# Don’t Be Dense!

## What If You Encountered Poor Performance on Takeoff? What Would You Do?

### Strategies for Airplane Performance, Density Altitude, Weight & Balance, ADM

Presented to: FAA Safety Seminar Attendees

By: W. J. Doyle, Jr., CFI A&I, AGI, IGI, FAAST Rep

Date: 2014 - 2015

Federal Aviation Administration

# *How to Download this Presentation*

- You can download this presentation at the link below. The link is case-sensitive.
  - The PPT format is password-protected. Click the read-only button on the right.
  - http://williamjdoylejr.net/FAAST/What_IF/Airplane_Performance/What_If_Airplane_Performance_ADM.ppt
- Email me at doylewj@ix.netcom.com to request this link

# *Presentation Agenda*

- FARs 91.3 and 91.103
- NTSB Airplane Performance Accident Trends
- What Factors Influence Airplane Takeoff Performance?
- How to Calculate Airplane Performance for Takeoff and Landing
- Takeoff Performance Issue Scenarios
- Are All Takeoff Performance Issues Due to Density Altitude, Weight & Balance
- What Do You Do If You Experience a Takeoff Performance Issue
- How to Query the NTSB Database
- Credits and Reference Information

# *What … If?*

- What if you were on your takeoff roll and the airplane was not putting out power like you typically got?
- What would you do?
  - Would you continue on?
  - What are your choices?
- Stay with us for a flight that encounters these choices
  - See NTSB accident statistics for airplane performance accidents

# *Two FARs You Really Need to Understand*

# *14 CFR 91.3*

- **Responsibility and authority of the pilot in command.**

  a) The pilot in command of an aircraft is directly responsible for, and is the **final authority** as to, the operation of that aircraft.

  b) In an **in-flight emergency requiring immediate action**, the pilot in command **may deviate from any rule of this part to the extent required to meet that emergency**.

  c) Each pilot in command who deviates from a rule under paragraph (b) of this section shall, **upon the request of the Administrator**, send a written report of that deviation to the Administrator.

- **What Can You Say to ATC If You Have a Takeoff Performance Problem?**

  – **Cessna 12345 is aborting takeoff!**

    - **Say it sooner rather than later!**

# *14 CFR 91.103 – Preflight Action*

- Each pilot in command shall, before beginning a flight, become familiar with all available information concerning that flight. This information must include—

  a) For a flight under IFR or a flight not in the vicinity of an airport, **weather reports and forecasts**, fuel requirements, **alternatives available if the planned flight cannot be completed**, and any known traffic delays of which the pilot in command has been advised by ATC;

  b) For any flight, **runway lengths at airports of intended use**, and the following takeoff and landing distance information:

  1) For civil aircraft for which an approved Airplane or Rotorcraft Flight Manual containing takeoff and landing distance data is required, the takeoff and landing distance data contained therein; and

  2) For civil aircraft other than those specified in paragraph (b)(1) of this section, other reliable information appropriate to the aircraft, relating to **aircraft performance under expected values of airport elevation and runway slope, aircraft gross weight, and wind and temperature.**

# NTSB Statistics
# on
# Airplane Performance
# General Aviation Accidents
# in the
# United States
# from 1/1/2000 to 7/31/2014

