Day 2: The Important stuff. (Required Memorization)

Risk Management

References: FAA-H-8083-9

Objectives: The student should develop knowledge of the elements related to managing and mitigating risk.

Elements:

1. Principles of Risk Management
2. Risk Management Process
3. Level of Risk
4. Assessing Risk
5. Mitigating Risk
6. IMSAFE Checklist
7. PAVE Checklist
8. 5P Checklist

What

Risk management is a decision-making process designed to perceive hazards systematically, assess the degree of risk associated with a hazard, and determine the best course of action.

Why

Flying is inherently dangerous, but there is no need for it to be unnecessarily dangerous. This lesson will describe ways to recognize and mitigate the risk involved with flying.

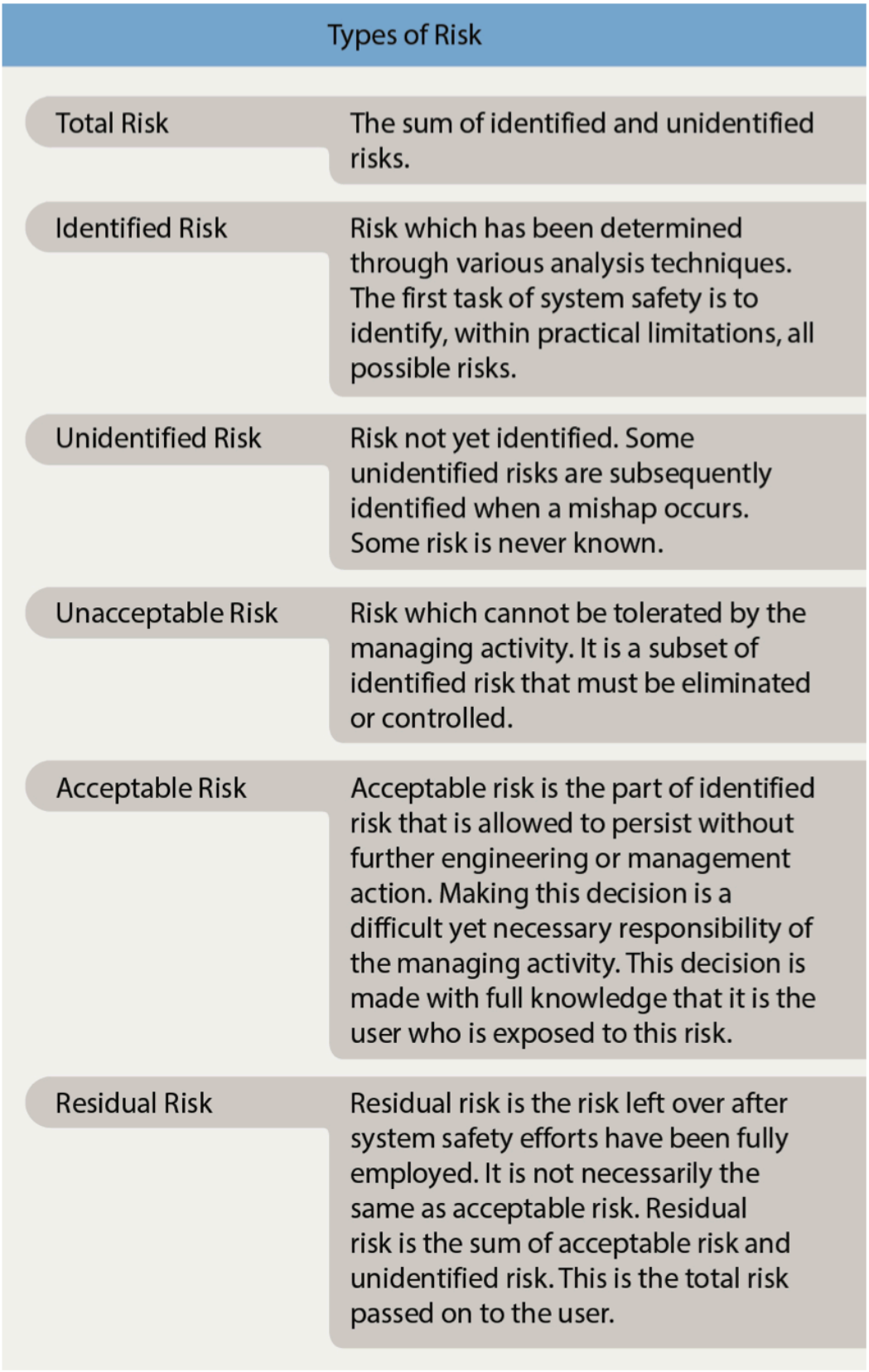

Figure 1-1. *Types of risk.*

How:

Principles of Risk Management

1. Accept no Unnecessary Risk
    a. Accept necessary risk
        i. Flying is impossible without risk, do not make a situation more dangerous than necessary
2. Make Risk Decisions at the Appropriate Level
    a. In single pilot situations, the pilot makes decisions
    b. In other situations it may be beneficial to "go up the ladder" for decisions
        i. i.e. Talk to the chief pilot or CFI about a potentially risky situation
    c. Accept Risk When Benefits Outweigh the Costs
        i. Analyse costs and benefits, make an informed decision
3. Integrate Risk Management into Planning at All Levels
    a. Safety requires risk management planning in all stages of flight
        i. Plan early and throughout to avoid unnecessary, amplified risk

Risk Management Process

1. Step 1: Identify the Hazard
    a. A hazard is any condition that can cause degradation, injury, illness, death, damage to or loss of equipment/property.
2. Step 2: Assess the Risk
    a. Determine the level of risk associated with the identified hazards
3. Step 3: Analyze Risk Control Measures
    a. Look into ways to reduce, mitigate, or eliminate the risk
    b. All risks have 2 components: Probability of occurrence & Severity of the hazard
        i. Try to reduce/eliminate at least one component
    c. Use Cost/Benefit analysis to decide if it is worth it
4. Step 4: Make Control Decisions
    a. Choose the best controls based on steps 1 & 2
5. Step 5: Implement Risk Controls
    a. Make a plan to apply #4 (time, materials, personnel, etc)
6. Step 6: Supervise and Review

