



Aeronautical Decision Making

Mohamed Ismail

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Housekeeping



Punctuality



Phones



**More Importantly NO
SLEEPING**



Participation



No Smoking

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Schedule

- 11:15 – 12:30 Session Activity
- 12:30 -12:45 - break
- 12:45 – 2:00 – Session Activity
- 2:00 – 2:15 - break
- 2:15 – 03:30 Session Activity & End



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TELL
us
about
You!

- Your Name
- Title
- Brief Background
- What you aim to get from this session

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About Us

Mohamed Ismail

Senior Consultant / Trainer
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IOSA Auditor/Senior Safety Investigator

Diploma in Risk Management from IATA

Diploma in SMS for Airlines from IATA

Diploma in QMS for Airlines from IATA

15+ years of experience in Safety
Management



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The Hillsborough Football Ground tragedy



On 15 April 1989, the Hillsborough Football Ground was the scene of the worst tragedy in English sporting history.

Liverpool was playing Nottingham Forest in an FA Cup semi-final. The disaster began as hundreds of Liverpool fans began streaming towards the stadium, a bottleneck developed and just before the game kicked off, **the police commander-in-charge ordered a gate be opened, thinking that it would alleviate the crowding.**

Unfortunately, that decision forced even more people into the already crowded central pens. They were forced up against those in front of them, who in turn were pushed against the perimeter fencing. **This resulted in 96 Liverpool fans being crushed to death and 766 people sustaining serious injuries.**



- There was no system on the day to ensure fans were evenly distributed.
- The police match commander was new in his post and had limited experience in policing soccer matches
- The funnel-shaped nature of the area meant that congestion was hard to escape for those at the front.

A well-intentioned decision by the police match commander to open a gate to ease the crowding had devastating consequences.

Consider, however, the unknowns the police were faced with at the time and their intention to solve the congestion problems by opening a gate.

At the inquest, the police match commander explained quite eloquently what the police were faced with when he said:

There's 1000 things happening, you're aware of 100 and you can only do something about 10.

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Objectives Overview of Aeronautical Decision Making

Crew Resources Management

Aeronautical Decision making- CRM factor

History of ADM development

Importance of ADM in aviation.

Case studies of accidents due to poor decision-making.

Key concepts and objectives of ADM.



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Crew Resource Management



The goal of crew resource management (CRM) training is to enhance safety in aviation by improving

Communication
Decision-making
Leadership
Teamwork Skills Among The Flight Crew



CRM training aims to reduce human errors, prevent accidents, and promote a culture of effective collaboration and risk management within the aviation industry.



CRM also focuses on the effective utilization of all available resources, including human resources, hardware, and information, to enhance crew cooperation and improve decision-making in aviation operations.

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ADM as a Factor of CRM

For over 50 years, the importance of good pilot judgment, or aeronautical decision-making (ADM), has been recognized as critical to the safe operation of aircraft, as well as accident avoidance.

The airline industry developed the first training programs based on improving ADM. Crew resource management (CRM) training for is focused on the effective use of all **available resources**:

- Human resources
- Hardware
- information supporting ADM to facilitate crew cooperation and improve decision-making.

The goal of all flight crews is good ADM and the use of CRM is one way to make good decisions.

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What is ADM?



Aeronautical Decision Making (ADM) is a systematic approach used by pilots and aviation professionals to consistently make informed and effective decisions in the complex and usually high-risk flight operations. ADM is crucial because poor decision-making has been identified as a significant factor in many aviation accidents.



Aeronautical Decision Making – A process used by pilots to consistently determine the best course of action in response to a given set of circumstances.

CONTINUOUS PROCESS FROM PREFLIGHT TO TIE DOWN.

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History of ADM

While progress is continually being made in

- Liveware
- Hardware
- Software

Remember
SHELL Model

One factor remains the same:

THE HUMAN FACTOR WHICH LEADS TO ERRORS.

It is estimated that approximately **80%** of all aviation accidents are related to human factors and most of these accidents occur during **landing (24.1%)** and **takeoff (23.4%)**

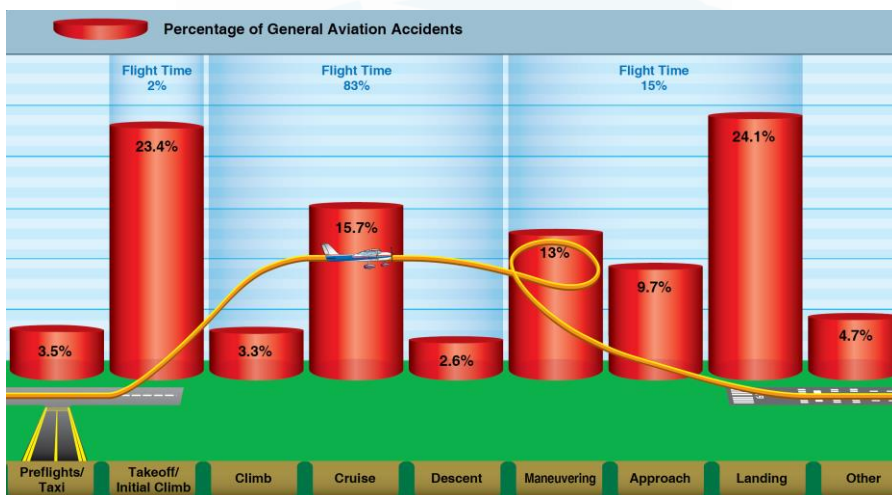


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History of ADM



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Can good judgement and decision making be taught?



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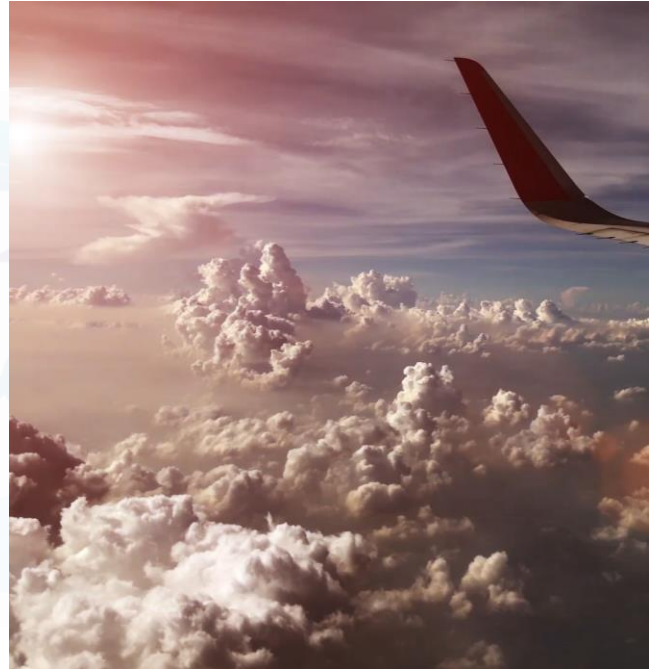


Can good judgement and decision making be taught?

