



NTSB National Transportation Safety Board

Some General Aviation Safety Issues:

What Accident Investigators Are Seeing

Presentation to: The Twin
Cessna Flyers

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Outline

- **NTSB 101**
- **Loss of Control**
 - Taken from slides presented at 2015 Sun & Fun by Paul Cox, Senior Air Safety Investigator, Eastern Region
- **Runway Accidents**
 - Taken from slides prepared by Dan Bartlett, ATC Transportation Safety Specialist
- **See and Be Seen**
 - Taken from NTSB Safety Alert, “See and Be Seen: Your Life Depends on It,” Issued May 2015
- **Mountain Flying**
 - Taken from slides prepared by Dr. David Bowling, Chief, Central Region Air Safety Investigation

What the NTSB Does

- Independent federal agency, investigate transportation accidents, all modes
- Determine probable cause(s) and make recommendations to prevent recurrences
- Do not determine blame or liability
- Independence
 - Political: Conclusions and recommendations based upon facts and evidence rather than politics
 - Functional: Impartial and unbiased because no “dog in the fight”

Purpose

- Single focus is **SAFETY**
- Primary product: Safety recommendations issued to any entity that has authority to address the problem
- Response to recommendations:
 - > 80% acceptable

General Aviation Investigations

- **Statute requires investigation of all aviation accidents**
 - **Lesser requirements for other modes**
- **About 1,500 GA accidents per year**
- **Most investigated, with FAA help, by about 50 regional investigators**
- **Upward trend in accidents involving personal (non-business) flying**