Reevaluate and make necessary changes

Identify Risk: PAVE and IMSAFE Checklists

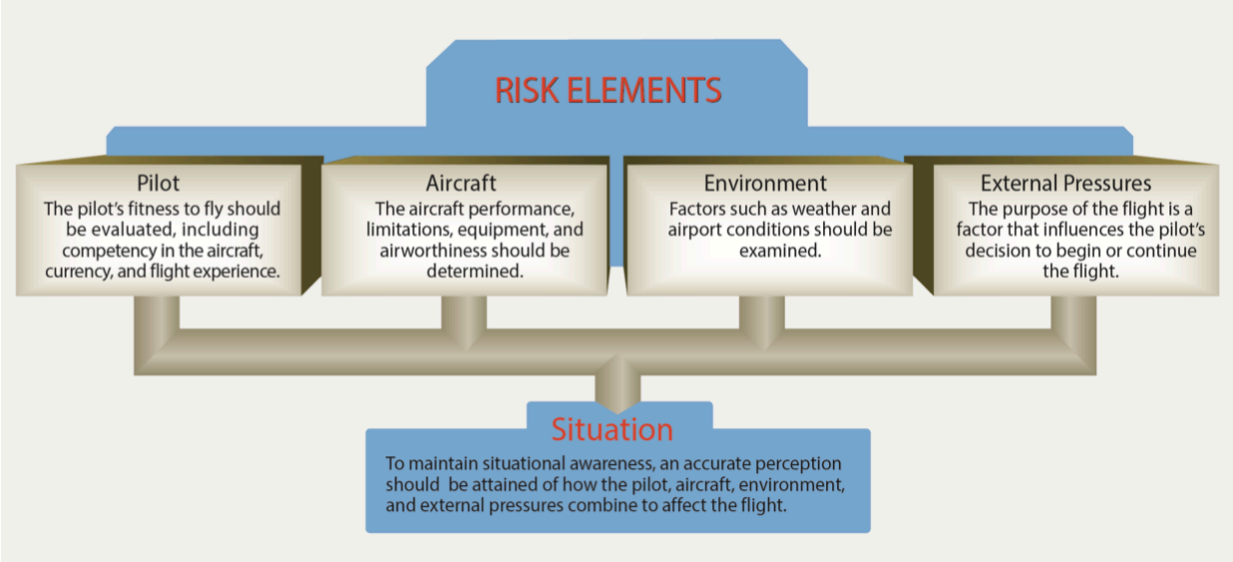

Figure 1-2. *One of the most important decisions that the pilot in command makes is the go/no-go decision. Evaluating each of these risk elements can help the pilot decide whether a flight should be conducted or continued.*

Figure 1-3. *Prior to flight, pilots may use a checklist to assess their fitness, just as they evaluate the aircraft's airworthiness.*

Assessing Risk: Use Risk Assessment Matrix

Level of Risk

1. The level of risk posed by a given hazard is measured in terms of:
    a. Severity (extent of possible loss)
    b. Probability (likelihood that a hazard will cause a loss)

Assessing Risk

- Pilots must differentiate in advance between a low-risk flight and a high-risk flight
- Establish a review process and develop strategies to minimize risk on the high and low risk flights
- Risk Matrix is a helpful risk assessment model
    a. Assesses the likelihood of an event occurring and the consequences of that event
        i. Likelihood (probability of occurrence): Probable, Occasional, Remote, Improbable
            1. Likelihood of a pilot flying MVFR to encounter IFR conditions
        ii. Severity: Catastrophic, Critical, Marginal, Negligible
            1. If pilot is not IFR rated how severe could the consequences be
    b. High Probability/Severity is bad and vice versa:

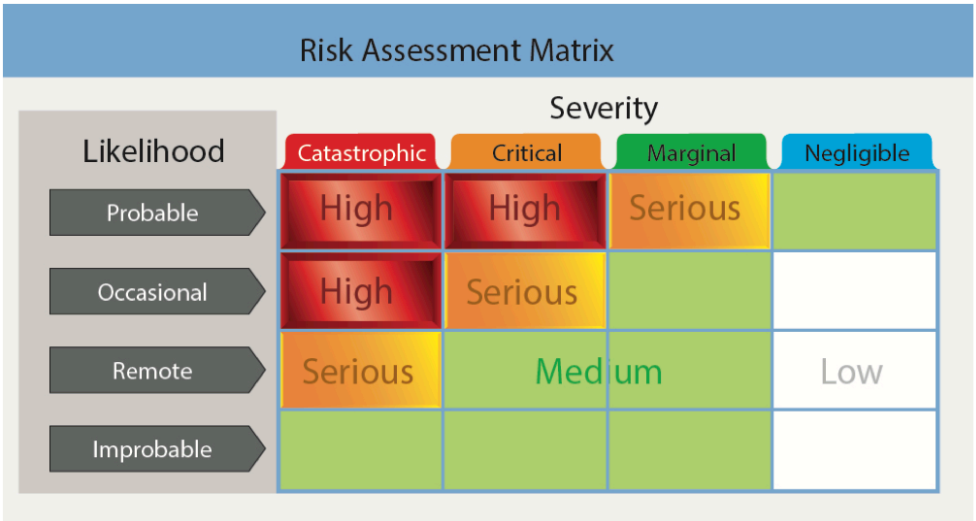

Figure 1-4. *This risk matrix can be used for almost any operation by assigning likelihood and severity. In the case presented, the pilot assigned the likelihood of occasional and the severity as catastrophic falls in the high-risk area.*

