Federal Aviation Administration

The National FAA Safety Team Presents

Managing Component Failures

Presented to:
By:
Date:

Produced by:
The National FAA Safety Team (FAASTeam)

Welcome

- Exits
- Restrooms
- Emergency Evacuation
- Silence Phones
- Sponsor Acknowledgment

FAA Defines: Com·po·nent

Any self-contained part, combination of parts, subassemblies or units, which perform a distinctive function necessary to the operation of the airframe, powerplant, or propeller.

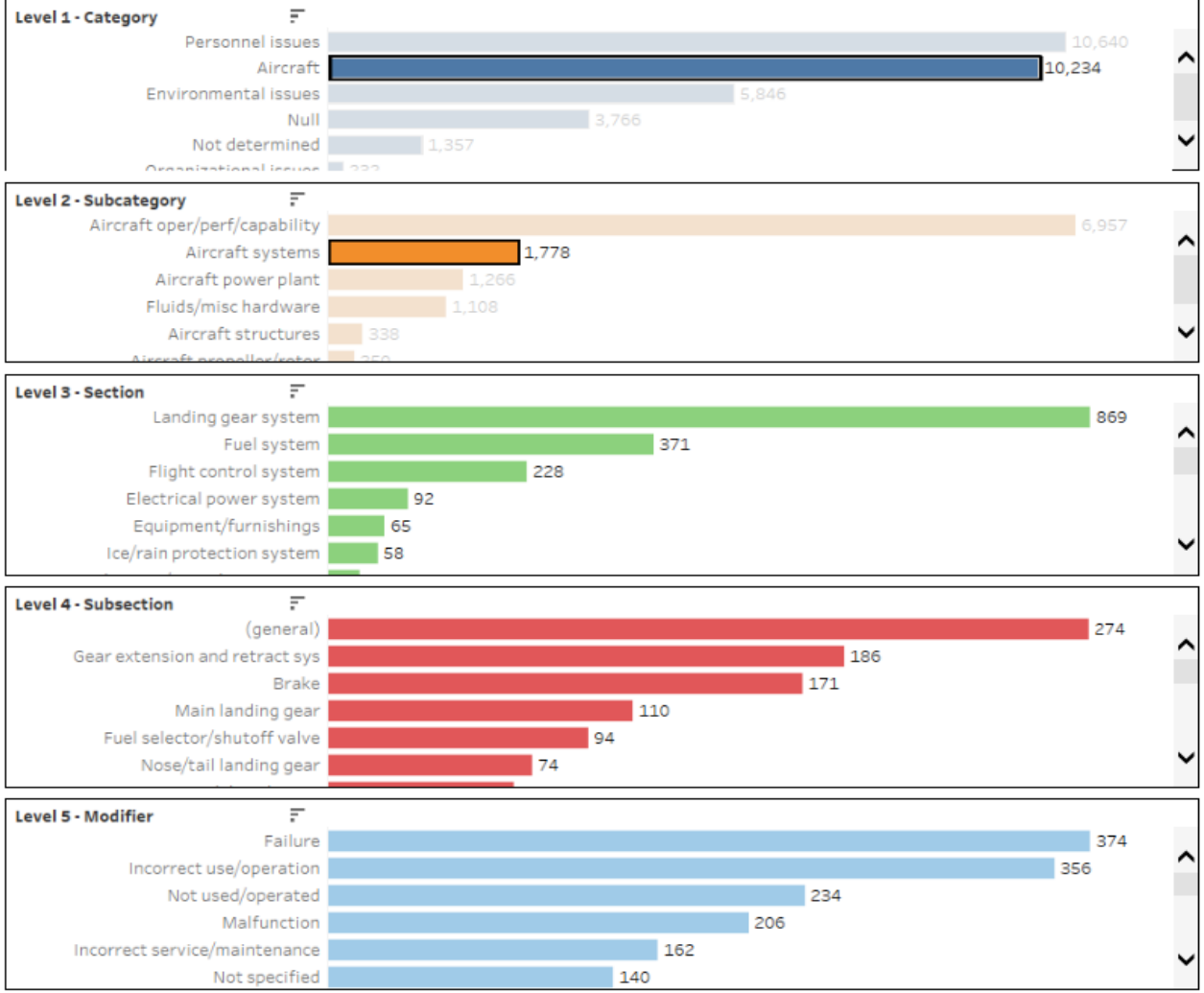
Objective:

