NTSB National Transportation Safety Board

General Aviation Personal Flying – How Safe Do You Want to Be?

Sun-n-Fun
April 13, 2013

Earl F. Weener, Ph.D.
Board Member

N6529R - B36TC Bonanza

NTSB

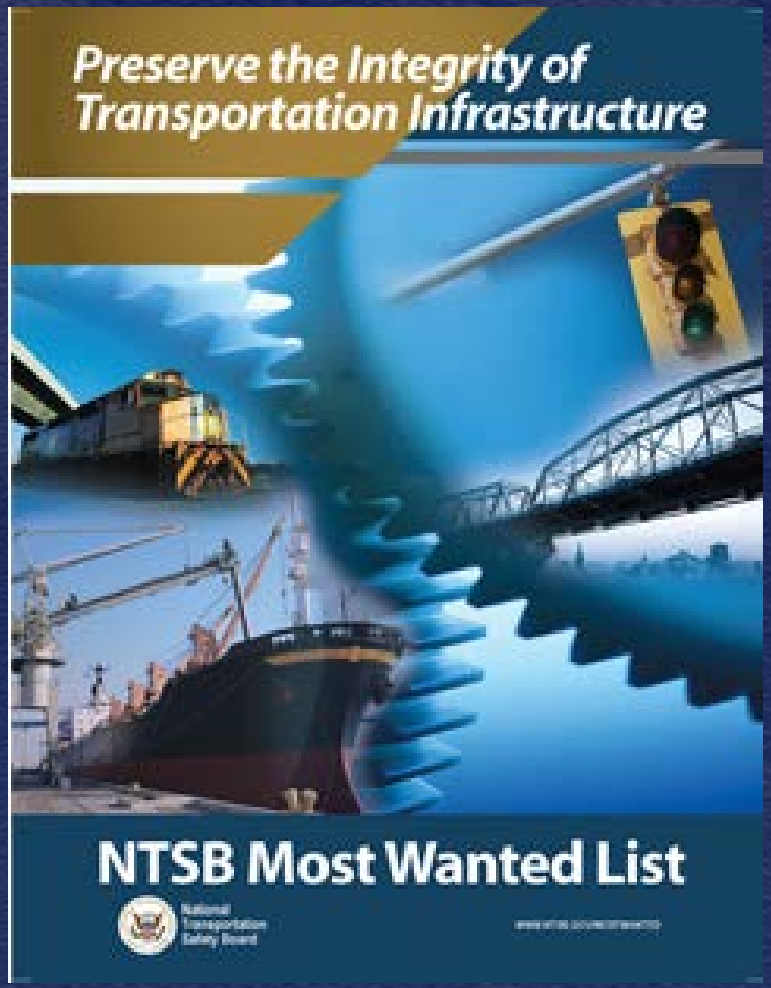
NTSB "Air Force"

- Built/Restored or Building/Restoring*
- **Sheryl Chappell:** Cessna 180 Floatplane
- **John Clark (EAA #603773):** Schreder RS-15, Vans RV-9A, Vans RV-12
- **Paul Cox:** Beech Bonanza G33, Vans RV-8a (Building)
- **Dennis Crider (EAA #1041658):** Vans RV-12
- **Dennis Diaz (EAA #1047382):** Vans RV-7a
- **Craig Hatch (EAA #659495):** Vans RV-8a, Cessna 140
- **Tom Haueter (EAA #251921):** 1943 Stearman, 1934 Lockheed Altair
- **Tim LeBaron (EAA #454270):** Piper J-3, Breezy (experimental), Pober Jr. Ace, 1941 Piper J5A, 1946 Cessna 120, 1975 Cessna 150, 1946 Ercoupe, Vans RV-4, 1947 Piper PA-11 Cub Special
- **Larry Lewis (EAA #751909):** Varga Kachina 2150A, Vans RV-8
- **Ron Price:** 1972 McCollough J2, Long EZ
- **Eliott Simpson:** Vans RV-7, Pietenpol Aircamper
- **Bob Swaim (EAA #221919):** 1974 Beech Sport, 1947 Cessna 140, 1967 Cessna 150, 1941 Stinson 10A, Kitfox
- * At least one airplane listed was built/restored or is in the process of being built/restored.

NTSB "Air Force"

- Own (Not Built/Restored)
- **Member Earl Weener (EAA #727429):** Beech Bonanza B36TC
- **Kurt Anderson:** Navion, Aeronca 11AC, Cessna 170A
- **Tim Burtch (EAA #1078661):** Cessna 172
- **John Brannen:** Sonerai IIL
- **Evan Byrne:** Cessna 172
- **Jill Demko:** PA-22-108 Piper Colt
- **J. Michael Duncan:** Beech Bonanza V35B
- **Kristi Dunks (EAA #689578):** 1955 Piper Super Cub
- **Catherine Gagne (EAA #646357):** 1956 Beech Bonanza G35
- **Craig Hatch:** Cessna 170a
- **Mike Huhn:** Cessna 182
- **Judge William Mullins:** Vans RV-8a
- **Jose Obregon:** Cessna 172
- **Jim Ritter:** Piper Comanche
- **Chris Stephens (EAA #689593):** Piper Comanche

NTSB Most Wanted List



- Improve general aviation safety
- Improve safety of airport surface operations
- Eliminate distraction in transportation
- Preserve the integrity of transportation infrastructure
- Improve fire safety in transportation
- Enhance pipeline safety
- Implement positive train control systems
- Improve the safety of bus operations
- Eliminate substance-impaired driving
- Mandate motor vehicle collision avoidance technologies