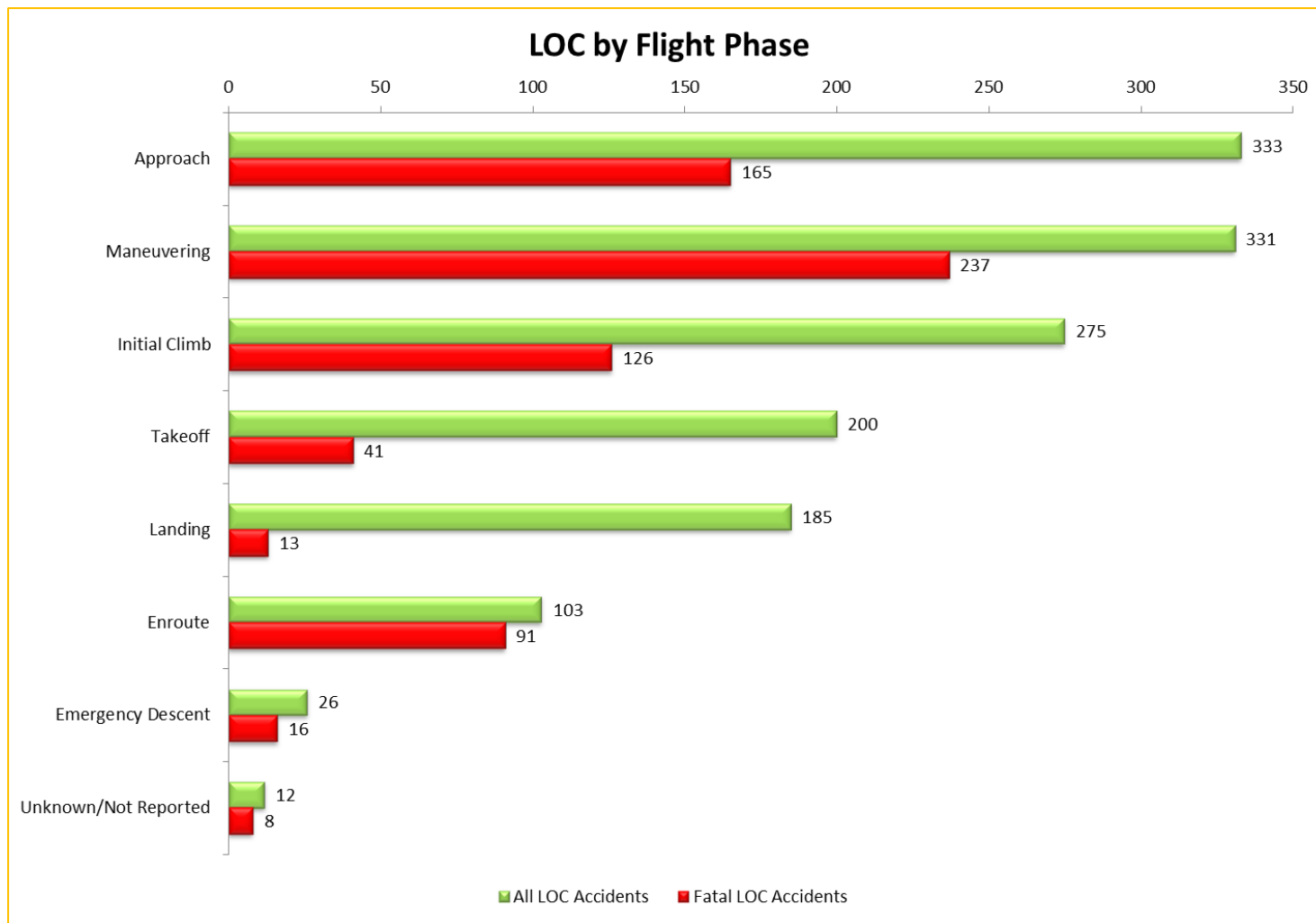
NTSB Advocacy Tools

- **Accident reports, recommendations**
- **Testimony in Congress**
- **Convening conferences and forums**
- **Most Wanted List, issued annually**
 - **Specific to GA: Loss of Control**
 - **Also relevant to GA: Distraction, impairment, medical fitness, and procedural compliance**
- **Safety Alerts**
- **Participating in conferences**

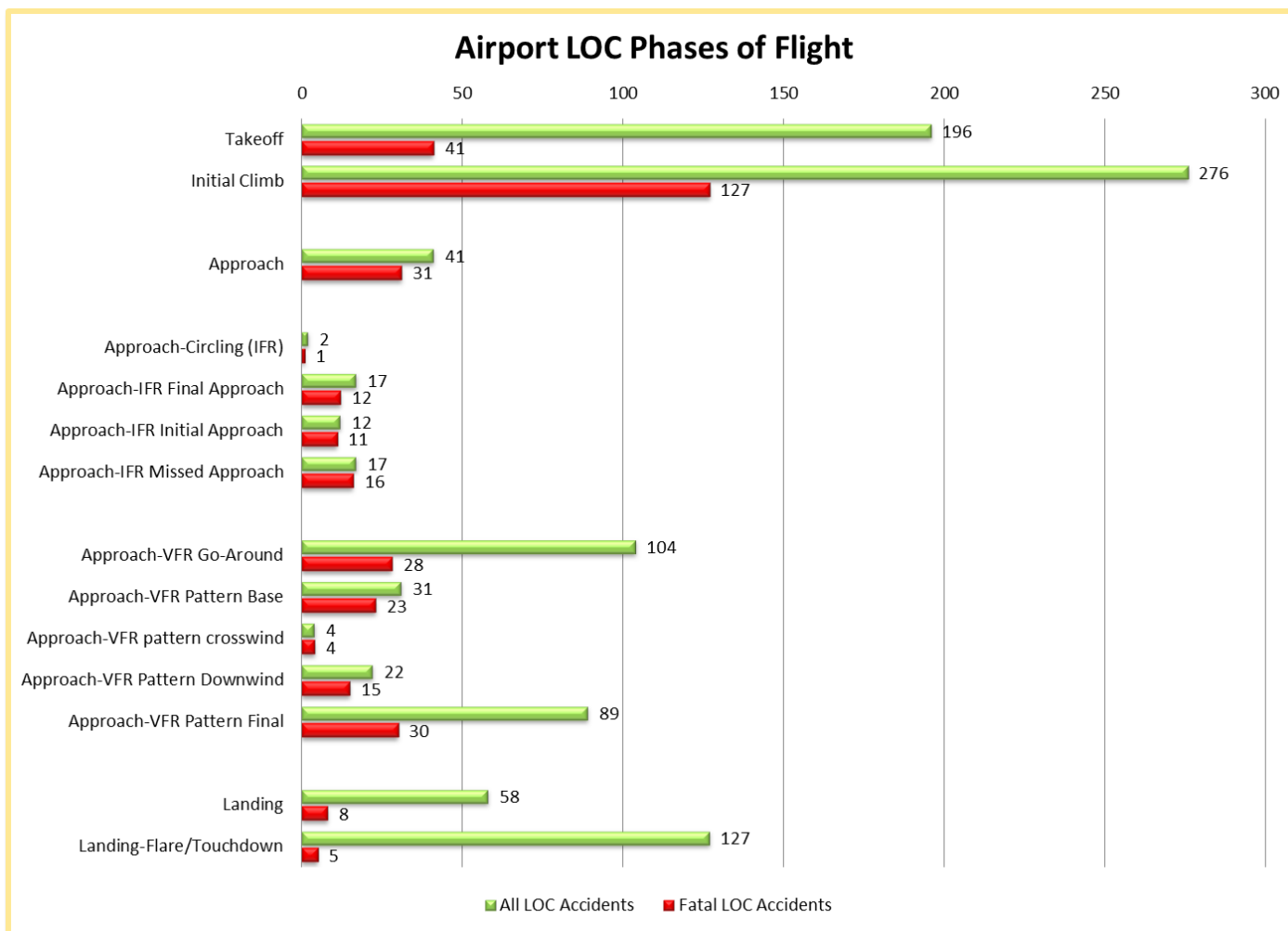
Loss of Control Accidents

- **Largest single cause (>40%) of GA accident fatalities**
- **General Aviation Joint Steering Committee (GAJSC) formed a Loss of Control Work Group**
- **On NTSB 2015 Most Wanted List**
- **Not defined in FARs, AIM, Pilot Handbook of Aeronautical Knowledge**
- **But we know it when we see it**