- Discuss Component Failure accident data
- Review & case study – Door Opening in Flight
- Unexpected Failure Realities
- Processing and dealing with Emergencies
- Scenario to think about
- Brief Accident Review
- Closing thoughts and best practices

Accident Causal Factors

Clicking on any bar in a chart will filter the charts below it --- To remove a filter, click on an empty space in a chart

Source: NTSB Accident Database System (eADMS) Updated Through December 22, 2020
Data Tool Refreshed on 1/7/2021 6:06:12 PM



FSDO (NTSB)
(All)

Accident Year
(All)

Status
(All)

FAR Part
(All)

A/C Cat
(All)

Number of Engines
(All)

Event State
(All)

Crew Home State
(All)

Experimental
(All)

Nearest Airport
(All)

DEP Airport
(All)

ARR Airport
(All)

Causal Factors

Phase of Flight
(All)

Human Characteristics Common To Unexpected Failures

- Usually *Close to the ground*
- Result of a *Configuration Change*
- No indication there was a prior concern or issue
- Limited Response time

"What the….!"

Fact – *Recovery success is based on trained response to abnormal events or emergencies!*

The Five Stages of Grief

Denial - "This Can't be Happening!"

Anger - "I can't believe this is happening

Bargaining - "If you'll just get me out of this…"

Depression - The hazardous attitude of Resignation

Acceptance - "This IS happening, I'll take action!"

ABOUT THOSE FIRST FOUR…..

In the case of many unexpected situations in aircraft, if the pilot allows the first four of the five ‘stages of grief’ to occur, precious altitude, distance and time are compromised!!

You MUST go DIRECTLY to #5: ACCEPT that the UNEXPECTED has occurred, and take action.

Which Brings Us To…

What ARE You Going to Do?

Imagine The Unexpected Failure *then,* apply the following objectives:

#1 *Get out of the emergency alive!*

#2

Prepare for Landing

PRACTICE makes PERFECT…

Example: While at cruise your cabin door suddenly pops open!

What can you do to prevent this **"failure"** from becoming an **"Emergency"** and possibly an accident?

Review, visualize and practice how you would handle this situation.

PRACTICE makes PERFECT

Think it through:

Example: Engine failure

- What will be the indications?
- What must I Manage?
- Practice will make the difference in the final outcome of any unexpected failure!
- Work with your experiences

CHAIR FLY!!

Regularly practice emergencies, in the comfort of your favorite chair…

Scenario

Cruising along at 5500 feet the aircraft suddenly starts to vibrate. Dull at first and violently within the next couple of seconds. What do you do?

Initial Action: What Just Happened?

#1 - Fly the airplane!

- Reduce Power
- Disengage the AP
- Tighten that seat belt
- Consider engine shutdown

Note: If a portion of the propeller has broken free, generally the vibration will continue at any power setting.

Secondary Actions:

Fly the airplane!

- Checklist - **breaks through the distraction**
- Prepare for a Landing – directly in front of or below the aircraft is best
- Communicate – remember the far reaching aspects of altitude.

Is there Time to Troubleshoot?

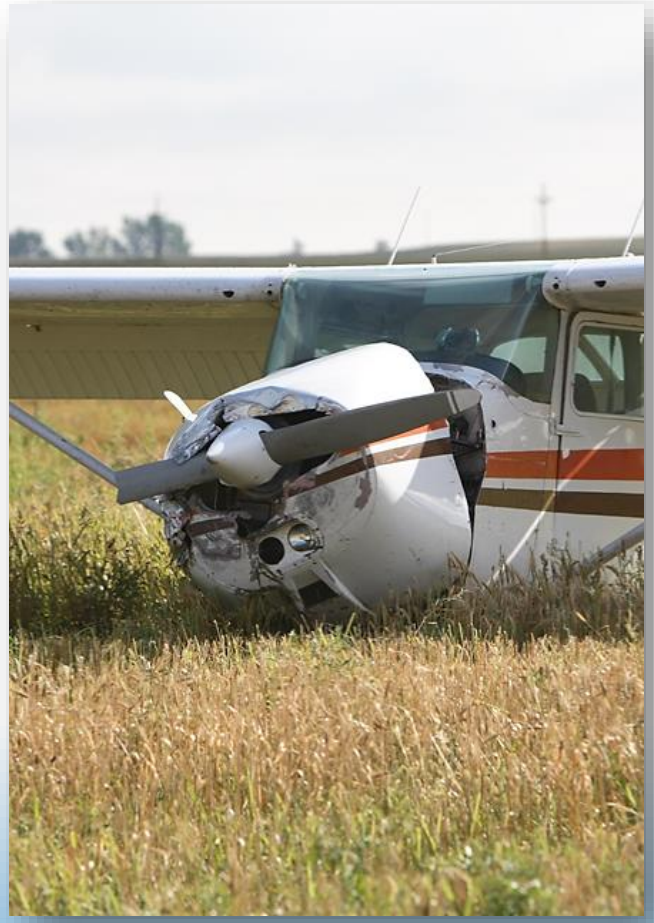
What lessens the degree of vibration?

