DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
2000 NAVY PENTAGON
WASHINGTON, D.C. 20350-2000

and
HEADQUARTERS
UNITED STATES MARINE CORPS
2 NAVY ANNEX
WASHINGTON, DC 20380-1775

IN REPLY REFER TO

OPNAVINST 3500.39A
MCO 3500.27A
N09K
SD
26 SEP 00

OPNAV INSTRUCTION 3500.39A
MARINE CORPS ORDER 3500.27A

From: Chief of Naval Operations
Commandant of the Marine Corps
All Ships and Stations

Subj: OPERATIONAL RISK MANAGEMENT (ORM)

a DODINST 6055.1 (NOTAL)

Encl: Introduction to Operational Risk Management

1. Purpose. To establish ORM, in accordance with reference (a), as an integral part of naval operations, training and planning at all levels in order to optimize operational capability, readiness, and enhance mission accomplishment.

2. Cancellation. OPNAVINST 3500.39 and MCO 3500.27

3. Background

a. Uncertainty and risk are inherent in the nature of military action. The success of the Naval Services is based upon a willingness to balance risk with opportunity in taking the bold and decisive action necessary to triumph in battle. At the same time, commanders have a fundamental responsibility to safeguard highly valued personnel and material resources, and to accept only the minimal level of risk necessary to accomplish an assigned mission.

b. ORM is an effective process for maintaining readiness in peacetime and achieving success in combat without infringing upon the prerogatives of the commander. Historically, the greater percentage of losses during combat operations was due to mishaps. Unnecessary losses either in battle or during training are detrimental to operational capability. Since 1991, ORM, applied

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

both in day-to-day operations and during crisis periods, has produced dramatic results in reducing these losses. This instruction supports the guidance provided in reference (a) to integrate this effective technique throughout the Department of Defense. It provides a means to help define risk and control it where possible, thereby assisting the commander in choosing the best course of action and seizing the opportunities which lead to victory.

c. All naval missions, as well as daily routines, involve risk. Every operation, both on and off-duty, requires some degree of decision making that includes risk assessment and risk management. The naval vision is to develop an environment where every leader, Sailor, Marine and civilian is trained and motivated to personally manage risk in everything they do, both in peacetime and during conflict, thus successfully completing all operations with minimum risk.

3. Scope. This instruction applies to all Navy and Marine Corps activities, commands and personnel. Addressees should, as appropriate, issue an implementing instruction to augment this policy, including command-specific applications and requirements.

4. Discussion. ORM is a decision making process that enhances operational capability. Naval Warfare Publication 1 states, "Risk management and risk assessment are formal, essential tools of operational planning. Sound decision making requires the use of these tools both in battle and in training." ORM, described in enclosure (1), is a method for identifying hazards, assessing risks and implementing controls to reduce the risk associated with any operation. Implementation of ORM in the Department of the Navy will be accomplished as follows:

a. ORM will be included in the orientation and training of all military personnel. Level of training will be commensurate with rank, experience and leadership position.

(1) ORM training shall be incorporated into leadership courses, General Military Training and courses where operational employment, safety, or force protection are addressed (e.g., safety schools, initial warfare qualification schools, and tactical or operational level war fighting courses). ORM training shall be incorporated into existing training periods on safety and operational planning/decision making whenever possible.

(2) The ORM process and its specific application to pertinent subjects shall be integrated into fleet tactical

training, Personnel Qualification Standards(PQS), Naval and Occupational Standards, Individual Training Standards and the Marine Corps Combat Readiness Evaluation System.

b. ORM lessons learned will be submitted to Chief of Naval Operations (N09K) and/or Commandant of the Marine Corps (SD) for inclusion in ORM data bases.

c. The ORM process shall be integrated into all levels of a command

(1) Hazards shall be identified, risks assessed, and controls developed and implemented during the earliest possible planning stages. Operations shall be continuously monitored for effectiveness of controls and situational changes.

(2) Information available through existing safety, training and lessons learned data bases will be considered whenever practicable in making risk decisions.