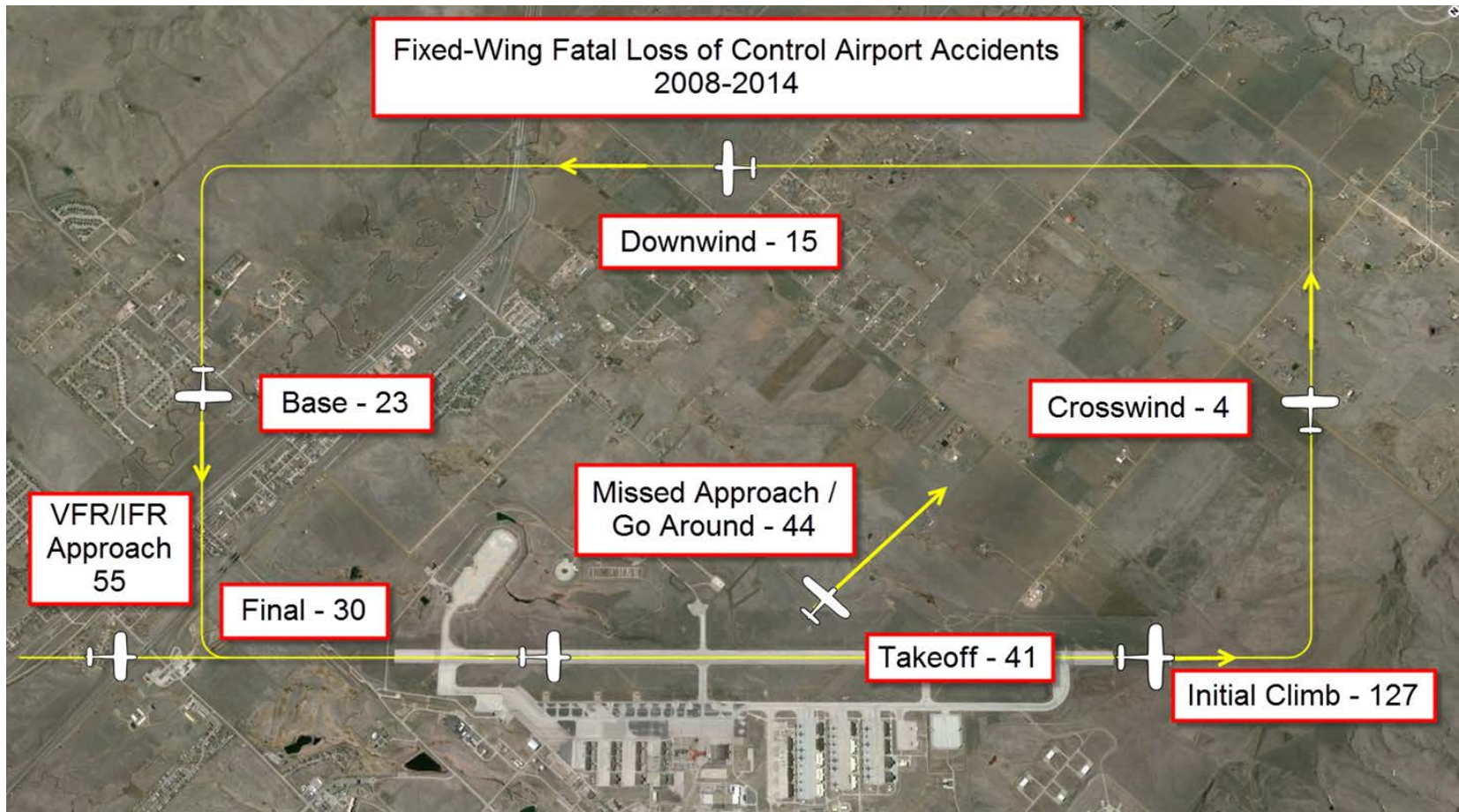
When Do LOC Accidents Occur?



LOC Accidents Near an Airport



Challenges Near the Airport



What's Happening in LOC Accidents?

- **All aircraft: Typically some type of aerodynamic stall**
 - **Straight stall**
 - **Accelerated stall**
 - **More than 1 g**
 - **Takeoff/climb stall**
 - **Back side of the power curve**
 - **Yaw stall (spin)**
 - **Skidded turn/cross-controlled stall**

- **Multi-engine aircraft**
 - **All of the above plus Vmc roll**

Case Study: Kitfox, April 14, 2013

- Probable Cause: Pilot's failure to maintain adequate airspeed during the turn to final, which resulted in an exceedance of wing critical angle-of-attack and a subsequent aerodynamic stall**
- Contributing: Pilot's combined use of two sedating antihistamines, which resulted in his impairment**

