Civil Air Patrol Guide to Operational Risk Management

CIVIL AIR PATROL NATIONAL HEADQUARTERS SAFETY

CAP ORM Principles

Four principles govern all actions associated with risk management. These continuously employed principles are applicable before, during and after all tasks and operations.

1) ***Accept no Unnecessary Risk:*** Unnecessary risk comes without a commensurate return in terms of real benefits or available opportunities. All CAP missions and our daily routines involve risk. The most logical choices for accomplishing a mission are those that meet all mission requirements with the minimum acceptable risk. The corollary to this axiom is "accept necessary risk" required to successfully complete the mission or task.

2) ***Make Risk Decisions at the Appropriate Level:*** Making risk decisions at the appropriate level establishes clear accountability. Those accountable for the success or failure of the mission must be included in the risk decision process. The appropriate level for risk decisions is the one that can allocate the resources to reduce the risk or eliminate the hazard and implement controls. Typically, the commander, leader, or individual responsible for executing the mission or task is:

    a) Authorized to accept levels of risk typical of the planned operation (i.e., loss of mission effectiveness, normal wear and tear on materiel).

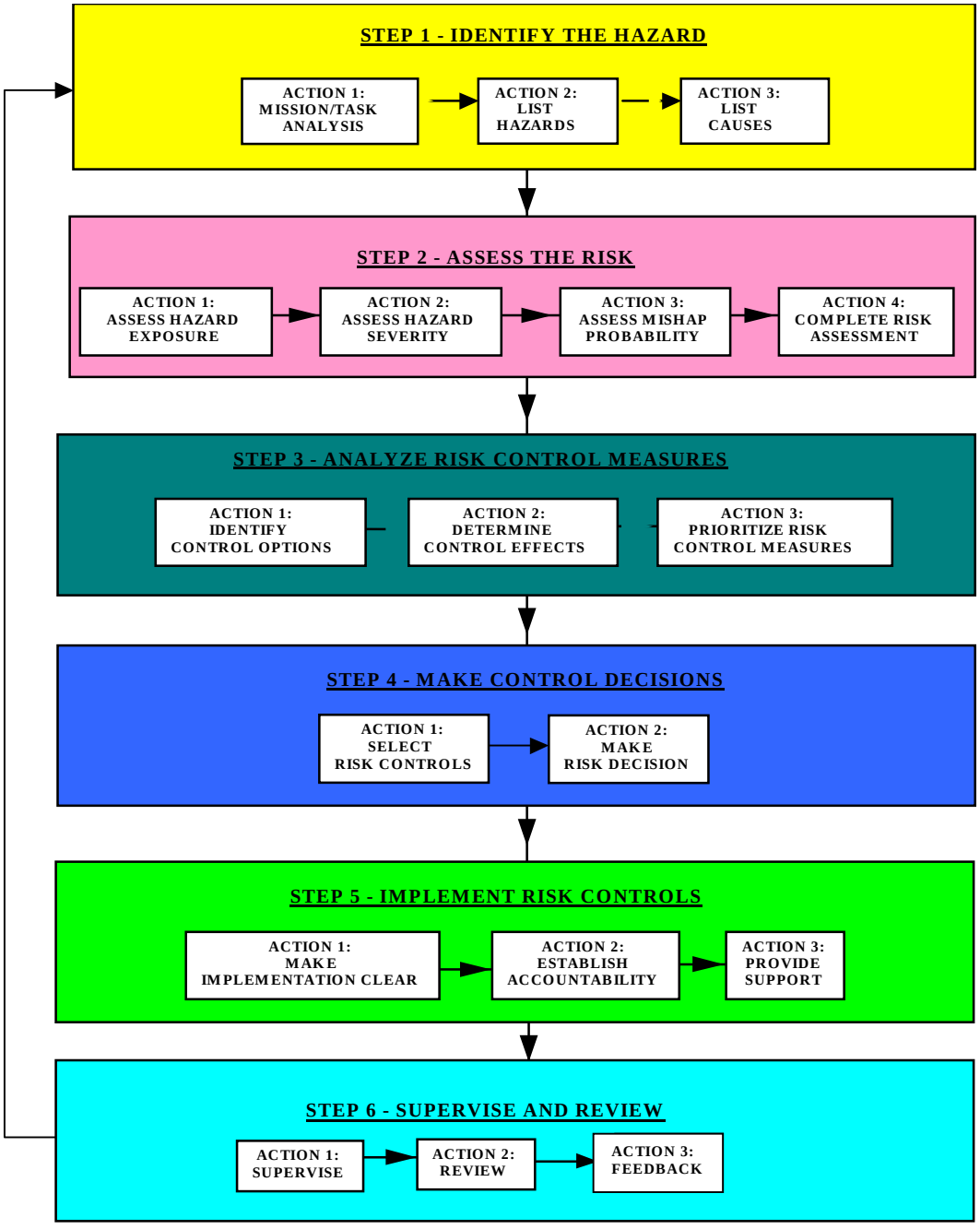
    b) Required to elevate decisions to the next level in the chain of command after it is determined that controls available to him/her will not reduce residual risk to an acceptable level.