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- Contrary to popular opinion, good judgment can be taught.
- Tradition held that good judgment was a natural by-product of experience.
- Corresponding increase of good judgment was assumed with increased experience and flight time.
- ADM provides a structured, systematic approach to analyzing changes that occur during a flight and how these changes might affect the safe outcome of a flight.



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Teaching the ADM



- FAA Mandated the ADM teaching in **6 manuals** as part of pilot licensing.
- Studies showed that pilots who received it made **10 - 50 % reduction** in-flight judgment errors.
- In the operational environment, an operator flying about 400,000 hours annually demonstrated a **54 % reduction** in accident rate after using these materials for recurrency training.



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ADM & Risk Management

- The goal of risk management is to proactively identify safety-related hazards and mitigate the associated risks. Risk management is an important component of ADM
- When a pilot follows good decision-making practices, the inherent risk in a flight is reduced or even eliminated.
- The ability to make good decisions is based upon direct or indirect experience and education.
- The formal risk management decision-making process involves six steps as shown.



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Give some examples of operational and non-operational risks to aviation industry.

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Give some examples of operational and non-operational risks to aviation industry.

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ADM & Risk Management

- Consider automotive seat belt use. In just two decades, seat belt use has become the norm, placing those who do not wear seat belts outside the norm.
- This group may learn to wear a seat belt by either direct or indirect experience.
- For example, a driver learns through:
 - **Direct Experience** about the value of wearing a seat belt when he or she is involved in a car accident that leads to a personal injury.
 - **Indirect Learning** experience occurs when a loved one is injured during a car accident because he or she failed to wear a seat belt.



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THE RISK MATRIX



- **Probable**—an event will occur several times
- **Occasional**—an event will probably occur sometime
- **Remote**—an event is unlikely to occur, but is possible
- **Improbable**—an event is highly unlikely to occur

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

- **Catastrophic**—results in fatalities, total loss
- **Critical**—severe injury, major damage
- **Marginal**—minor injury, minor damage
- **Negligible**—less than minor injury, less than minor system damage

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4 Principles of Risk Management



Accept no unnecessary risk. Flying is not possible without risk, but unnecessary risk comes without a corresponding return.



Make risk decisions at the appropriate level. Risk decisions should be made by the person who can develop and implement risk controls. Remember that you are pilot-in-command, so never let anyone else—not ATC and not your passengers—make risk decisions for you.



Accept risk when benefits outweigh dangers (costs). In any flying activity, it is necessary to accept some degree of risk. A day with good weather, for example, is a much better time to fly an unfamiliar airplane for the first time than a day with bad weather.



Integrate risk management into planning at all levels. Because risk is an unavoidable part of every flight, safety requires the use of appropriate and effective risk management not just in the preflight planning stage, but in all stages of the flight.

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Hazard and Risk in ADM process

- Two defining elements of ADM are **hazard** and **risk**.
- Hazard is a real or perceived condition, event, or circumstance.
- Different persons see hazards differently.



Mention examples of Hazards that might exist in your workplace.



Mention examples of Hazards that might exist in your workplace.

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Hazard Identification individual influence (1)

- For example, the pilot arrives to preflight and discovers a small hair crack the middle of the aircraft's prop.
- The hair crack is the hazard (a present condition). The risk is prop fracture if the engine is operated with in such condition
- The **experienced** pilot may see the crack as a low risk and based on experience; he does not expect it to propagate and lead to high-risk problems. He does not cancel his flight.
- The **inexperienced** pilot may see the crack as a high risk factor because he is unsure of the affect the crack will have on the operation of the prop. This assessment leads him to cancel his flight.
- Therefore, elements or factors affecting individuals are different and profoundly impact decision-making.
- These are called human factors.



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Hazard Identification individual influence (2)

- Another example of risk assessment was the flight of a **Beechcraft king air** equipped with deicing and anti-icing.
- The pilot deliberately flew into moderate to severe icing conditions.
- A careful pilot would assess the risk as high and beyond the capabilities of the aircraft, yet this pilot did the opposite.

Why did the pilot take this action?

- **Experience prompted the action.** The pilot had successfully flown into these conditions repeatedly although the icing conditions were previously forecast 2,000 feet above the surface. This time, the conditions were forecast from the surface.
Since the pilot was in a hurry and failed to factor.
- In the difference between the forecast altitudes, he assigned a low risk to the hazard and took a chance.



He and the passengers died from a poor risk assessment of the situation.



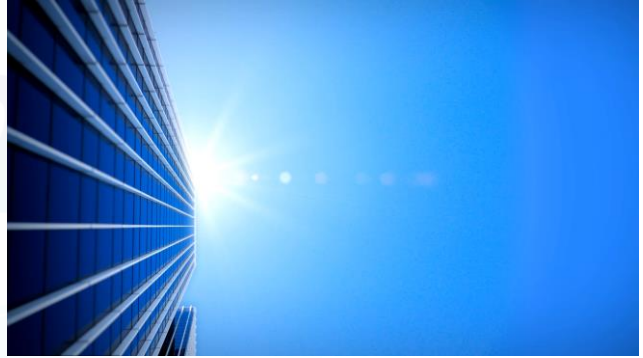
15 Minutes
Break





Important Question – Food for Thought

What does “Fit for Flying” mean?



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What does "Fit for Flying" mean?

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Hazardous Attitudes and Antidotes

- Being fit to work depends on more than just a physical condition and recent experience.
- For example, attitude affects the quality of decisions. Studies have identified **five hazardous attitudes** that can interfere with the ability to make sound decisions and exercise authority properly.
- Hazardous attitudes contribute to poor judgment but can be **effectively counteracted** by using antidotes
- Identification of hazardous thoughts is the first step toward neutralizing them and then you should state the corresponding antidote.
- Antidotes should be memorized for **each of the hazardous attitudes, so they automatically come to mind** when needed.



