

Advanced Risk Management

DLO's:

- Move on from “Intermediate” understanding of Risk Management.
- Use RM in the planning and execution of activities.
- Understand and perform Advance Risk Management.

Introduction: This lesson will take you through each step of the logic-based, common-sense approach to make calculated decisions on human, material and environmental factors associated with any type of activity. It is a six-step process to manage inherent risk.

Operational Risk Management does not replace Civil Air Patrol Regulations, Policy's, or Procedures, it does fill the gap between real-world conditions and scenarios which are not already covered under regulations or law.

If you forget certain aspects of Operational Risk Management, go back over to the two previous courses (Basic and Intermediate Operational Risk Management), before proceeding with Advance Risk Management.

For ORM to be effective in CAP, these principles must be present 24 hours a day, 7 days a week, 365 days a year, and used by all staff and members in all tasks and activities. There are four principles which govern all applications of ORM.

The principles of Operational Risk Management are:

1. Accept no unnecessary risks.
2. Make risk decisions at the appropriate level.
3. Accept risk when the benefits outweigh the cost.
4. Integrate ORM into CAP at all levels.

The steps of ORM (The ORM “loop”) are:

1. Identify the Hazards,
2. Assess the Risks
3. Analyze the Risk Control Measures
4. Make Control Decisions and implement
5. Supervise and Review

The 5M Model:

Using the 5 M's in risk assessment. Here is what you will see when you look at Steps 4 & 5 of the CAPF 160: Here is an effective way to complete these important steps of the risk assessment:

Step 1: The Plan. Look at the whole plan for the entire activity. You may want to go through in order and write down every event and sub-activity and list each of them in the blocks provided in Step 4.

Step 2: The Hazards. Using the 5 M's, described below, ask yourself "what can go wrong?" What are all the things that pose a risk? What are the hazards you will face in every task?

MAN: Look at all the information about the members themselves. A few examples:

- Cadets or senior members? - Are they physically able to perform the task?
- Could pre-existing injuries or illnesses be a hazard? - Are they adequately trained?
- Do you expect them to be nervous? Scared? Apprehensive?
- Long hours? The need for rest?
- Look at ALL the vulnerabilities of the members participating.

MEDIA: This refers to the environment you will be facing.

- What is the weather and what effect could it have on the plan? Heat? Cold? Rain?
- How about the terrain? Is the "playing surface" appropriate for the activity?
- Look at ALL the conditions and the hazards they might bring.

MACHINE: This applies to the airplane, the vehicle, and the gear that will be used.

- Is the equipment well-suited to the task or mission? Will it do what you want it to do?
- Is the equipment well-maintained? Well designed? Are the members trained in how to use it?
- Look at ALL the equipment from an airplane down to the smallest canteen or pocketknife.

MANAGEMENT: This refers to the organizational factors that influence our activities and missions.

- What do regulations and written guidance say about the activity? Are they being followed?
- Is it clear who is in charge? Is there adequate supervision?

MISSION: This looks at the plan itself and the complexity of the mission.

- Is the activity well-planned? Look at the pace of the plan.
- Is the plan too complex for the members involved? Too much to do in too little time?

IMPORTANT NOTE: The 5 M's are a starting point to help you look at a wide variety of hazards. Brainstorm ALL the things that could pose a risk. The goal of a risk assessment is to ask, and answer:

"What can go wrong, and what am I doing to prevent it?"

The 3 levels of ORM:

Time Critical ORM: Normally refers to the on-going ORM decisions made in real-time during the execution of every activity. When time does not permit deliberate ORM, members must still apply the 5-steps of the ORM process. The CAPF 160S, Real Time Risk Assessment, may be used to guide the process

Deliberate ORM: Deliberate ORM process must be completed and documented, to include signature of the member in charge of the activity or mission. Deliberate ORM will be accomplished utilizing the CAP Form 160 in the following cases, or in similar cases where a thorough planning process is indicated. Deliberate ORM is well planned and thought out in advance.

Strategic ORM: is used to study the hazards and associated risks in a complex operation in which the hazards are not well understood. This level is a long-term application that involves research, various analysis tools and long-term tracking of the associated hazards. This level of ORM is typically used for high-visibility risks and requires a lot of time and resources.