Accelerated Stall: Cirrus SR22, February 29, 2012

- Probable Cause: Pilot's abrupt maneuver in response to a perceived traffic conflict, which resulted in an accelerated stall and a loss of airplane control at low altitude**
- Contributing: Air traffic controller's incomplete instructions, which resulted in improper sequencing of traffic landing on the same runway**

Takeoff/Climb Stall: Cessna 177B, May 5, 2012

- Probable Cause: Pilot pitching the airplane to an excessive nose-up attitude during an aborted landing, which resulted in increased induced drag, diminished airspeed, and an aerodynamic stall/spin**
- Contributing: Pilot's use of a sedating antihistamine, which resulted in impaired mental and motor skills**

Vmc Roll: Cessna 441, December 22, 2012

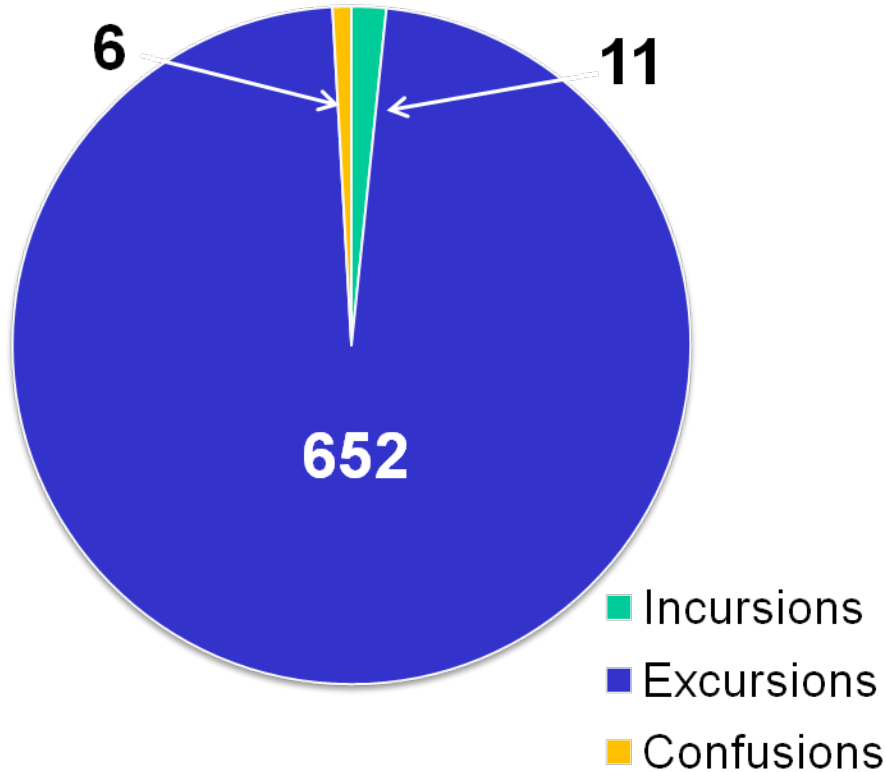
- **Probable Cause: Pilot's failure to maintain minimum control airspeed after a loss of power to the right engine which resulted in an uncontrollable roll into an inadvertent stall/spin**
- **Contributing: Failure of the right engine for undetermined reasons and the pilot's subsequent turn toward that inoperative engine while maintaining altitude**

Remedies? Mostly Human Factors

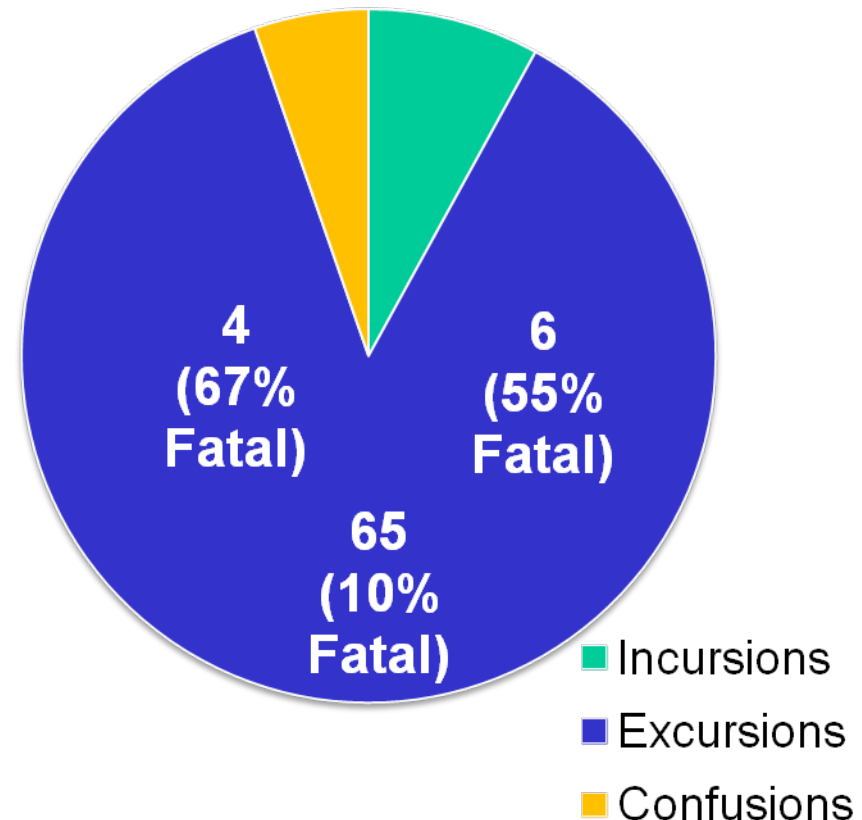
- Be honest with yourself about your knowledge of stalls and your ability to anticipate and react to them**
- Understand and maintain currency in the equipment and airplanes you fly**
- Maximize training opportunities**
- Prepare thoroughly for the environments in which you'll be flying**
- Anticipate, manage, and minimize distractions**
- Increase your situational awareness, e.g., angle of attack indicator**

