

Alaska Region Ship Visit Safety

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1. Introduction. This supplement defines the safety requirements when making ship visits within the National Weather Service (NWS) Alaska Region (AR). The AR has Port Meteorological Officers (PMO) who support the Voluntary Observing Ship (VOS) program in Alaska. Almost every NWS office within the AR has personnel designated as marine focal points who accomplish many of the same tasks as the PMOs, but lack the official PMO designation. No one in the AR performs ship visits in a full time, primary duty capacity. Experience levels vary greatly, ranging from decades of experience to trainees with little or no experience. Ship visits in Alaska are rarely scheduled more than a day in advance. Visits are usually accomplished based on time and personnel availability. This often creates short-fused, “go, no-go” situations, particularly for multiple or unexpected ship visits.

The ships and vessels visited within the state vary considerably from super tankers to 30-foot fishing boats. They all contribute to the VOS and marine spotter programs. Similarly, the port or dock access to these ships and vessels also vary greatly across Alaska. They range from modern, high activity ports offering multiple ways to access ships, to remote village piers with nothing more than a vertical ladder or floating dock.

Add the harsh weather conditions and large seasonal tidal fluctuations common in Alaska to the variables listed above, and our staff face a number of safety issues when accomplishing a ship visit. For these reasons, instead of providing a long list of all possible variables, the AR adapted the seven-step Operational Risk Management (ORM) process developed by the U. S. Coast Guard (USCG) to meet our requirements. The ORM contains a “Green, Amber, Red” (GAR) safety model. The GAR safety model is a tool that allows those performing ship visits a quick way to assess the safety hazards. It then helps in determining if there are methods of mitigating these hazards to a level that will allow a safe ship visit.

2. Operational Risk Management (ORM) Process. The ORM process shown in Appendix A is the core of the AR ship visit safety program.

The ship visit risk management process exists on three levels. One objective of risk management training is to develop sufficient proficiency in applying the process so ship visit risk management becomes an automatic part of the decision-making methodology. Those involved in the ship visit program must employ the risk management process to make sound, timely decisions. The three levels of risk management are:

a. Time-Critical: Time-critical ship visit risk management is an “on the run” mental or verbal review of the situation using the basic ship visit risk management process without recording the information. Personnel employ the time-critical process to consider risk when making decisions in a time-compressed situation. It is particularly helpful in choosing the appropriate course of action when another unplanned ship visit occurs while executing a planned ship visit.

b. Deliberate: Deliberate ship visit risk management applies the complete process. Each step is documented in some manner at the discretion, and for the benefit, of the process owner. It primarily uses experience and direct knowledge of the visitation variables to identify hazards and develop controls and is, therefore, most effective.

c. Strategic: The Strategic process identifies hazards and assesses ship visit risk more thoroughly than the deliberative process by researching available data and tracking hazards associated with the program operations over the long term. Strategic planning is done at the regional level. Local strategic planning is done to more quickly adjust for changing conditions. Strategic applications study complex operations or system hazards associated with ship visit risks, or those whose hazards are not well understood.

3. Green, Amber, Red (GAR) Safety Model. NWS AR personnel will use the GAR model contained in step 3 of Appendix A, Alaska Region Ship visit Operational Risk Management, as the operational on-site risk assessment tool. The Ship Visit Risk Calculation Worksheet (Figure 2 in Appendix A) will be filled out as part of the safety evaluation for each ship visit and submitted to the Data Acquisition Branch at Alaska Region Headquarters along with the standard Ship Visitation Report.

The worksheet provides an easy way for personnel involved in ship visits to evaluate both the overall risk and the individual risk factors of each of the six common elements that make up the worksheet. The numerical scores for each element are based on the individual's personal assessment of the current situation. Because of the variety of conditions that can be present for each ship visit, the scores can vary greatly from person-to-person and from one ship visit to another, even on the same day.