General Aviation Safety

Climbing to the Next Level

June 19-20, 2012

Safety Forum Agenda

- **Panel 1 – Safety Priorities**
  - NASA, GA-JSC, FAA
- **Panel 2 – Safety Programs**
  - ABS, AVEMCO Insurance, AOPA, FAA (Wings Program)
- **Panel 3 – Role of the Flight Instructor**
  - SAFE, NAFI, FAA, UND, IAFTP
- **Panel 4 – Content, Quality & Consistency of Pilot Training**
  - FAA, ASA, Red Bird Simulators, SAFE, ERAU

Safety Forum Agenda (cont'd)

- **Panel 5 – Weather Related Decision-Making**
  - FAA, Baron Services, ERAU, CAMI, Independent Aviation Safety Weather Expert
- **Panel 6 – Aircraft Maintenance and Modification**
  - FAA, EAA/VAA, Middle TSU, PAMA
- **Panel 7 – New Aircraft Design and Certification**
  - FAA, GAMA, Cirrus, AOPA, ICON Aircraft
- **Panel 8 – Advanced Avionics and Handhelds**
  - GAMA, AOPA, NASA, ERAU

GENERAL AVIATION
SEARCH + RESCUE

GENERAL AVIATION SEARCH AND RESCUE FORUM

JULY 17-18, 2012

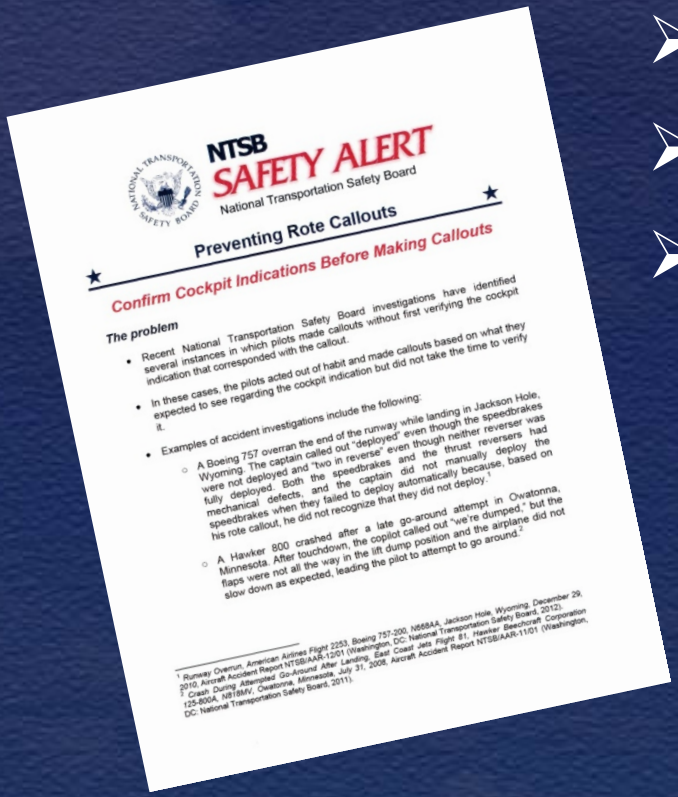
SAR Forum Agenda

- **Panel 1 – National SAR System Overview**
  - NOAA, NSARC, USCG
- **Panel 2 – National SAR Policy**
  - FAA, FCC, AOPA
- **Panel 3 – Operational Issues**
  - FAA, AFRCC, CAP, State SAR Coordinators Council

SAR Forum Agenda (cont'd)

- **Panel 4 – Technical Issues**
  - AEA, FCC, ACR Electronics, EBC, ACK, FAA
- **Panel 5 – Emerging Technologies**
  - RTCM, DeLorme, Globalstar, Spidertracks, FAA, USFS, CTIA
- **Panel 6 – The Future of GA SAR**
  - USAF, USCG, Equipped to Survive Foundation, AFRCC

