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Risk Management

Realistic training to standard

U.S. ARMY SAFETY CENTER

Six things battery commanders can do to save lives and equipment

1. Set high standards. Set and enforce high operating standards in every activity of your unit. Safety is a by-product of professionalism, of doing the job right the first time every time. By-the-book disciplined operations are mandatory.

2. Know your soldiers. Know their training status and their qualifications. Test new people's knowledge, regardless of whether or not they have been previously operator certified. This applies to weapons, every type of moving equipment, even protective masks—all equipment.

3. Know your equipment. Know its capabilities and its condition. Numerous check sheets and publications are available to guide you.

4. Apply dispatch discipline. Many accidents involve equipment that should not even be out of the motor pool. Commit the use of equipment only when necessary, only when it can contribute to genuine training in the unit mission. Tough-minded dispatch discipline reduces exposure to accidents. Hold your section chief accountable for the condition of the vehicles.

5. Manage risks in training. Integrate the requirement for safety with the demand for realistic combat training. A high degree of safety can be achieved through the systematic management of inherent mission risks. (A practical process for managing these risks is included in this pamphlet.)

6. Maintain awareness. Be constantly aware of the mission-critical importance of safety in all your operations. You cannot allow yourself to relax your vigil and become complacent when everything is running smoothly. Continuous awareness of the requirement for integrating safety into all day-to-day unit operations is essential to maintaining peak readiness.

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Introduction

Leaders at all levels must build basics that will save resources in peacetime as well as in combat. We cannot afford to lose 20 percent of our fatalities to accidents as we did in World War II. We must build a safety awareness that facilitates realistic and safe training. This pamphlet contains a procedure that allows the integration of safety into our planning and implementation phases of military operations. This technique complements mission analysis and execution and allows commands to manage risk.

Risk management is, in reality, smart decision making. It focuses on mission accomplishment while minimizing the effects of hazards that could cause accidental loss of our men and materiel.

Since all soldiers, from the private to the general, make decisions that entail hazardous operations, risk management techniques are applicable to soldiers at all levels.

Leaders must be trained to use risk management skills and techniques to establish "situational" standards that effectively balance risk with operational objectives.

Risk management
Training to standard . . .safely

Leaders must make safety an integral part of tactical operations from inception to conclusion. The best way to do this is to integrate safety into tactical operation development. Before safety can be integrated into the operational process, the process itself must be clearly defined.

The following depicts a basic operational process. The left column outlines major mission phases, and the middle column depicts typical operational activities associated with each mission phase. The right column lists a variety of safety-related activities that can be used in various combinations to improve safety. Although these activities are shown separately, it must be emphasized that they take place as part of the operational activities shown in the middle column.

Basic Operational Process

Mission Phase	Operational Activity	Safety Activity
Commander's Mission	• Initial estimate • Evaluate mission options • Develop operational alternatives • Decision-making	• Mission analysis • Hazard assessment • Risk assessment • Risk matrices • Risk reduction options
Preparation of Operation Plans and Orders	• Mission briefing • Battery level plans/orders	• Safety input to briefings, orders, and SOPs • Special safety briefings and training
Preparation for Operations	• Prepare equipment • Prepare troops • Make necessary changes	• Safety checks • Special training • Higher-level support
Conduct Operations	• Lead tactical and logistical operations • Change plans as required	• Enforce compliance with safety guidance • Review changes for risk implications
After Action	• Assess performance strengths and weaknesses	• Assess risk management effectiveness

Army accident experience shows that, in the absence of command-defined risk parameters, individual soldiers decide for themselves what level of risk they will accept.

On the following pages are synopses of Army accidents that actually happened. What if the risk management process had been used before these missions? Would the results have been the same?

• The battery was on a night tactical roadmarch. The commander made a route reconnaissance during the day. However, the move was delayed until after dark. The convoy consisted of 11 vehicles with blackout markers. Visibility was further hampered by heavy dust conditions on a night with zero illumination. The accident vehicle was traveling at 10 to 15 mph instead of the recommended 5 mph as the driver tried to catch up with the convoy. He missed the narrow bridge in the darkness, the left track went off the side of the bridge, and the vehicle rolled over, killing the section chief and gunner. The bridge had not been marked to identify the edges, nor was the hazard briefed to the crews.