Runway Accidents, 1995-2010

All Runway Accidents

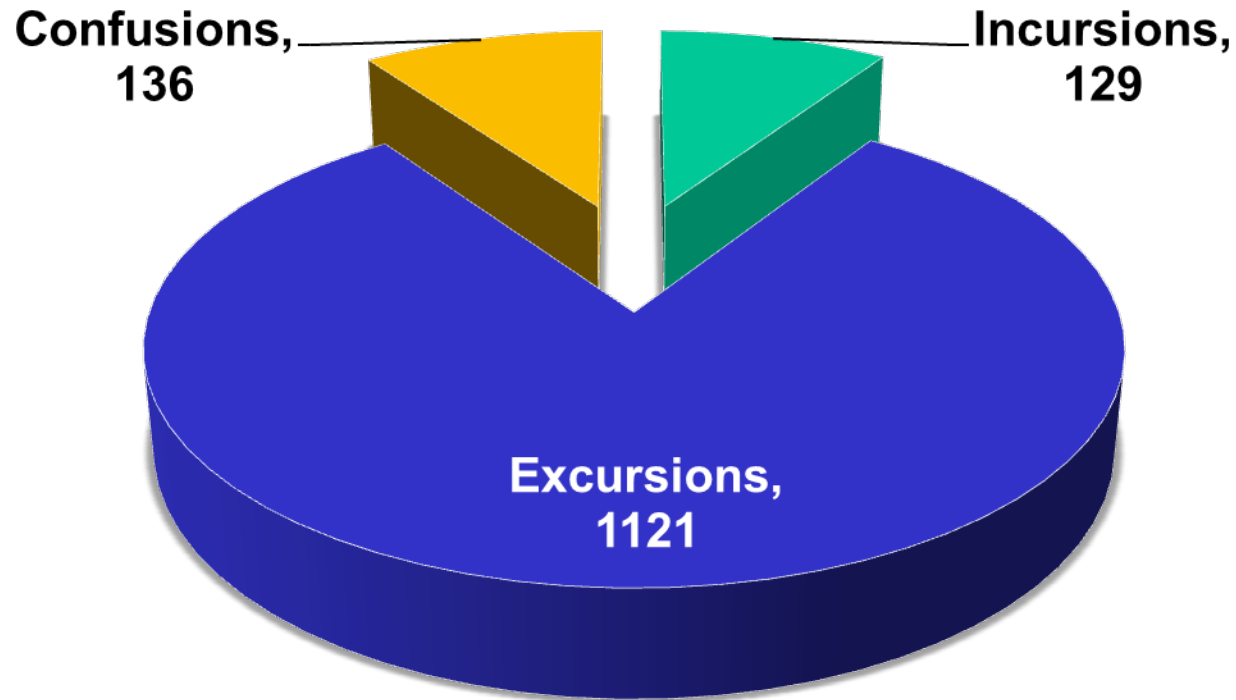


Fatal Runway Accidents



Note: Of 1429 accidents involving major or substantial damage from 1995-2008, 431 (30%) were runway related

Runway Accident Fatalities, 1995-2010



Runway Incursions

- Previously defined by FAA as ***hazard created by*** airplane or vehicle on the runway when it should not have been
- Now defined as “any occurrence at an aerodrome involving incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing or takeoff aircraft”
whether or not a hazard was created