3) ***Accept Risk When Benefits Outweigh the Costs:*** All identified benefits should be compared to all identified costs. The process of weighing risks against opportunities and benefits helps to maximize unit capability. Even high-risk endeavors may be undertaken when there is clear knowledge that the sum of the benefits exceeds the sum of the costs. Balancing costs and benefits may be a subjective process and open to interpretation. Ultimately, the balance may have to be determined by the appropriate decision authority.

4) ***Integrate ORM into Planning at all Levels:*** Risks are more easily assessed and managed in the planning stages of an operation. Integrating risk management into planning as early as possible provides the decision maker the greatest opportunity to apply ORM principles. Additionally, feedback must be provided to benefit future missions/activities.

THE ORM PROCESS

ORM is a continuous process designed to detect, assess, and control risk while enhancing performance and maximizing combat capabilities. ORM provides the basic structure for the detection, assessment, and ultimate sustained control of risk while enhancing performance and maximizing capabilities. The specific actions associated with each step of the ORM process are depicted below.



Use this chart and the information on the following pages to work through your risk analysis. The last two pages of this guide include a worksheet with instructions.

STEP 1. IDENTIFY THE HAZARDS

The purpose of Step 1 is to identify as many hazards as possible. A hazard can be defined as any real or potential condition that can cause mission degradation, injury, illness, death to personnel or damage to or loss of equipment or property. The following tools help identify real or potential hazards.

PRIMARY HAZARD IDENTIFICATION TOOLS

OPERATIONS ANALYSIS

Purpose: To understand the flow of events.
Method: List events in sequence. May use time checks.

PRELIMINARY HAZARD ANALYSIS (PHA)

Purpose: To get a quick hazard survey of all phases of an operation. In low hazard situations the PHA may be the final Hazard ID tool.
Method: Tie it to the operations analysis. Quickly assess hazards using scenario thinking, brainstorming, experts, accident data, and regulations. Considers all phases of operations and provides early identification of highest risk areas. Helps prioritize area for further analysis.

"WHAT IF" TOOL

Purpose: To capture the input of operational personnel in a brainstorming-like environment.
Method: Choose an area (not the entire operation), get a group and generate as many "what-ifs" as possible.

SCENARIO PROCESS TOOL

Purpose: To use imagination and visualizations to capture unusual hazards.
Method: Using the operations analysis as a guide, visualize the flow of events.

LOGIC DIAGRAM

Purpose: To add detail and rigor to the process through the use of graphic trees.
Method: Three types of diagrams- positive, negative and risk event.

CHANGE ANALYSIS

Purpose: To detect the hazard implications of both planned and unplanned change.
Method: Compare the current situation to a previous situation. The form supports this process.

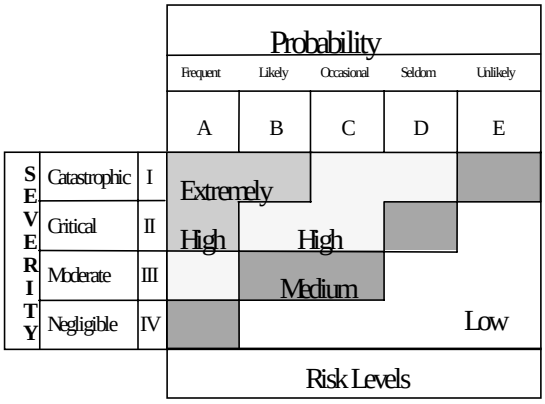
CAUSE & EFFECT TOOL

Purpose: To add depth and increased structure to the Hazard ID process through the use of graphic trees.
Method: Draw the basic cause and effect diagram on a worksheet. Select the four "P's (people, procedures, policies, plant) or the four "M's (manpower, methods, machinery, materials) or tailor the branches of the diagram. Use a team knowledgeable of the operation to develop causal factors for each branch. Can be used as a positive or negative diagram.