- Power reduction – Monitor gauges, note changes
- Reduce speed, increase speed, flaps, gear, elevator trim

Secondary Action:

Propeller? – issues to expect:

- Is it possible a piece of the propeller has already departed the aircraft?
- Secondary damage to the aircraft?
  If so, did it possibly hit?:
  - Tire
  - Fuel Tank
  - Wing strut, Tail, or wing surfaces
- Tears engine off of its mount?

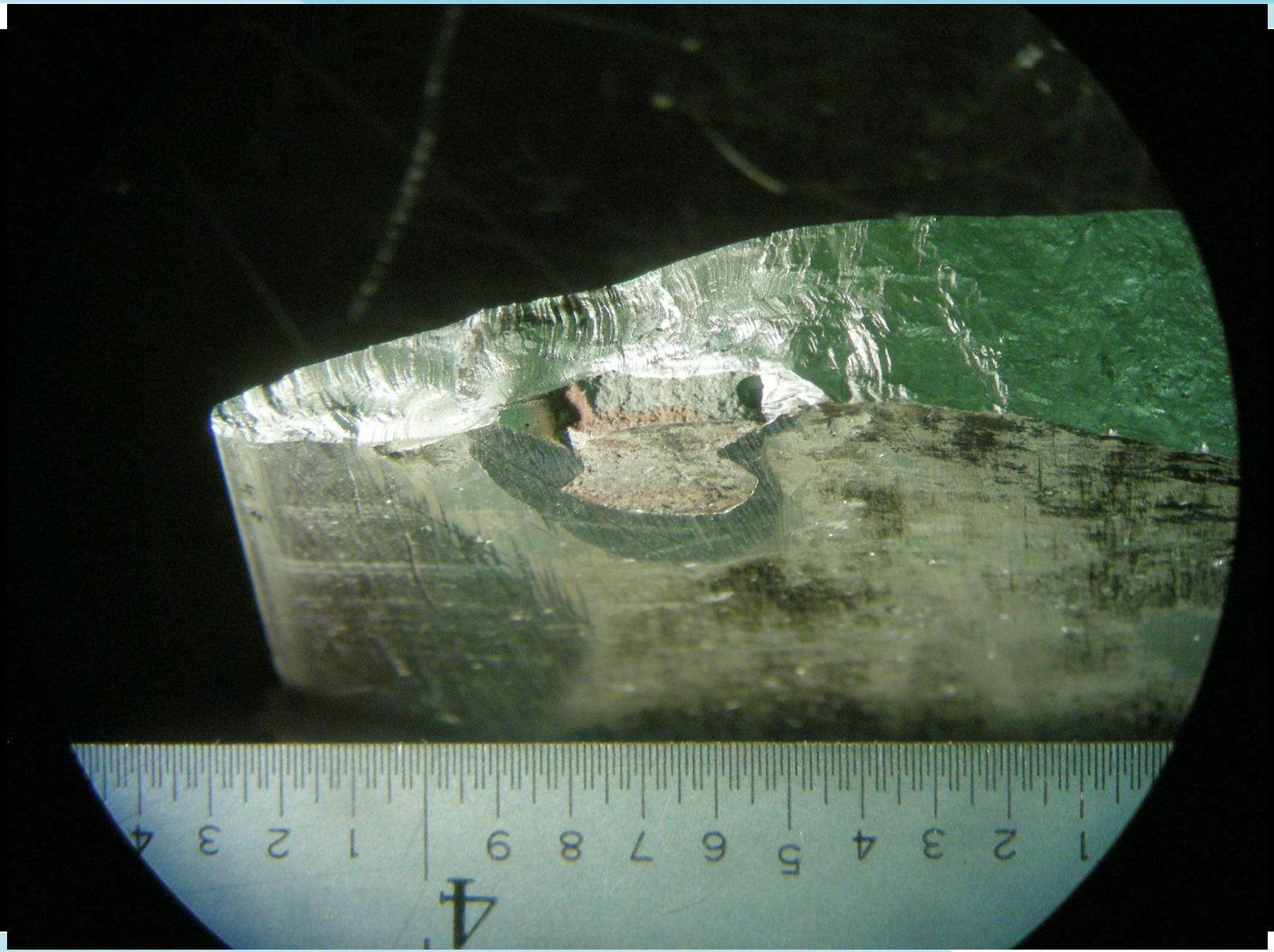


Secondary Actions:

