The National FAA Safety Team Presents

Federal Aviation Administration

Topic of the Month
March
Emergency Procedures Training

Presented to: Oakland, CA

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National FAASTeam

Welcome

- Exits
- Restrooms
- Emergency Evacuation
- Breaks
- Sponsor Acknowledgment
- Set phones & pagers to silent or off
- Other information

Overview

- GAJSC* Safety Enhancements
- Emergency procedures training
- Scenario-based training
- Multi-engine Scenarios
- Single-engine Scenarios
- Computer-based training & simulation

*General Aviation Joint Steering Committee

Training for emergencies

Correlation

Application

Understanding

Rote/Memorization

In a High-Stress Situation, Training Takes Over

In any high stress situation you are going to default to your level of training...period.

— *Joe Teti* —

Correlative learning

- **Puts students in realistic, complex situations**
  - Controlled environment
  - CFI ensures safety

U.S. Navy photo by Photographer's Mate 2nd Class Daniel J. McLain

Training Versus Reality

Differences in Training vs. Reality

	Training	Reality
Errors:	Do Overs	Consequences
Liability:	Say Sorry	Financial / Jail
Risk:	Safe Environment	Injury / Death
Stress:	Low Stress	High Stress / Melt Down

In Aviation

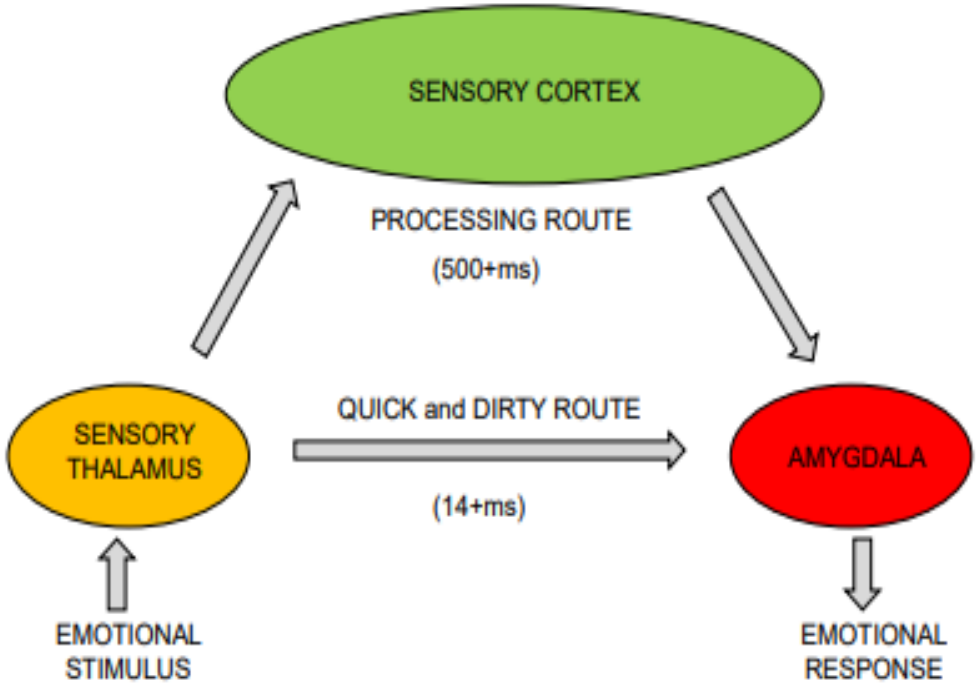
Viper flight training

- **Safety of flight keeps us at low stress**
- **Simulators or advanced training are useful**

The Startle Effect

P11 The Effects of Startle on Pilots During Critical Events: A Case Study Analysis

- **The conditioned expectation of normalcy amongst pilots may contribute to underperformance during surprise critical events, resulting in poor handling of complex situations**
- **These effects may seriously impair situational awareness, decision making and problem solving**