NTSB Safety Alerts



NTSB
SAFETY ALERT
National Transportation Safety Board

Preventing Rote Callouts

Confirm Cockpit Indications Before Making Callouts

The problem

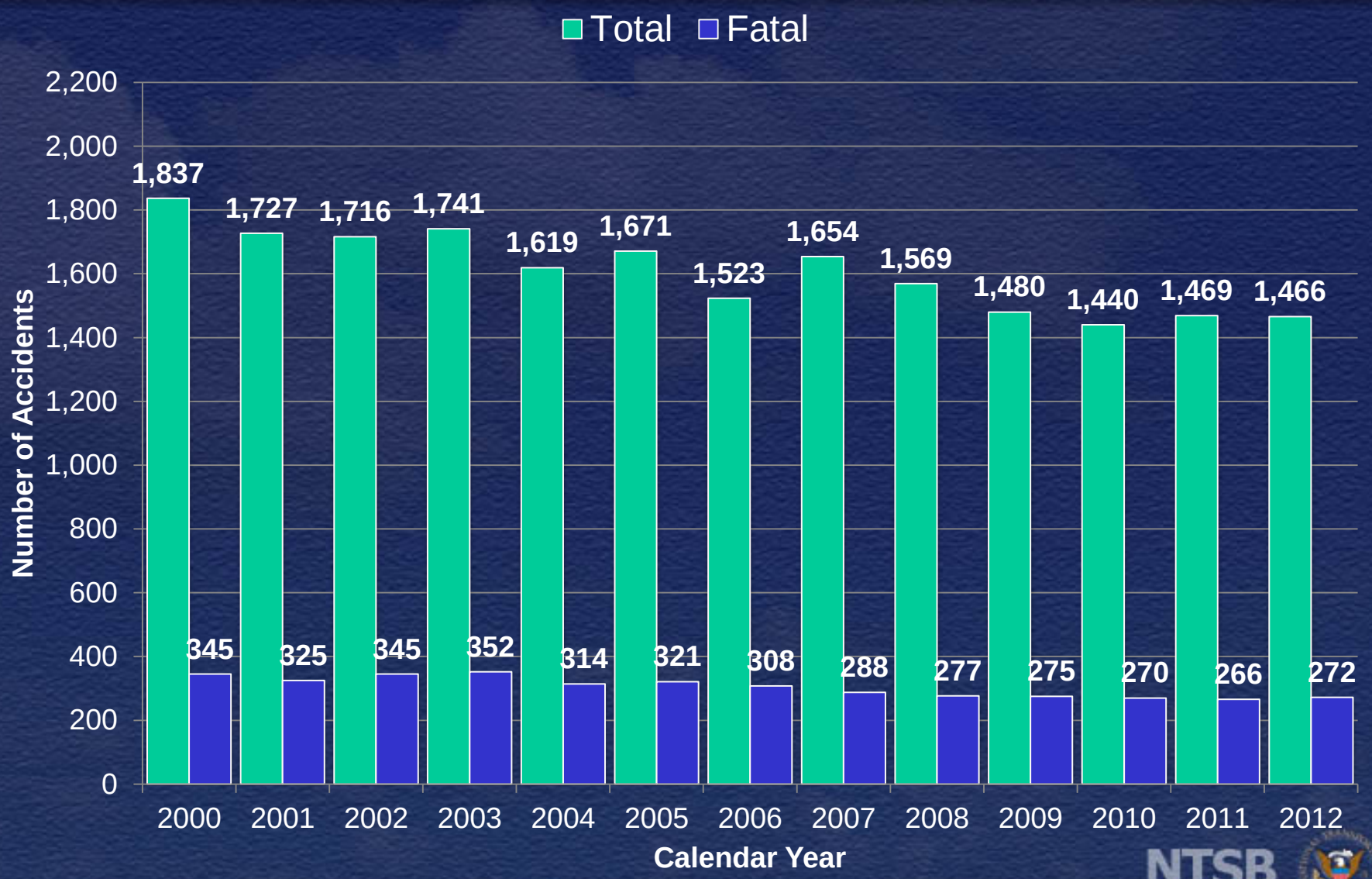
- Recent National Transportation Safety Board investigations have identified several instances in which pilots made callouts without first verifying the cockpit indication that corresponded with the callout.
- In these cases, the pilots acted out of habit and made callouts based on what they expected to see regarding the cockpit indication but did not take the time to verify it.
- Examples of accident investigations include the following:
  - A Boeing 757 overran the end of the runway while landing in Jackson Hole, Wyoming. The captain called out "deployed" even though the speedbrakes were not deployed and "two in reverse" even though neither reverser was fully deployed. Both the speedbrakes and the thrust reversers had mechanical defects, and the captain failed to deploy automatically because, based on speedbrakes when they did not manually deploy the his rote callout, he did not recognize that they did not deploy.[1]
  - A Hawker 800 crashed after a late go-around attempt in Owatonna, Minnesota. After touchdown, the copilot called out "we're dumped," but the flaps were not all the way in the lift dump position and the airplane did not slow down as expected, leading the pilot to attempt to go around.[2]

[1] Runway Overrun, American Airlines Flight 2253, Boeing 757-200, N668AA, Jackson Hole, Wyoming, December 29, 2010, Aircraft Accident Report NTSB/AAR-12/01 (Washington, DC: National Transportation Safety Board, 2012).
[2] Crash During Attempted Go-Around After Landing, East Coast Jets Flight 81, Hawker Beechcraft Corporation 125-800A, N818MV, Owatonna, Minnesota, July 31, 2008, Aircraft Accident Report NTSB/AAR-11/01 (Washington, DC: National Transportation Safety Board, 2011).

- Preventing Aerodynamic Stalls
- Reduced Visual References
- Is Your Aircraft Talking to You
- Risk Management for Pilots
- Risk Management for Mechanics

Available on www.NTSB.gov

All GA Accidents (Part 91)



