Unit 6 Aeromedical Factors and Aeronautical Decision Making

6.1 Hypoxia

- Types of hypoxia:
    - Hypoxic hypoxia - not enough oxygen to the entire body (ex: loss of partial pressure at altitude)
    - Anemic (hypemic) hypoxia - deficiency in the blood's ability to carry oxygen (such as blood loss due to blood donation, or CO poisoning). Not because of too little inhaled oxygen.
    - Stagnant hypoxia - when oxygen-rich blood in the lungs is not moving (circulatory) (ex. Pulling too many Gs in flight, shock, loss of circulation to extreme cold)
    - Histotoxic hypoxia - inability of cells to effectively use oxygen (ex. Caused by alcohol use)
- Symptoms: initially a feeling of euphoria, then headache, delayed reaction time, visual impairment, then unconsciousness
- Correct response: reduce altitude or use supplemental oxygen

6.2 Hyperventilation

- When an excess amount of air is breathed out of the lungs, such as when one becomes excited, stressed, tense, fearful, or anxious.
- Results in excess CO2 released from the body and too much oxygen retained
- Symptoms: dizziness, hot and cold sensations, nausea, tingling in the extremities
- Overcome by slowing respiration rate, breathing in a bag, or talking out loud

6.3 Spatial Disorientation

- A state of temporary confusion resulting from misleading information being sent to the brain by various sensory organs (not knowing whether you're turning, going up or down, etc)
- If you lose outside visual refs and become disoriented, you are experiencing spatial disorientation.
- To overcome: rely on instruments, avoid sudden head movements, and ensure outside references are fixed points on the surface.

6.4 Vision

- Adapt eyes for night flight by avoiding bright white lights for 30 mins prior to flight
- Off-center viewing is better at night. Scan slowly to permit off-center viewing
- Scanning for traffic is best accomplished by bringing small portions of the sky into the central field of vision slowly and in succession.
- Haze can create the illusion of traffic or terrain being farther than actual
- Narrower-than-usual runway can create the illusion that the a/c is higher than it actually is. Results in a lower-than-normal approach. Wider runway has the opposite effect.

- Upward sloping runway creates the illusion that the a/c is at a higher-than-actual altitude. Results in a lower-than-normal approach. Downward sloping runway has the opposite effect.

6.5 Carbon Monoxide

- CO - colorless, odorless gas produced by all combustion engines
- CO can enter a flight deck or cabin through heater and defrost vents. If a leak is detected or the pilot smells gas fumes or exhaust, immediate corrective action must be taken. Including turning off the heater, opening air vents or windows, or using supp. oxygen if available.
- Blurred thinking and vision, uneasiness, dizziness, and tightness across the forehead are early symptoms of CO poisoning. Followed by headache and a loss of muscle power. Tobacco smoke also causes CO poisoning - medically disqualifying for pilots.
- Increase in altitude increases susceptibility to CO poisoning b/c of decreased oxygen availability.

6.6 ADM and Judgment

- ADM - 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.
- Risk management - part of the decision making process that relies on situational awareness, problem recognition, and good judgment to reduce risks and manage external pressures associated with each flight. Four fundamental risk elements in any given aviation situation:
    - Pilot, aircraft, environment, mission (type of operation)
- Most pilots have fallen prey to dangerous tendencies or behavioral problems at some time. Scud running, continuing visual flight into IMC, and neglecting checklists are 3 examples.
    - Scud running - pilot pushes their capabilities and the airplane to the limit by trying to maintain visual contact with terrain while trying to avoid contact with it during low vis and low ceilings
    - Continuing visual flight into IMC often results in spatial disorientation or collision with the ground or obstacles
    - Neglect of checklists- an example of a pilot's unjustified reliance on his or her short and long term memory for repetitive tasks.
- 5 hazardous attitudes that contribute to poor judgment: recognition is the first step to neutralizing hazardous attitudes; then state the corresponding antidote
    - Anti-authority: "don't tell me!" => Follow the rules. They are usually right.
    - Impulsivity: "Do something quickly!" => Not so fast. Think first.
    - Invulnerability: "It won't happen to me" => It could happen to me.
    - Macho: "I can do it." => Taking chances is foolish.
    - Resignation: "What's the use?" => I'm not helpless. I can make a difference.

- You are responsible for determining whether or not you are fit to fly for a particular flight.
    - Ask, could I pass a medical right now? If you cannot absolutely answer yes, you are not fit to fly.
    - IMSAFE - illness, medication, stress, fatigue, eating/emotions
- Human error is the one common factor of most preventable accidents. Pilots involved in an accident usually know what went wrong and are aware of the possible hazards when making the decision that led to the wrong course of action.
- CRM - application of team management concepts in the flight deck. CRM refers to the effective use of all resources available, such as human resources (dispatchers, FAs, maintenance personnel, ATC, and flight crew), hardware (computers and flight directories) and information (charts and supplements)
    - Includes all groups routinely working with the flight crew who are involved in decisions required to operate a flight safely.
    - Mission of CRM training has always been to prevent aviation accidents by improving crew performance through better crew coordination
    - Goal of all flight crews is good ADM - using CRM is one way to make good decisions that proactively recognize safety related hazards and mitigate the associated risks.

Unit 6 Quiz 40/44

Missed questions 4

4. Blood donations result in anemic hypoxia, which is when sufficient oxygen doesn't reach cells in the body. Doesn't have to do with availability of oxygen.

6. Altitude induced hypoxia is caused b/c there is insufficient **partial pressure** of inhaled oxygen.

24. When the runway is narrower than usual, the pilot thinks they are higher, which results in a lower approach.

35. The antidote to the anti-authority attitude is "Follow the rules".