Startle Induced Confusion

Colgan Air Flight 3407

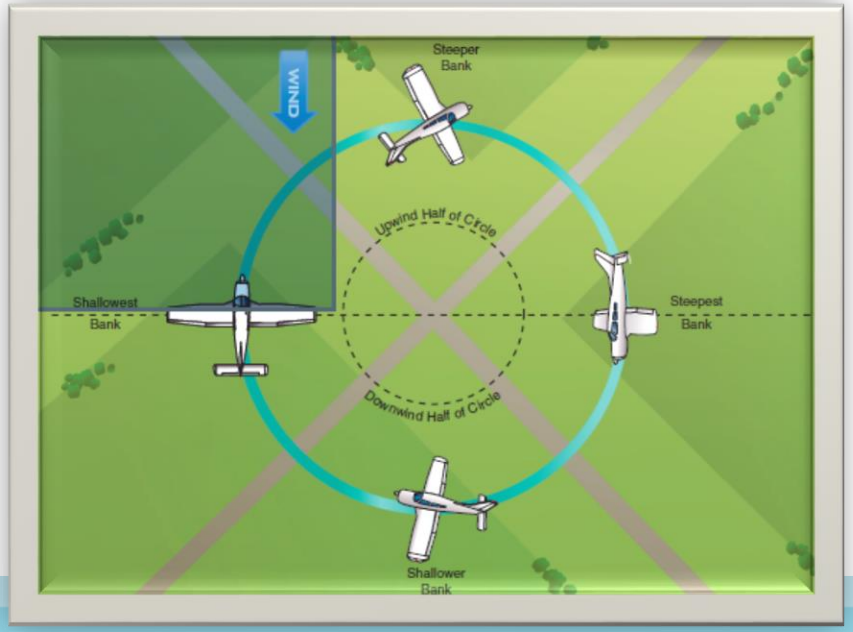
- Commencing approach from 2300 feet - Flaps and gear lowered, high drag
- Power left at idle, speed reduces
- Stall warning stick shaker activates
- Captain pulls up, aircraft stalls
- First Officer retracts flaps

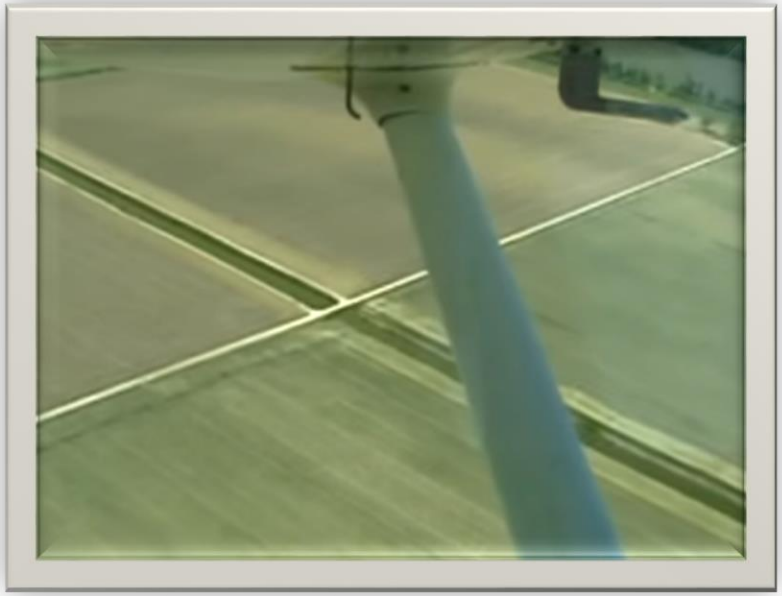
Air France Flight 447

- Pitot probes ice up giving false speeds
- Autopilot drops out. Aircraft reverts to alternate law mode
- Stick shaker stall warning commences
- F/O pulls up 2000 feet
- Aircraft fully stalls
- F/O applies full up control inputs

Scenario-based training

- **Realistic, complex situations**
  - Controlled environment
  - Safety Pilot
- **Turns about a point**





Scenario-based training

- **Aerial Photography**
  - Low altitude
    - CFR 91.119
  - Emergency landing area (s)
  - Airspace
    - ATC coordination
  - Performance pressure
    - Lower, slower, tighter
      - Pre-flight briefing
  - Community relations

