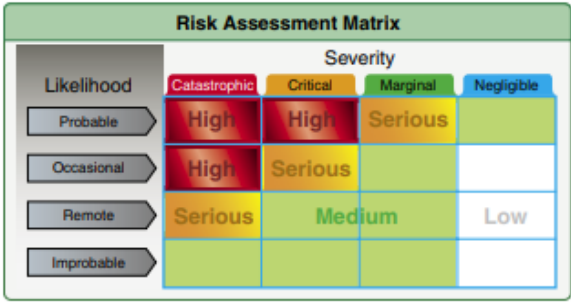


Risk Management

Objective	 <p>Risk Assessment Matrix</p> <table border="1"> <thead> <tr> <th rowspan="2">Likelihood</th> <th colspan="4">Severity</th> </tr> <tr> <th>Catastrophic</th> <th>Critical</th> <th>Marginal</th> <th>Negligible</th> </tr> </thead> <tbody> <tr> <td>Probable</td> <td>High</td> <td>High</td> <td>Serious</td> <td></td> </tr> <tr> <td>Occasional</td> <td>High</td> <td>Serious</td> <td></td> <td></td> </tr> <tr> <td>Remote</td> <td>Serious</td> <td>Medium</td> <td></td> <td>Low</td> </tr> <tr> <td>Improbable</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Likelihood	Severity				Catastrophic	Critical	Marginal	Negligible	Probable	High	High	Serious		Occasional	High	Serious			Remote	Serious	Medium		Low	Improbable				
Likelihood			Severity																											
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Probable	High	High	Serious																											
Occasional	High	Serious																												
Remote	Serious	Medium		Low																										
Improbable																														
<p>To ensure the applicant learns the purpose of and can exhibit a clear understanding of the principles of risk management and the risk management process.</p>																														
Purpose	Equipment																													
<p>Flying is inherently a dangerous activity. While it is impossible to completely eliminate risk from flying, pilots should aim to take no unnecessary risks. This lesson introduces pilots to the concept of formal risk management, and teaches them tools they can use when flight planning to increase the margins of safety.</p>	<ul style="list-style-type: none"> Whiteboard / Markers (optional) 																													
Schedule	Instructor Actions																													
<ul style="list-style-type: none"> Ground Lesson: 15 minutes Student Q&A: 10 minutes 	<ul style="list-style-type: none"> Deliver the ground lesson (below). Answer student questions. 																													
Student Actions	Completion Standards																													
<ul style="list-style-type: none"> Ask any questions, receive study material for the next lesson. Watch linked video. Review listed references. 	<ul style="list-style-type: none"> Student can explain the following concepts: <ul style="list-style-type: none"> The purpose and principles of Risk Management The Basic Risk Management Process Risk Management Tools, including: <ul style="list-style-type: none"> PAVE, IMSAFE, and 5P Checklists and their usage 																													

References

- FLY8MA.com Flight Training - "CFI ORAL EXAM: Part 1 | FOI"
 - YouTube - <https://www.youtube.com/watch?v=4lxiQeh0FFI>
- FAA-H-8083-9A (Aviation Instructor's Handbook) - Chapter 9 [Risk Management]
- FAA-S-8081-6D (CFI PTS) - Area I Task G

Ground Lesson Outline

- Principles of Risk Management - Formal system for identifying and analyzing hazards.
 - Hazards - Real or perceived conditions that could affect safety.
 - Risks - Possible future impact of hazards, and the probability and severity of them.
 - Safety - Freedom from risks that can affect health, endanger life, damage property, etc.
 - Types of Risk
 - Total Risk, Identified Risk
 - Unidentified Risk
 - Unacceptable Risk
 - Acceptable Risk
 - Residual Risk
 - Principles
 - Accept No Unnecessary Risk, Make Risk Decisions At The Appropriate Level, Accept Risk When Benefits Outweigh Costs, Integrate Risk Management Into Planning At All Levels
- Risk Management Process
 - Formal system which categorizes risks according to certain metrics
 - Step 1 - Identify the Hazard - Consider all risk areas to identify hazards (PAVE, etc)
 - Step 2 - Assess the Risk - Determine probability and severity
 - Step 3 - Analyze Risk Control Measures - Identify measures which reduce probability or severity
 - Step 4 - Make Control Decisions - Decide which measures will be taken
 - Step 5 - Implement Risk Controls - Implement the measures
 - Step 6 - Supervise and Review - Periodically reassess
 - Level of Risk - Combination of Severity and Probability
 - Assessing Risk - Determine severity and probability, cost vs. benefit
 - Mitigating Risk - Consider alternatives, avoid high-risk operations, use risk management tools
- Risk Management Tools for Pilots
 - IMSAFE checklist
 - Illness, Medication, Stress, Alcohol/Drugs, Fatigue, Eating
 - PAVE checklist - Divides Risk into Categories
 - Pilot, Airplane, enVironment, External Pressures
 - The Five Hazardous Attitudes
 - Anti-Authority, Impulsivity, Invulnerability, Resignation, Macho
 - Antidotes
 - 5P checklist - A tool for Single-Pilot Resource Management (SRM), scheduled review of risk areas at various points in the flight (before departure, midway, prior to approach, etc.)
 - The Plan, the Plane, the Pilot, the Passengers, and the Programming

