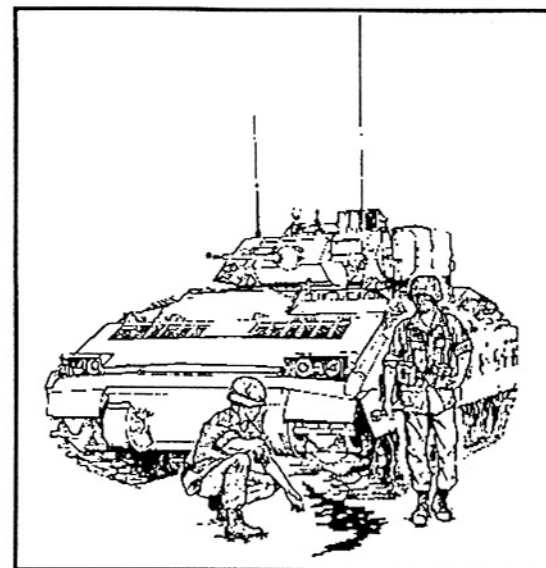


ENVIRONMENTAL-RELATED RISK ASSESSMENT

PURPOSE: This graphic training aid (GTA) illustrates how the risk-assessment process is used to assess and reduce environmental-related risk while conducting operations. Although all risk cannot be eliminated, leaders must identify hazards that may negatively impact the environment and implement controls to reduce the overall risk.

Remember, assessing environmental-related risk is only a part of the overall risk-management process.



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OVERVIEW

Risk decisions are commanders' business. Such decisions are normally based on the next higher commander's guidance on how much risk he is willing to accept and delegate for the mission. Risk decisions should be made at the lowest possible level, except in extreme circumstances.

Both leaders and staff manage risk. Staff members continuously look for hazards associated with their areas of expertise. They then recommend controls to reduce risks. Hazards and the resulting risks may vary as circumstances change and experience is gained. Leaders and individual soldiers become the assessors for ever-changing hazards such as those associated with the environment (weather; visibility; contaminated air, water, and soil), equipment readiness, individual and unit experience, and fatigue. Leaders should advise the chain of command on risks and risk-reduction measures.

THE RISK-MANAGEMENT PROCESS

Risk management is the process of identifying, assessing, and controlling risk that arises from operational factors and balancing risk with mission benefits. This description integrates risk management into the military decision-making process (MDMP). Field Manual (FM) 100-14 outlines the risk-management process and provides the framework for making risk management a routine part of planning, preparing, and executing operational missions and everyday tasks. Assessing environmental-related risks is part of the total risk-management process. The five steps in the risk-management process are as follows:

Step 1. Identify environmental hazards.

Step 2. Assess environmental hazards to determine the risk.

Step 3. Develop controls and make risk decisions.

Step 4. Implement the controls.

Step 5. Supervise and evaluate.

Knowledge of environmental factors is key to planning and decision making. With this knowledge, leaders quantify risks, detect problem areas, reduce risk of injury or death, reduce property damage, and ensure compliance with environmental laws and regulations. Leaders should conduct risk assessments using a

Step 5. Supervise and Evaluate. A leader continuously monitors controls throughout an operation to ensure their effectiveness and to modify them as required. A leader—

- Makes on-the-spot corrections and evaluates individual and collective performances.
- Holds those in charge accountable.
- Requires that all tasks be performed to applicable environmental standards.
- Ensures that the after-action review (AAR) process includes an evaluation of environmental-related hazards, controls, soldiers' performance, and leaders' supervision.
- Ensures that environmental lessons learned are developed for use in future operations.

SUMMARY

The ability of leaders to identify hazards is a key responsibility. One reality of today's missions is that the aspect of a hazard can change rapidly. Things of little risk initially can quickly become major threats due to unforeseen natural or man-made events. Leaders should be aware of this possibility. If they become complacent regarding such events, their lack of action should be viewed as a hazard.

Completing the risk assessment alone but failing to identify effective controls usually results in a go/no-go decision based on the initial risk. If risk assessment does not accurately identify the hazards and determine the level of residual risk, the leader is likely to make his risk decision based on incomplete or inaccurate information. If the risk assessment places a mission in the routine, low-risk category, the commander may not be informed of a risk decision, resulting in an accepted risk level that could imperil his or his higher commanders' intent or other organizations.

The risk-management process is intended to provide reasonable controls to support mission accomplishment.