5. Action. All Navy and Marine Corps activities shall apply the principles of ORM in planning, operations and training. The ORM process shall be applied to optimize operational capability and readiness. ORM decisions are made by the leader directly responsible for the mission. Prudence, experience, judgement, intuition and situational awareness are critical elements in making effective risk management decisions. When the leader responsible for executing the mission determines that the risk associated with that mission cannot be controlled at his/her level, or goes beyond the commander's stated intent, he/she shall elevate the decision to his/her chain of command.

a. Chief of Naval Operations (N09K) and Commandant of the Marine Corps (SD) shall provide policy sponsorship and service approval of Navy and Marine Corps ORM.

b. Chief of Naval Operations resource sponsors shall integrate ORM into existing training topics during review of courses under their cognizance.

c. Chief of Naval Operations (N09K) and Commandant of the Marine Corps (SD) shall serve as technical advisors on ORM curricula.

d. Navy Warfare Development Command shall address ORM concepts and applications in appropriate doctrinal publications

e. Systems Commands shall provide information, data and technical support for the resolution of hazards under their cognizance.

f. Chief of Naval Education and Training (CNET shall

(1) Develop curricula for and incorporate appropriate ORM instructions at each level of formal leadership training, General Military Training (GMT) and all courses where safety or force protection is or should be appropriately addressed.

(2) Integrate specific applications of the Operational Risk Management process into PQS.

g. Commanding General, Marine Corps Combat Development Center shall:

(1) Develop curricula for and incorporate appropriate ORM instructions at each level of formal leadership training, GMT and all courses where safety or force protection is or should be appropriately addressed.

(2) Integrate specific applications of the Operational Risk Management process into Individual Training Standards and the Marine Corps Combat Readiness Evaluation System.

(3) Address ORM concepts and applications in appropriate doctrinal publications.

h. Commander, Naval Safety Center shall provide on request ORM excerpts from mishap and hazard reports and analysis of loss data.

i. Naval Manpower Analysis Center shall incorporate the ORM process into Naval Standards and, where specific applications warrant additional requirements, Occupational Standards.

j. Fleet Commanders in Chief (CINCs) and Commanders, Marine Forces (COMMARFORs) shall provide resources necessary to implement Operational Risk Management in accordance with this instruction.

k. Fleet, Type and Marine Expeditionary Force (MEF Commanders shall:

(1) Incorporate the ORM process into operations, exercises and training.

(2) Address the ORM process in post exercise/operation reports

1. Unit Commanders shall:

(1) Implement the ORM process within their commands. Examples include, but are not limited to:

(a) Providing training to Command personnel on enclosure 1

(b) Incorporating identified hazards, risk assessments and controls into briefs, notices and written plans

(c) Conducting a thorough risk assessment for all new or complex evolutions, defining acceptable risk and possible contingencies for the evolution.

(2) Address the ORM process in safety, training and lessons learned reports. Reports should comment on hazards, risk assessments and effectiveness of controls implemented.

(3) Inform the chain of command as to what hazards cannot be controlled or mitigated at their command level.

V. E. CLARK
Chief of Naval Operations

J. L. JONES, JR.
Commandant of the Marine Corps

Distribution:
SNDL Parts 1 and 2
MARCORPS PCN 10203352700

INTRODUCTION TO OPERATIONAL RISK MANAGEMENT (ORM)

1. Background. NDP-1 (Naval Warfare) states, "By its nature, the uncertainty of war invariably involves the acceptance of risk...Because risk is often related to gain, leaders weigh risks against the benefits to be gained from an operation." We rely on the judgment of individual Commanders to balance the requirements of mission success with the inherent risks of military action. Naval leaders have always practiced risk management in their operational decision making. However, the approach to risk, and degree of success in dealing with it, have varied widely depending on the leader and his/her level of training and experience. The principles of ORM can be taught and effectively applied throughout the Navy and Marine Corps to enhance the decision making capabilities of our personnel. Many ORM techniques are currently incorporated into our operational planning and decision making processes. The evaluation and wargaming of different courses of action, the establishment of mission go/no-go criteria, the employment of maximum/minimum operating envelopes, and the use of mission/ confirmation briefings are all examples of how Commanders and units evaluate and manage risk. In addition to continuing to utilize these techniques, the remainder of this enclosure outlines a formalized process, which may be applied in dealing with risk.

2. Concept. The ORM process:

a. Is a decision making tool used by people at all levels to increase operational effectiveness by anticipating hazards and reducing the potential for loss, thereby increasing the probability of a successful mission.

b. Increases our ability to make informed decisions by providing the best baseline of knowledge and experience available.

c. Minimizes risks to acceptable levels, commensurate with mission accomplishment. The amount of risk we will take in war is much greater than that we should be willing to take in peace, but the process is the same. Applying the ORM process will reduce mishaps, lower costs, and provide for more efficient use of resources.