“Green, Amber, Red” directly relates to the overall score given for a particular ship visit. An *overall* score of 0 to 23 qualifies as “Green,” or a Low Risk assessment. A score of 24 to 44 qualifies as “Amber,” or a Caution assessment. A score of 45 to 60 qualifies as “Red,” or a High

Risk assessment. In addition, each individual risk element is numerically evaluated in a similar fashion: 0 to 3 is a Low Risk, 4 to 6 is a Caution, and 7 to 10 is a High Risk. Low Risk means no added precautions or further safety mitigation is required. "Caution" means there are elevated risk levels and the individual should consider added precautions or safety mitigation to reduce the risk factor(s) before proceeding. High Risk means added precautions, safety mitigation, or an alternate solution is **required** before proceeding any further in the task or the ship visit should be modified, rescheduled, or cancelled.

4. Mandatory Safety Equipment. The following NWS supplied safety equipment is required when making a ship visit:

a. Backpack. The backpack is a sturdy, water resistant unit with dual shoulder straps that allow the ship visitor two free hands to climb ladders, stairs, or gangways.

b. Hard Hat with Chin Strap. The hard hat is intended to reduce the force of an impact resulting from a blow to the top of the head. Hard hats are mandatory on docks and ships where on/off loading material is occurring, or where heavy machinery is in operation. A chin strap is required to secure the hard hat to a person's head while climbing ladders, stairs, gangways, or during high wind situations.

c. USCG Approved Type V Personal Floatation Device (PFD). The PFD is a low-profile vest designed for active work around bridges, shorelines, and shipyards. The design also maximizes freedom of movement and affords universal sizing. The PFD must be worn anytime a ship visitor boards or departs a vessel by means other than as normal passenger traffic, or whenever there is a risk of falling into the water. The PFD will also be worn anytime there is a risk of falling into the water in dark or low light conditions, during inclement or icy weather, in waters choppy enough to affect stability, and anytime there is no safety spotter available.

NOTE: Due to increasing security requirements the employee should always carry DOC/NOAA identification.

5. Additional Equipment. The following additional equipment is recommended, but is not mandatory, when making a ship visit:

a. Some type of traction shoes or boots to ensure stable footing.

b. Gloves to help maintain a firm grip on ladders, stairs, or gangway rails during ship visits conducted in wet or icy conditions.

c. Eye and ear protection in dock areas, especially where on/off loading material is occurring, or where heavy machinery is in operation.

NOTE: Gloves, hearing, and eye protection are readily available through the GSA Supply System.

6. Personal Safety/Security. As a properly identified representative of the NWS, a ship visitor should conduct themselves in a friendly and business-like manner. Likewise, the officers and crew of ship or vessel are expected to treat the ship visitor in a like manner. Business should be conducted in “common” spaces such as the bridge/wheelhouse, navigation office, or wherever the barometer is housed whenever possible. Avoid meetings in “private” spaces, or wandering “below-deck” where there is a greater potential to get lost, or for mishaps to occur. This is particularly true when going aboard an unfamiliar ship or one with a foreign registry and crew. At the first sign of disrespect, confrontation, or unease at the situation, politely leave the ship immediately, return to the office, and report the instance to your supervisor.

7. Training. There is no formal ship visit safety training program. Safety procedures are addressed through on-the-job-training for personnel new to the ship visit program. Any person that conducts ship visits must review this supplement annually. The Data Acquisition Branch at Alaska Region Headquarters will be responsible for annual review verification by those involved in the program. The goal is to keep personnel involved in the program focused on the ongoing process of risk evaluation and mitigation.