Mission analysis. When you are assigned to create a mission, as part of your initial estimate you immediately begin to break it down into its component parts: movement to the operations site, night convoy, movement to contact, assault on an objective, etc. To build safety into an operation, you must first "see" the operation in these same component parts. Operations also have a time factor, a beginning-to-end series of events in which the timing of events is often as significant as the events themselves when evaluating risk. The objective is to reflect the total life cycle of the operation from the first preparatory actions until the soldiers are back in the barracks or the next phase of operations is under way.

Mission analysis is nothing new. A good commander and tactician analyzes the mission in this manner regardless of safety needs. This same analysis makes it possible to systematically and objectively inject safety into the operational process.

Risk assessment. There are no hard and fast rules for assessing risks. The bottom line is that commanders have some flexibility in planning and execution and can reduce the probability or severity of an accident.

Risks may be assessed by first measuring the various risks, combining their values, then making a value judgment of what safety precautions are appropriate. By adding the values together, the commander can determine if a proposed mission falls within acceptable risk parameters. He then has the option to take action to reduce the risk as time and flexibility permit. As a minimum, he will become aware that he is functioning in a variable risk environment.

For the most part, risk measurement is a subjective assessment of hazards. What is needed is a quick test to measure the risks involved in a wide spectrum of operational missions. The act of consciously evaluating a mission results in the commander's thinking through the factors that affect mission safety.

Different missions will involve different elements that can affect mission safety. However, seven elements—planning, mission control, soldier endurance, soldier selection, weather, terrain, and sustainability—are central to safe completion of any operation. Using matrices that assign a numerical value to each of the elements is one way of quickly gaining an appreciation of overall risks. The following matrices offer examples of risk assessments for each of the seven elements common to all missions. Keep in mind, however, that these are arbitrary weighted factors; modify them to accommodate particular missions and units.

The numbered matrix approach is one way of thinking through a mission and identifying risks.

• The M110 howitzer battery had been tactical for 3 weeks in a winter environment. Personnel strength was down but the "can do" attitude of the soldiers caused them to attempt to conduct operations that were not in accordance with the technical manual. With only four soldiers to march order the M548 and M110, the section chief depressed the gun tube with the controls on the gunner's position while another soldier engaged the gun tube travel lock. As the section chief depressed the tube, it struck the soldier on the shoulder and forced him to the deck of the howitzer. The section chief did not see him and continued to depress the tube. The soldier's skull was crushed. In addition to not following procedures, the crew did not properly perform the scheduled maintenance and services on this vehicle.

Planning. The planning element is measured by comparing guidance to preparatory time. Specific guidance from established OPLANs and optimum preparation times are usually safer operations.

Planning

Risk Value			
	Preparatory Time		
Guidance	Optimum	Adequate	Minimal
FRAGO	3	4	5
OPORD	2	3	4
OPLAN/LOI	1	2	3

Example: An OPORD received in the unit 3 days in advance would be assessed a risk value of 2. A FRAGO received only minutes in advance would be assessed 5.

Mission control. The level of control is measured by comparing training event to task organization. Garrison, day tactical, and night tactical are seen as increasingly difficult mission parameters. Support includes routine nontactical missions conducted by the unit in the local area. Command and control range from organic control to the unit being placed under the operational control of external organizations.

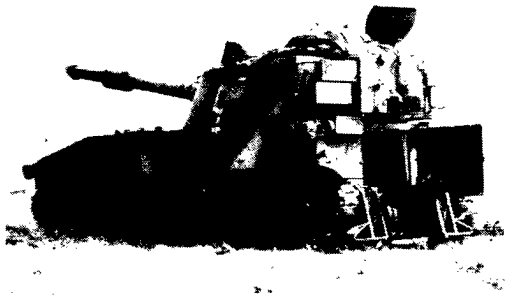
Mission Control

Risk Value			
	Training Event		
Task Organization	Support Nontactical / Garrison	Day Tactical	Night Tactical
OPCON	3	4	5
Attached	2	3	4
Organic	1	2	3

Example: An OPCON garrison support mission would receive a risk value of 3.

The level of the decision maker should correspond to the level of the risk. The greater the risk, the more senior the final decision maker should be.

• The mission involved an M109-equipped field artillery battery conducting a live-fire exercise. The howitzer had been properly laid on the azimuth of fire by the assistant gunner during an unexplained absence of the gunner. When the gunner arrived, he assumed his duties and prepared to verify the lay of the weapon. While filling out the gunner's reference card with the numbers from the assistant gunner's notebook, he wrote 1144 instead of 1444. As he verified the lay, the collimator was not in view of his panoramic telescope, so he realigned the sight with it. This induced a 300 mil error which caused a round to impact approximately 1100 meters to the right of the intended target. No supervisor checked the howitzer before the fire mission as required in the technical manual and FM 6-50. Several members of the battery were new and unsure of their duties, and the gunner had gotten only 3 hours of sleep the night before. The 155mm round impacted in the vicinity of an infantry squad roadmarching 100 yards outside the impact area. Two soldiers were killed.