Admit it! *You're not going to make your destination!*

Act: The Engine Must be Shut down!

Establish - Best Glide
Continue - Landing site
Always - Fly the Airplane



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History is telling us:

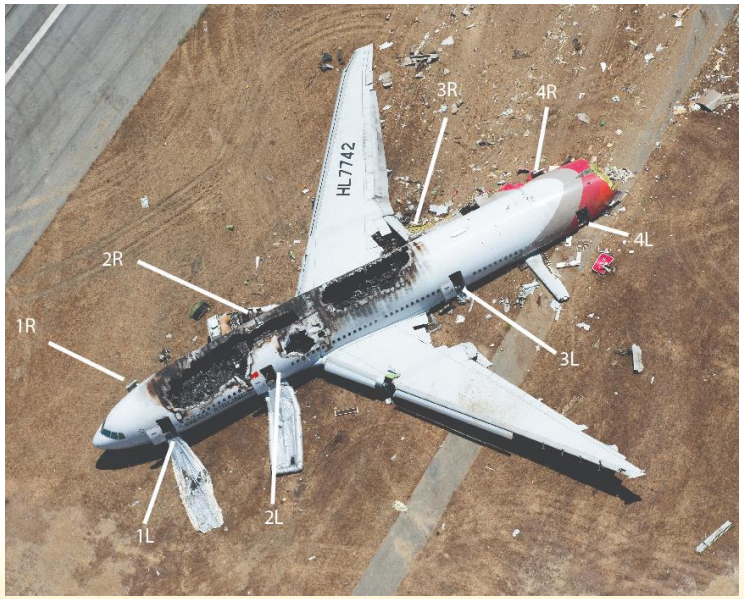
TransAsia ATR 72

- **Loss of Control due to lack of system knowledge**

Air France 447 (Atlantic Ocean)

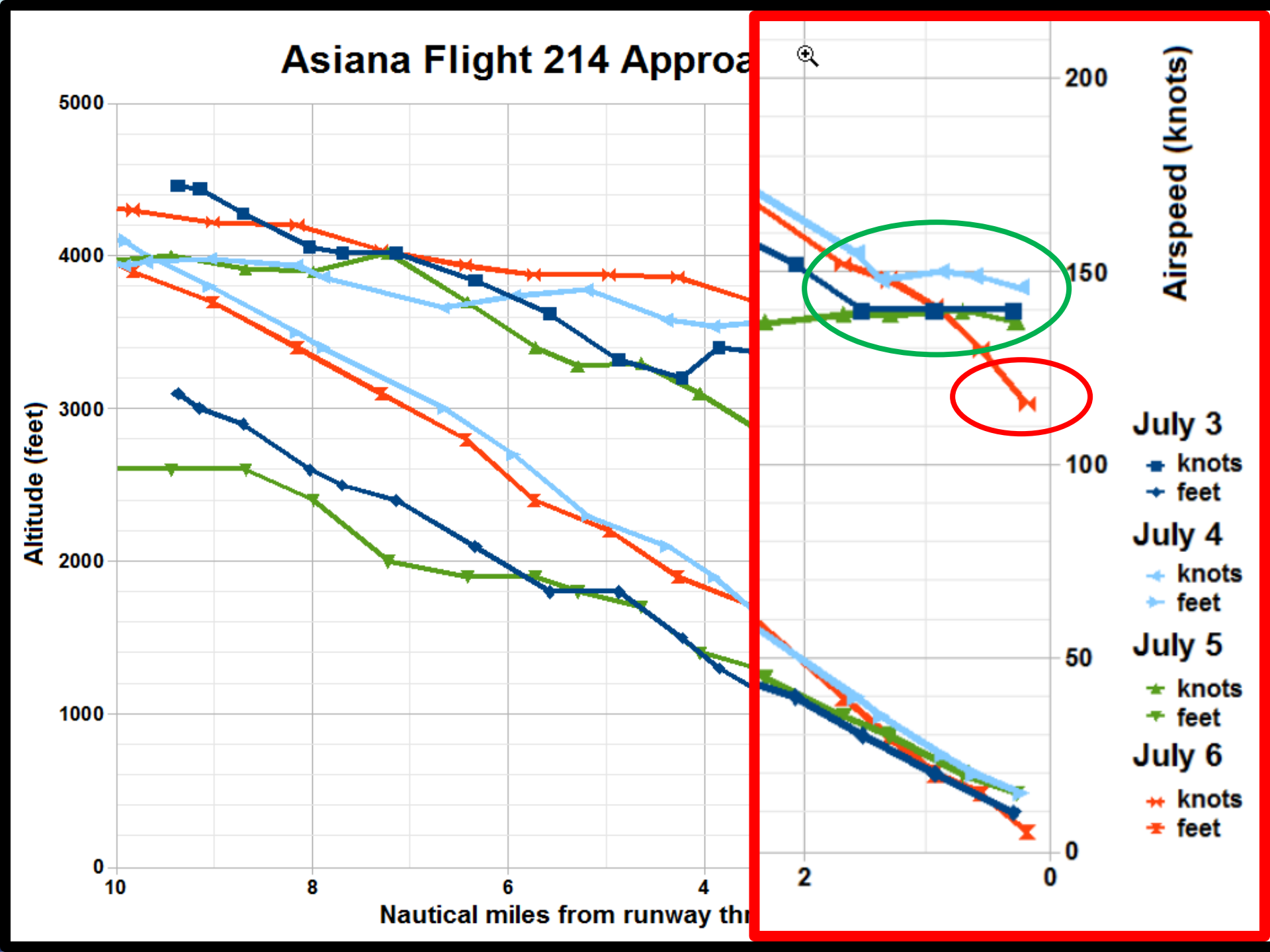
- **Loss of Control due to inability to recognize a deep stall**