Hazard Identification Tools:

To identify the hazards, you: analyze the mission, list the hazards, and list the causes.

Identify the hazards on all of CAP's assets:

- Aircraft
- Vehicles
- Personnel
- Equipment

Identify the hazards to all operational levels:

- National
- Region
- Wing
- Group
- Squadron & Flights

There are several hazard identification tools presented to help you uncover areas of potential hazards as you work through the ORM's first step. Use the tool that best fits your activity.

Operations Analysis: A big picture look at what is expected to happen. This helps overcome major weakness by focusing on a few intuitively risky areas. Evaluates all elements of operation for potential sources of risk.

Preliminary Hazard Analysis Tool: This is used to identify hazards requiring more in-depth identification. Provides initial overview of hazards presented in an overall operational flow. Considers ORM in every aspect. Can serve only as a hazard ID tool for low or routine risks.

"What If" Tool: One of the best hazard tools. Typically used after the operations analysis and preliminary hazard analysis. Designed to add structure to the intuitive and experiential expertise of operational personnel. Use by personnel to brainstorm and visualize expected operational flow in chronological order from beginning to end of a mission or activity considered in anticipated failure and worse-case scenarios.

Scenario Process Tool: This tool uses imagination and visualization to reveal unusual hazards. Construct a mental movie of the operation and walk through the events with visualizing type of controls to mitigate diverse types of hazards.

Logic Diagram Tool: The most comprehensive and detailed of the hazard identification tools. Most effective with complicated operations where hazards are interlinked in many ways. Tree-

like structure establishes the connectivity and linkages that may exist between hazards. Its graphics capture and correlates the hazards data produced by the other tools.

Change Analysis Tool: Used to analyze the hazard implications of planned or unplanned changes.

- Focuses only on the changed aspect of event.
- Compare the current situation with the previous one.
- Only tool needed if operation has been subjected to in-depth hazard analysis.
- Best accomplished using a simple worksheet.

Cause & Effect Tool: Brainstorming is used to identify causes, using the 5M Model, that may lead to a hazard. Uses the “Fishbone” or Ishikawa Diagram. Named after the inventor, Professor Kaoru Ishikawa of Tokyo University, a highly regarded expert in quality management. (See Advance Level Operational Risk Management Slide #19 & #20).

- Illustrates hierarchical relationships between potential causes according to their level of importance.
- Can be drawn on flip chart or whiteboard.
- Variation of the Logic Diagram.

STEP 1: Identify the Hazards (Specialty Hazard Identification Tool)

The United States Airforce identifies 14 specialty hazards ID tools used to enhance the primary tools. In this course will be explore three:

The Mapping Tool:

Someone who has seen the map object is an invaluable resource to consult. An on-site inspection should occur before the operation begins. Incorporate these hazards into other Primary Hazard ID Tools

The Interface Analysis Tool:

Used to uncover potentially hazardous linkages or interfaces between unrelated activities. A SAR/SAREX at a local airport may impose hazards to the local airport operations, facilities, and pilots.

CAP operations at an airport not used before is a good cue to use the interface analysis and the Primary Hazard ID Change Analysis

Mission Protection Tool:

Designed to focus on protection of the mission rather than on protection of personnel or other assets. It has no specific method or worksheet and is characterized by its focus. Helps prevent

the mission from stopping by events that injure no one or cause no damage. Identify key components of the “missions' continual success” and what could interrupt it.

Examples to consider that may prevent missions from proceeding are:

Computers or Internet service

CAP Forms, reports, personnel contact information

Aircraft & vehicle tires, backup radios

STEP 2: Assess the Risk (The Standard Risk Matrix)

Risk is assessed based on exposure, severity, and probability in the order of most likely to least likely to happen. You can use the standard risk assessment matrix below to find the risk.

3 Problems with standard matrix:

- Subjected to individual interpretation of Severity and Probability.
- A problem arises if the two hazards are competing for the same risk control resource.
- Only four ranges with most falling in the medium and high-risk level.

Below is the matrix identified with the Advance Operational Risk Management course.

		Probability				
		Frequent	Likely	Occasional	Seldom	Unlikely
Severity	Catastrophic	Extremely High				
	Critical		High			
	Moderate		Medium			
	Negligible					Low

Below is the current matrix identified with the CAPF 160, Deliberate Risk Assessment worksheet, dated: 1 April 2022.