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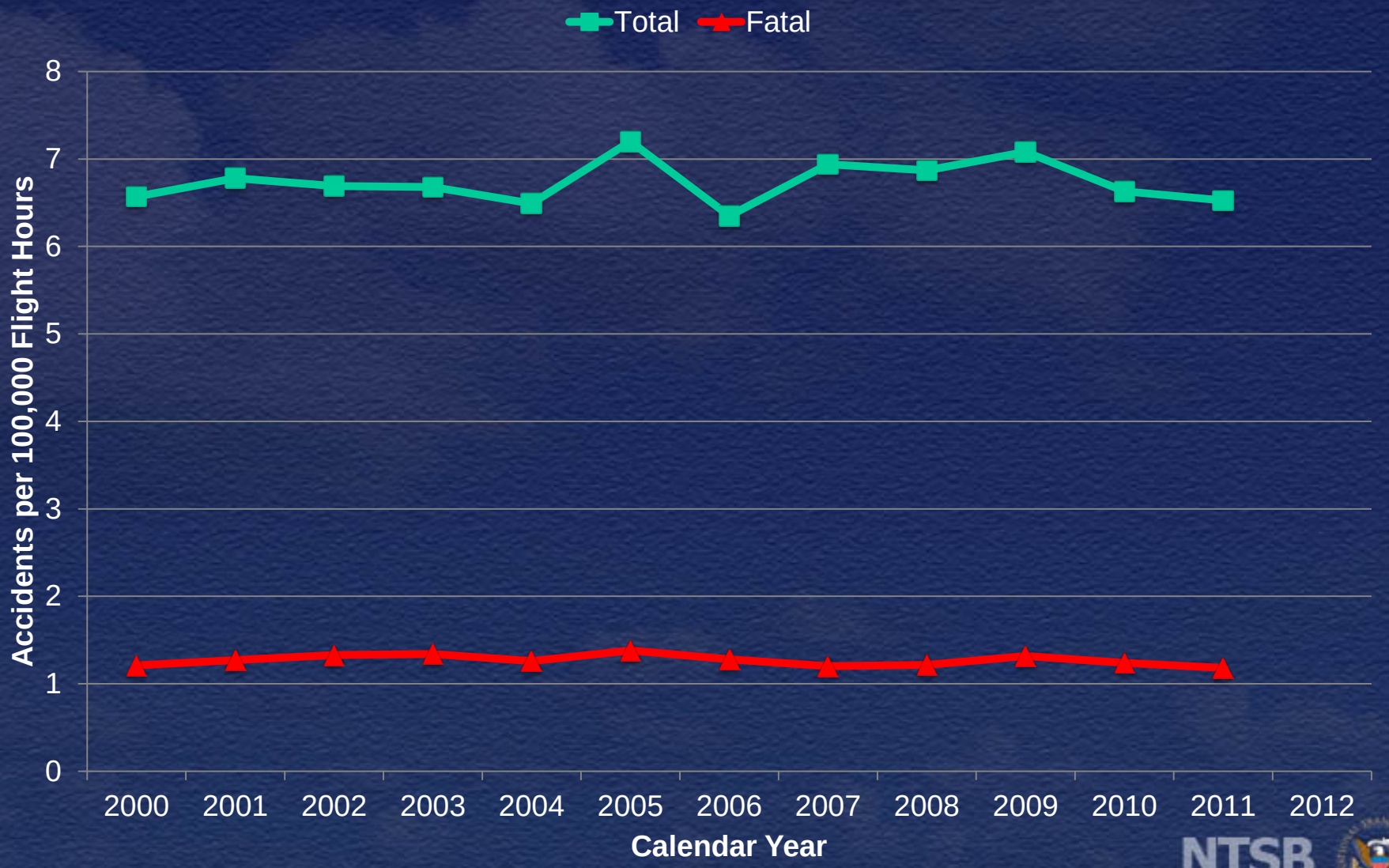
GA Accident-involved Fatalities