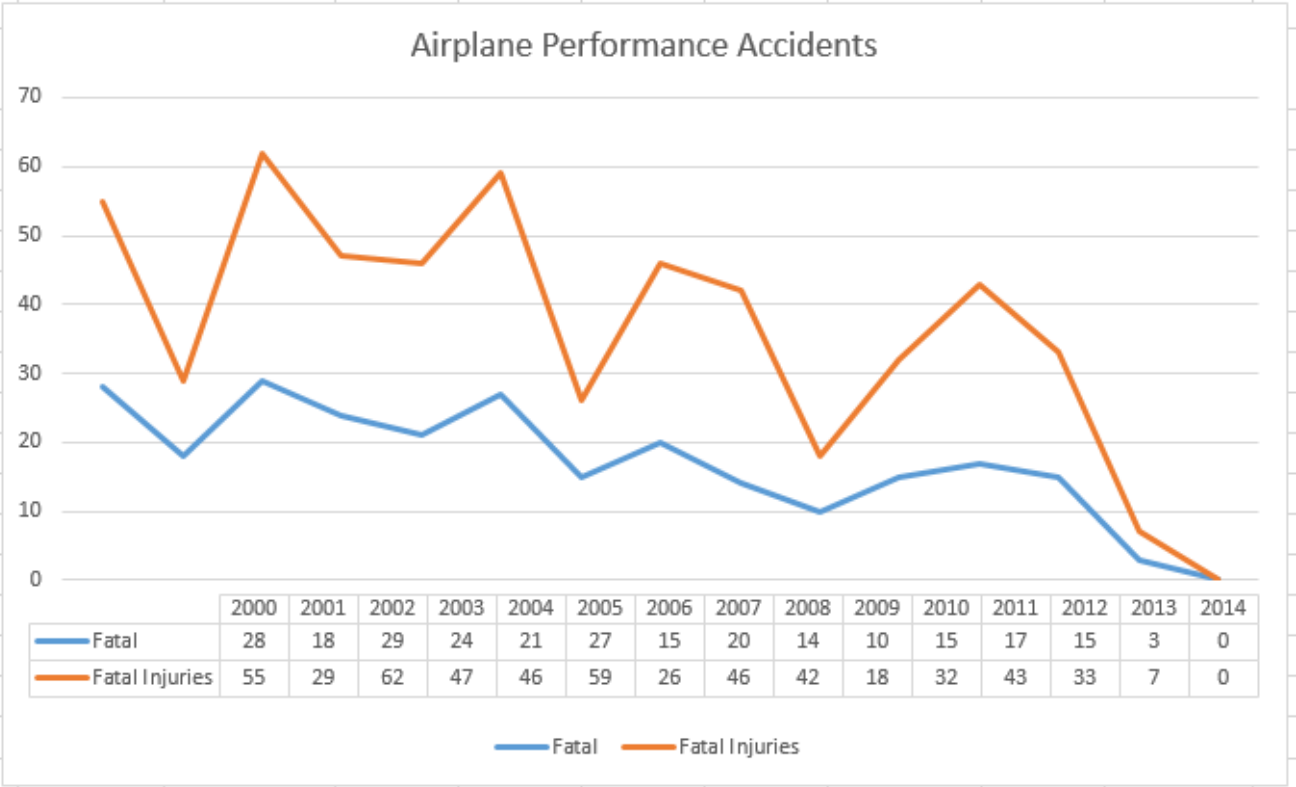
# *NTSB Airplane Performance Accidents*

## U.S. – 1/1/2000 – 07/31/2014

***40% Fatal***

| Airplane Performance Accidents from 01/01/2000 to 07/31/2014 | | | | | | |
|---|---|---|---|---|---|---|
| U.S. | Fatal | Non-Fatal | Fatal Injuries | Serious Injuries | Minor Injuries | No Injuries |
| 645 | 256 | 387 | 545 | 217 | 278 | 502 |

| Accident Trend by Year | | |
|---|---|---|
| Year | Fatal | Fatal Injuries |
| 2000 | 28 | 55 |
| 2001 | 18 | 29 |
| 2002 | 29 | 62 |
| 2003 | 24 | 47 |
| 2004 | 21 | 46 |
| 2005 | 27 | 59 |
| 2006 | 15 | 26 |
| 2007 | 20 | 46 |
| 2008 | 14 | 42 |
| 2009 | 10 | 18 |
| 2010 | 15 | 32 |
| 2011 | 17 | 43 |
| 2012 | 15 | 33 |
| 2013 | 3 | 7 |
| 2014 | 0 | 0 |
| **Total** | **256** | **545** |



# *NTSB Airplane Performance Accidents*
## U.S. – 1/1/2000 – 07/31/2014

## Purpose of Flight

| U. S. | Instructional | Personal | Business | Executive/ Corporate | Aerial Observation | Banner Tow | Ferry | Flight Test | Glider Tow | Positioning | Public Use | Skydiving | Other Work Use |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Fatal** | 27 | 191 | 7 | 1 | 5 | 1 | 3 | 2 | 1 | 7 | 0 | 1 | 2 |
| **Non-Fatal** | 47 | 290 | 9 | 2 | 2 | 0 | 0 | 2 | 0 | 9 | 5 | 3 | 12 |
| **Total** | **74** | **481** | **16** | **3** | **7** | **1** | **3** | **4** | **1** | **16** | **5** | **4** | **14** |

