, can the mission objective be modified to reduce risk to an acceptable level?

**C.2.f. Step 6**
The decision implements the best option given the risks and gains. In executing the decision, the crew is made aware of what the expected outcome should be.

**C.2.g. Step 7**
Did the action achieve the desired outcome? Are the risks within the mission changing? If so, repeat the steps to manage those risks.

## Section D. Informal Crew Briefing and Debriefing

**Introduction**
Informal crew briefings are required before the boat gets underway. Briefings for the VO and the crew help create a shared mental picture of what is expected to happen and strives to set rules for the mission.

Informal crew debriefings should be performed after most missions. The debriefing is the best opportunity to evaluate performance and recognize individual and team accomplishment. When correctly performed, the debriefing can serve as a valuable tool for continuous improvement. It can show the way form just ‘doing things right’ to knowing how to do “right things right”.

**D.1. Informal Crew Briefing**
The informal crew briefing shall be comprised of the following topics:

- Mission objective
- Duties and responsibilities
- Positive climate for teamwork

- Improvement goals

**D.1.a Mission Objectives**
Include the mission objective, known information and risks regarding the mission, and the planned course of action.

**D.1.b. Duties and Responsibilities**
Be specific in assigning duties and responsibilities. Mission coordinator expectations should be understood by the VO and conveyed to the crew. Do not let the crew have to second guess what needs to be done, or in special situations, how it should be done.

**D.1.c. Positive Climate for Teamwork**
Establish a positive climate for teamwork. The crew is encouraged to double-check each other, point out errors, speak up when they have relative information, and ask questions when they do not understand.

**D.1.d. Improvement Goals**
Restate the goal for improving one or two weak areas in crew coordination. This goal was generated from a previous crew debriefing. Try to be as specific as possible in describing what is considered an improvement.

**D.2. Informal Crew Debriefing**
The informal crew debriefing shall cover the following topics:
- Major events
- Level of performance
- Outcome of events
- Evaluation of goals
- Establishment of goals

**D.2.a. Major Events**
Recap major events of the mission (e.g., preparations, transit, on-scene operations).

**D.2.b. Level of Performance**
Determine level of performance within key events. Key events include the following:
- Crew briefing
- Critical navigation segments of the transit
- Approaches to vessels
- Personnel transfers
- Stricken vessel crew extractions
- Communications
- Other hazardous parts of the assigned mission

**D.2.C. Outcome of Events**
Have the VO and crew, and when possible the command, discuss what human behavior or risk decisions affected the outcome in these events. This discussion is for professional growth and learning.

**D.2.d. Evaluation of Goals**
Determine if the goal to improve one or two weak coordination areas has been met.

**D.2.e. Establishment of Goals**
Set, change, or affirm a specific goal for improving one or two weak areas in crew coordination. Goals are set or changed with the knowledge and guidance of the command.

# Section E. Risk Calculation Worksheet – Calculating Risk Using GAR Model (GREEN-AMBER-RED)

To compute the total level of risk for each hazard identified below, 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.

**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 vessel 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 form falls and sharp objects). Remember that Great Salt Lake is the largest lake in Utah with extremely dense water and waves that can be steep, deep, and close together. This can accelerate fatigue.

**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. Assign a risk code of 0 (For No Risk) through 10 (For Maximum Risk) to each of the six elements below.

**Supervision** _____

**Planning** _____

**Team Selection** _____

**Team Fitness** _____

**Environment** _____

**Event/Evolution Complexity** _____

**Total Risk Score** _____

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.

**GAR Evaluation Scale**
**Color Coding the Level of Risk**

**1** **23** **44** **60**

| 10 20 | 30 40 | 50 |
|---|---|---|
| **GREEN** **(Low Risk)** | **AMBER** **(Caution)** | **RED** **(High Risk)** |

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

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