Mitigating Risk

1. After determining the level of risk, the pilot needs to reduce the risk
    a. Analyze options that can reduce unnecessary risk
        i. Cancel/delay flight, bring CFI or more experienced pilot, etc

2. Flight Risk Assessment Tools (FRAT)
    a. Because every flight has some level of risk, it is critical that pilots can differentiate, in advance, between a low risk flight and a high- risk flight, establish a review process, and develop risk mitigation strategies. A Flight Risk Analysis Tool (FRAT) enables proactive hazard identification, is easy to use, and can visually depict risk. It is a tool many pilots use to make better go/no-go decisions.
    b. Why Should I Use a FRAT?
    c. "In the thick" is no time to try to mitigate a potentially hazardous outcome. When preparing for a flight or maintenance task, pilots and maintenance technicians may set aside time to stop and think about the hazards involved.
    d. Just thinking about this task may not consider the actual risk exposure. We may allow our personal desires to manipulate our risk assessment in order to meet personal goals. A formal process using pen and paper gives a perspective on the entire risk picture and is a good way to make a thorough analysis.

See Handout for FRAT Safety Briefing

Three-P Model for Pilots

As we have just learned with the Identify, Assess, & Mitigate model, risk management is a decision-making process designed to identify or perceive hazards systematically, assess the degree of risk associated with a hazard, and determine the best course of action to mitigate the risk. For example, the Perceive, Process, Perform (3P) model for aeronautical decision-making (ADM) offers a simple, practical, and structured way for pilots to manage risk. [Figure 1-5]

Figure 1-5. *3P Model (Perceive, Process, and Perform).*

To use the 3P model, the pilot:

• Perceives the given set of circumstances for a flight.
• Processes by evaluating the impact of those circumstances on flight safety. • Performs by implementing the best course of action.

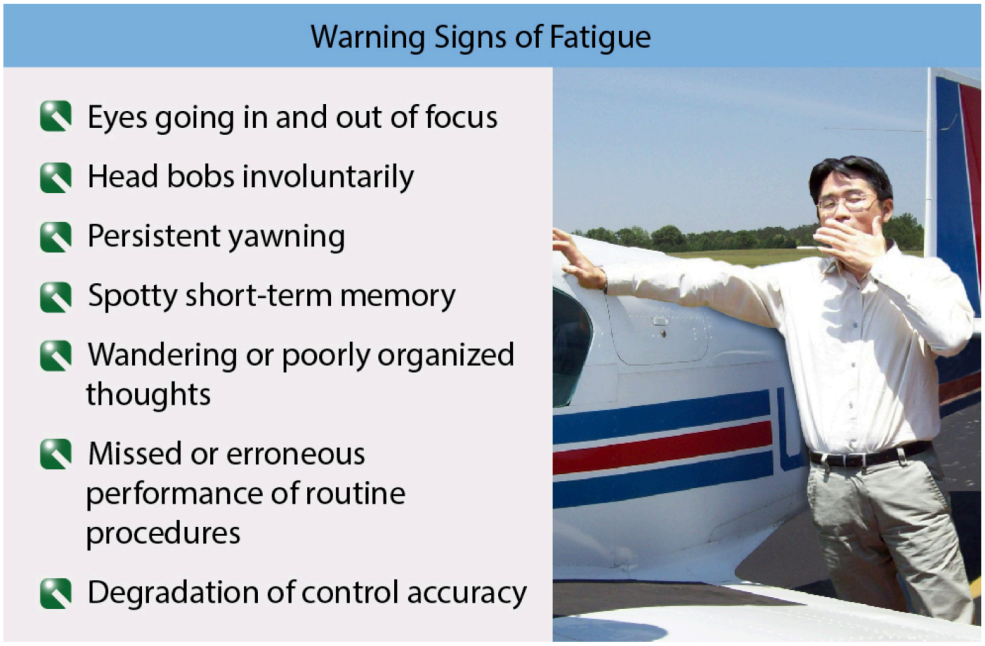

Figure 1-6. *Fatigue is a threat to aviation safety because it impairs alertness and performance.*