Photo courtesy of:
Unique Media and Design
www.uniquemediadesign.com

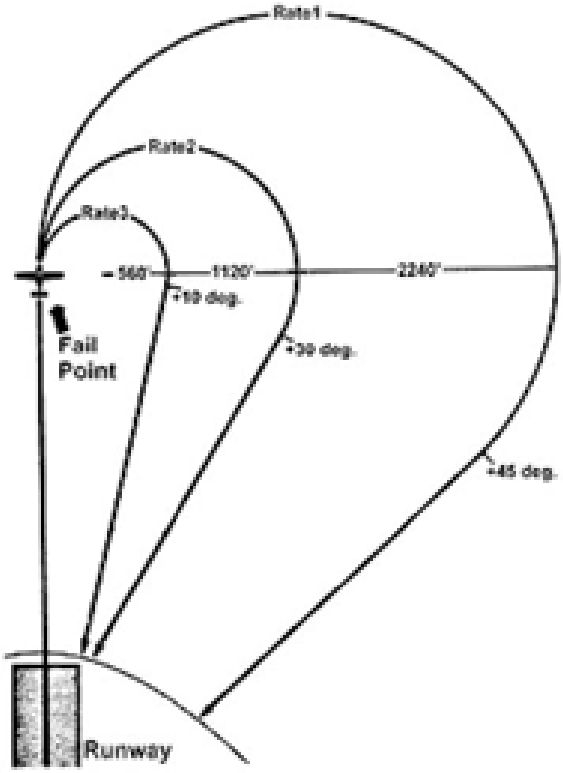
Single Engine Power Loss: Understanding

Cessna 182T POH

- **Airspeed 76 KIAS (Vg)**
- **Fuel selector – BOTH**
- **Fuel pump – ON**
- **Mixture control – RICH**
- Magnetos – BOTH
- Fuel pump – OFF
- What is the purpose? What could be added?
- When to use the checklist?

The Impossible Turn

- **Has anyone tried this?**
- **What altitude above which can we turn?**



Max Trescott

Figure 1- Although doubling turn rate halves turn radius when attempting to turn back to the runway, stalling speed increases dramatically.

Single Engine Power Loss: Apply and Correlate

- **How do you typically train for this?**
- **How do you think we should train?**
  - Think scenario-based training
- **How does your preflight planning take this scenario into account?**

Electrical Fire in Flight Understanding

Cessna 182T POH

- **STBY and Master switches - OFF**
- **Cabin vents - CLOSED**
- **Cabin HT and AIR - CLOSED**
- **Fire extinguisher - ACTIVATE**
- Avionics - OFF
- Other switches except magnetos – OFF
- After fire out: Open cabin vents, HT, AIR
- What is the purpose? What could be added?

Electrical Fire in Flight: Apply and Correlate

- **How do you typically train for this?**
- **How do you think we should train?**
  - Think scenario-based training
- **How does your preflight planning take this scenario into account?**

Single Engine Other Scenarios

- **Which of these do you train for and how:**
  - Precautionary landing with engine power
  - Ditching
  - Engine fire on ground
  - Engine fire in flight
  - Cabin fire in flight
  - Wing fire
  - Manual gear extension
  - Partial engine failure

Multi-engine scenarios

- **Power loss on takeoff / climb**
  - Proven fatal accident scenario
    - Critical engine
    - Air speed close to Vmc
    - Startle response = delayed reaction
  - Safer to practice in a simulator
- **En route / Approach**
  - Decision factors
    - Continue to destination or divert to more suitable alternate
    - Go around possible?