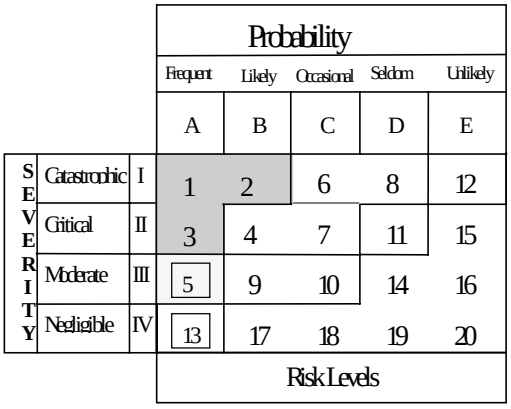
Reference AFPAM 90-902 for additional Hazard Identification Tools available.
http://afpubs.hq.af.mil/pubfiles/af/90/afpam90-902/afpam90-902.pdf

STEP 2. ASSESS THE RISKS

Risk is the probability and severity of loss from exposure to the hazard. The assessment step is the application of quantitative or qualitative measures to determine the level of risk associated with a specific hazard. This process defines the probability and severity of an undesirable event that could result from the hazard.



Risk Assessment Matrix



Modified Risk Assessment Matrix

SEVERITY

Catastrophic – Complete mission failure, death, or loss of system.
Critical – Major mission degradation, severe injury, occupational illness or major system damage.
Moderate – Minor mission degradation, injury, minor occupational illness, or minor system damage.
Negligible – Less than minor mission degradation, injury, occupational illness, or minor system damage.

PROBABILITY

Frequent – Individual/Item. Occurs often in career/equipment service life. Everyone exposed. Continuously experienced.
Likely – Individual/Item. Occurs several times in career/equipment service life. All members exposed. Occurs frequently.
Occasional – Individual/Item. Occurs sometime in career/equipment service life. All members exposed. Occurs sporadically, or several times in inventory/service life.
Seldom – Individual/Item. Possible to occur in career/equipment service life. All members exposed. Remote chance of occurrence; expected to occur sometime in inventory service life.
Unlikely – Individual/Item. Can assume will not occur in career/equipment service life. All members exposed. Possible, but improbable; occurs only very rarely.

Reference AFPAM 90-902 for Severity/Probability Definitions
http://afpubs.hq.af.mil/pubfiles/af/90/afpam90-902/afpam90-902.pdf

STEP 3. ANALYZE RISK CONTROL MEASURES

Investigate specific strategies and tools that reduce, mitigate, or eliminate the risk. Effective control measures reduce or eliminate one of the three components (probability, severity, or exposure) of risk.

MACRO OPTIONS

Reject – We can and should refuse to take a risk if the overall costs of the risk exceed its mission benefits.

Avoid – Avoiding risk altogether requires canceling or delaying the job, mission, or operation, but is an option that is rarely exercised due to mission importance.

Delay – It may be possible to delay a risk. If there is no time deadline or other operational benefit to speedy accomplishment of a risky task, then it is often desirable to delay the acceptance of risk. During the delay, the situation may change and the requirement to accept the risk may go away.

Transfer – Risk transference does not change probability or severity of the hazard, but it may decrease the probability or severity of the risk actually experienced by the individual or organization accomplishing the mission/activity. As a minimum, the risk to the original individual or organization is greatly decreased or eliminated because the possible losses or costs are shifted to another entity.

Spread - Risk is commonly spread out by either increasing the exposure distance or by lengthening the time between exposure events.

Compensate – We can create redundant capability in certain special circumstances. An example is to plan for a back up, and then when a critical piece of equipment or other mission asset is damaged or destroyed we have capabilities available to bring on line to continue the mission.

Reduce – The overall goal of ORM is to plan missions or design systems that do not contain hazards. A proven order of precedence for dealing with hazards and reducing the resulting risks is:

(1) Plan or Design for Minimum Risk. Design the system to eliminate hazards. Without a hazard there is no probability, severity or exposure.
(2) Incorporate Safety Devices. Reduce risk through the use of design features or devices. These devices usually do not effect probability but reduce severity: an automobile seat belt doesn't prevent a collision but reduces the severity of injuries.
(3) Provide Warning Devices. Warning devices may be used to detect an undesirable condition and alert personnel.
(4) Develop Procedures and Training. Where it is impractical to eliminate hazards through design selection or adequately reduce the associated risk with safety and warning devices, procedures and training should be used.