3. Terms. ORM terms:

a. Hazard - A condition with the potential to cause personal injury or death, property damage or mission degradation.

b. Risk - An expression of possible loss in terms of severity and probability.

c. Risk Assessment - The process of detecting hazards and assessing associated risks.

d. ORM - The process of dealing with risk associated within military operations, which includes risk assessment, risk decision making and implementation of effective risk controls.

4. Process. Figure 1) shows the flow of the ORM process The five step process is:

a. Identify Hazards - Begin with an outline or chart of the major steps in the operation (operational analysis). Next, conduct a Preliminary Hazard Analysis by listing all of the hazards associated with each step in the operational analysis along with possible causes for those hazards.

b. Assess Hazards - For each hazard identified, determine the associated degree of risk in terms of probability and severity. Although not required, the use of a matrix may be helpful in assessing hazards described further in paragraph d).

c. Make Risk Decisions - First, develop risk control options. Start with the most serious risk first and select controls that will reduce the risk to a minimum consistent with mission accomplishment. With selected controls in place, decide if the benefit of the operation outweighs the risk. If risk outweighs benefit or if assistance is required to implement controls, communicate with higher authority in the chain of command.

d. Implement Controls - The following measures can be used to eliminate hazards or reduce the degree of risk. These are listed by order of preference:

(1) Administrative Controls - Controls that reduce risks through specific administrative actions, such as:

(a) providing suitable warnings, markings, placards, signs, and notices.

(b) establishing written policies, programs instructions and standard operating procedures (SOP).

(c) training personnel to recognize hazards and take appropriate precautionary measures.

(d) limiting the exposure to a hazard (either by reducing the number of personnel/assets or the length of time they are exposed).

(2) Engineering Controls - Controls that use engineering methods to reduce risks by design, material selection or substitution when technically or economically feasible.

(3) Personal Protective Equipment - Serves as a barrier between personnel and a hazard. It should be used when other controls do not reduce the hazard to an cceptable level.

e. Supervise - Conduct follow-up evaluations of the controls to ensure they remain in place and have the desired effect. Monitor for changes which may require further ORM. Take corrective action when necessary.

5. ORM Process Levels. The ORM process exists on three levels. The Commander selects which level based upon the mission, the situation, the time available, the proficiency level of personnel and the assets available. While it would be preferable to perform a deliberate or in-depth risk management process for all evolutions, the time and resources to do so will not always be available. One of the objectives of ORM training is to develop sufficient proficiency in applying the process such that ORM becomes an automatic or intuitive part of our decision-making methodology. In the operational environment, leaders should be able to employ this time-critical process to make sound and timely decisions that generate tempo and facilitate decisive results. The three levels are as follows:

a. Time-critical - An "on the run" mental or oral review of the situation using the five step process without recording the information on paper. The time critical level of ORM is employed by experienced personnel to consider risk while making decisions in a time-compressed situation. It is the normal level of ORM used during the execution phase of training or operations, as well as in planning during crisis response scenarios. It is particularly helpful in choosing the appropriate course of action when an unplanned event occurs during the execution of a planned operation or daily routine.

b. Deliberate - Application of the complete five step process as depicted in figure I in planning an operation or evaluating procedures. It uses primarily 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 of upcoming operations, review of standard operating, maintenance or training procedures and damage control/disaster response planning.

c. In-Depth - Deliberate process with a more thorough risk assessment (first two of the five steps) involving research of available data, use of diagram and analysis tools, formal testing or long term tracking of the hazards associated with the operation (sometimes with assistance from technical experts) to identify and access the hazards. It is used to more thoroughly study the hazards and their associated risk in a complex operation or system, or one in which the hazards are not well understood. Examples of in-depth applications include long term planning of complex operations, introduction of new equipment, materials and missions, development of tactics and training curricula and major system overhaul or repair.