CAPF 160 - DELIBERATE RISK ASSESSMENT WORKSHEET						
Risk Assessment Matrix		Likelihood (expected frequency)				
		Frequent: Continuous, regular, or inevitable occurrences	Likely: Several or numerous occurrences	Occasional: Sporadic or intermittent occurrences	Seldom: Infrequent occurrences	Unlikely: Possible occurrences but improbable
Severity (expected consequence)		A	B	C	D	E
Catastrophic: Death, unacceptable loss or damage, mission failure, or unit readiness eliminated	I	EH	EH	H	H	M
Critical: Severe injury, illness, loss, or damage; significantly degraded unit readiness or mission capability	II	EH	H	H	M	L
Moderate: Minor injury, illness, loss, or damage; somewhat degraded unit readiness or mission capability	III	H	M	M	L	L
Negligible: Minimal injury, loss, or damage; little or no impact to unit readiness or mission capability	IV	M	L	L	L	L
Legend: EH – extremely high risk H – high risk M – medium risk L – low risk						
NOTE: All residual risks identified as "H" or "EH" must be approved by CAP/CC						

STEP 2: Assess the Risk (Modified Risk Matrix)

Risk is assessed based on exposure, severity, and probability in the order of most likely to least likely to happen.

Here is a sample of Modified Risk Matrix:

- 20 levels of risk. Highest risk is 1, lowest risk is 20.
- Helps to prioritize risk control efforts.
- Can be used to group risks into clusters of related risks.
- Does not replace the standard matrix but augments it.

		Probability				
		Frequent	Likely	Occasional	Seldom	Unlikely
		A	B	C	D	E
S E V E R I T Y	Catastrophic I	1	2	6	8	12
	Critical II	3	4	7	11	15
	Moderate III	5	9	10	14	16
	Negligible IV	13	17	18	19	20
		Risk Levels				

Analyzing Risk Control Measures involves 3 actions:

- Identify Control Options.
- Determine Control Effects.
- Prioritize Control Measures.

It is important to keep risk at the best acceptable level using control options, even if risk is at an acceptable level.

STEP 3: Analyze Risk Control Measures (Identify Control Options)

Eight major risk control options are designed to have the broadest applications:

- **Reject the Risk:** If overall risks exceed benefits. It is the correct option if you do not have the authority to put proper controls in place.
- **Avoid the Risk:** By going around it or by performing the operation in another way.
- **Delay the Risk:** Is the right answer if there is no urgency to perform the operation. The hazard could go away, or the operation may not be needed.
- **Transfer the Risk:** To another individual operation. The hazard is not eliminated but may be better controlled with a different operator and/or equipment.
- **Spread the Risk:** By increasing the exposure distance or increasing the time between exposure events.
- **Compensate for the Risk:** By having redundant capabilities, extra resources, or parts.
- **Accept the Risk:** If benefits exceed the cost in personnel and resources. Use risk controls to reduce the risk to the lowest possible level.
- **Reducing the Risk:** is the most widely used option. Brainstorm to produce ideas or use the Risk Control Options Matrix.

Risk Control Options Matrix uses 46 proven ways to reduce risk from most preferred to least preferred control area.

Options	Examples
ENGINEER/ENERGY MANAGEMENT <ul style="list-style-type: none"> •Limit Energy •Substitute Safer Form •Prevent Buildup •Prevent Release •Provide Slow Release •Re-channel/Separate in Time/Space •Provide Special Maintenance of Controls 	<ul style="list-style-type: none"> •Reduce speeds, reduce heights •Less hazardous chemicals •Automatic cutoffs, limit momentum •Containment, chock A/C & vehicles •Use energy absorbing materials •Barriers, launch A/C farther apart •Special procedures, checklists
GUARD <ul style="list-style-type: none"> •On Source •Barrier Between •On Human or Object •Raise Threshold (Harden) 	<ul style="list-style-type: none"> •Fire suppression, energy absorption •Walls, distance •Personal protective equipment •Reinforce, physical conditioning