The Five Hazardous Attitudes	Antidote
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 your prerogative to question authority if you feel it is in error.	Follow the rules. They are usually right.
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.	Not so fast. Think first.
Invulnerability: "It won't happen to me." Many people falsely believe that accidents happen to others, but never to them. They know accidents can happen, and they know that anyone can be affected. However, 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.	It could happen to me.
Macho: "I can do it." Pilots who are always trying to prove that they are better than anyone else think, "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.	Taking chances is foolish.
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 them 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."	I'm not helpless. I can make a difference.



The Most Dangerous words at work /cockpit “Watch this!”

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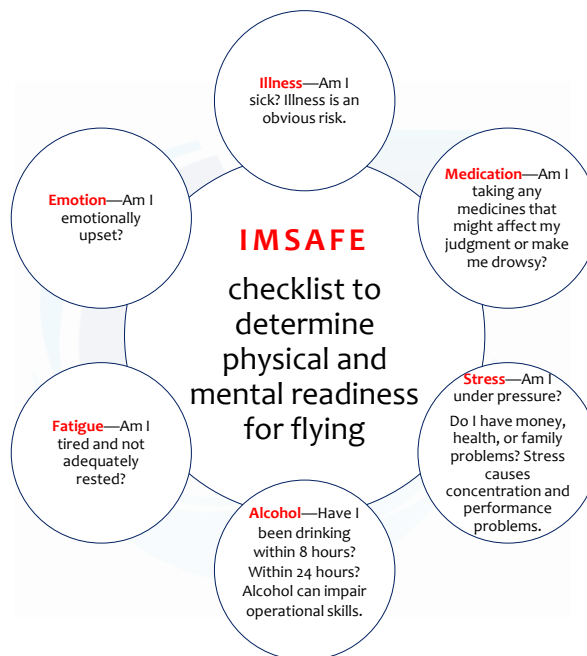


Which Character do you think you are?

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Mitigating the Risk



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Mitigating the Risk-The PAVE Checklist

- Another way to mitigate risk is to perceive hazards. By incorporating the PAVE checklist into preflight planning, the pilot divides the risks of flight into four categories:

Pilot/ Human

Aircraft / Equipment

enVironment

External pressures

(PAVE) which form part of a individuals decision-making process.

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Pilot/Human

Examples of questions to ask yourself:

- How current am I or qualified for the task ?
- Am I well rested ?
- Am I familiar with the task?
- Do I have experience with the task/route/flight?



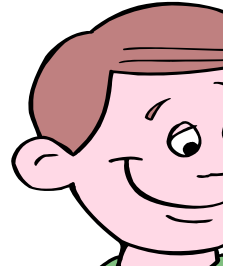
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Procedures



- Do you know the most up-to-date operational procedures and the current regulations?
- Are you using a current manual?
- Are you aware of latest issue of the SOP?



USING HARDCOPIES DOCUMENTS

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Beware of Overconfidence

Overconfidence in a pilot occurs when they are grabbed into a sense of self-satisfaction accompanied by:

- a failure to recognize changes in their situation; or
- a failure to assess the actual dangers or deficiencies in their situation.



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Avoiding Overconfidence

- Do a thorough Inspection/Never skip
- Anticipate and continually assess the situation.
- Always have an escape route (an alternate plan of action or a plan “B”).



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Fatigue

A fatigued individual:

- is susceptible to visual illusions.
- may forget or ignore checks and procedures;
- is easily distracted;
- has limited situational awareness;
- exhibits poor communication skills;
- is likely to doze off.



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Preventing Fatigue

- Get 8 hours of sleep *if possible*.
- If you are unable to fall asleep in 30 minutes, get up.
- Take a power nap, *if possible* (45 minutes max.).
- Stay in good physical condition (aerobic) and eat sensibly.
- Avoid using stimulants, sleep aids, alcohol and tobacco.
- Drink enough water.



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Alcohol:



- is a sedative;
- decreases the brain's ability to use oxygen;
- affects our senses;
- affects our judgement;
- distorts our perception.



The effects of alcohol are increased in altitude because the partial pressure of oxygen is decreased.

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Alcohol vs. Judgment

Alcohol impairs our judgment by:

- increasing our reaction time;
- clouding our memory;
- making us accept a higher level of risk than normal;
- making us underestimate the risks involved.



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Illness and Medication

- Medication covers up symptoms but does not cure the underlying problem.
- Always consult a Medical Examiner.
- Educate yourself on the side effects of prescription and over-the-counter medications.



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Stress Management

- Identify, recognize and manage stressors.
- Check your attitude, sense of humour and emotional state.