6. Principles of ORM. ORM incorporates the following four principles:

a. Accept risk when benefits outweigh the cost. Fleet Marine Force Manual I (WARFIGHTING) states, "Risk is inherent in war and is involved in every mission. Risk is also related to gain; normally greater potential gain requires greater risk." Our naval tradition is built upon principles of seizing the initiative and taking decisive action. The goal of ORM is not to eliminate risk, but to manage the risk so that the mission can be accomplished with the minimum amount of loss.

b. Accept no unnecessary risk. Fleet Marine Force Manual I also states, "We should clearly understand that the acceptance of risk does not equate to the imprudent willingness to gamble. Take only risks which are necessary to accomplish the mission.

c. Anticipate and manage risk by planning. Risks are more easily controlled when they are identified early in the planning process.

d. Make risk decisions at the right level. Risk management decisions are made by the leader directly responsible for the operation. Prudence, experience, judgment, intuition and situational awareness of leaders directly involved in the

planning and execution of the mission are the critical elements in making effective risk management decisions. When the leader responsible for executing the mission determines that the risk associated with that mission **cannot be controlled at his/her level**, or goes beyond the commander's stated intent, he/she **shall elevate the decision to their chain of command.**

7. Risk Assessment Matrix. A matrix can be used to accomplish the second step of the ORM process. Using a matrix to quantify and prioritize the risk(s) does not lessen the inherently subjective nature of risk assessment. However, a matrix does provide a consistent framework for evaluating risk. Although different matrices may be used for various applications, any risk assessment tool should include the elements of hazard severity and mishap probability. The risk assessment code (RAC) defined by a matrix represents the degree of risk associated with a hazard considering these two elements. While the degree of risk is subjective in nature, the RAC does accurately reflect the relative amount of perceived risk between various hazards. The example matrix described below is used in Naval Occupational Safety and Health assessments. Using the matrix, the RAC is derived as follows:

a. Hazard Severity - An assessment of the worst credible consequence which can occur as a result of a hazard. Severity is defined by potential degree of injury, illness, property damage, loss of assets (time, money, personnel) or effect on mission. The combination of two or more hazards may increase the overall level of risk. Hazard severity categories are assigned as Roman numerals according to the following criteria:

(1) Category I - The hazard may cause death, loss of facility/asset or result in grave damage to national interests

(2) Category II - The hazard may cause severe injury, illness, property damage, damage to national or service interests or degradation to efficient use of assets.

(3) Category III - The hazard may cause minor injury, illness, property damage, damage to national, service or command interests or degradation to efficient use of assets.

(4) Category IV - The hazard presents a minimal threat to personnel safety or health, property, national, service or command interests or efficient use of assets.

b. Mishap Probability - The probability that a hazard will result in a mishap or loss, based on an assessment of such factors as location exposure (cycles or hours of operation),

affected populations, experience or previously established statistical information. Mishap probability will be assigned an English letter according to the following criteria:

(1) Sub-category A - Likely to occur immediately or within a short period of time. Expected to occur frequently to an individual item or person or continuously to a fleet, inventory or group.

(2) Sub-category B - Probably will occur in time. Expected to occur several times to an individual item or person or frequently to a fleet, inventory or group.

(3) Sub-category C - May occur in time. Can reasonably be expected to occur some time to an individual item or person or several times to a fleet, inventory or group.

Sub-category D - Unlikely to occur

c. Risk Assessment Code - The RAC is an expression of risk which combines the elements of hazard severity and mishap probability. Using the matrix shown below, the RAC is expressed as a single Arabic number that can be used to help determine hazard abatement priorities.

Figure 1
Mishap Probability

Hazard Severity	A	B	C	D
I	1	1	2	3
II, III	1	2	3	4
IV	2	3	4	5
	3	4	5	5

RAC Definitions:

1 - Critical
2 - Serious
3 - Moderate
4 - Minor
5 - Negligible

Note 1. In some cases, the worst credible consequence of a hazard may not correspond to the highest RAC for that hazard. For example, one hazard may have two potential consequences. The severity of the worst consequence (I) may be unlikely (D), resulting in a RAC of 3. The severity of the lesser consequence (II) may be probable (B), resulting in a RAC of 2. Therefore, it is also important to consider less severe consequences of a

hazard if they are more likely than the worst credible consequence, since this combination may actually present a greater overall risk.

Note 2. The ORM process provides an additional tool for commanders to use in reducing risks inherent in military operations. It is not a complete change in the way we approach the risk management problem, but rather provides a specific methodology for personnel to anticipate hazards and evaluate risk. Just as we have trained our personnel to focus on the mission, we can train our personnel to evaluate risk as part of their decision making process. As personnel are trained in and use the process, ORM will become intuitive, being applied automatically as a means to aid in quickly developing an effective course of action to accomplish the mission.