IMPROVE TASK DESIGN <ul style="list-style-type: none"> •Sequence of Events/Flow •Timing (within/between tasks) •Man-Machine Interface/ Ergonomics •Simplify Tasks •Reduce Tasks Loads •Physical, Mental, Emotional •Backout Options 	<ul style="list-style-type: none"> •Toughest task first, only a few in a row •Allow enough time, don't rush •Proper fitting equipment, good design •Provide job aids, safely reduce steps •Set weight limits, use automation •Avoid excessive stress, provide breaks •Stop process if new hazards observed
LIMIT EXPOSURE <ul style="list-style-type: none"> •Number of People/Items •Time •Interactions 	<ul style="list-style-type: none"> •Only expose essential personnel & things •Minimize time of exposure •Limit repeat exposures
SELECTION OF PERSONNEL <ul style="list-style-type: none"> •Mental Criteria •Emotional Criteria •Physical Criteria •Experience 	<ul style="list-style-type: none"> •Essential skills, proficiency, common sense •Essential stability and maturity •Essential strength, endurance, motor skills •Demonstrate performance abilities

TRAIN AND EDUCATE <ul style="list-style-type: none"> •Core Tasks (especially critical tasks) •Leader Tasks •Emergency Contingency Tasks •Safety Tasks •Rehearsals 	<ul style="list-style-type: none"> •Define min abilities: train, test, score •Define leader standards: train,test,score •Define, assign, train, verify ability •Hazard ID, risk controls, standards •Validate process, skills, verify interfaces
WARN <ul style="list-style-type: none"> •Signs/Color Coding •Audio/Visual Alarms •Briefings 	<ul style="list-style-type: none"> •Warning, instruction and traffic signs •Bells, flares, flashing lights, whistles •Refresher training, demonstrate hazards
MOTIVATE <ul style="list-style-type: none"> •Measurable Standards •Essential Accountability •Positive/Negative Incentives •Competition •Demonstrations of Effects 	<ul style="list-style-type: none"> •Define min acceptable risk controls •Check performance at essential levels •Meaningful awards or punishment •Healthy competition on a fair basis •Graphic, dynamic, tasteful demos of effects of unsafe acts

REDUCE EFFECTS <ul style="list-style-type: none"> •EMERGENCY Equipment •Rescue Capabilities •Emergency Medical Care •Emergency Damage Control Procedures •Backup/Redundant Capabilities 	<ul style="list-style-type: none"> •Fire Extinguishers, first aid materials •Rescue squad, equipment, 911 •Quality first aid personnel and facilities •Emergency responses, co-agencies •Alternate ways to perform mission
REHABILITATE <ul style="list-style-type: none"> •Personnel •Facilities/Equipment •Mission Capabilities 	<ul style="list-style-type: none"> •Rehabilitate to restore confidence •Return key elements back to service •Focus on restoration of mission

Determine Control Effects

From the control matrix, determine what effect each option will have on the associated hazard.

Prioritize Risk Controls

Controls must be chosen and prioritized to make the most effective and efficient use of mission available resources. Establish guidelines that will direct which control measure to recommend and implement.

Guidelines for selecting risk control measures:

- Follow all published directives, regulations, policies, and standard operating procedures.
- Select combinations yielding the most mission-supportive risk level; not necessarily the lowest risk as there is a risk of mission ineffectiveness with not taking risks.

- Avoid incompatible risk controls. Do not have only one brand of hydration available to combat dehydration if persons are allergic to food additives; have water available. Need to ensure you have checked prior to the event to personnel medical issues.
- Choose risk controls that reinforce each other. Discipline safety rule violators and have a special awards program or recognition for individual following safety procedures and being accident free.
- Evaluate full costs versus full benefits, not isolated areas. Apply controls to activities and personnel at risk.
- Choose redundant risk controls when it is mission supportive, practical, and cost effective, but do not waste resources.

STEP 4: Make Control Decisions

Coordinate with Safety, Commanders and subject matter experts on decision making system that established the best implementation of risk controls and who determines the final go/no go decision for the mission or event.

Below is an example of a Risk Decision Making Personnel for a Search and Rescue Exercise

Risk Level	Decision Level
01-03, Extremely High	Wing Commander
04-08, High	Incident Commander
09-13, Medium	Mission Safety Officer
14-20, Low	Operations/Planning Section Chief

The Person Making Decisions

- Civil Air Patrol Senior Member must pick the controls and oversee the implementation selected.
- Must decide how much to spend.
- Be responsible for the outcome of the operation or event.
- Be able to obtain resources needed for safe operation or activity.
- Be in control or delegate responsible person in control of resources.
- Have authority in, or delegated from, the chain of command.