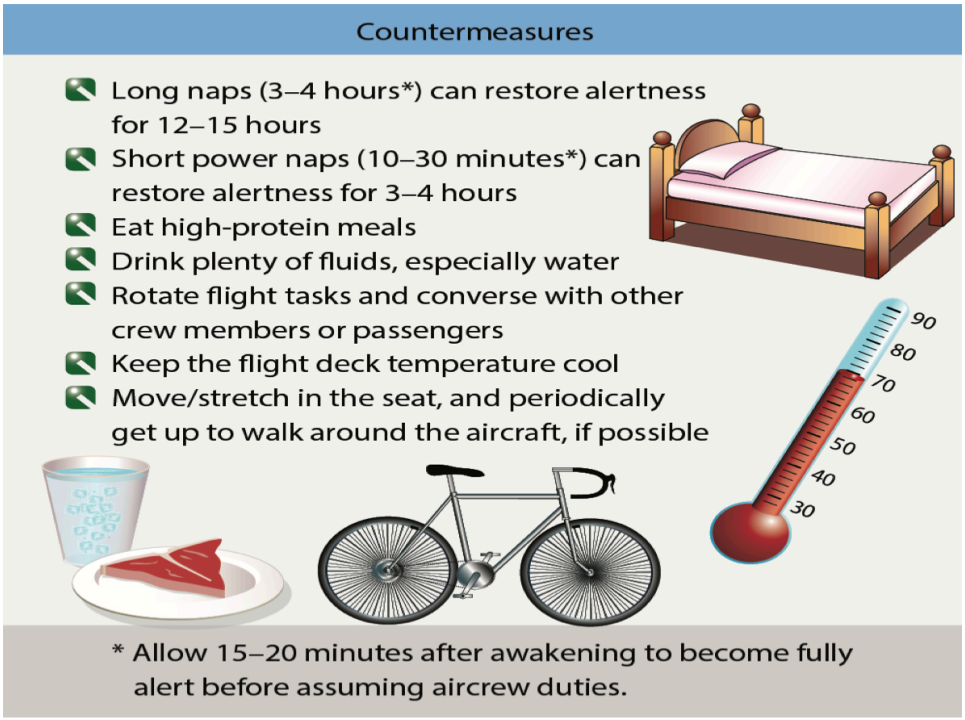

Figure 1-7. *Countermeasures for coping with fatigue.*

SRM: Single Pilot Resource Management

SRM is all about helping pilots learn how to gather information, analyze it, and make decisions. Although the flight is coordinated by a single person and not an onboard flightcrew, the use of available resources such as air traffic control (ATC) and Flight Service replicates the principles of CRM.

Figure 1-8. *All experienced pilots have fallen prey to, or have been tempted by, one or more of these tendencies in their flying careers.*

SRM and the 5P Checklist

The 5 Ps are used to evaluate the pilot's current situation at key decision points during the flight, or when an emergency arises. These decision points include preflight, pretakeoff, hourly or at the midpoint of the flight, predescent, and just prior to the final approach fix or for visual flight rules (VFR) operations, just prior to entering the traffic pattern.

Figure 1-9. *The 5P checklist.*

ADM: Aeronautical Decision Making

Aviation training and flight operations are now seen as a system rather than individual concepts. The goal of system safety is for pilots to utilize all four concepts (ADM, risk management, situational awareness, and SRM) so that risk can be reduced to the lowest possible level.