Appendix A – Alaska Region Ship Visit Operational Risk Management

I. Operational Ship Visit Risk Management (ORM) Process Steps

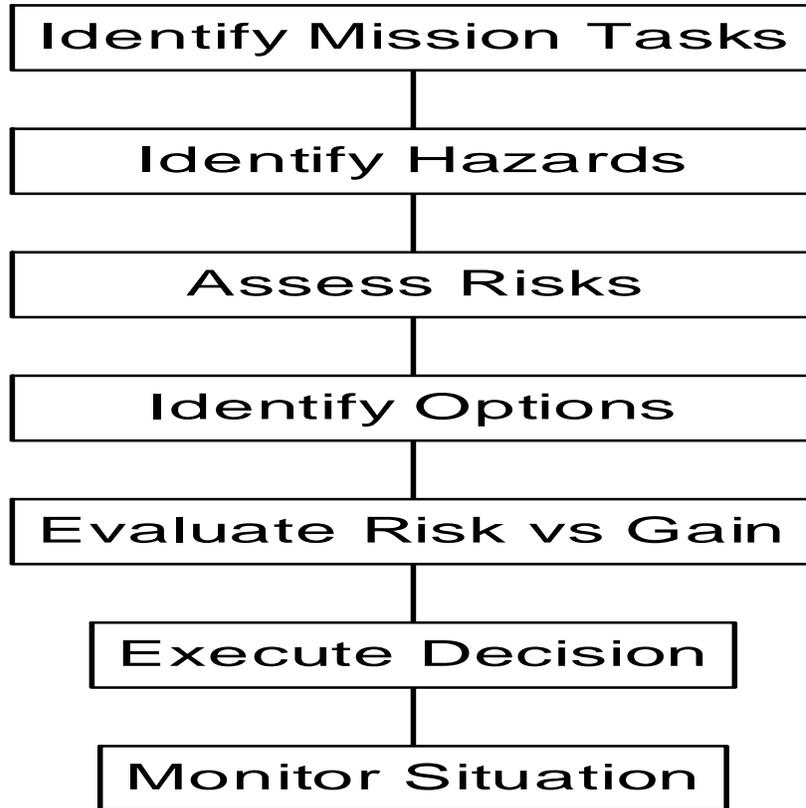


Figure 1. National Weather Service seven-step ORM process

II. Using the ORM Process

STEP 1:

IDENTIFY MISSION: Review the current and planned operations describing the ship visit. Construct a list or chart that depicts the major phases of the ship visit in a time sequence. Break the operation into manageable units.

Example:

- Receive notification of a ship's date and time of arrival in port
- Assess type of ship visit expected or requested vs. personnel availability
- Contact the ship to coordinate dock and ship access and set time for the visit
- Travel to dock
- Evaluate and avoid hazardous operations around the dock area
- Safely board the ship after identifying yourself and requesting "permission-to-come-aboard"
- Crew member available to provide escort aboard ship
- Interact with the crew and perform ship visit weather tasks
- Safely depart the ship
- Return to office

STEP 2:

IDENTIFY HAZARDS: Use the list formulated in Step 1 and list the hazards associated with each phase of the ship visit.

Example:

- Hazardous driving conditions exist for getting to and from the docks
- Possible accidents caused by high winds, wave action, or precipitation
- Falling off or slipping on a ladder or gangway
- Falling into the water risking death due to drowning or hypothermia
- Injury due to dangerous loading operations
- Inhaling dust or petroleum vapors
- Understanding emergency egress routes off the ship (larger ships)

Consider the following elements and their impact in mitigating the identified hazards:

- **Equipment:** Is the NWS-provided safety equipment and vessel boarding equipment or facilities functioning properly and will it do so throughout the planned ship visit?
- **Environment:** How will weather, geographic influences, physical barriers, workplace climate, and available light affect the ship visit?

- **Personnel:** Are personnel properly trained and capable of handling the demands of the ship visit? Are they fatigued, complacent, or suffering from physical or mental stress?

The key to successfully analyzing ship visit risks is to carefully identify the hazards and evaluate safeguards. In evaluating each situation, asking the question “What if?” is an excellent tool to help identify all potential hazards. Specific hazard identification is important since it leads to assessing risk more accurately and subsequently developing truly effective control options or safeguards. When identifying a hazard, state what it is and describe the cause of potential exposure to that hazard. This will help identify risk controls or safeguards later in the ORM process.