The following options assist in identifying potential controls:

REDUCE OPTIONS

Engineer	*Train & Educate*
Guard	*Warn*
Improve Task Design	*Motivate*
Limit Exposure	*Reduce Effects*
Selection of Personnel	*Rehabilitate*

STEP 4. MAKE CONTROL DECISIONS

After controls have been selected to eliminate hazards or reduce their risk, determine the level of residual risk for the selected tasking, mission and/or course of action.

- Accept the plan as is: Benefits outweigh risks (costs), and total risk is low enough to justify the proposed action if something goes wrong. In peacetime, no one should accept an appreciable risk of any casualties. The decision maker must allocate resources to control risk. Available resources are time, money, personnel, and/or equipment.
- Reject the plan out-of-hand. Risk is too high to justify the operation in any form. The plan was probably faulty in some manner, or the objective was not that important.
- Modify the plan to develop measures to control risk. The plan is valid, but the current concept does not adequately minimize risk. Further work to control the risk is necessary before proceeding.
- Elevate the decision to higher authority. The risk is too great for the decision-maker to accept, but all measures of controlling risk have been considered. If the operation is to continue, a higher authority must make the decision if the mission is worth it, and accept the risk.

Make Risk Decisions at the Appropriate Level - Factors below become the basis of a decision-making system to guide leaders:

- Who will answer in the event of a mishap?
- Who is the senior person at the scene?
- Who possesses best insight into the full benefits and costs of a risk?
- Who has the resources to mitigate the risk?
- What level makes the most operational sense?
- What level makes these types of decisions in other activities?
- Who will have to make this decision in emergency operations?

STEP 5. IMPLEMENT RISK CONTROLS

Once the risk control decision is made, assets must be made available to implement specific controls. Part of implementing control measures is informing the personnel in the system of the risk management process results and subsequent decisions. Careful documentation of each step in the risk management process facilitates risk communication and the rational processes behind risk management decisions.

- **Make Implementation Clear**
- **Establish Accountability**
- **Provide Support**

STEP 6. SUPERVISE AND REVIEW

Risk management is a process that continues throughout the life cycle of the system, mission, or activity. Leaders at every level must fulfill their respective roles in assuring controls are sustained over time. Once controls are in place, the process must be periodically reevaluated to ensure their effectiveness.

SUPERVISE – Monitor the operation to ensure:

- Controls are effective and remain in place.
- Changes, which require further risk management, are identified.
- Action is taken when necessary to correct ineffective risk controls and reinitiate the risk management steps in response to new hazards.
- Anytime the personnel, equipment, or mission taskings change or new operations are anticipated in an environment not covered in the initial risk management analysis, the risks and control measures should be reevaluated.
- Successful mission performance is achieved by shifting the cost versus benefit balance more in favor of benefit through controlling risks.

REVIEW – After assets are expended to control risks, then a cost benefit review must be accomplished to see if risk and cost are in balance.

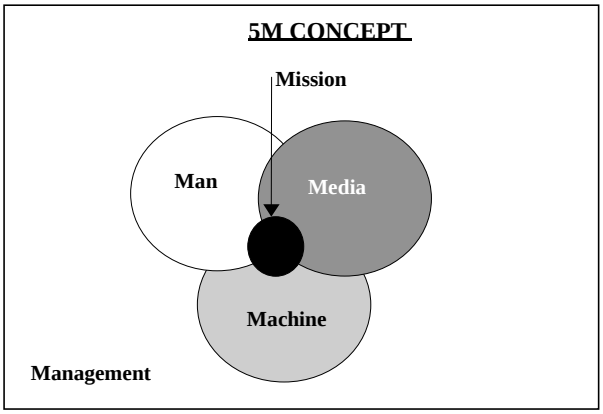
- Is the actual cost in line with expectations?
- What effect did control measures have on performance?
- Was a mission feedback system established to ensure that the corrective or preventative action taken was effective?
- Was documentation available to allow a review of the risk decision process?
- What measurements were in place to ensure accurate evaluations of how effectively controls eliminated hazards or reduced risks?

FEEDBACK – Feedback informs all involved as to how the implementation process is working, and whether or not the controls were effective. Feedback can be in the form of briefings, lessons learned, cross-tell reports, benchmarking, database reports, etc.

The 5M Concept

General

The 5M Concept. The 5M concept is a commonly used tool to graphically illustrate the relationship that exists in any typical process. In this case, the dynamic interaction of the man, the machine and the media (environment) converge to produce either a successful mission or if unsuccessful, a mishap. Management provides guidance, policy and standards.