Definitions
Aeronautical Decision-Making (ADM) is a systematic approach to the mental process used by pilots to consistently determine the best course of action in response to a given set of circumstances.
Attitude is a personal motivational predisposition to respond to persons, situations, or events in a given manner that can, nevertheless, be changed or modified through training as sort of a mental shortcut to decision-making.
Attitude Management is the ability to recognize hazardous attitudes in oneself and the willingness to modify them as necessary through the application of an appropriate antidote thought.
Crew Resource Management (CRM) is the application of team management concepts in the flight deck environment. It was initially known as cockpit resource management, but as CRM programs evolved to include cabin crews, maintenance personnel, and others, the phrase crew resource management was adopted. This includes single pilots, as in most general aviation aircraft. Pilots of small aircraft, as well as crews of larger aircraft, must make effective use of all available resources: human resources, hardware, and information. A current definition includes all groups routinely working with the cockpit crew who are involved in decisions required to operate a flight safely. These groups include, but are not limited to: pilots, dispatchers, cabin crewmembers, maintenance personnel, and air traffic controllers. CRM is one way of addressing the challenge of optimizing the human/machine interface and accompanying interpersonal activities.
Headwork is required to accomplish a conscious, rational thought process when making decisions. Good decision-making involves risk identification and assessment, information processing, and problem solving.
Judgment is the mental process of recognizing and analyzing all pertinent information in a particular situation, a rational evaluation of alternative actions in response to it, and a timely decision on which action to take.
Personality is the embodiment of personal traits and characteristics of an individual that are set at a very early age and extremely resistant to change.
Poor Judgment Chain is a series of mistakes that may lead to an accident or incident. Two basic principles generally associated with the creation of a poor judgment chain are: (1) One bad decision often leads to another; and (2) as a string of bad decisions grows, it reduces the number of subsequent alternatives for continued safe flight. ADM is intended to break the poor judgment chain before it can cause an accident or incident.
Risk Elements in ADM take into consideration the four fundamental risk elements: the pilot, the aircraft, the environment, and the type of operation that comprise any given aviation situation.
Risk Management is the part of the decision-making process which relies on situational awareness, problem recognition, and good judgment to reduce risks associated with each flight.
Situational Awareness is the accurate perception and understanding of all the factors and conditions within the four fundamental risk elements that affect safety before, during, and after the flight.
Skills and Procedures are the procedural, psychomotor, and perceptual skills used to control a specific aircraft or its systems. They are the airmanship abilities that are gained through conventional training, are perfected, and become almost automatic through experience.
Stress Management is the personal analysis of the kinds of stress experienced while flying, the application of appropriate stress assessment tools, and other coping mechanisms.

Figure 1-10. *Terms used in AC 60-22 to explain concepts used in ADM training.*

Hazardous Attitudes

Flight instructors should be able to spot hazardous attitudes in a learner because recognition of hazardous thoughts is the first step toward neutralizing them. Flight instructors should keep in mind that being fit to fly depends on more than just a pilot's physical condition and recency of experience. Hazardous attitudes contribute to poor pilot judgment and affect the quality of decisions.