STEP 3:

ASSESS THE RISKS: Consider risk applicable to the ship visit. Determine individual risk levels for each hazard identified. Assess risk by using the Green, Amber, and Red (GAR) model below to evaluate specific elements or factors, that, when combined, define risk.

GAR SHIP VISIT RISK ASSESSMENT MODEL

Employee Fitness: Is the employee in good physical and mental condition? Some ships and vessels require various levels of stair and ladder-climbing. Is the employee physically able to safely accomplish the task of ascending and descending the stairs or ladders? Is the employee tired from recent shift work? This could impair clear judgment or limit physical capabilities when maneuvering aboard the ship, increasing the risk for injury.

Environment: Environment includes factors that affect the ship visit, such as time of day, lighting, rain, snow, ice, wind, tides, wave conditions, chemical hazards, and proximity to other external and geographic hazards and barriers.

Port/Dock Hazards: The ship visitor should be aware of the activities taking place at the port or dock and make the necessary adjustments to stay out of harm’s way. Port or dock facilities may have security checkpoints to clear, have various types of vehicles (tractors, trailers, forklifts, and cranes) involved in the onloading and offloading of ships, or refueling activities going on. The ship visitor, whether in the station vehicle or on foot, must avoid these types of hazards as much as possible. In addition, the ship visitor needs to assess the means in which they will get on and off the ship or vessel. Is it a simple horizontal gangway, are there vertical ladders, stair-type ladders (how many and how steep), crane/basket? These need to be accounted for and judged in combination with environmental conditions and the employee’s fitness level.

Safety Equipment: Is the NWS-provided equipment in good working order and adequate to conduct a safe ship visit? Did you remember to bring it? If environmental conditions warrant, are added safety measures (e.g., spotter, safety line) available? If you are being transported onto the ship or vessel in a basket, is the crane operator and equipment certified?

Complexity of Ship Visit: Each ship visit considers both the time and resources required to conduct the visit. Generally, the longer the exposure to a hazard, the greater the risks involved. However, each visit is unique. For example, the more ship visits performed can increase the opportunity for an accident to occur; but on the positive side, it may improve the proficiency of the person conducting the ship visit. Another factor to consider is how long the environmental conditions will remain stable.

Calculating Risk: To compute the total degree 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 to obtain a personal estimate of the risk. Add the risk scores to come up with a total risk score for the ship visit. Figure 2 is suitable for this process:

Ship Visit Risk Calculation Worksheet	
Enter a numerical score for each risk element based on personal assessment 0 to 3 – Low Risk (no added precautions or further safety mitigation required) 4 to 6 – Caution (elevated risk levels, consider added precautions or safety mitigation) 7 to 10 – High Risk (added precautions, safety mitigation, or alternate solution required)	
Risk	Score
Employee fitness related to type of ship being visited	
Weather, lighting, and driving conditions to and from the dock	
Hazards at the dock, or getting on and off the ship	
Exposure to vapors or dust at the dock or aboard ship	
Hazards performing the mission on the ship	
Condition and availability of safety equipment	
TOTAL SCORE	

GAR Evaluation Scale for Color-Coding the Degree of Ship Visit Risk		
GREEN (Low risk)	AMBER (Caution)	RED (High risk)
0 → 23	24 → 44	45 → 60

If the total risk value falls in the green zone (1-23), the ship visit risk is rated low. A value in the amber zone (24-44) indicates moderate ship visit risk; consider adopting procedures to minimize it. If the total value falls in the red zone (45-60), implement measures to reduce the risk before starting the ship visit. *A ship visitor must use extreme caution, or consider an alternate means of accomplishing the task, anytime an individual risk element is rated “7” or higher.*

Ship/Vessel: _____ **Visited by:** _____ **Date:** _____

Safety Issues/Mitigation:

Figure 2

Ship Visit Risk Ratings: The ability to assign numerical values or color codes to risk elements in the GAR model is not the most important part of risk assessment. What is critical in this ORM step is to understand the risks and how you will manage them.