8. Example. In preparation for an amphibious exercise, a deck officer might use ORM to plan for launching small boats.

a. Step 1 - Identify Hazards

Operational Analysis:
Muster deck watch section
Brief
Man launch positions
Attach lines and Load boats
Move boats over water and lower
Detach lines and retrieve
Small boats move away from ship
Stow lines
Muster deck watch section

b. Preliminary Hazard Analysis: For each step of the operational analysis, list any hazards which might result in personnel injury/death, property damage or mission degradation

Hazards	Causes
Personnel slips/falls	Wet deck Gear adrift Rushing
Time/position requirements requirements confused	Incomplete/Inaccurate brief
Boat overloaded	Inadequate training Crew complacency

Improperly attached lines	same as above
Lost control of boats (resulting in death/injury, damage or delay/abort of launch)	Material casualty (davit, crane or hardness failure) High sea state Improper procedures (winch, davit operation) Improper positioning (boat crew and boat)
Man overboard	same as above
Lines tangled/knotted	same as above Improperly attached lines
Small boats unable to break away from the ship	Small boat engine failure Suction effect from ship

c. Step 2 - Assess Hazards. Assess each hazard identified in terms of severity and probability of possible loss. For example, the deck officer might assess the hazard "Lost control of boats" using the Risk Assessment Matrix as follows:

(1 Consider possible consequences of hazard severity.

(a) Death, boat knocks someone unconscious and overboard or crushes them between the ship and the boat (I)

(b) Severe injury, boat rolls, (II) crewman slips and breaks bones

(c Severe small boat or ship damage (II

(d) Boat launch(es) delayed or even aborted, resulting in diminished reconnaissance support for the amphibious landing and possibly delaying H-hour due to insufficient surf reports. (III for training environment, I for actual combat)

(2) Determine probability of loss from hazard based on past experience, available safety data, the weather forecast, information about the operations area, assigned personnel, the number of small boats and the assigned mission.

(a) With current procedures and personnel, the probability of a death during small boat operations is considered unlikely (D).

(b) Although small boat operations have not been a problem on this ship in the past few years, frequent small boat mishaps in the fleet and the number of potential causes lead the deck officer to conclude that a small boat mishap resulting in severe injury or damage and delayed boat launches probably will occur in time (B).

(3) Determine the RAC. Based on the following analysis, the hazard "Lost Control of Boats" would be assigned a RAC of 2, and prioritized with other hazards based on most serious RAC.

(a) Entering the matrix with severity I and probability D gives a RAC of 3 for personnel death during small boat launch.

(b) Entering the matrix with severity II and probability B gives a RAC of 2 for severe injury or damage

(c) Entering the matrix with severity III and probability B gives a RAC of 3 for delayed launch or abort during training exercise.

d. Step 3 - Make Risk Decisions

(1) Beginning with most serious risks first (lowest RAC), consider risk control options. For example, some controls for the hazard of lost control of boats might include thorough equipment checkout prior to the exercise, review of key procedures during brief, practice launch of empty boats prior to exercise, stationing supervisor/observer to monitor proper position and procedures and wearing helmets.

(2) Determine if benefit outweighs risk with selected controls in place. The deck officer decides the risk is acceptable with the above controls in place. However, he must coordinate with the Captain to conduct the pre-exercise launch.

e. Step 4 - Implement Controls. The deck officer might draft a pre-exercise plan which establishes a requirement to check the equipment, delineates key procedures to be briefed, schedules the practice launch and assigns supervisor responsibility. Existing applicable SOPs should be referenced.

f. Step 5 - Supervise

(1) monitor the evolution for any changes which might present new hazards. Ensure appropriate supervisors enforce established procedures and follow through with selected controls.

(2) Adjust controls which are ineffective.

(3) After the evolution, determine which controls were effective and ensure they are implemented for future, similar evolutions.