Lessons Learned:



Asiana Flt 214 (SFO)

- **Loss of Control Inability to handfly aircraft on VFR day for landing**
- **30 Non Accident related Findings**
- **27 Safety Rec. from the NTSB**
  - Airline Specific
  - Aircraft Manufacturer Specific
  - Fire Fighting
  - Airport


Asiana Flight 214 Approa
5000
4000
3000
2000
1000
0
Altitude (feet)
10
8
6
4
Nautical miles from runway thr
200
150
100
50
0
Airspeed (knots)
2
0
July 3
knots
feet
July 4
knots
feet
July 5
knots
feet
July 6
knots
feet

15 Safety Recommendations including:

- **Adherence of Company to standard operating procedures (SOP) regarding callouts.**
- **Reduced design complexity and enhanced training on the airplane's auto-flight system.**
- **Guidance for Company pilots on use of flight directors during a visual approach.**
- **More manual flight for Company pilots.**

Thoughts for continued safety:

- **Scenario Based Training - Plan, practice, evaluate**
  - Review/Determine factors which affect the outcome of a failure in your aircraft
  - Develop a strategy for mitigating associated risks
  - Train utilizing your mitigation strategies
  - Review your outcomes and adjust for additional risks found.
- **Work with your CFI, adjust scenario(s) as your knowledge and skill increase.**

THINK AHEAD, CHALLENGE YOURSELF!

One More Reason to Train with ***WINGS***

WINGS Industry Sweepstakes!

WINGS Industry Network

The Paul and Fran Burger 2021 $10,000 *WINGS* Sweepstakes

https://www.wingsindustry.com/WINGS-Sweepstakes

WINGS Pilot Proficiency Program

- **Pilots never stop learning, and those who participate in regular proficiency training are competent, confident, and safe.**
- **Earn *WINGS* awards and recognition based on a combination of practical knowledge and hands-on coaching. Skill will be the result of your efforts.**
- ***Get started now!***

WINGS and Pilot Proficiency
What a Pair!

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AMT Awards Program

- **The AMT Awards program can help you fulfill your commitment to aviation maintenance excellence through continuing education and training.**
- **Earn annual awards based on core training hours at Bronze, Silver, and Gold levels.**
- ***Get started now!***

Team AMT for the Employer

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Safety Management Systems (SMS) Coming to General Aviation

https://www.faa.gov/about/initiatives/gasafetyoutreach

Contact Us:

FLIGHT STANDARDS DISTRICT OFFICE

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