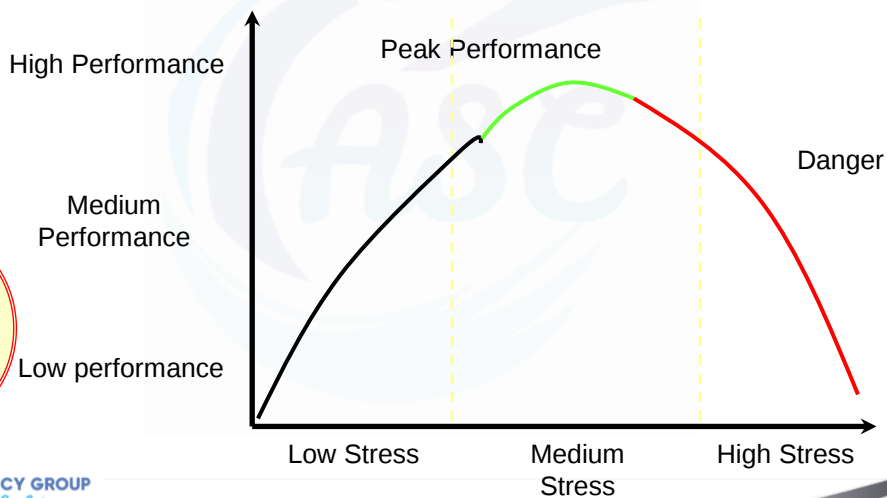


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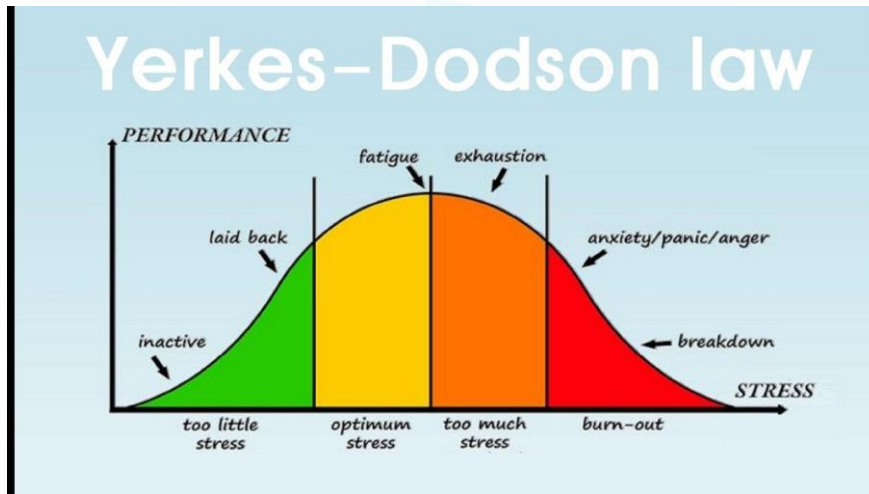


Stress vs. Performance



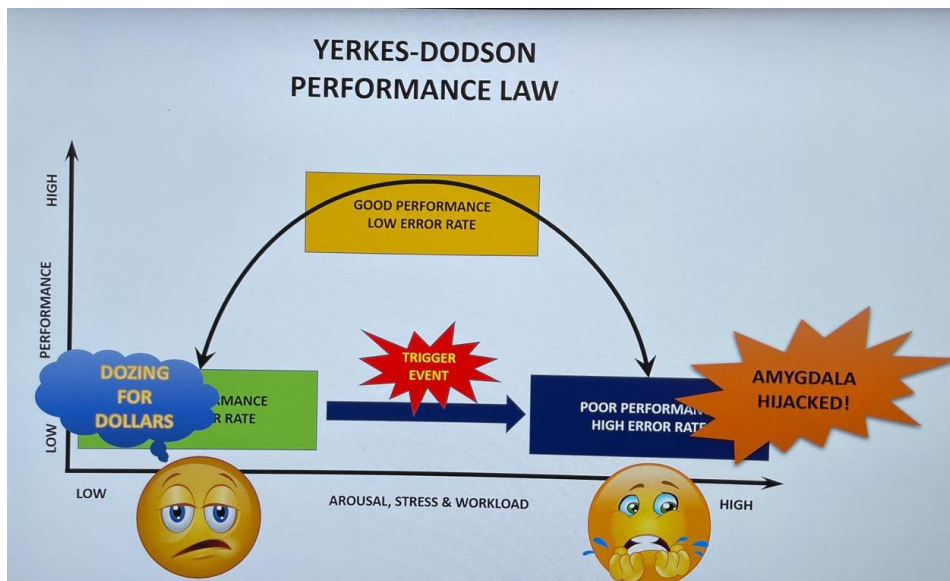
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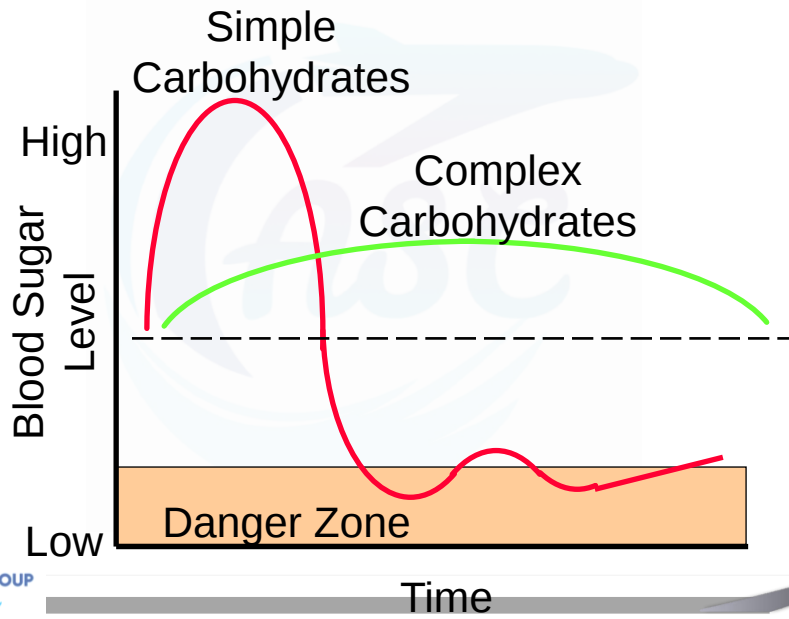
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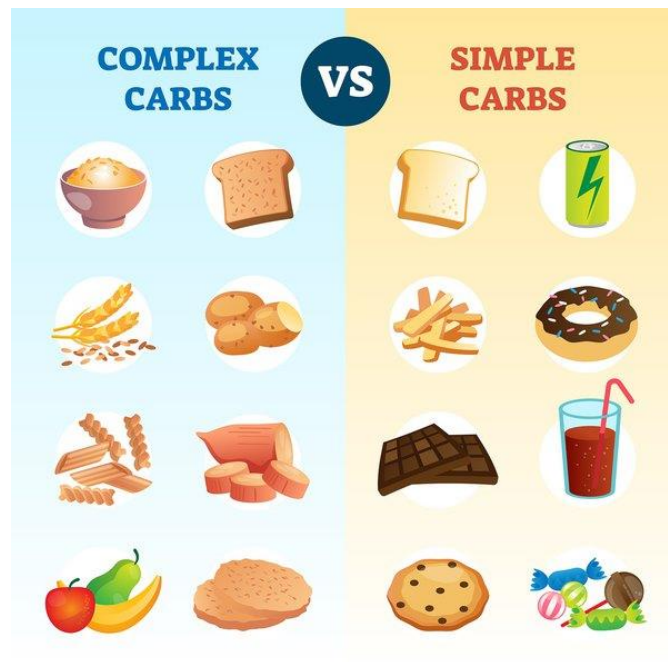
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Coffee Break



The three most useless things to a pilot:

The altitude above you,
the runway behind you, and
a tenth of a second ago.