## Weather Conditions of Flight

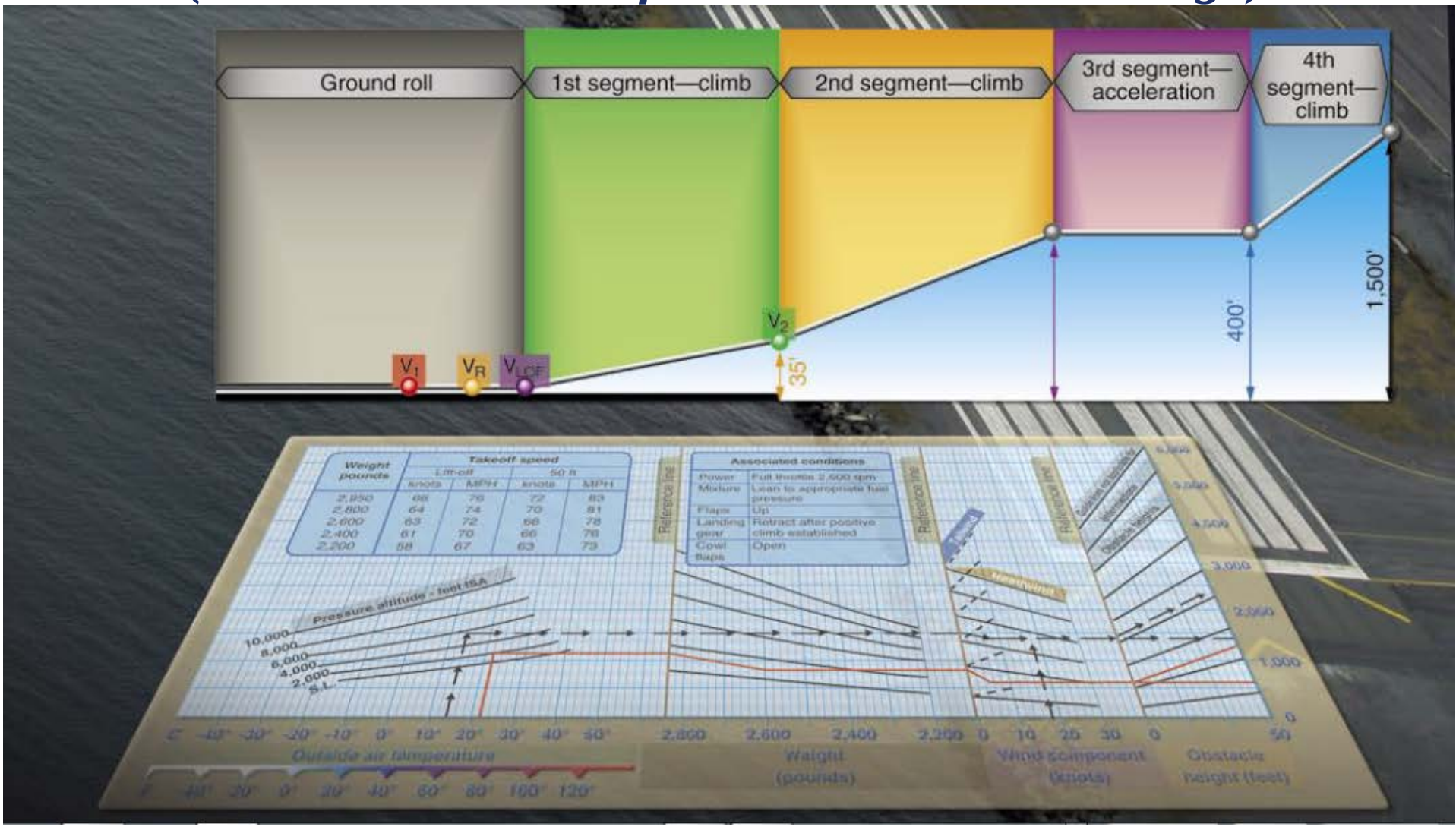
| U. S. | VMC | IMC |
|---|---|---|
| **Fatal** | 237 | 19 |
| **Non-Fatal** | 378 | 9 |
| **Total** | **615** | **28** |