Ground Lesson Content

- **Principles of Risk Management** - Formal system for identifying and analyzing hazards.
 - **Hazards** - Real or perceived conditions that could affect safety.
 - **Risks** - Possible future impact of hazards, and the probability and severity of them.
 - **Safety** - Freedom from risks that can affect health, endanger life, damage property, etc.
 - **Types of Risk**
 - **Total Risk** - The sum of identified and unidentified risks.
 - **Identified Risk** - Risks which have been identified and analyzed.
 - **Unidentified Risk** - Risks which have not yet been identified. May be impossible to know until a mishap occurs.
 - **Unacceptable Risk** - Risks that must be eliminated or controlled. Consequences cannot be tolerated.
 - **Acceptable Risk** - Risks that can be allowed to exist, but should be carefully managed.
 - **Residual Risk** - Risks that are left over after risk and safety management processes have occurred.
 - **Principles**
 - **Accept No Unnecessary Risk** - Risks are a cost vs. benefit analysis, do not accept risks which provide no benefit.
 - **Make Risk Decisions At The Appropriate Level** - Risk management decisions should be made by the people most directly in a position to control them, e.g. the pilot should make decisions about risks related to the flight plan or passengers, etc.
 - **Accept Risk When Benefits Outweigh Costs** - When the benefits outweigh the costs, risks can be accepted. It is impossible to completely eliminate risk.
 - **Integrate Risk Management Into Planning At All Levels** - Risk management should be considered during flight planning, during preflight, and at every stage of flight. It is not a one-time process.
- **Risk Management Process** - Formal system which categorizes risks according to certain metrics.
 - **Step 1 - Identify the Hazard** - Identify any real or potential hazardous condition which could pose a danger to people or property.
 - **Step 2 - Assess the Risk** - Consider the probability and severity of the risk. For example, the risk of an in-flight structural failure for most aircraft is generally low, since it is improbable, although the severity (should it occur) is catastrophic.
 - **Probability** - Probable, Occasional, Remote, Improbable
 - **Severity** - Negligible, Marginal, Critical, Catastrophic
 - **Step 3 - Analyze Risk Control Measures** - What actions can be taken to reduce either the probability, or the severity of the risk?
 - **Step 4 - Make Control Decisions** - Identify the decision maker, and decide which risk control measures will be implemented.
 - **Step 5 - Implement Risk Controls** - Implement the risk control decisions. In some situations, this involves creating a plan and identifying who will perform the steps.
 - **Step 6 - Supervise and Review** - Periodically re-evaluate the situation to monitor for changes to the situation.
 - **Level of Risk** - Combination of Severity and Probability. Probable but Negligible risks may be considered Medium risks, whereas Probable but Marginal risks are considered Serious risks.
 - **Assessing Risk** - Determine severity and probability, cost vs. benefit.

Risk Assessment Matrix				
Likelihood	Severity			
	Catastrophic	Critical	Marginal	Negligible
Probable	High	High	Serious	
Occasional	High	Serious		
Remote	Serious	Medium		Low
Improbable				

- **Mitigating Risk** - Consider alternatives, avoid high-risk operations, use risk management tools. For example, a very long flight may create a risk of fuel exhaustion, this risk can be mitigated by reducing the probability by planning shorter legs or fuel stops, etc.
- **Risk Management Tools for Pilots**
 - **IMSAFE Checklist** - Considers pilot risk aeromedical risk factors.
 - **Illness** - Do I have any symptoms?
 - **Medication** - Am I taking any medications which can affect my flying performance?
 - **Stress** - Am I under stress or pressure?
 - **Alcohol/Drugs** - Have I been drinking within 8 or 24 hours?
 - **Fatigue** - Am I well rested?
 - **Eating** - Am I adequately nourished?