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**15 Minutes
Break**



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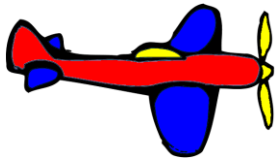


Aircraft/Equipment



- **Examples of questions to ask yourself:**

- Is the aircraft airworthy?
- Is the Equipment serviceable?
- Does the aircraft/equipment have any maintenance problems?



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Airworthiness



- **Make sure your aircraft is airworthy:**

- Check all aircraft documents.
- Do a complete walk-around.
- Make sure weight and balance is within the limits.



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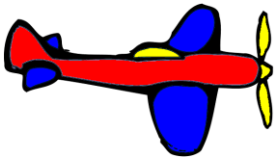


Competency and Experience on Type

Are you up-to-date on the aircraft you intend to fly?

How is your:

- flying ability (hands and feet);
- knowledge of the aircraft;
- knowledge of the emergency procedures.



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Avionics

The time to learn how to operate the system is when you are on the ground, not in the air!!



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Environment

Examples of questions to ask yourself:

- What will the weather be at destination?
- Will it be a day flight or a night flight?
- Is the runway in good condition?



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Airport Conditions

- Check NOTAMs.
- If you are unfamiliar with the airport, conduct proper Risk Assessment



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Airspace

- Know the area radio frequencies and monitor them.
- Familiarize yourself with transition routes and reporting points.
- Look for, and monitor, other aircraft in the area.



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Weather

- Check METARs, TAFs.
- Assess any meteorological hazards such as:
 - reduced visibility, thunderstorms, wind shear, icing, low ceilings etc.



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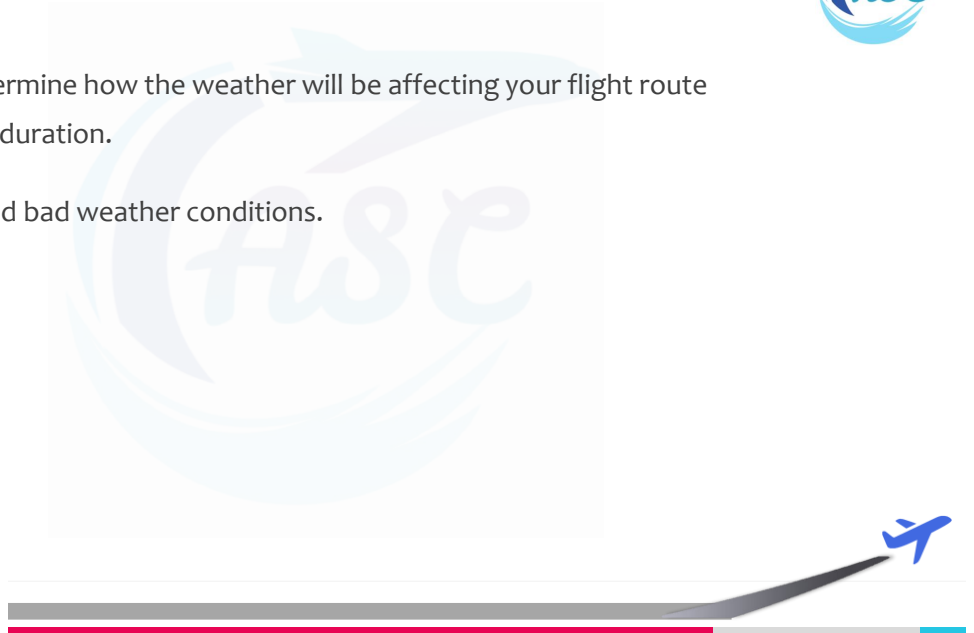
Weather

- Determine how the weather will be affecting your flight route and duration.
- Avoid bad weather conditions.



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Terrain

- Be familiar with obstacles and terrain.



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External Pressures

- **Examples of questions to ask yourself:**

- What outside forces are pushing me?
- Why am I making this trip?
- Am I pressed for time?
- What are the real consequences to my decisions?



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Define Operational Pressure!

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Time Pressure

- The more you feel pressed for time,
- the more you do things hastily,
- the higher your chances of making a mistake.



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Time Pressure Management

- Do not put yourself under unnecessary time pressure:
- Allow sufficient time for unforeseen delays.
- Plan alternate means of travel to allow for bad weather.



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Time Pressure Management

- Do not rush
- Use your checklist and stick to the procedures.
- If you are interrupted, go three steps back on the checklist or start at the beginning!



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Managing External Pressures

- Beware of the effects of the “I have to get there no matter what” syndrome.
- Always have a plan “B”;
 - What is your way out?
- Set limits (fuel, weather, etc.) at which you will turn around or divert.



Do not exceed your limits—Stick to them!!!

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Peer and Passenger Pressures

- Make decisions based on facts and your limitations.
- Do not get yourself into situations that you did not plan. Beware of last minute, unplanned changes!



Do not take unnecessary risks under pressure!!!

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Human Factors - PAVE Checklist



Pilot	Aircraft
A pilot must continually make decisions about competency, condition of health, mental and emotional state, level of fatigue, and many other variables. For example, a pilot may be called early in the morning to make a long flight. If a pilot has had only a few hours of sleep and is concerned that the congestion being experienced could be the onset of a cold, it would be prudent to consider if the flight could be accomplished safely. A pilot had only 4 hours of sleep the night before being asked by the boss to fly to a meeting in a city 750 miles away. The reported weather was marginal and not expected to improve. After assessing fitness as a pilot, it was decided that it would not be wise to make the flight. The boss was initially unhappy, but later convinced by the pilot that the risks involved were unacceptable.	A pilot will frequently base decisions on the evaluations of the aircraft, such as performance, equipment, or airworthiness. During a preflight, a pilot noticed a small amount of oil dripping from the bottom of the cowl. Although the quantity of oil seemed insignificant at the time, the pilot decided to delay the takeoff and have a mechanic check the source of the oil. The pilot's good judgment was confirmed when the mechanic found that one of the oil cooler hose fittings was loose.
Environment	External pressures
This encompasses many elements not pilot or airplane related. It can include such factors as weather, air traffic control, navigational aids (NAVAIDS), terrain, takeoff and landing areas, and surrounding obstacles. Weather is one element that can change drastically over time and distance. A pilot was landing a small airplane just after a heavy jet had departed a parallel runway. The pilot assumed that wake turbulence would not be a problem since landings had been performed under similar circumstances. Due to a combination of prevailing winds and wake turbulence from the heavy jet drifting across the landing runway, the airplane made a hard landing. The pilot made an error when assessing the flight environment.	The interaction between the pilot, airplane, and the environment is greatly influenced by the purpose of each flight operation. The pilot must evaluate the three previous areas to decide on the desirability of undertaking or continuing the flight as planned. It is worth asking why the flight is being made, how critical is it to maintain the schedule, and is the trip worth the risks? On a ferry flight to deliver an airplane from the factory, in marginal weather conditions, the pilot calculated the groundspeed and determined that the airplane would arrive at the destination with only 10 minutes of fuel remaining. The pilot was determined to keep on schedule by trying to "stretch" the fuel supply instead of landing to refuel. After landing with low fuel state, the pilot realized that this could have easily resulted in an emergency landing in deteriorating weather conditions. This was a chance that was not worth taking to keep the planned schedule.