## Broad Phase of Flight

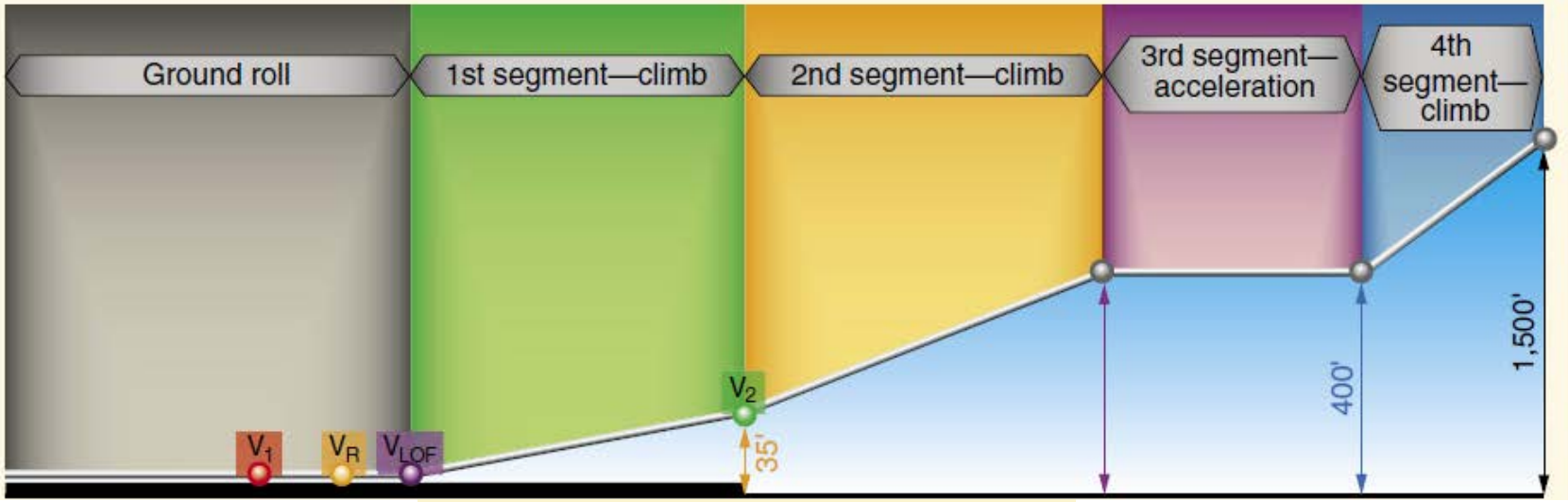
| U. S. | Taxi | Takeoff | Climb | Cruise | Descent | Approach | Maneuvering | Landing | Go-Around | Standing |
|---|---|---|---|---|---|---|---|---|---|---|
| **Fatal** | 1 | 98 | 11 | 20 | 5 | 20 | 72 | 8 | 8 | 1 |
| **Non-Fatal** | 1 | 214 | 19 | 8 | 2 | 22 | 21 | 65 | 15 | 1 |
| **Total** | **2** | **312** | **30** | **28** | **7** | **42** | **93** | **73** | **23** | **2** |

# *What Factors Influence Airplane Takeoff Performance*

# What Factors Influence Airplane Takeoff Performance? (Pilots Handbook of Aeronautical Knowledge)



# What Factors Influence Airplane Takeoff Performance? (Pilots Handbook of Aeronautical Knowledge)




$V_1$ = Critical-engine-failure speed

$V_2$ = Takeoff safety speed

$V_S$ = Calibrated stalling speed, or minimum steady flight speed at which the aircraft is controllable

$V_R$ = Speed at which aircraft can start safely raising nose wheel off surface (Rotational Speed)