Man - category encompasses our aircrew members. It includes training, selection, proficiency, habit patterns, performance, and personal factors. In risk assessment, the operator is always an essential element, i.e., and the human who operates the machine within a media under management criteria. Some of these human elements are:

- *Selection*: right person emotionally/physically trained in event proficiency, procedural guidance, habit pattern.
- *Performance:* awareness, perceptions, saturation, distraction, channelized attention, stress, peer pressure, confidence, insight, adaptive skills, pressure/workload, fatigue (physical, motivational, sleep deprivation, circadian rhythm, klutz).
- *Personal Factors*: Expectancies, job satisfaction, values, families/friends, command/control, discipline (internal and external), modeling, pressure (overtasking) and communication skills.

Media - is the environment with which aircrews fly. This includes climate, terrain, and noise/distraction and runway environment. These external, largely environmental, forces vary and must be considered when assessing risk:

- *Climactic:* Temperature, seasons, precipitation, aridity, wind.
- *Operational:* Routes, surfaces, terrain, vegetation, obstructions, and constrictions.
- *Hygienic*: Vent, noise, toxicity, corrosives, dust, and contaminants.
- *Vehicular/Pedestrian*: paved, gravel, dirt, ice, mud, dust, snow, sand, hilly, curvy.

Machine **-** The MACHINE category encompasses the aircraft. The machine category includes its design, its maintenance history and performance, its maintenance technical orders and its user perception. This category consists of:

- *Design:* engineering and user friendly (ergonomics).
- *Maintenance*: Training, time, tools, parts.
- *Logistics:* supply, upkeep, and repair.
- *Tech data*: clear, adequate, useable, and available.

Management - is the final overall coordinating category. Management provides the enforcement and establishment of standards, procedures and controls. It drives the interaction between MAN, MEDIA, MACHINE, and MISSION**.** Management dictates the process by defining Standards, Procedures, and Controls.

There is significant overlap between Man, Machine, Mission and Media because these elements interrelate directly, but the critical element is Management. Any breakdown within the man, machine, mission or media must be viewed as an effect of management performance. When outcome fails to meet anticipated goals, these 5 M's must be thoroughly reassessed. Management is the controlling factor in defining the process of either production success or failure.

Mission – The desired outcome. Successful missions, or mishaps, do not just happen, they are indicators of how well a system is functioning. The basic cause factors for mishaps fall into the same categories as the contributors to successful missions—Man, Media, Machine, and Management.

RISK MANAGEMENT WORKSHEET

PAGE _____ OF _____

1. MISSION/TASK:		2. DATE/TIME BEGIN:		3. DATE PREPARED:	
4. PREPARED BY: (Rank, Name, Duty Title)					
5. HAZARDS	6. RISK LEVEL	7. CONTROL(S)	10. HOW TO IMPLEMENT	11. HOW TO SUPERVISE	12. ARE CONTROLS EFFECTIVE (Y/N)
8. OVERALL RISK LEVEL AFTER CONTROLS ARE IMPLEMENTED (Circle one) **LOW** **MODERATE** **HIGH** **EXTREMELY HIGH**				9. RISK DECISION AUTHORITY	

WORKSHEET INSTRUCTIONS

Block

1-4 Self-explanatory

5. Identify Hazard: Objective is to ID those things most likely to have a negative impact on the mission.

6. Assess Risk: Determine risk of each hazard using the Risk Assessment Matrix. In Block 6, enter the risk level for each hazard, i.e., L-Low, M-Moderate, H-High, or E-Extremely High.

7. Develop Controls: Develop one or more controls for each hazard to reduce its risk. As needed, specify who, what, where, when, and how for each control.

8. Determine Mission/Task Risk: From Block 6, identify hazard with highest residual risk. This is the overall risk for the task/mission. Circle the appropriate risk level in Block 8.

9. Make Risk Decision: Decide to accept or not accept the residual risk for this mission/task. Unit commander will determine authority and level for risk acceptance. Decisions for high and extremely high risk levels should be elevated up the chain of command.

10. Implement Controls: Decide how each control will be put into effect/communicated to the personnel and who will make it happen (written instructions, operating instructions, checklists, dry-runs). Enter in Block 10.

11. Supervise: Show how each control will be monitored to ensure proper implementation (i.e., continuous supervision, spot checks, etc.). Enter in Block 11.

12. Evaluate: After mission/task is complete, determine effectiveness of each control in reducing the risk of the targeted hazard. Indicate in Block 12 Y (yes) if the control was effective or N (no) if the control was ineffective. For those controls that were not effective, determine why and what to do the next time this hazard is identified. For example change the control or change how the control will be implemented/supervised.

RISK
PERCEPTION

RISK
ASSESSMENT

RISK
MANAGEMENT