STEP 4:

IDENTIFY THE OPTIONS: Starting with the highest risk hazards assessed in Step 3, identify as many risk control options or safeguards as possible for all hazards exceeding an acceptable degree of risk. Determine each option's impact on the ship visit and select the perceived best alternative or combination of alternatives. Mission priority and time criticality often drive option choice. Risk control options include: **Spread out, Transfer, Avoid, Acept, and Reduce (STAAR).**

Spread Out: Risk is commonly spread out by increasing either the exposure distance or the time between exposures.

Transfer: Transferring risk does not change probability or severity but rather shifts possible losses or costs to another entity.

Avoid: Avoiding risk altogether requires canceling or delaying the ship visit. However, it may be possible to avoid specific risks by changing the time or location for the visit/briefing.

Accept: Accept risk when the ship visit benefits clearly outweigh the costs, but only as much as necessary to accomplish the mission or task.

Reduce: Ship visit risks can be reduced. The overall goal of risk management is to plan ship visits that do not contain hazards. However, the nature of most ship visits makes it impossible or impractical to design them completely hazard-free. As we analyze hazards, we will identify those requiring resolution. To be effective, risk management strategies must address risk's components: severity, probability, and exposure.

- Using protective devices, engineering controls, and personal protective equipment usually helps control *severity*.
- Training, situational awareness, attitude change, rest, and stress reduction usually help control *probability*.
- Reducing the number of people involved or the number of ship visits usually helps control *exposure*.

STEP 5:

EVALUATE RISK VS. GAIN: Analyze the ship visit's degree of risk with the proposed controls in place. Determine whether the ship visit's benefits now exceed the degree of risk the operation presents. Be sure to consider the cumulative risk of all identified hazards and the decision's long-term consequences. This step also serves as a reality check to verify that the objectives are still valid.

- If the ship visit risks outweigh the benefits, re-examine the control options to learn if any new or modified controls are available. If not, then coordinate with appropriate ship's crew member to accomplish the visit or briefing at a safe location, e.g., at the dock, or at the office.
- If the benefits of the ship visit outweigh the risks **with** controls in place, determine if your supervisor still wants you to proceed.
- If the risk of a ship visit outweighs the benefit, the ship visitor should modify, reschedule, or cancel the ship visit.

It is easy to overlook the issue of perceived value in typical risk management theories, but it may determine the kinds of actions the supervisor may take in weighing risk vs. gain. Personnel should be aware the acceptability of risk can vary from person to person because the perceived risk, affected by different values placed on the expected loss, also varies. Therefore, while taking this "reality check" step in the risk management process, it is wise to consider a loss's perceived as well as expected value to avoid potential controversy when making risk decisions.

STEP 6:

EXECUTE THE DECISION: Once the risk control decision is made, assets must be made available to implement the specific controls. Part of implementing control measures is informing the personnel in the system of the risk management process results and subsequent decisions. If personnel disagree, the supervisor should explain the decision rationally. Carefully documenting the decision and all steps in the process, usually done only for deliberate or strategic ORM applications, facilitates communications and clarifies the rational process behind risk management decisions.

STEP 7:

MONITOR THE SITUATION: Monitor the situation to ensure the controls are effective and remain in place. Identify changes requiring further risk management and act on them. Take action when necessary to correct ineffective risk controls and reinitiate the risk management steps in response to new hazards. It is important to remember **ship visit risk management is a continuous process**. Failure to respond to changes in the situation can become a link in a chain of errors that lead to a mishap.