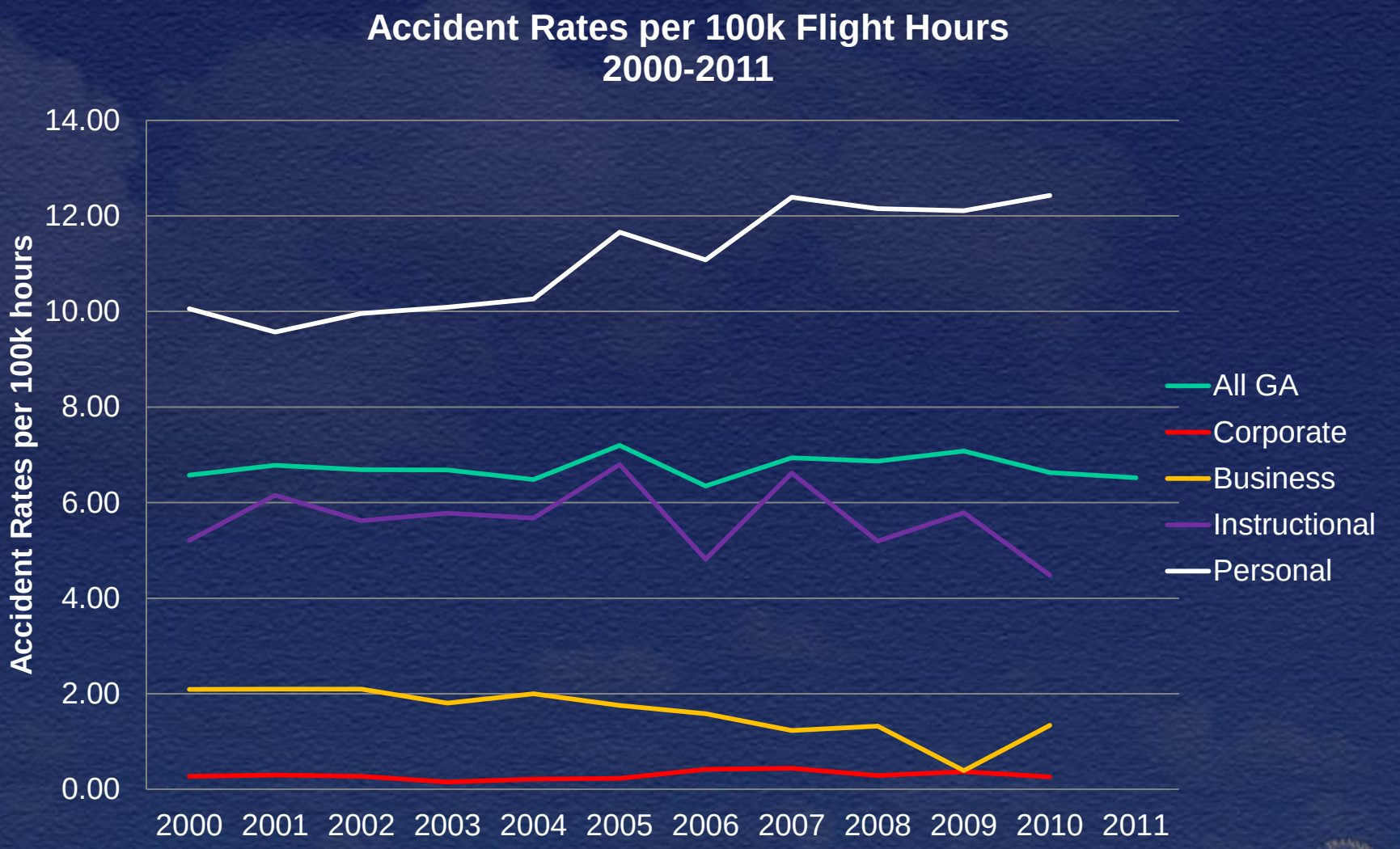
GA Accident Rates



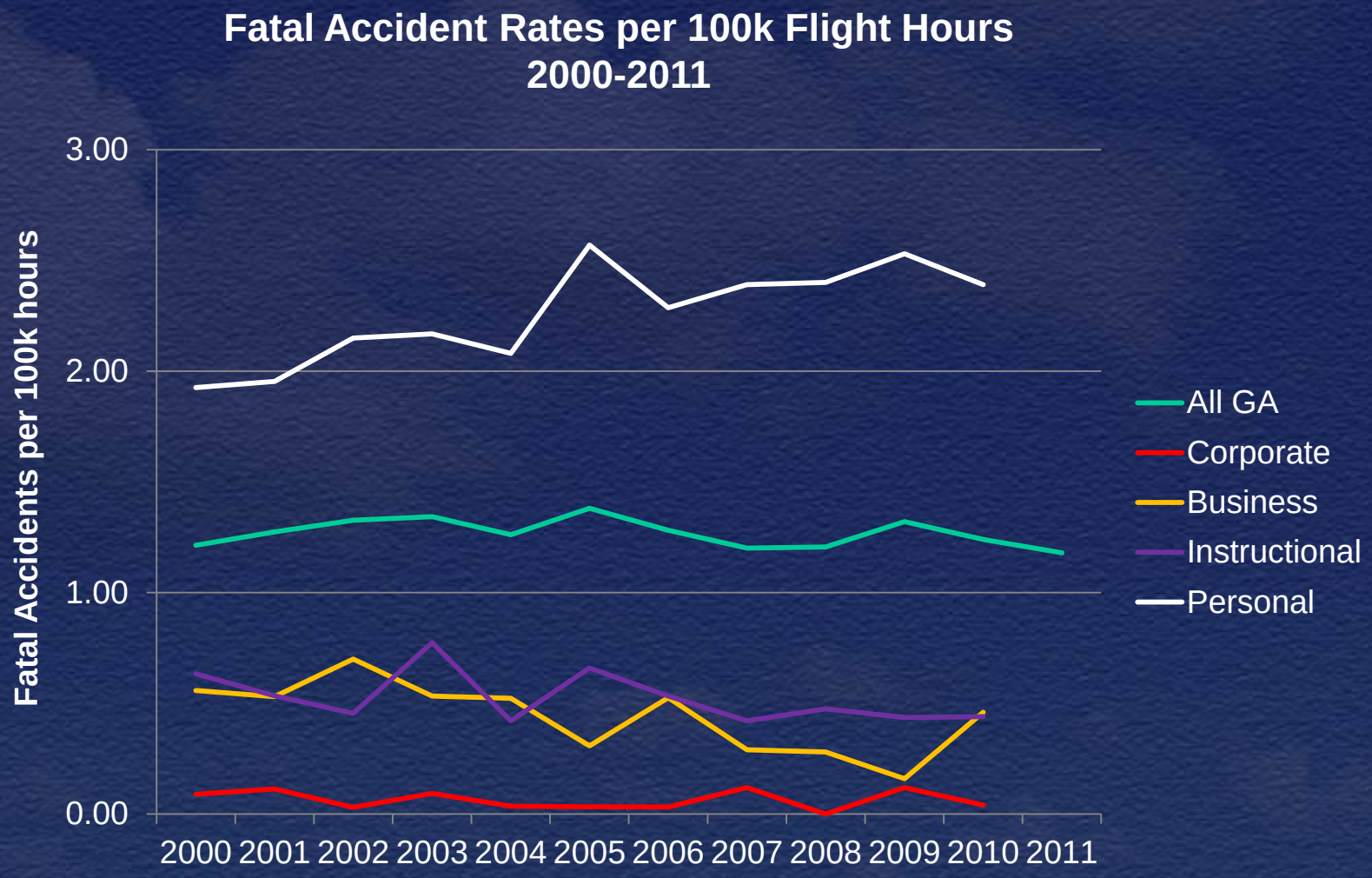
Defining Fatal Accident Events

- Loss of Control in Flight
- System/Component Failure – Powerplant
- Controlled Flight into Terrain
- Collision with Terrain/Object (non-CFIT)
- VFR Encounter with IMC
- System/Component Failure – Non-Powerplant