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Human Behavior role in Decision Making

- The term “pilot error” has been used to describe an accident in which an action or decision made by the pilot was the cause or a contributing factor that led to the accident.
- This definition also includes the pilot’s failure to make a correct decision or take proper action.
- Usually, a single decision or event does not lead to an accident, but a series of events and the resultant decisions together form a chain of events leading to an outcome.



Human Behavior-Case Study (Accident Prone Pilot)

- In his article “Accident-Prone Pilots,” Dr. Patrick R. Veillette uses the history of “**Captain Everyman**”.
- While taxiing a **his aircraft** out of the ramp, **Everyman neglected to complete the checklist neglecting the fuel cross-feed check before taking off**. He left the right-fuel selector in the cross-feed position. During cruising, he noticed a right roll.
- After two hours of flight, the right engine quit.
- While he was trying to troubleshoot the cause of the right engine’s failure, the left engine quit.
- **Everyman landed the aircraft on a river sand bar but it sank into ten feet of water.**
- **Several years later** Everyman during landing, aircraft veered sharply to the left, departed the runway. Upon inspecting the wreck, accident investigators found **the nose wheel steering tiller in the fully deflected position**. Both the after takeoff and before landing checklists require the tiller to be placed in the **neutral** position. **Everyman had overlooked this item.**



Human Behavior - Case Study

- Now, is Everyman accident prone or just unlucky?
- Skipping details on a checklist appears to be a common theme in the preceding accidents. While most pilots have made similar mistakes, these errors were probably caught prior to a mishap due to extra margin, good warning systems, a sharp copilot, or just good luck.

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Human Behavior in ADM

Five traits were discovered in pilots prone to having accidents. These pilots:

- Have reluctance toward rules.
- Have very high correlation between accidents on their flying records and safety violations on their driving records.
- Frequently fall into the “thrill and adventure seeking” personality category.
- Are impulsive rather than methodical and disciplined, both in their information gathering and in the speed and selection of actions to be taken.
- Have a disregard for or tend to under utilize outside sources of information, including copilots, flight attendants, flight service personnel, flight instructors, and ATC.

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**15 Minutes
Break**

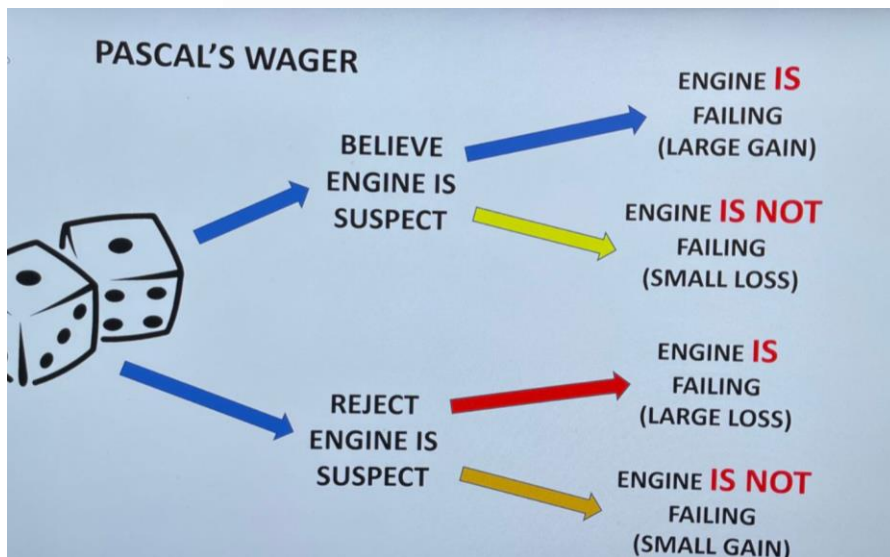


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Decision Making Philosophy



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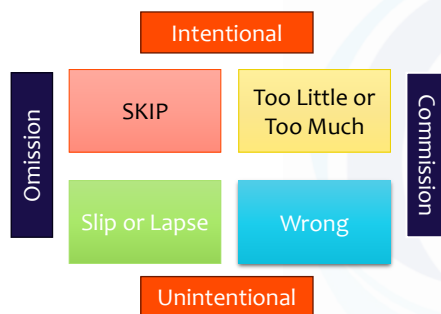
It's better to be on the ground
wishing you were in the air
than in the air wishing you
were on the ground

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Decision Process



- Decided Not to Refuel
- Added too little or too much fuel
- Forgot to refuel
- Added wrong fuel type