Table 5. Environmental-related controls

Control Type	Environmental Related Examples
Educational	Conducting unit environmental-awareness training Conducting an environmental briefing before deployment Performing tasks to environmental standards Reviewing environmental considerations in AARs Reading units environmental SOPs and policies Conducting spill-prevention training Publishing an environmental annex/appendix to the OPOD/OPLAN
Physical	Providing spill-prevention equipment Establishing a field trash-collection point and procedures Establishing a field satellite-accumulation site and procedures Policing field locations Practicing good field sanitation Filling in fighting positions Posting signs and warnings for off-limit areas
Avoidance	Maneuvering around historical/cultural sites Establishing refueling and maintenance areas away from wetlands and drainage areas Crossing streams at approved sites Preventing pollution Limiting noise in endangered and threatened species habitats Avoiding refueling over water sources Curtailing live vegetation use for camouflage

Step 4. Implement the Controls. Implementing the controls requires informing all subordinates of the risk-control measures. To do this, a leader defines the controls by filling in column J of the risk-management work sheet (see *Figure 1*, page 4). He states how each control will be implemented and assigns responsibility for implementing the controls. For example, if the control measures for a fuel-spill hazard are to ensure that operators are properly trained to dispense fuel and ensure that appropriate spill equipment is available, then he must ensure that these controls are in place before an operation.

A leader must anticipate environmental requirements and incorporate them as part of his long-, short-, and near-term planning. The key to success is identifying the who, what, where, when, and how aspects of each control and entering the information in the work sheet.

risk-management work sheet before conducting any training, operations, or logistical activities.

Figure 1, page 4, is an example of a completed work sheet. Blocks A through D contain general information. Column E lists the tasks associated with the mission. Steps 1 through 4 in the following paragraphs explain how to fill in columns F through J.

Step 1. Identify Environmental Hazards. Leaders identify environmental hazards during mission analysis (see *Figure 1*, column F). FM 100-14 defines a hazard as any actual or potential condition that can cause injury, illness, or death of personnel; damage to or loss of equipment or property; or mission degradation. Environmental hazards include all activities that may pollute, create negative noise-related effects, degrade archeological/cultural resources, or negatively affect threatened or endangered species' habitats. *Table 1*, page 5, lists common environmental hazards identified by environmental media areas.

Step 2. Assess Environmental Hazards to Determine the Risk. Risk assessment is a three-stage process used to determine the risk of potential harm to the environment. A leader considers two factors—probability and severity. Probability is how often an environmental hazard is likely to occur. Severity is the effect that a hazard will have on the environment. Probability and severity are estimates that require an individual's judgment and a working knowledge of the risk-management process and its terminology. *Table 2*, page 6, defines the five degrees of probability for a hazard; *Table 3*, page 7, defines the four degrees of severity.

Stage 1. A leader assesses the probability of each hazard. For each hazard identified (see *Figure 1*, column F), he makes the following determinations:

- Based on experience and the information in *Table 2*, he determines that a vehicle accident or breakdown causing a fuel and/or hazardous material (HM) spill would seldom happen.
- Based on his judgment and the information in *Table 2*, he determines that spills during refueling stops can occasionally be expected.
- Based on his working knowledge and the information in *Table 2*, he determines that maneuver damage from off-road movement could happen frequently.

and increasing supervision. Using the information from *Table 5*, page 10, a leader fills in column H of the risk-management work sheet (see *Figure 1*, page 4).

Once all practicable risk-control measures are in place, some risk will always remain. Based on the controls that he develops, a leader reassesses the hazards using the procedures from step 2. Once he determines the residual risk for each hazard, he fills in column I in the risk-management work sheet (see *Figure 1*). The residual risk requires the commander's attention. He decides whether or not to accept the risk. The commander may direct his subordinates to consider additional controls or a change in the course of action (COA).