III. Levels of Risk Management

The ship visit risk management process exists on three levels. One objective of risk management training is to develop sufficient proficiency in applying the process so ship visit risk management becomes an automatic part of the decision-making methodology. Those involved in this program must employ the risk management process to make sound, timely decisions. The three levels of risk management are:

- **Time-Critical:** Time-critical ship visit risk management is an “on the run” mental or verbal review of the situation using the basic ship visit risk management process without recording the information. Personnel employ the time-critical process to consider risk when making decisions in a time-compressed situation. It is particularly helpful in choosing the appropriate course of action when another unplanned ship visit occurs while executing a planned ship visit.
- **Deliberate:** Deliberate ship visit risk management applies the complete process. Each step is documented in some manner at the discretion, and for the benefit, of the process owner. It primarily uses experience and direct knowledge of the visitation variables to identify hazards and develop controls and therefore is most effective.
- **Strategic:** The Strategic process identifies hazards and assesses ship visit risk more thoroughly than the deliberative process by researching available data and tracking hazards associated with the program operations over the long term. Strategic planning is done at the regional level. Local strategic planning is done to more quickly adjust for changing conditions. Strategic applications study complex operations or system hazards associated with ship visit risks, or those whose hazards are not well understood.

IV. Example of Applying a Deliberate Level of ORM to an Alaskan Ship Visit

The ship visit aboard the *Coastal Trader* must occur between 0500 and 0600 at Cold Bay, Alaska. The time of year is mid-February, so it will be dark at this time of the morning. The weather is typical for Cold Bay: overcast and 36 degrees with occasional mixed rain and snow showers, southeast winds 20 mph and gusty. There is a 2-3 foot wind chop at the dock. The *Coastal Trader* is there to offload supplies for the town. Time is short as the ship is behind schedule due to rough seas and bad weather.

The physical aspects of the ship visit require the ship visitor to climb 10 feet down a vertical ladder that is attached to the Cold Bay dock, clearing the ship's guard rail, and getting safely on the deck. Next, the visitor needs to navigate a series of 3 steep ladders to get to the wheel house to conduct the business of the visit. After the visit is complete, the visitor needs to safely get from the ship to the ladder and climb back up to the dock.

There is a generator on the dock to power a pair of floodlights which provide light to the central section of the dock. Deck lights on the *Coastal Trader* provide minimal lighting for climbing down the ladder and going aboard the ship.

NWS mandatory safety gear assumption: The ship visitor has a hard hat with a chin strap, personal floatation device, and backpack for carrying materials and equipment.

STEP 1:

IDENTIFY MISSION TASKS: (SHIP VISIT)

Weather Service Office (WSO) Cold Bay is the only stop along the *Coastal Trader*'s route between Seattle, King Cove, Cold Bay, and Dutch Harbor where a ship visit can be conducted. The ship's Captain would like a weather briefing, including copies of the latest satellite pictures and surface analysis for the remainder of their trip. In addition, there have been no previous opportunities to recruit the *Coastal Trader* into the VOS program and their observations would be invaluable. There is a strong desire to accomplish the ship visit.

These are the primary tasks (not an all-inclusive list) for the ship visit:

- a. Arrange the visit using the VHF, HF Radio, or telephone.
- b. Load the ship visit backpack and drive to the Cold Bay dock.
- c. After identifying yourself and asking "permission-to-come-aboard," safely climb down the ladder and board the ship, avoiding offloading of supplies at the dock.
- d. Safely navigate the steep ladders aboard the ship and conduct your business in the wheel house.
- e. Safely climb the ladder up to the dock when the visit is complete.
- f. Drive back to the WSO.

STEP 2:

IDENTIFY HAZARDS: Many different hazards could be associated with each operational phase identified in Step 1. Here are a few possible causes for exposure and simple safeguards to limit exposure to those hazards.