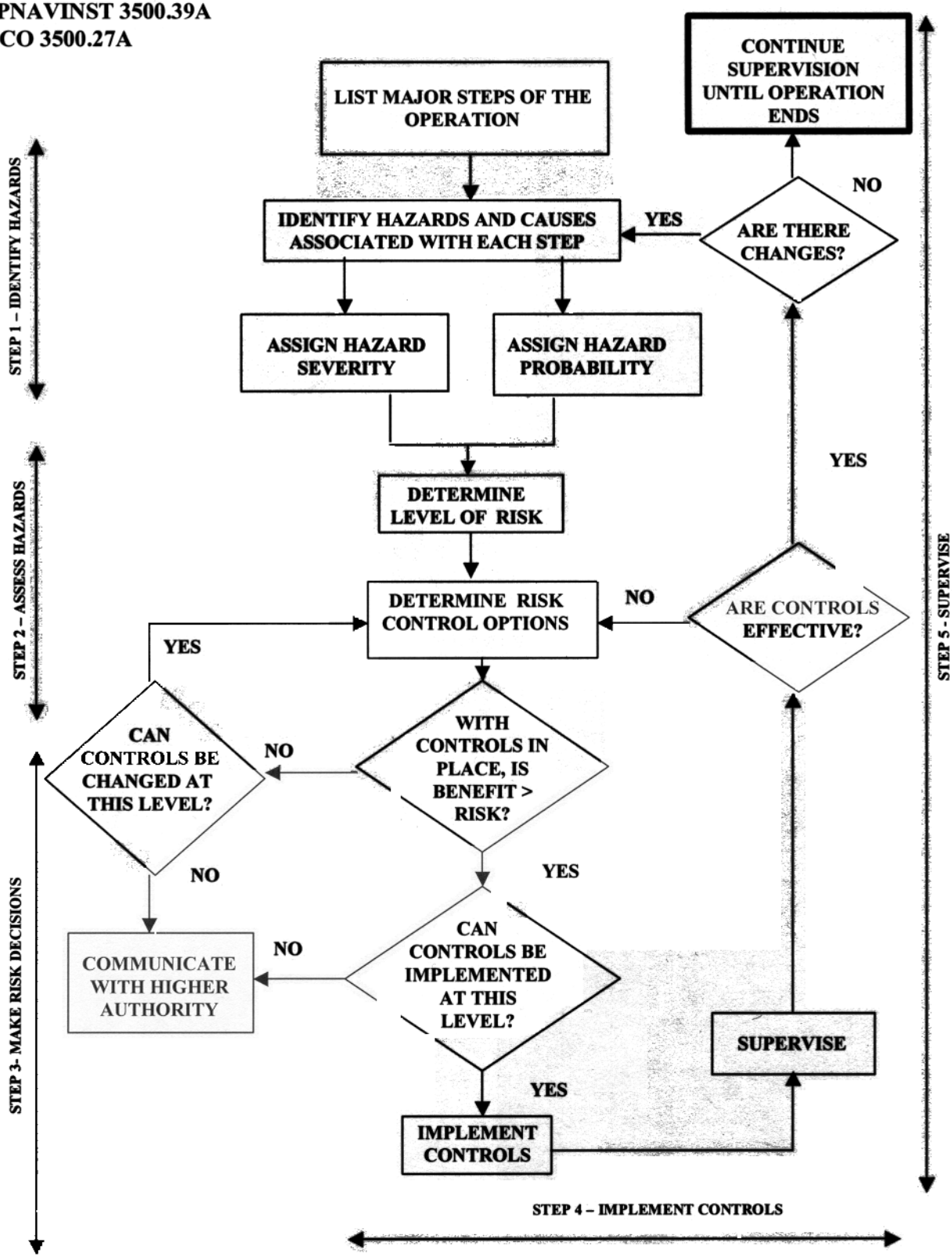
LIST MAJOR STEPS OF THE OPERATION
IDENTIFY HAZARDS AND CAUSES ASSOCIATED WITH EACH STEP
ASSIGN HAZARD SEVERITY
ASSIGN HAZARD PROBABILITY
DETERMINE LEVEL OF RISK
DETERMINE RISK CONTROL OPTIONS
WITH CONTROLS IN PLACE, IS BENEFIT > RISK?
CAN CONTROLS BE CHANGED AT THIS LEVEL?
COMMUNICATE WITH HIGHER AUTHORITY
CAN CONTROLS BE IMPLEMENTED AT THIS LEVEL?
IMPLEMENT CONTROLS
SUPERVISE
ARE CONTROLS EFFECTIVE?
ARE THERE CHANGES?
CONTINUE SUPERVISION UNTIL OPERATION ENDS
YES
NO
STEP 1 – IDENTIFY HAZARDS
STEP 2 – ASSESS HAZARDS
STEP 3- MAKE RISK DECISIONS
STEP 4 – IMPLEMENT CONTROLS
STEP 5 - SUPERVISE

FIGURE 1