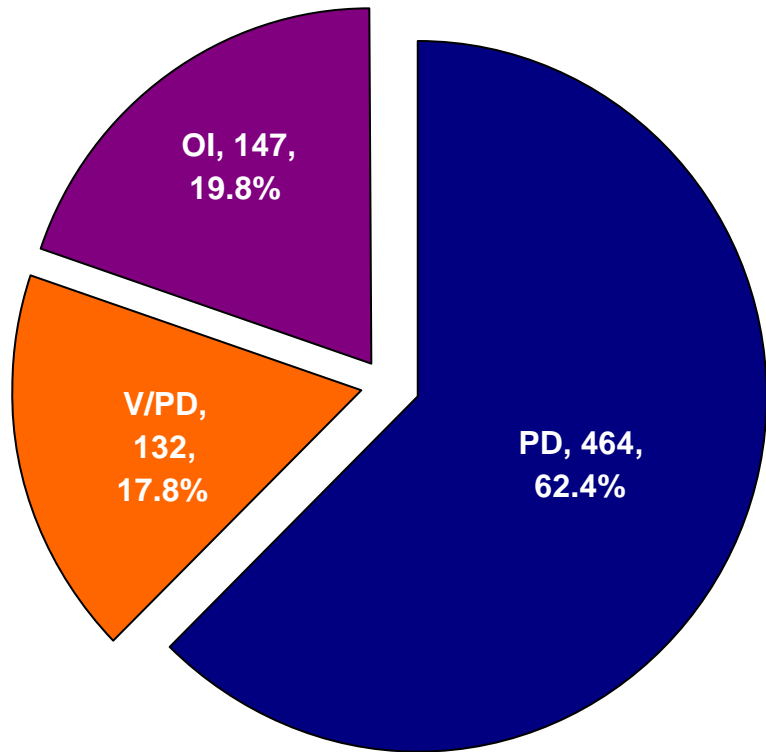
Runway Excursions

- Includes takeoff overruns, landing overruns, and departing the runway laterally during takeoff or landing
- Does not include landing short
- Almost 60 times more excursion accidents than incursion accidents
- Almost 11 times more fatal accidents, and almost 9 times more fatalities, from excursions than incursions

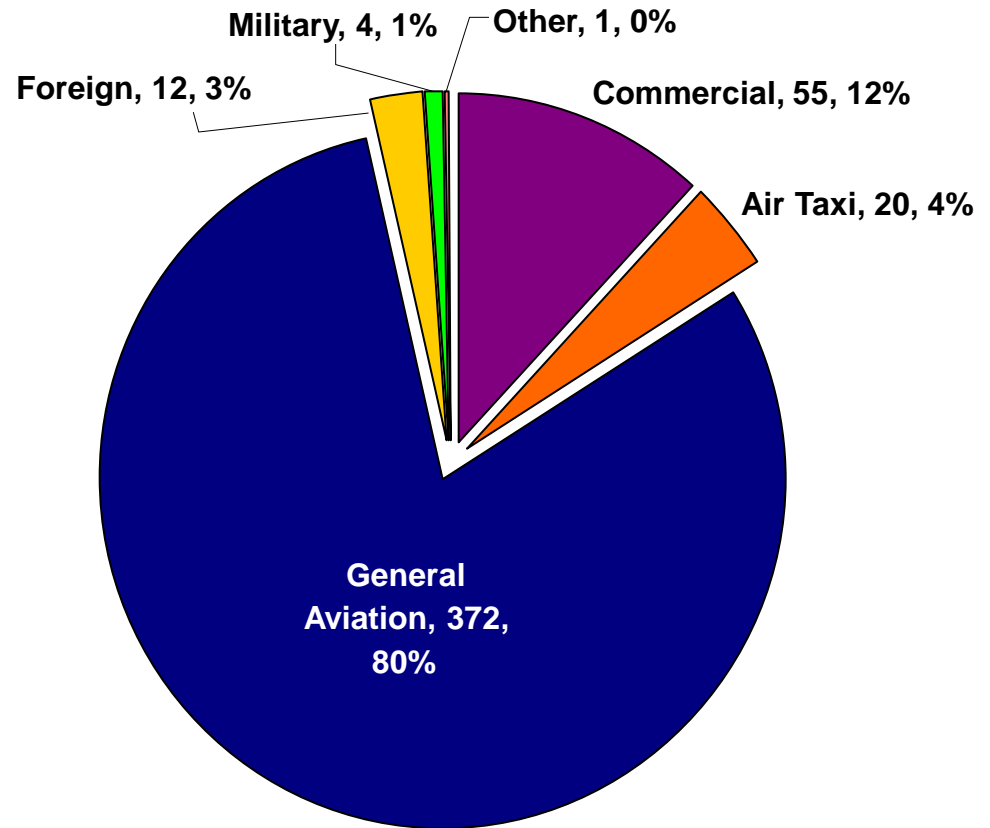
Runway Confusions

- Includes using other than dedicated or assigned surface for takeoff or landing, e.g., taxiway other than runway, or wrong runway
- Less than 1% of runway related accidents