A. Mission or Task: 586 th Engineer company convoy		B. Date/Time Group Begin: 010600RJun XX		C. Date Prepared: 15 Oct XX	
D. Prepared By: (Rank, Last Name, Duty Position) 1LT Young, XO					
E. Task:	F. Identify Hazards:	G. Assess Hazards:	H. Develop Controls:	I. Determine Residual Risk:	J. Implement Controls: ("How To")
Conduct convoy operations to Camp Yukon	Vehicle accidents and breakdowns causing fuel and HM spills	Moderate (M)	1. Train all drivers on proper actions to take during a spill: protect themselves, stop the flow, notify chain of command, and confine the spill.	Low (L)	Soldiers will review the TACSOP, para 8(a), and OPORD. Train all drivers before the exercise. Supply NCO will order and issue vehicle-spill equipment. Platoon leaders will brief soldiers before the convoy.
	Spills during refueling stops	Moderate (M)	2. Provide vehicle-spill equipment.	Low (L)	Soldiers will review the TACSOP, para 11(a), and OPORD. Support platoon leader will check status of spill equipment and brief all soldiers, before the convoy, on refueling procedures.
	Maneuver damage from off-road movement	Moderate (M)	1. Brief all drivers to stay on primary and secondary roads. 2. Identify all sensitive areas and habitats along the route. 3. Conduct prior-route recon.	Low (L)	Soldiers will review the TACSOP, para 9(a), and OPORD. Provide all drivers with strip-map marking route and sensitive areas; leaders account for all vehicles at halts.
K. Determine the overall mission/task risk level after controls are implemented (circle one): <input checked="" type="radio"/> LOW (L) <input type="radio"/> MODERATE (M) <input type="radio"/> HIGH (H) <input type="radio"/> EXTREMELY HIGH (E)					

Table 4. Risk-assessment matrix

Severity	Probability				
	Frequent (A)	Likely (B)	Occasional (C)	Seldom (D)	Unlikely (E)
Catastrophic (I)	E	E	H	H	M
Critical (II)	E	H	H	M	L
Marginal (III)	H	M	M	L	L
Negligible (III)	M	L	L	L	L

Risk Categories

Extremely High (E)
Mission failure if hazardous incidents occur during mission; a frequent or likely probability of catastrophic loss (IA or IB) or frequent probability of critical loss (IIA) occurs.

High (H)
Significantly degraded mission capabilities in terms of required mission standard; will not accomplishing all parts of the mission, not completing the mission to standard (if hazards occur during mission); occasional to seldom probability of catastrophic loss (IC or ID); a likely to occasional probability of a critical loss occurring (IIB or IIC) with material and soldier system; frequent probability of marginal (IIIA) losses.

Moderate (M)
Expected degraded mission capabilities in terms of required mission standard; will have reduced mission capability (if hazards occur during mission); unlikely probability of catastrophic loss (IE). The probability of a critical loss occurring is seldom (IID). Marginal losses occur with a probability of no more often than likely (IIIB or IIIC). Negligible (IVA) losses are a frequent probability.

Low (L)
Expected losses have little or no impact on accomplishing the mission. The probability of critical loss is unlikely (IIE), while that of marginal loss is no more often than seldom (IIID through IIIE).

Figure 1. Completed risk-management work sheet

environmental damage. The severity would be negligible.

A leader uses the determinations from stage 1 with the severity caused by an occurrence in stage 2 to determine the overall risk of each hazard.

Stage 3. First, a leader determines the risk level of each hazard. Then, using the defined degrees of probability and severity from *Tables 2 and 3*, pages 6 and 7, and the risk-assessment matrix (see *Table 4*), he determines the overall environmental-related risk level.

For the hazards identified in *Table 1*, page 5, a leader would make the following determinations and enter the assessments in column G of the risk-management work sheet (see *Figure 1*, page 4).

- Vehicle accidents and breakdowns causing fuel and/or HM spills would seldom happen; but if they did, the severity could be critical. Based on this information and *Table 4* (severity, critical; probability, seldom), he determines the overall assessment to be moderate.
- Spills during refueling stops will happen occasionally; and when they do, the severity will be marginal. Based on this information and *Table 4* (severity, marginal; probability, occasional), he determines the overall assessment to be moderate.
- Maneuver damage from vehicle off-road movement will happen frequently, and the damage will be negligible. Based on this information and *Table 4* (severity, negligible; probability, frequent), he determines the overall assessment to be moderate.

Step 3. Develop Controls and Make Risk Decisions. Controls eliminate or reduce the probability or severity of each hazard, thereby lowering the overall risk. Controls can consist of one of the categories listed in *Table 5*, page 10, which also lists examples.

Many environmental-risk controls are simply extensions of good management, housekeeping, operations security (OPSEC), and leadership practices. Risk-reduction controls can include conducting rehearsals, changing locations, establishing procedures,