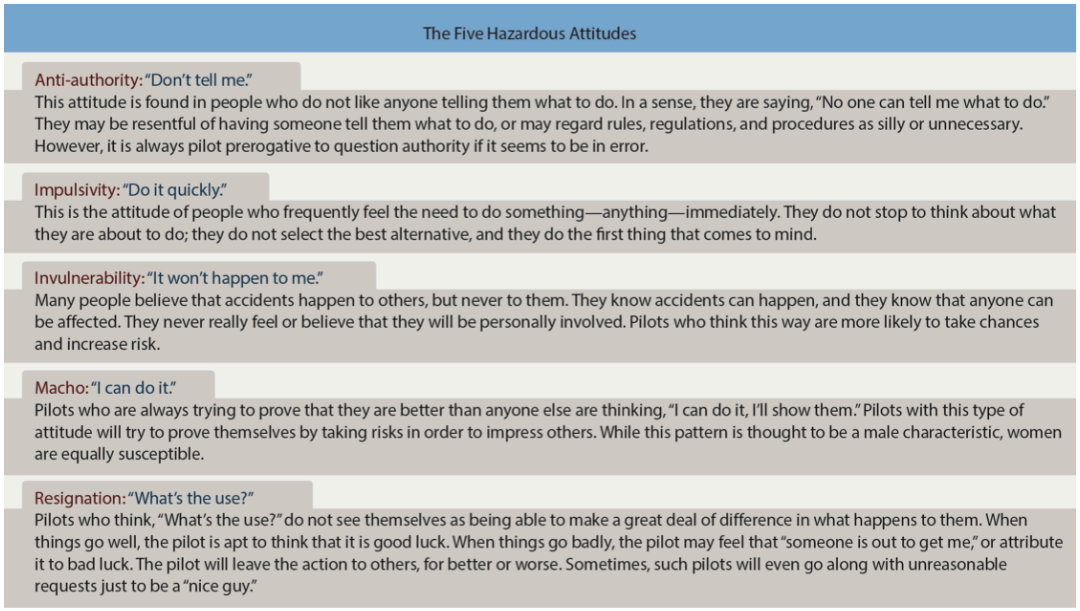

Figure 1-11. *Pilots should examine their decisions carefully to ensure that their choices have not been influenced by a hazardous attitude*

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.

Figure 1-12. *Learners in training can be asked to identify hazardous attitudes and the corresponding antidotes when presented with flight scenarios.*

Stress Management

Performance generally increases with the onset of stress, peaks, and then begins to fall off rapidly as stress levels exceed a person's ability to cope. The ability to make effective decisions during flight can be impaired by stress. Factors, referred to as stressors, can increase a pilot's risk of error in the flight deck. [Figure 1-13]