Soldier endurance. This element is measured by comparing the length and quality of the mental and physical preparation of the soldiers prior to the event with adjustment (acclimation) to the area of operation. Highly trained, physically fit soldiers who have adjusted to the climate are less likely to get hurt than fatigued soldiers who are concentrating on the effects of the environment.

Soldier Endurance

Risk Value

Environmental Preparation	Soldier Preparation		
	Optimum	Adequate	Minimal
Nonacclimated	3	4	5
Partially Acclimated	2	3	4
Acclimated	1	2	3

Soldier selection. Measurement is done by comparing the task to soldier experience. Experience is a subjective command call based on level of training.

Soldier Selection

Risk Value

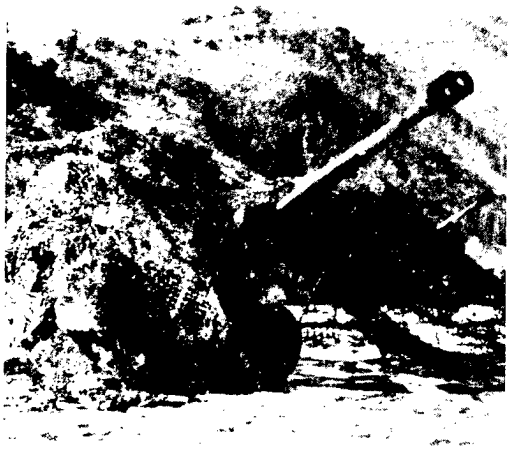
Task	Soldier Experience		
	Highly Qualified	MOS Qualified	Untrained
Complex	3	4	5
Routine	2	3	4
Simple	1	2	3

Weather. This element is measured by comparing temperature with visibility/moisture.

Weather

Risk Value

Temperature °F	Visibility / Moisture		
	Clear/ Dry	Fog/ Humid/ Drizzle	Rain/ Snow/Ice/Dust
<31° or >80°	3	4	5
32°-59°	2	3	5
60°-79°	1	2	5



Terrain. The measurement for terrain is done by comparing the physical features of the land with the road networks that exist in that area. For example, mountainous trails are much more dangerous than the howitzer trails at Fort Sill.

Terrain

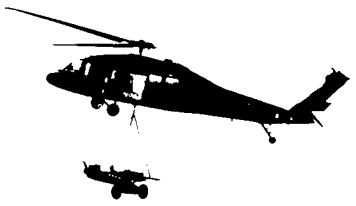
Risk Value			
	Trafficability		
Type Terrain	Improved	Secondary	Trail/Cross Country
Mountain	3	4	5
Desert/Jungle	2	3	4
Hills	2	3	4
Flat/Rolling	1	2	3

Sustainability. This element is measured by comparing the type of equipment used with the percentage of personnel strength. Undermanned crews will attempt to achieve the same standard as fully manned crews, creating dangerous shortcuts.

Sustainability

Risk Value			
	Type System		
Percentage Personnel Fill	Wheel	Track	Crew Served
0-65%	4	5	5
66-79%	2	4	4
80-100%	1	2	2

When operating in the high-risk zone, everyone involved must be aware of the risk implications.



After all risks have been assessed, the values would be totaled and applied to a quick-reference gauge.

0 to 12 Low Risk	13 to 23 Caution	24 to 35 High Risk

Operations with a value of 0 to 12 would be judged as **low risk.** A value of 13 to 23 is seen as a **caution** area; complete unit command involvement is warranted. A "caution" rating should be given special consideration, since only one or two elements have significantly raised the overall risk level. For example, a long flight through changing time zones immediately before a 48-hour tactical mission would be cause for serious concern even though the operation's overall risk assessment might well be within the "caution" range. **High risk** operations, assigned a value of 24 to 35, require prior coordination with the next higher level of command external to the organization making the assessment. When two or more areas are assigned a risk factor of 5, the overall rating is considered high risk.

This coordination is necessary so that additional resources can be allocated to control or reduce risk factors.