I Lost an Engine but Kept Smiling

Engine Loss in Flight

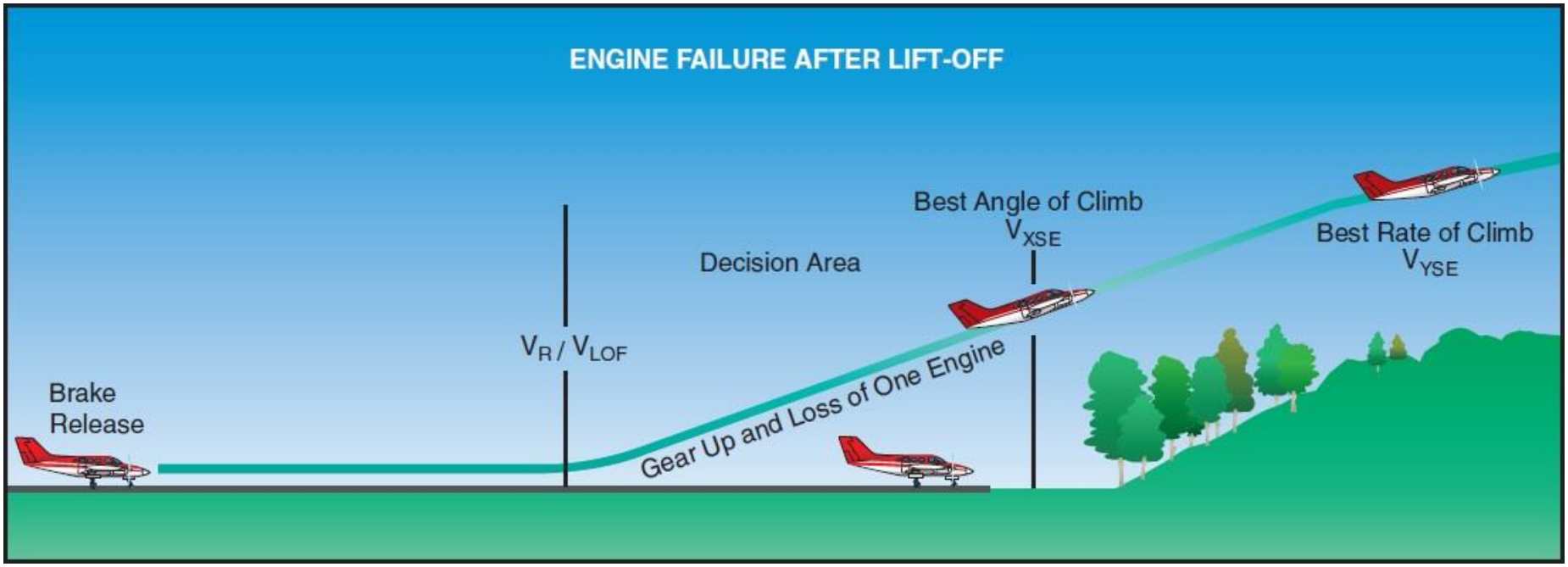
BE76 Duchess POH

- **Directional control - MAINTAIN**
- **Gear and flaps – UP**
- **Airspeed – Vyse (blue line)**
- **Inoperative engine – IDENTIFY**
- **Try to restart**
  - Fuel select, fuel pump, mixture, throttle, magnetos
- **Inoperative engine – THROTTLE IDLE & FEATHER**
- **Throttle – AS REQUIRED**
- **Inoperative engine - SECURE**

Engine Loss in Flight

12Charlie.com

- **It’s complicated! Fast reaction required**



Engine Loss in Flight

- **How do we train for this?**
- **How to simulate how quickly actions need to be taken without error?**
  - E.g., shutting down the operating engine

Simulators and scenarios

- **Safer and better**
  - Results of inadequate response can be experienced
  - Scenarios can progress further in Sims than in flight.
  - Scenarios can be paused or reset
- **Any Sim can provide effective training**
  - Instructors
  - Scenario-based Training programs

What Kind of Sim?

Redbird

3 Keys to success

- **Plan your response to emergencies**
  - Accelerate stop distance and abort point
  - Vyse - Best single-engine climb speed
  - Vsse - Safe single-engine speed
  - Off-airport landing opportunities
  - Return to airport or proceed to alternate
- **Review the plan before flying**
  - Brief the takeoff plan before taking the runway
  - Also brief approach and landing
- **Practice with a CFI**
  - Scenario-based training

Emergency vs Abnormal

- **Emergency is when the safety of the aircraft or people is in danger**

- **Abnormal is when the flight cannot continue with normal procedures**
  - Example?
- **If the situation is not an emergency do not convert it into one by rushing unnecessarily!**

Questions?

Proficiency and Peace of Mind

- **Fly regularly with your CFI**
- **Perfect Practice**
- **Document in WINGS**

Thank you for attending

- **You are vital members of our GA safety community**