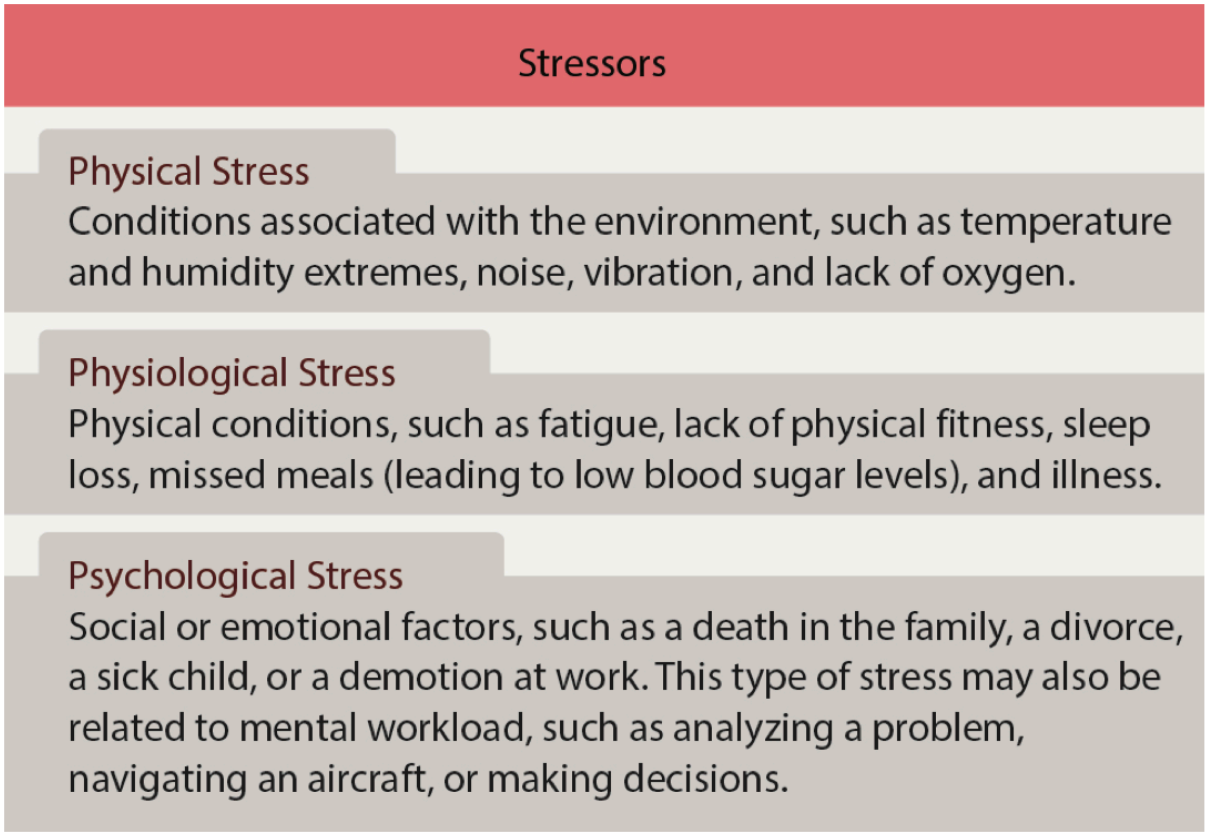

Figure 1-13. *Three types of stressors that can affect pilot performance.*

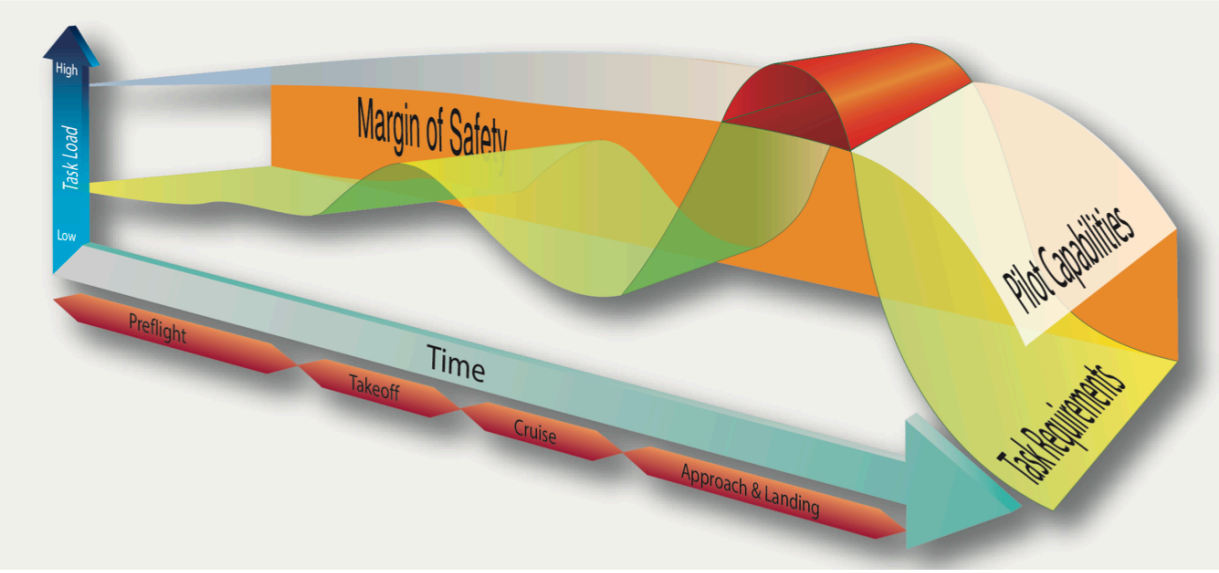

Figure 1-14. *Accidents often occur when flying task requirements exceed pilot capabilities. The difference between these two factors is called the margin of safety. Note that in this idealized example, the margin of safety is minimal during the approach and landing. At this point, an emergency or distraction could overtax pilot capabilities, causing an accident.*