Accident Rates per 100k Flight Hours



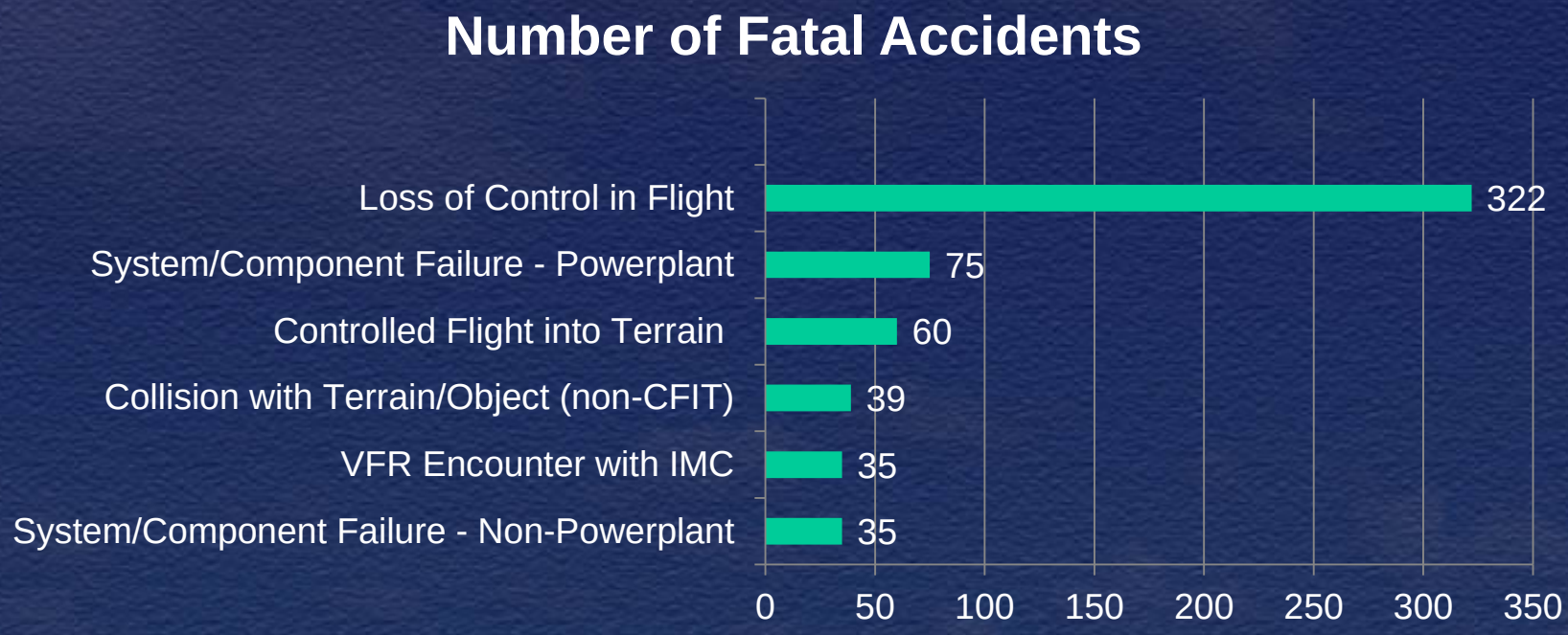
Fatal Accident Rates per 100k Flight Hours



Personal Flying, 2008-2012

Total accidents - loss of control in flight and on the ground and power plant failure were the most common defining events.

Loss of control in flight accounted for the greatest proportion of the fatal personal flying accidents.



Phase of Flight for Personal Flying – 2010-2012

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Alfred Sheinwold

"Learn all you can from the mistakes of others. You won't have time to make them all yourself"

Accident Chain-of-Events

- An accident is typically the end of a sequence of events
- Interruption of this chain-of-events could eliminate the accident
- Look for opportunities to break the chain

Loss of Control in Flight

Loss of Control In-flight

- Accident #LAX08FA300
- Beechcraft A36
- Approach to KCRQ, Carlsbad CA airport, 331 ft msl
- One person onboard, fatal
- Weather – 100 ft ceiling, ¼ mi visibility, wind 280 degrees at 5 kt
- ILS 24 minimums 200 ft ceiling, ¾ mi visibility

Loss of Control In-flight

- Pilot
  - Private certificate
  - Instrument rating 2 months prior
  - Nine hundred hours total time
  - No instrument training in accident aircraft
- Aircraft
  - No apparent malfunctions
  - Adequate fuel

Loss of Control In-flight

- Accident sequence
  - ATC cleared for ILS approach RW 24
  - Tower issued “low altitude alert” and advised pilot he was south of localizer
  - Two minutes later pilot stated he was “aborting” the approach
  - One minute later pilot stated “I’m in trouble”

Loss of Control In-flight

- Radar tracks
  - Two miles from approach end RW24 airplane crossed LOC at 800 ft heading south
  - Track started tight left-hand turns
  - Altitude fluctuated between 600 and 1100 ft msl
  - Last radar return showed airplane at 900 ft msl and 56 kt ground speed
- Wreckage confined to initial impact area

Loss of Control In-flight

Probable Cause

The pilot's failure to maintain control during the instrument approach and attempted go-around