Incursion Numbers and Rates



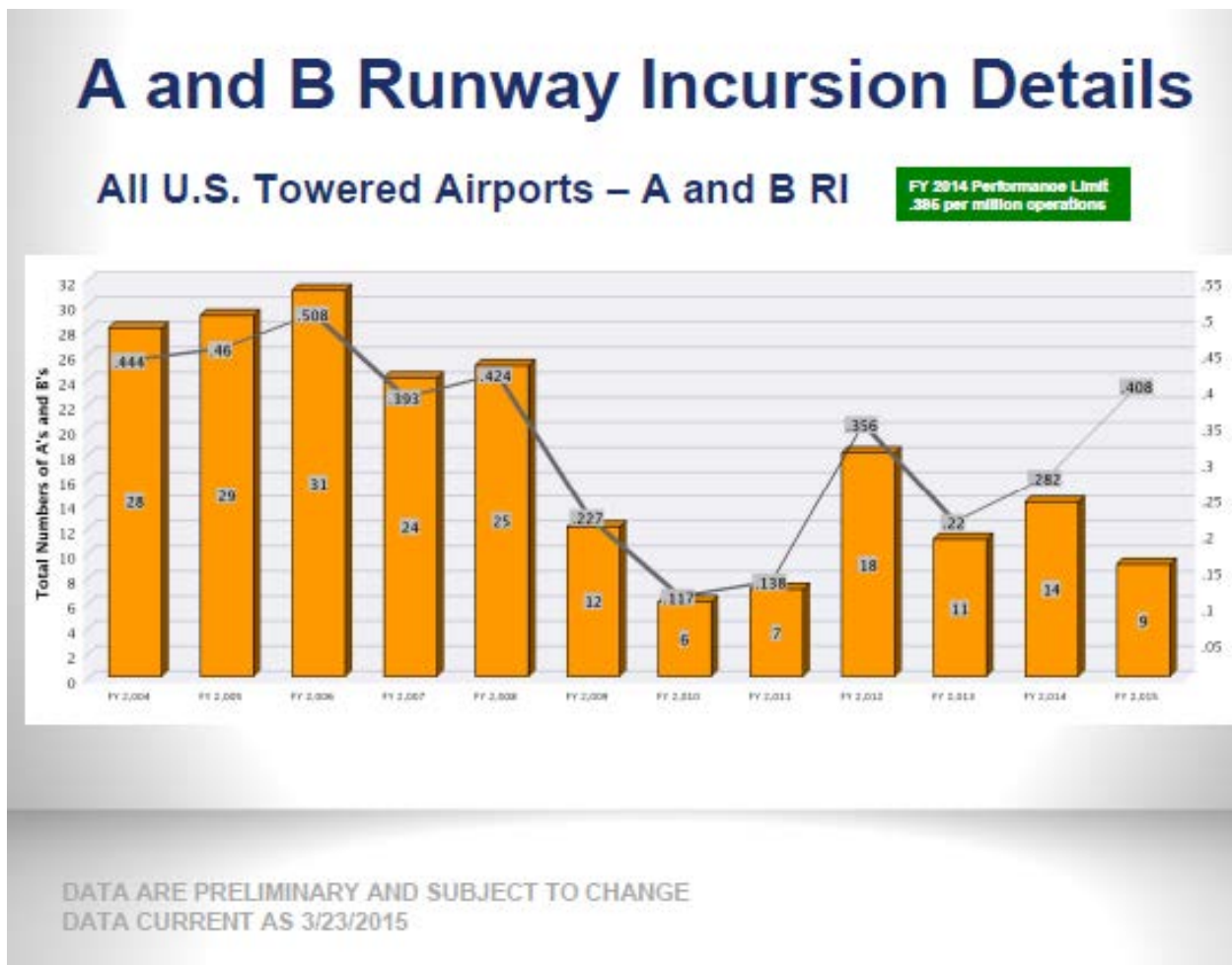
743 Runway Incursions



464 Pilot Deviations

Source: FAA, 1 Oct 2011 – 30 June 2012

Runway Incursions – Bad News



Makeup of GA Incursions

- **Nearly half involve entry onto the runway or across the hold short line**
 - **In nearly half of those, the pilot received a clearance, acknowledged the clearance, and read it back correctly**
 - **In the remainder, the pilot either received no clearance, or received a clearance to, but not onto, the runway**

The Paradigm Shift

- **Previous Response: Punishment**
 - Mostly pilots
 - Sometimes controllers
- **The Good News: Runway Safety Council**
 - Objective: Identify and fix problems, rather than punish
 - Collaborative activity, including FAA, airlines, labor, AOPA, and others
 - Quarterly meetings to determine root causes, re most recent RI's, make recommendations
 - Follow up on recommendations

Sample of Results

- Inclusion of chapter re Runway Incursion Avoidance in Pilot's Handbook of Aeronautical Knowledge
- Progress toward inclusion of runway incursion material in
 - Practical Test Standards
 - Instructor training
 - Part 142 curriculum
- Changes in ATC procedures
- Changes re airport signs and markings

Problems and Solutions: Airport Chart

- Have it

- **Incursions sometimes due to pilots unfamiliar, no chart**
- **Get charts online**
- **Encourage FBOs to provide charts**

- Understand it (especially “Hot Spots”)

- **Incursions due to missed turn while programming FMS**
- **Incursions due to failure to clarify confusing clearance**
- **Incursions due to unawareness of “gotcha”**
- **Wrong runway due to inadequate awareness of geometry**