To demonstrate the assessment technique, let's look at a scenario—

Field Artillery Night Move—Your field artillery battery has been tactical for 6 days undergoing an ARTEP. You have just received a warning order to conduct a night move in 2 hours from the northern part of Grafenwoehr to the southwestern tank trail. Radio communication has been poor due to atmospheric conditions. The weather is deteriorating rapidly, and fog and light snow flurries are forecast. Low temperatures of 34° to 38° are expected. Four of your section chiefs are new, and you have received 20 new MOS-trained artillerymen from Fort Sill in the last 3 months to bring your crew strength to 95 percent fill. This is your first experience at Grafenwoehr.

Any increase in a mission's level of difficulty produces a corresponding increase in the level of risk involved.

Element	Assessment Elements	Risk Value
Planning	Guidance is oral and preparation is adequate	4
Mission Control	Mission is categorized as organic night tactical	3
Soldier Endurance	Soldiers are acclimated and prior training has been adequate	2
Soldier Selection	Operation is complex and personnel are judged MOS qualified	4
Weather	Fog and light snow flurries create additional risks	4
Terrain	Tank trails traverse hilly terrain on the western portion of Grafenwoehr	3
Sustainability	Crew-served weapons are adequately manned	2

Risk value = 22 (caution)

What are your risk-reduction options? The use of risk matrices and hazard analyses will define the kinds and significance of hazards faced in an operation. Now the task is to reduce the risk **without** significant adverse impact on operational objectives.

The countermeasure option checklist below has direct application to the development of risk-reduction options. It can be used to develop a full array of possibilities and to weed out those that are clearly impractical. The product of the risk-reduction phase should be a list of options that are practical, although not necessarily desirable, for the particular operation.

Countermeasure options:

Eiiminate the hazard. Eliminate the hazard totally, if possible, or substitute a less hazardous alternative.

Control the hazard. Reduce the magnitude of the hazard or provide containment or barriers.

Change operational procedures. Modify operational procedures to minimize risk exposure consistent with mission needs.

Educate. Train personnel to recognize and properly react to hazards.

Motivate. Motivate personnel to use effective hazard avoidance actions.

A key factor in detecting significant risk is to maintain a strong organizational mission perspective. Adapt these basic assessment elements to fit your organizational needs. You can also develop additional matrix charts that blend in special considerations. One caution—keep the process simple. The idea is to develop a quick measure for risk and then determine an array of options for eliminating or controlling that risk.

The risk management approach gives commanders as much capability as possible with the least amount of potential risk.

The Risk Management Process

1. Risk identification
This is risky, this isn't.
2. Risk evaluation and quantification
The risk is this great.
3. Risk reduction
Risk can be reduced by this and this.
4. Risk decision making
This risk we can live with, this we can't.
5. Risk decision followup
Is the risk and benefit as projected?
6. Risk research
What is the risk? What risk is essential?

Advantage of Risk Management for Command

- Detect risks before losses.
- Quantify risk.
- Provide risk reduction alternatives.
- Better management decisions.
- Greater integration of safety.
- Increased mission capability.

Completing integration of safety into the operational process. At this point, you, for the investment of as little as 30 to 60 minutes of your time, should have a thorough insight into the risks you will face in the operation and the risk reduction options available to you. All this is achieved **before** final operational decisions are made or a single operation order is issued. From this point, the safety process becomes a totally integrated aspect of the operational process. There must be no distinction **whatsoever**. The operational process continues with the final selection of specific tactical procedures and the issuing or briefing of orders. These final tactical procedures are influenced by, but not dominated by, risk considerations. Ultimately, you must balance training needs against potential risk costs.

Risk reduction measures are an important factor in the details of tactical procedures and will be a meaningful part of written and verbal orders. Similarly, safety checks, special training and briefings, revisions to SOP, etc., are all accomplished as an integral part of the operational process.

In summary, the effective commander defines his objectives and standards of performance for each operation he conducts. These objectives and standards include risk management factors as the full equal of the tactical, logistical, and leadership components.

What's the payoff? The risk management approach gives commanders a tool to improve efficiency, effectiveness, and safety in all operations. The payoff is in increased readiness as a result of safer, smarter, more beneficial training.

Risk management permits the execution of realistic training scenarios not possible without risk management procedures due to their high potential cost in accidents. It also minimizes personnel and materiel losses in day-to-day training activities. Finally, leaders who routinely use risk management techniques to make risk decisions in training are prepared to make better risk decisions in wartime, resulting in better tactical decisions and thus greater mission potential.