Hazard	Cause	Safeguard in Place
Personnel slip, fall (possibly into the water)	Wet or icy deck/dock/ladder, darkness, choppy sea state, windy, occasional precipitation, 2-3 foot rise and fall of ship	Non-skid boat deck, high traction shoes, gloves, hard hat, personal flotation device (PFD), life ring on the dock, spotter in place
Ship visitor not physically capable of performing the visit	Ship visitor is on their 2 nd mid-shift, has not slept well, and is physically and mentally tired. The weather and the ship motion will not make it any easier	An alternate ship visitor is available if primary decides they are not capable of safely accomplishing the task. Or, the visit can be conducted in the station vehicle or at the office (if time allows)
Injury from offloading of supplies	Machine noise, wind/weather, lighting, crane/material swaying due to wave action affecting the ship	Careful avoidance of the area where offloading is occurring

STEP 3:

(SAMPLE) Ship Visit Risk Calculation Worksheet	
Enter a numerical score for each risk element based on personal assessment 0 to 3 – Low Risk (no added precautions or further safety mitigation required) 4 to 6 – Caution (elevated risk levels, consider added precautions or safety mitigation) 7 to 10 – High Risk (added precautions, safety mitigation, or alternate solution required)	
Risk	Score
Employee fitness related to type of ship being visited	7
Weather, lighting, and driving conditions to and from the dock	7
Hazards at the dock, or getting on and off the ship	8
Exposure to vapors or dust at the dock or aboard ship	0
Hazards performing the mission on the ship	2
Condition and availability of safety equipment	2
TOTAL SCORE	26

GAR Evaluation Scale for Color-Coding the Degree of Ship Visit Risk		
GREEN (Low risk)	AMBER (Caution)	RED (High risk)
0 → 23	24 → 44	45 → 60

If the total risk value falls in the green zone (1-23), the ship visit risk is rated low. A value in the amber zone (24-44) indicates moderate ship visit risk; consider adopting procedures to minimize it. If the total value falls in the red zone (45-60), implement measures to reduce the risk before starting the ship visit. *A ship visitor must use extreme caution, or consider an alternate means of accomplishing the task, anytime an individual risk element is rated “7” or higher.*

Ship/Vessel: _____ **Visited by:** _____ **Date:** _____

Safety Issues/Mitigation:

Figure 3

Step 4:

Identify the Options: Identify and evaluate ship visit risk control options according to their impact on mission and unit goals, using each **STAAR** technique element for guidance.

Some of the risk control options available for the “Personnel slip, fall, etc.” category are:

Spread Out: Not Applicable

Transfer: Hold ship visit in the station vehicle or at the office, instead of risking ladders

Avoid: Cancel ship visit or hold the briefing/visit in the station vehicle or at the office.

Accept: Hold the ship visit as originally scheduled in the wheel house of the ship

Reduce: Do not go aboard ship or stay in loading zone, and hold visit/briefing in an alternate location.

Use same **STAAR** techniques for *Physically Capable* and *Injury* hazards identified in Step 2.

Step 5:

Evaluate Risk vs. Gain: The ship visitor determined they were too tired and the weather/sea conditions were too marginal to safely conduct the visit/briefing aboard the *Coastal Trader*. However, they were able to have the ship’s Captain and Second Mate come to the office for a formal weather briefing since the First Mate was in charge of offloading supplies.

Step 6:

Execute the Decision: Based on the ORM/GAR Model analysis and the cooperation of the ship’s officers, the ship visitor drove to the dock, picked up the Captain and Second Mate, took them back to the office, gave them a complete weather briefing, successfully recruited the *Coastal Trader* into the VOS program, and later performed a barometer calibration via the VHF radio. While this did not accomplish the “perfect” ship visit scenario, it did accomplish the most important aspects without taking unnecessary risks.

Step 7:

Monitor the Situation: The GAR Model analysis showed an “AMBER” situation, the ship visitor did not feel physically prepared to accomplish the task aboard ship and the **STAAR** helped determine an alternate solution to safety concerns. The fact that the Captain and Second Mate were able to come ashore for a weather briefing made the decision easier.

If the Captain and/or the Second Mate had not been able to leave the ship, the other options would have been to wake the alternate and have them make the visit, accept the risk and make the visit themselves, or cancel the visit, deliver copies of the satellite pictures and surface charts to one of the ship’s crew at the dock and provide a weather briefing via telephone or radio.