Expectation Bias

(Think You Hear What You Expect To Hear)

- No Readback**
 - Pilot's readback did not specify which runway
 - Controller did not ask
 - Took off on wrong runway

- Pilot Hears Clearance Incorrectly**
 - Pilot told to continue approach
 - Controller in long conversation re other matter
 - Pilot landed without clearance

- Controller Hears Readback Incorrectly**
 - Readback re non-existent intersection should have alerted controller to problem

Abnormal Operations

– Construction

- Lights inop
- Routes may not be well marked
- Procedures interim, may not be robust

–Other

- Stuck mike -- Causal link in takeoff without clearance
- Long conversation -- Resulted in landing without clearance
- Controller forgot -- Resulted in simultaneous conflicting landing clearances
- Mishap at airport – Resulted in incorrect clearance (procedures not robust or well-practiced)

Moral of the Story

- Many Good People Trying to Do the Right Thing, But the System is Clearly Not Perfect
- Trust But Verify
- When in Doubt – **ASK!!**

See and Be Seen

- **The good news – It's a very big sky**
- **The bad news – One midair collision can ruin your whole day!**
- **Collisions are more likely in high traffic areas, e.g., near airports and ground-based nav aids (less now since GPS)**
- **Can also happen enroute**
- **Emerging threat – distractions in the cockpit**

Suggested Pilot Countermeasures

- **Vigilant and methodical scanning . . . and not just in high-volume traffic areas**
- **Divide attention in and out of the cockpit, minimize distractions**
- **Maximize conspicuity of your aircraft**
- **Broadcast your intentions clearly**
- **Increase vigilance in situations that make aircraft spotting more difficult**
- **Encourage passengers to participate in spotting traffic**
- **Use on-board traffic advisory systems . . . but only as backup, not as a substitute**

Mountain Flying

- **Lessons Learned from Accidents**
 - **If you have never operated at a high density altitude airport, consider some training**
 - **Be certain that you know the capability of your aircraft**
 - **Be certain that you are confident about the operation you are contemplating**
 - **Weather – Information is less robust, forecasts are uncertain, so when in doubt, consider going later**
 - **Good Preflight Planning is essential**

Case Study: PA-28-235, June 30, 2014

- Pilot, his wife, and 8 year old son, from Raymond, OH, departed Rocky Mountain Metropolitan Arpt, Jefferson County, CO (KBJC)
- No indication that the pilot had training in mountain flying
- At KBJC, pilot was looking for advice on flying through the mountains to get to Moab, Utah
- He was overheard saying that he would fly south to Interstate 70 and follow it through the mountains
- Took off, climbed to 10,400' msl and proceeded south to I-70, then turned west and proceeded into the mountains
- Witnesses who saw the airplane as it approached Loveland Pass saw the airplane at full power, nose raised, and not gaining any altitude. It then “snapped” into a left spiraling descent
- Elevation of crash site: 10,969' msl

The Conditions

- **Engine: Lycoming IO-540-B4B5, fuel-injected, rated at 250 bHP**
- **Density Altitude: 12,850'**
 - **Temperature: 78 degrees F**
 - **Pressure: 30.03"**
- **Koch Chart in FAA Pamphlet 8740-2: Rate of climb would be decreased by greater than 90 percent**

The Big Picture

- **The Problem: 39 accidents and 81 fatalities in the past 10 years involving pilots from lower elevations with no mountain flying education that crashed in the mountains in VMC conditions**
- **The Response**
 - **NTSB met with the Colorado Pilot's Association a few weeks after this accident occurred (during which time, two more mountain flying accidents happened in Colorado)**
 - **CPA issued a poster for display in FBOs**
 - **NTSB issued a Safety Alert for pilots**

CPA Poster, NTSB Safety Alert



Flying Into The Mountains?

STOP!

- Have you had a thorough mountain flying course and checkout?
- Does your airplane have at least 200 horsepower?
- Are the winds at mountaintop level below 25 knots?
- Have you checked you POH for the takeoff, landing, and climb performance you should expect?

If you answered NO to any of these questions, seriously consider cancelling your flight until you get training and conditions are better.

If you want to talk to an experienced mountain flight instructor about your trip, go to -
www.mountainflyingsafety.com

Sponsored by The Colorado Pilots Association

Safety Alert: Go to NTSB.gov/safety/safety-alerts/Pages/default.aspx

Grassroots Safety Advocacy

- The Colorado Pilot’s Association (CPA) is placing the “Flying Into The Mountains?” poster in FBOs, flight schools, and airport restaurants in the 73 public airports in Colorado**
- The CPA is developing a mobile app that pilots can download to get information on Mountain flight planning**
- The FAA is adding Mountain Flying education to its requirements for Flight Instructor Refresher Courses**
- In Colorado, the CPA is putting on two weekend Mountain Flying Courses**
- They’ll be speaking at Oshkosh in July**

Thank You, and Happy Flying!!!



Questions?