System Failure – Powerplant

System Failure - Powerplant

- Accident ERA09FA093
- Beechcraft 36
- Night IFR approach, Bowman Field, KLOU, Louisville, KY
- One fatality – pilot
- Weather
  - Winds 330 degrees at 3 kts
  - Ceiling overcast at 800 ft
  - Visibility 6 miles in mist

System Failure - Powerplant

- Pilot
  - Commercial Certificate, SEL/MEL
  - Flight Instructor rating, SEL
  - Instrument rating
  - Approximately 2300 hrs total flight time
- Airplane
  - Total airframe time – 6274 hours
  - Engine IO 520, 58 hours since overhaul
  - Pilot observed oil pressure problem
  - Mechanic advised to have problem checked

System Failure - Powerplant

- Accident sequence
  - Prior to night departure from MDW, pilot noted problem with airplane
  - Maintenance not available until morning
  - After several attempts, pilot managed to get engine started and departed for KLOU at about 0220
  - Nine miles out on RNAV approach to KLOU pilot declared “Emergency” due to engine failure

System Failure - Powerplant

- Aircraft right wing struck tree at height of about 30 ft along side a golf course
- Aircraft came to rest inverted approximately 175 ft from tree
- Front section of cabin roof crushed in
- Fuel recovered from left tank, right tank separated from aircraft
- Initial examination revealed engine would not rotate

System Failure - Powerplant

- Engine teardown
  - Crankshaft and counterweight assembly fractured through at forward fillet radius of #2 main bearing journal
  - #2 main bearing journal showed scoring consistent with bearing rotation
  - #3 main bearing journal fractured at rear fillet area

System Failure - Powerplant

- NTSB Materials Lab found presence of silk thread patterns and gasket making material on sealing surfaces of the main bearing bosses
- Material not part of engine manufacturer maintenance documentation, TCM SIL 99-2B
- #2 main bearing boss severely damaged on both halves, including rotation mechanical gouging and deformation of the boss area behind the bearing, including mushrooming deformation of the boss

System Failure - Powerplant

Probable Cause

The pilot's continued operation of the aircraft with known deficiencies. Contributing to the accident was the improper sealing of the engine case during overhaul

Controlled Flight into Terrain

Controlled Flight into Terrain

- Accident NYC08FA138
- Cirrus SR22
- Night IFR Departure Front Royal Virginia, KFRR, 709 ft msl
- Two fatalities – pilot & son
- Weather – Winchester, KOKV, 15 mi S
  - Wind 340 deg at 4 kt
  - 3 mi visibility in rain
  - Broken 2,400 ft, overcast 3,000 ft

Controlled Flight into Terrain

- Pilot
  - Private Certificate, Instrument rating
  - Estimated total time – 193 hours
- Aircraft
  - Airplane total time less than 300 hrs
  - No apparent malfunctions
  - Flight data extracted from PFD system

Controlled Flight into Terrain

- Accident sequence
  - IFR clearance – direct COGAN intersection, climb and maintain 4,000, expect 5,000 ft, 10 minutes after departure
  - Prior to takeoff, Desired Course set to 050 deg, approximate direct course to COGAN
  - Airplane departed RW27
  - GPS waypoint COGAN selected during takeoff roll
  - Aircraft path continued west, consistent with GPSS not selected

Controlled Flight into Terrain

- Flight path
  - Total time of flight 80 seconds
  - First 40 sec, runway heading, climbing 900 to 1,000 fpm
  - 25 sec, vertical speed decreased to 0 fpm,
  - then up 2200 fpm,
  - then decreased to 700 – 750 fpm up
  - Airplane reached 2,200 ft msl and 140 kt ias
  - Last 6 sec, steep descending turn to left, roll to 95 deg and pitch to 27 deg down

Controlled Flight into Terrain

Probable Cause

The pilot's failure to maintain clearance from rising mountainous terrain, and his failure to turn toward his assigned course during initial climb. Contributing to the accident were the low ceiling, reduced visibility, dark night conditions and rising mountainous terrain