Implement good decision making by using a decision matrix:

Example of Decision Matrix

Characteristics	Control Option:	1	2	3	4	5	6	7
Low Cost		5	8	6	10	4	9	9
Easy to Implement		8	8	5	9	9	5	7
Positive Operator Involvement		7	4	7	10	6	4	8
Consistent with Culture		5	7	6	7	6	3	6
Easy to Integrate		1	6	2	10	5	9	7
Easy to Measure		8	4	9	5	8	7	9
Low Risk/Sure to Succeed		8	10	7	9	10	8	9
TOTALS		42	47	42	60	48	45	55

Rank each risk control option considering on a scale of 1 to 10, 1 being the lowest and 10 the highest, on a list of chosen desirable characteristics. Add up each risk's score. The option with the highest score is chosen.

STEP 5: Implement Risk Controls

Once risk controls are developed for your activity or mission, you must determine what assets are available to implement the specific control.

To implement the risk controls:

- Develop a complete action plan.
- Establish accountability.
- Provide a means of resource support.

Develop an action plan to manage the control options:

- Determine all workforce and resources needed and have backup or replacement options.
- Estimate cost to implement each control.
- Set a timeline that clearly sets milestones and goals.
- Assign tasks and due dates to specific personnel.
- Enlist user input to establishment ownership.
- Provide job aids, tools, and examples to make implementation clear to everyone.
- Measure performance
- Document any outside support given. (Example: local ambulance service or contracting).

Establish Accountability

Levels of accountability:

- Identify person responsible for successful implementation of each control measure.
- Identify unit or operations level person responsible for the implementation.
- Combine the power of command with leadership to maintain accountability.
- Establish motivation and create meaningful and positive incentive for success.
- Involve persons affected by the controls during implementation.

Resource Support

Resource support includes 6 components:

- Policy support with operating instructions, technical orders, and any standard operation procedures or operating guidelines.
- Command support showing the absolute backing of the leadership.
- Training support for personnel implementing controls.
- Tools support including job aids, checklist, decision guides, best practices, and instructions.
- Measurement support to determine if timelines, schedules, and standards are being met.
- Motivation support provides the positive and negative incentives for successful risk control.

STEP: 6 Supervise and Review

Resource support

Determining the effectiveness for risk control Involves setting a goal, knowing where you are in relation to the goal, and a plan in place to reach those goals.

These last steps of Operational Risk Management:

- Supervise
- Review
- Feedback

Supervise the implementation plan, ensure all are in place, monitor all controls and make certain they are effective.

Controls are effective if they bring about favorable changes to the physical condition or personal behavior.

If a control is ineffective, correct or discontinue.

Use the Change of Analysis Tool from Step 1 to reevaluate and changes that require further risk management.

Review the total cost versus total benefits the controls provide; for each control consider both physical and behavioral changes.

- Costs should be in line with expectations. The benefits in risk reduction should be greater than the cost of the control measure.
- Benefits or effectiveness of controls should be compared to forecasted goals.
- A simple cost vs. benefit matrix is recommended.

Feedback is the essential element in Step 6. It provides the ability to share success and failure. One of the basic rules of Operational Risk Management is to stop reinventing the wheel and learn from past mistakes and practices.

Feedback should go to all personnel, from new cadets to commanders. Effective risk controls that increase the overall mission success should be a part of every Civil Air Patrol member's lesson learned file.

Coordinate and share your feedback with your Squadron, Group and Wing Safety Officers.

Conclusion

To fully realize all the benefits from Operational Risk Management, it must be integrated into every aspect of Civil Air Patrol organization and its missions and events.

All levels of Civil Air Patrol should be proactive and promote the use of Operational Risk Management. Operational Risk Management use will benefit everyone by improving mission capabilities, enhancing better decision making, reducing accidents and injuries, and preserving our assets.

REFERENCES:

- Air Force Policy Directive 90-9, Operational Risk Management
- Air Force Instruction 90-901, Operational Risk Management
- Air Force Pamphlet 90-902, Operational Risk Management (ORM) Guidelines and Tools