Table 1. Common environmental hazards

Element	Hazard
Air	Equipment exhaust Convoy dust Range fires Open-air burning Pyrotechnics/smoke pots/smoke grenades Part-washer emissions Paint emissions Air-conditioner/refrigeration CFCs HM/HW release
Archeological/cultural	Maneuvering in sensitive areas Digging in sensitive areas Disturbing or removing artifacts Demolition/munitions effects HM/HW spills Sonic booms/prop wash
Noise	Low-flying aircraft (helicopters) Demolition/munitions effects Nighttime operations Operations near post/camp boundaries and civilian populace Vehicle convoys/maneuvers Large-scale exercises
Threatened/endangered species	Maneuvering in sensitive areas Demolition/munitions effects, especially during breeding seasons Disturbing individual species or their habitats HM/HW spills or releases Poor field sanitation improper cutting of vegetation Damage to coral reefs
Soil (terrain)	Overuse of maneuver areas Demolition/munitions effects Range fires Poor field sanitation Poor maneuver-damage control Erosion Troop-construction effects Refueling operations HM/HW spills Maneuvering in ecologically sensitive areas such as wetlands and tundra
Water	Refueling operations near water sources HM/HW spills Erosion and unchecked drainage Amphibious/water-crossing operations Troop-construction effects Poor field sanitation Washing vehicles at unapproved sites

Table 2. Hazard probability

Frequent (A) Occurs very often, continuously experienced	
Single Item	Occurs very often in service life; expected to occur several times over duration of a specific mission or operation; always occurs
Fleet or inventory of items	Occurs continuously during a specific mission or operation or over a service life
Individual soldier	Occurs very often in career; expected to occur several times during mission or operation; always occurs
All soldiers exposed	Occurs continuously during a specific mission or operation
Likely (B) Occurs several times	
Single Item	Occurs several times in service life; expected to occur during a specific mission or operation
Fleet or inventory of items	Occurs at a high rate but experienced intermittently (regular intervals, generally often)
Individual soldier	Occurs several times in career; expected to occur during a specific mission or operation.
All soldiers exposed	Occurs at a high rate but experienced intermittently
Occasional (C) Occurs sporadically	
Single Item	Occurs sometimes in service life; may occur about as often as not during a specific mission or operation
Fleet or inventory of items	Occurs several times in service life
Individual soldier	Occurs sometime in career; may occur during a specific mission or operation but not often
All soldiers exposed	Occurs sporadically (irregularly, sparsely, or sometimes)
Seldom (D) Remotely possible: could occur at some time	
Single Item	Occurs in service life but only remotely possible, not expected to occur during a specific mission or operation
Fleet or inventory of items	Occurs as isolated incidents; possible to occur sometime in service life but rarely; usually does not occur
Individual soldier	Occurs as isolated incident during a career; remotely possible but not expected to occur during a specific mission or operation
All soldiers exposed	Occurs rarely within exposed population as isolated incidents
Unlikely (E) Can assume will not occur, but not impossible	
Single Item	Occurrence not impossible; but may assume will almost never occur in service life; may assume will not occur during a specific mission or operation
Fleet or inventory of items	Occurs very rarely (almost never or improbable); incidents may occur over service life
Individual soldier	Occurrence not impossible but may assume will not occur in career or during a specific mission or operation
All soldiers exposed	Occurs very rarely but not impossible

Table 3. Hazard severities

Catastrophic (I)	Loss of ability to accomplish the mission or mission failure, death or permanent total disability (accident risk), loss of major or mission-critical system or equipment, major property (facility) damage, severe environmental damage, mission-critical security failure, unacceptable collateral damage
Critical (II)	Significantly (severely) degraded mission capability or unit readiness, permanent partial disability, temporary total disability exceeding 3 months time (accident risk), extensive (major) damage to equipment or systems, significant damage to property or the environment, security failure, significant collateral damage
Marginal (III)	Degrade mission capability or unit readiness; minor damage to equipment or systems, property, or the environment; lost day due to injury or illness, not exceeding 3 months (accident risk); minor damage to property or the environment
Negligible (IV)	Little or no adverse impact on mission capability, first aid or minor medical treatment (accident risk) slight equipment or system damage but fully functional and serviceable, little or no property or environmental damage

Stage 2. A leader assesses the severity of each hazard he identified. Definitions for the degrees of severity are not absolutes; they are conditional and are mission, enemy, terrain, troops, time available, and civilian consideration (METT-TC) related. A leader must use experience, judgment, lessons learned, and subject-matter experts to help determine the degrees of severity. From the information in *Figure 1*, page 4, a leader makes the following determinations:

- Based on experience and the information in *Table 3*, he determines that a vehicle accident or breakdown causing a fuel and/or HM spill could be significant and cause major damage to the environment. The severity would be critical.
- Based on his judgment and the information in *Table 3*, he determines that spills during refueling stops could cause minor damage to the environment. The severity would be marginal.
- Based on his working knowledge and the information in *Table 3*, he determines that maneuver damage from off-road movement would cause little or no