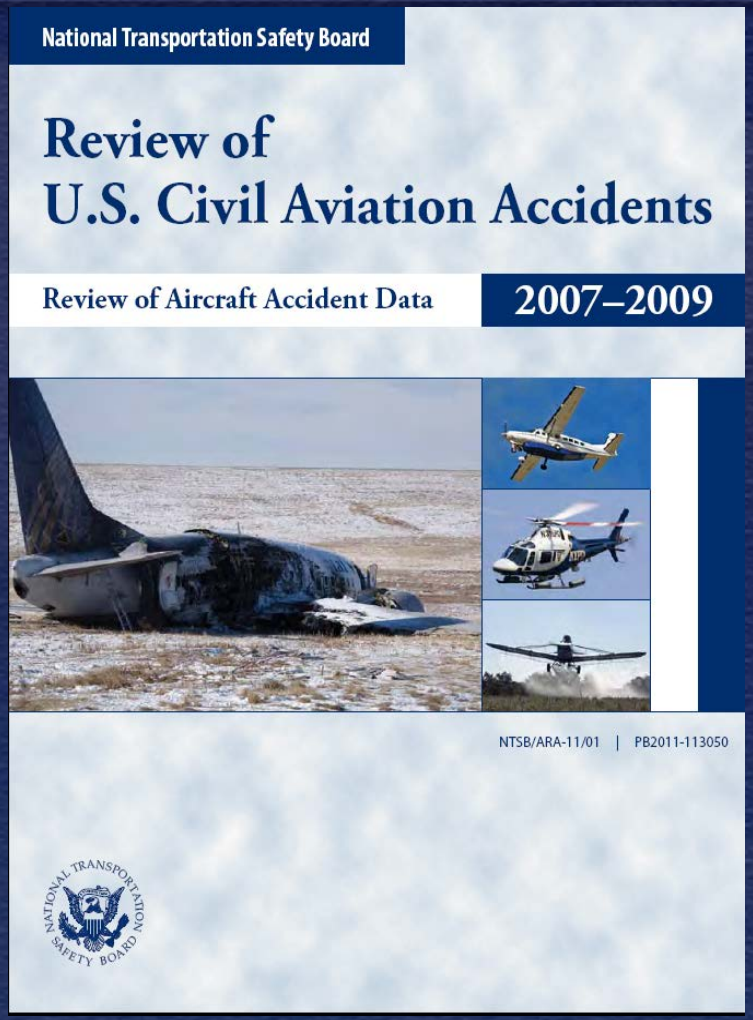
Summary

- Pilot proficiency
  - Launch into hard IMC with new instrument rating and no instrument instruction in airplane
  - System operational confusion on IFR departure
- Airworthiness
  - Takeoff night IFR with known deficiency

Summary

- Preparation & planning
  - Launch into weather with destination forecast to be below minimums
- Decision making
  - Numerous points where a different decision would have lead to a different outcome

You can try this at home



- NTSB accident files are on-line
- Many recent accident Dockets are on-line
  - Factual reports,
  - Interviews
  - Photographs
- www.ntsb.gov

http://www.ntsb.gov/doclib/reports/2011/ARA1101.pdf

NTSB

PROFESSIONALISM FOR PERSONAL FLYING

Professional Pilot

- Personal characteristics
  - Flies frequently
  - Experience - Thousands of hours
  - Frequent health evaluations

Modern Corporate Aircraft

Turbine Powered

Two Crew

Glass Instrumentation

Autopilot

Autothrottle

Flight Management System

NTSB

Professional Operational Environment

- Working environment characteristics
  - *Detailed Operating Procedures*
    - Rest and duty time requirements
    - Stabilized approach requirements
  - *Training*
    - Recurrent training
    - Transition training with Initial Operating Experience (IOE) requirements
  - *Operations and Dispatch support*
    - Weather
    - IFR Routing
    - Alternates
    - Aircraft weight & balance
    - Fuel planning, including reserves requirements
  - *Maintenance support*

Comparison - Professional Pilots

- Approach weather minima – no “go down and take a look”
- IFR Alternate airports are practical and valid
- Explicit Initial Operational Experience (IOE)
- Thorough training on aircraft and systems
- Recurrently drilled on non-normal and emergency procedures
- Self assessment of both fitness for duty and recency of experience

Dispatch Support

- Professional pilots often have dispatch support
  - Route planning and alternates
  - Weather assessment and forecasting
  - Fuel planning
  - Aircraft takeoff and landing performance

Dispatch – Personal Flying

- Personal aviation dispatch functions
  - Done by the pilot
- Potential dispatch support - ***SPOUSE***
  - Knows pilot better than anyone else
  - Any sign of hesitance or concern – ask questions
    - Weather
    - Route
    - Fuel
    - Performance

Spouse Messages

- For a safer pilot and safer flight
  - Encourage your pilot to fly often
  - Designate some flying for proficiency
  - Encourage use of safety equipment
    - IFR GPS/FMC
    - Map displays with terrain warning
    - On-board weather display
    - Fuel usage/state instrumentation
    - Carbon Monoxide (CO) monitor

Professionalism – Personal Flying

- *Accident rate difference* between Professional Pilots and GA Pilots should be much smaller
  - Proficiency – recurrent training
  - Equipment – more than just airworthy
  - Good health – fit to fly
  - Match weather demands to capabilities

Conclusion

- You don’t need to fly for a living to be a professional

- *Professionalism is a quality*
- *Professionalism is a state-of-mind*
- *Professionalism is an expectation*

Douglas Adams

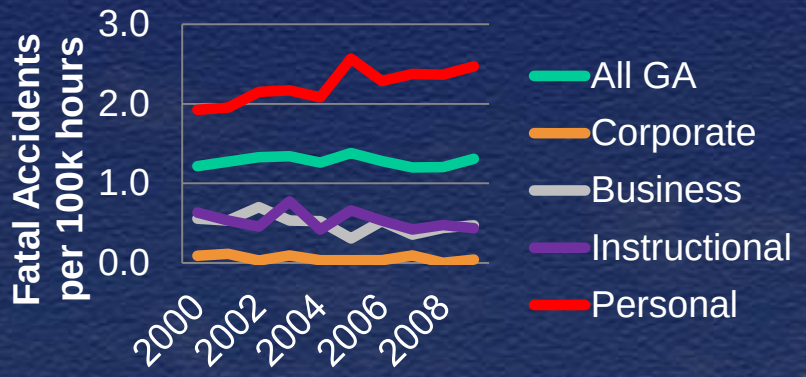
"Human beings, who are almost unique in having ability to learn from the experience of others, are also remarkable for their apparent disinclination to do so."

A Personal Decision

The equipment we fly is capable of much greater safety than many pilots achieve.

At what accident rate do you want to operate by yourself or with family and friends; down with the Corporate and Business operators or at the Personal level?

It's your choice!



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