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Decision Making Models

The 5 Ps

The 3Ps

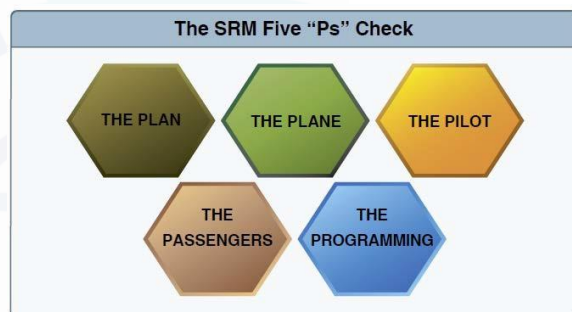
The DECIDE Model

THE DECISION MAKING PROCESS- 5Ps Model



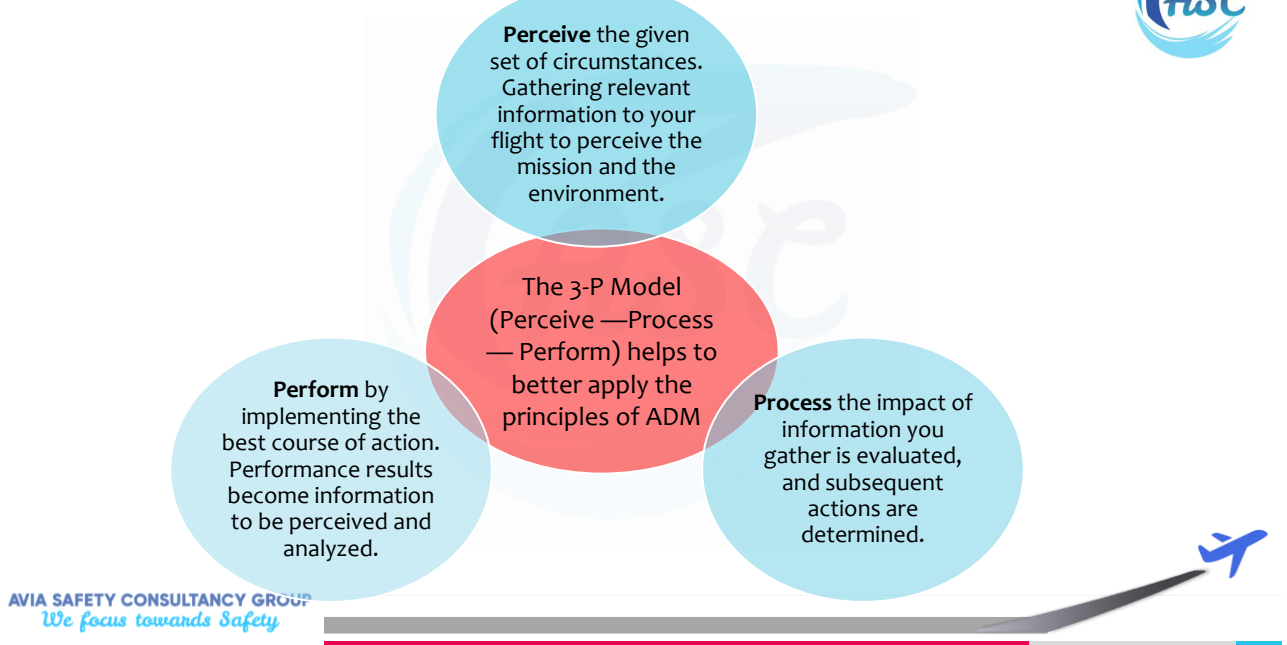
Done at:

- Preflight
- Pre-takeoff
- Hourly or at mid-point of the flight
- Pre-descent
- Prior to entering the traffic pattern





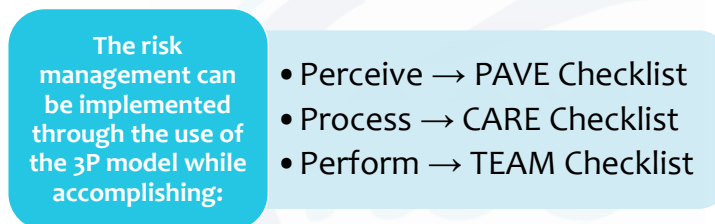
THE DECISION MAKING PROCESS- 3P Model



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THE DECISION MAKING PROCESS-3P Model



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3P Model (Perceive)

- PAVE Checklist
- Flight Risk Assessment Tool (FRAT Risk Assessment-PAVE Checklist)
 - Because every flight has some level of risk, it is critical that pilots are able to differentiate, in advance, between a low-risk flight and a high-risk flight, and then establish a review process and develop risk mitigation strategies. A FRAT enables proactive hazard identification, is easy to use, and can visually depict risk. It is an invaluable tool in helping pilots enhance their ADM skills and should be a part of every flight.
 - Although designs can vary, FRATs generally ask a series of questions that help identify and quantify risk
 - FRAT enables the the PAVE checklist, covering questions on the Pilot, Aircraft, enViroment, and External Pressures.
 - [Workbook: FRAT TOOL \(dot.gov\)](#)

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3P Model (Process)

The CARE Checklist (the Process step)

- **Consequences** — departing after a full workday creates fatigue and pressure
- **Alternatives** — delay until morning; reschedule meeting
- **Reality** — dangers and distractions of fatigue could lead to an accident
- **External pressures** — business meeting at destination might influence me

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3P Model (Perform)

TEAM Checklist: Choose and Implement Risk Controls Perceive the given set of circumstance for a flight. (The Perform Step)

- **Transfer** — Should this risk decision be transferred to someone else (e.g., do you need to consult the chief flight instructor?)
- **Eliminate** — Is there a way to eliminate the hazard?
- **Accept** — Do the benefits of accepting risk outweigh the costs?
- **Mitigate** — What can you do to mitigate the risk?

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3P Model Case Study- Malfunctioning Tow Bar on the Ramp



Scenario

- A ground crew at a busy airport is preparing to tow a commercial aircraft from the gate to a remote parking area. As the team begins the towing operation, they notice that the tow bar appears to be malfunctioning—it's not locking securely to the aircraft's nose gear, creating a potential safety hazard.
- **Perceive "Establishing the problem/awareness"**
 - **Human:** The ground crew perceives that the tow bar is not functioning as expected. It seems loose and fails to securely latch onto the nose gear.
 - **Equipment** The tow bar is a critical piece of equipment, and its malfunction presents a significant risk. The ground crew must decide whether to proceed with the operation or take alternative actions.
 - **Environmental Factors:** The ramp is busy, with several aircraft movements taking place simultaneously. The operation is on a tight schedule, and there is pressure to move the aircraft quickly to avoid delays.

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3P Model Case Study- Malfunctioning Tow Bar on the Ramp



Process "CARE Checklist to assess the impact"

- **Consequences:** The primary risks include the tow bar detaching during the tow, which could result in damage to the aircraft, injury to ground personnel, and disruption of airport operations.
- **Alternatives:**
 - Option 1: Replace the malfunctioning tow bar with a functioning one, which may take additional time.
 - Option 2: Delay the towing operation until the tow bar can be properly inspected and repaired, ensuring safety but causing potential delays.
- **Reality:** operating with malfunctioned tow bar is risky
- **External:** busy airport, operational pressure.