- **PAVE Checklist** - Divides Risk into Categories.
 - **Pilot** - Risk factors affecting pilot performance, health (IMSAFE), etc.
 - **Aircraft** - Risk factors affecting the airplane, maintenance, etc.
 - **enVironment** - Risk factors relating to weather, unfamiliar airports, etc.
 - **External Pressures** - Risk factors relating to external pressures, e.g. get-there-itis
- **The Five Hazardous Attitudes**

The Five Hazardous Attitudes

Anti-authority: "Don't tell me."

This attitude is found in people who do not like anyone telling them what to do. In a sense, they are saying, "No one can tell me what to do." They may be resentful of having someone tell them what to do, or may regard rules, regulations, and procedures as silly or unnecessary. However, it is always pilot prerogative to question authority if it seems to be in error.

Impulsivity: "Do it quickly."

This is the attitude of people who frequently feel the need to do something—anything—immediately. They do not stop to think about what they are about to do; they do not select the best alternative, and they do the first thing that comes to mind.

Invulnerability: "It won't happen to me."

Many people believe that accidents happen to others, but never to them. They know accidents can happen, and they know that anyone can be affected. They never really feel or believe that they will be personally involved. Pilots who think this way are more likely to take chances and increase risk.

Macho: "I can do it."

Pilots who are always trying to prove that they are better than anyone else are thinking, "I can do it, I'll show them." Pilots with this type of attitude will try to prove themselves by taking risks in order to impress others. While this pattern is thought to be a male characteristic, women are equally susceptible.

Resignation: "What's the use?"

Pilots who think, "What's the use?" do not see themselves as being able to make a great deal of difference in what happens to them. When things go well, the pilot is apt to think that it is good luck. When things go badly, the pilot may feel that "someone is out to get me," or attribute it to bad luck. The pilot will leave the action to others, for better or worse. Sometimes, such pilots will even go along with unreasonable requests just to be a "nice guy."

- **Anti-Authority** - "Don't tell me!"
- **Impulsivity** - "Do it quickly"
- **Invulnerability** - "It won't happen to me"
- **Resignation** - "What's the use?"
- **Macho** - "I can do it"
- **Antidotes To Hazardous Attitudes**

Hazardous Attitude	Antidotes
Macho Steve often brags to his friends about his skills as a pilot and how close to the ground he flies. During a local pleasure flight in his single-engine airplane, he decides to buzz some friends barbecuing at a nearby park.	Taking chances is foolish.
Anti-authority Although he knows that flying so low to the ground is prohibited by the regulations, he feels that the regulations are too restrictive in some circumstances.	Follow the rules. They are usually right.
Invulnerability Steve is not worried about an accident since he has flown this low many times before and he has not had any problems.	It could happen to me.
Impulsivity As he is buzzing the park, the airplane does not climb as well as Steve had anticipated and, without thinking, he pulls back hard on the yoke. The airspeed drops and the airplane is close to stalling as the wing brushes a power line.	Not so fast. Think first.
Resignation Although Steve manages to recover, the wing sustains minor damage. Steve thinks to himself, "It doesn't really matter how much effort I put in—the end result is the same whether I really try or not."	I'm not helpless. I can make a difference.

- **Anti-Authority** - Follow the rules, they are there for a reason.
 - **Impulsivity** - Not so fast, think.
 - **Invulnerability** - It can happen to you.
 - **Resignation** - I am not helpless, I can make a difference.
 - **Macho** - Taking chances is foolish.
- **5P checklist** - A tool for Single-Pilot Resource Management (SRM), scheduled review of risk areas at various points in the flight (before departure, midway, prior to approach, etc.). Accounts for the idea that the safety margin is the difference between the task requirements and pilot capabilities. During various phases of flight, these factors create differing levels of workload for pilots.
 - **The Plan** - The flight plan, the mission, etc. Includes the pilots familiarity with the airports, the route, etc.
 - **The Plane** - The airplane that will be used, including the pilot's familiarity with it.
 - **The Pilot** - The pilots current level of proficiency, currency, medical condition, etc.
 - **The Passengers** - The passengers, the pressures they may put on completing the mission, etc.
 - **The Programming** - Level of familiarity or proficiency with programming avionics, radios, or other modern electronic flying aids.