3P Model Case Study

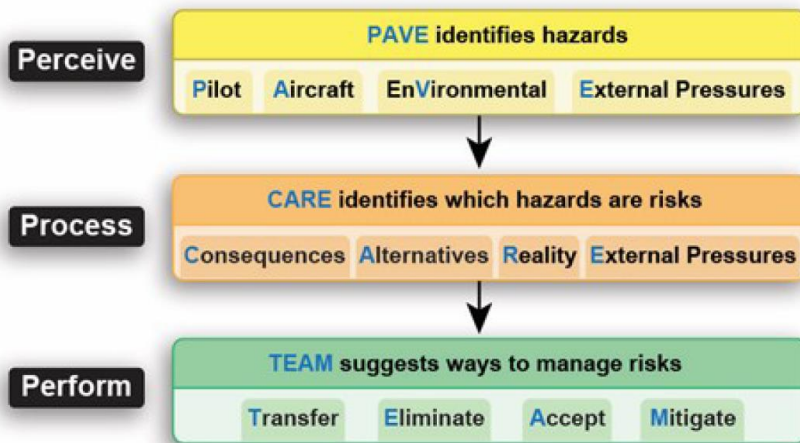


Perform "TEAM" checklist Implement the risk mitigation.

- **Transfer:** the crew communicates the situation to the operations control center and the flight crew, explaining the delay and the steps being taken to resolve the issue.
- **Eliminate** and stop the operation immediately: the towing operation is halted, and the aircraft remains stationary until a safe solution is found.
- **Accept** the risk of towing the aircraft with malfunctioning towbar.
- **Mitigate** inspect & replace the tow bar: the tow bar is inspected by maintenance personnel to diagnose the malfunction and if the tow bar cannot be quickly repaired, a functioning tow bar is brought in to continue the operation safely.



3P Model summary



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THE DECISION MAKING PROCESS

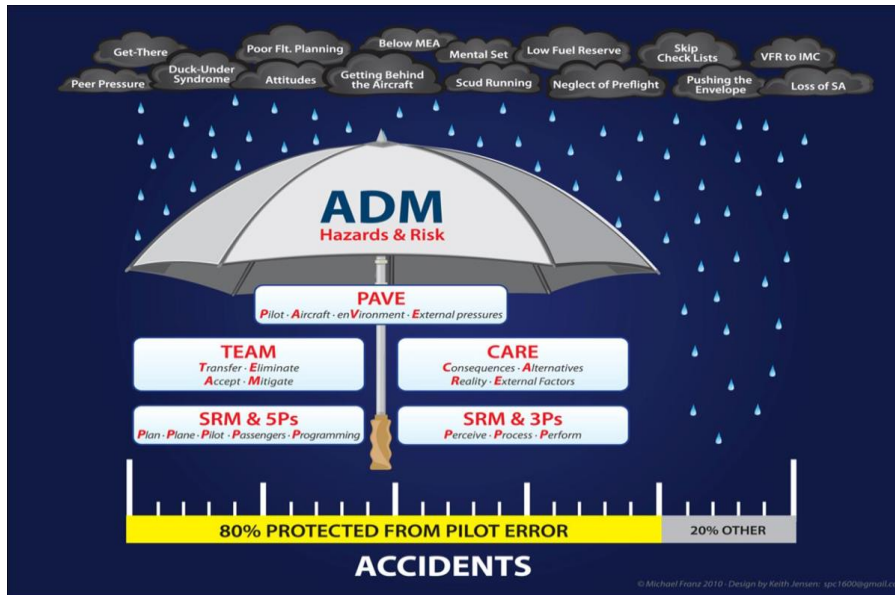
The DECIDE model

1. **Detect.** The decision maker detects the fact that change has occurred.
2. **Estimate.** The decision maker estimates the need to counter or react to the change.
3. **Choose.** The decision maker chooses a desirable outcome (in terms of success) for the flight.
4. **Identify.** The decision maker identifies actions which could successfully control the change.
5. **Do.** The decision maker takes the necessary action.
6. **Evaluate.** The decision maker evaluates the effect(s) of his/her action countering the change.

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ADM Errors



Confirmation Bias:

- After making a decision, humans tend to irrationally search for and Favor information that confirms that the decision is correct. The “Reality” component of the 3-P model “CARE checklist” is beneficial towards decreasing confirmation bias.

Filtering:

- The brain is very good at filtering the multitude of information presented to us at any given moment. Subconscious information filtering can be detrimental, however, as the pilot may filter important information. The “PAVE” component of the 3-P model can counteract this subconscious filtering of information.

Patterns and Expectations:

- The brain can use previous experiences to identify patterns and create expectations, which can cause issues if the assumptions are incorrect. For example, a pilot who transfers to a different Electronic Flight Information System (EFIS) may assume how the new system displays information based on their previous experiences with EFIS instruments. This assumption will lead to the pilot incorrectly interpreting information.

Filling in the Gaps:

- When incomplete information is presented to the brain, it will make assumptions about the missing information. As we saw in the previous example, assumptions can lead to dangerous situations. Optical illusions are an excellent example of dangerous assumptions the brain can make.

Framing:

- When considering your options, be careful of how you frame a statement, as this will influence your decision. For example, if you are on an unstable final approach, and you frame the “continue” statement as “If I don’t land, my passengers will be angry”, you may be biased towards continuing the approach. You should instead frame the statement, “If I continue this unstable approach, I may not be able to land”

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ADM Errors

STRESSORS	SYMPTOMS
Physiological »	Sleep disturbance, migraines, muscular tension, low-grade infections, sweating, dryness of the mouth, nausea, headaches, shaking, etc.
Psychological »	Anxiety, uneven temper, loss of interest, poor self-esteem, feelings of loss of control, irritability, depression, moodiness, aggression, etc.
Cognitive »	Difficulties in concentrating, omissions, errors, slowness, poor judgment, poor memory, reduced vigilance and attention, etc.
Behavioural »	Loss of motivation, tendency to skip items and look for short cuts, easily distracted, slowness or hyperactivity, nervous laughter, etc.



If, in aircraft, you ever wonder
where you are, you are in the
wrong place.
Richard Collins



THANK YOU