$V_{LOF}$ = Speed at point where airplane lifts off

# *Atmospheric Factors That Influence Airplane Takeoff Performance*

- Pressure
  - Actuates altimeter, ASI, VSI, and MP gauge
  - Standard pressure at sea level is 29.92“ Hg
- Temperature
  - Standard temperature at sea level is 59° F or 15° C
  - Standard temperature lapse rate
    - Decreases at approximately 3½° F or 2° C per thousand feet up to 36,000 feet
    - Above 36,000 feet, the temperature is considered constant up to 80,000 feet

# *Atmospheric Factors That Influence Airplane Takeoff Performance*

- Density Altitude
  - Density altitude is pressure altitude corrected for nonstandard temperature.
  - The density of air has significant effects on the aircraft's performance.
  - As air becomes less dense, it reduces:
    - Power, because the engine takes in less air.
    - Thrust, because the propeller is less efficient in thin air.
    - Lift, because the thin air exerts less force on the airfoils.

# *Atmospheric Factors That Influence Airplane Takeoff Performance*

- **Calculating Density Altitude**
  - At 29.92"Hg, the altimeter may indicate a pressure altitude of 5,000 feet.
    - Per POH, the ground run on takeoff may require a distance of 790 feet under standard temperature conditions.
  - If the temperature is 20°C above standard, the expansion of air raises the density level.
    - Using temperature correction data from tables or graphs, or by deriving the density altitude with a computer, it may be found that the density level is above 7,000 feet, and the ground run may be closer to 1,000 feet.
  - See your airplane's POH for more information.

# *Environmental Factors That Influence Airplane Takeoff Performance*

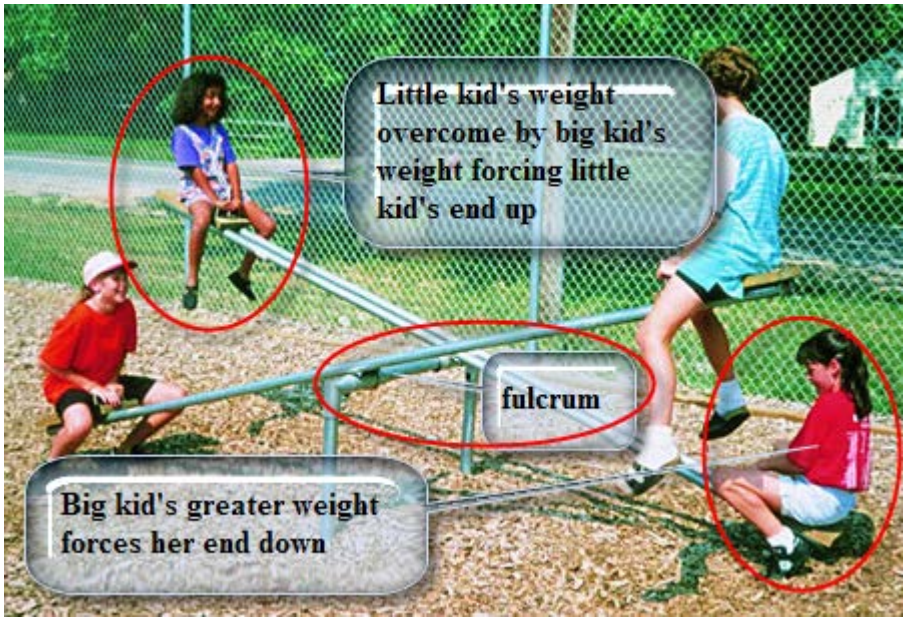
- Runway surface
  - Paved runways give best performance
  - Grass runways increase ground roll
- Wind direction and velocity
  - Headwinds decrease ground roll
  - Tailwinds increase ground roll
- Weight & Balance
  - See your airplane's POH
  - See next section

# Weight & Balance Concepts from an Elementary School and Middle School Perspective

# How Much Can an Airplane Weigh?

- Each airplane has a limitation called the maximum gross takeoff weight. Some airplanes also have a maximum gross landing weight.
- This weight includes everything
  - Airplane (empty)
  - Fuel
  - Pilot and passengers
  - Baggage
- There is another component called “Balance.”
- The entire process is called “Weight and Balance.”

# What Does Balance Mean?



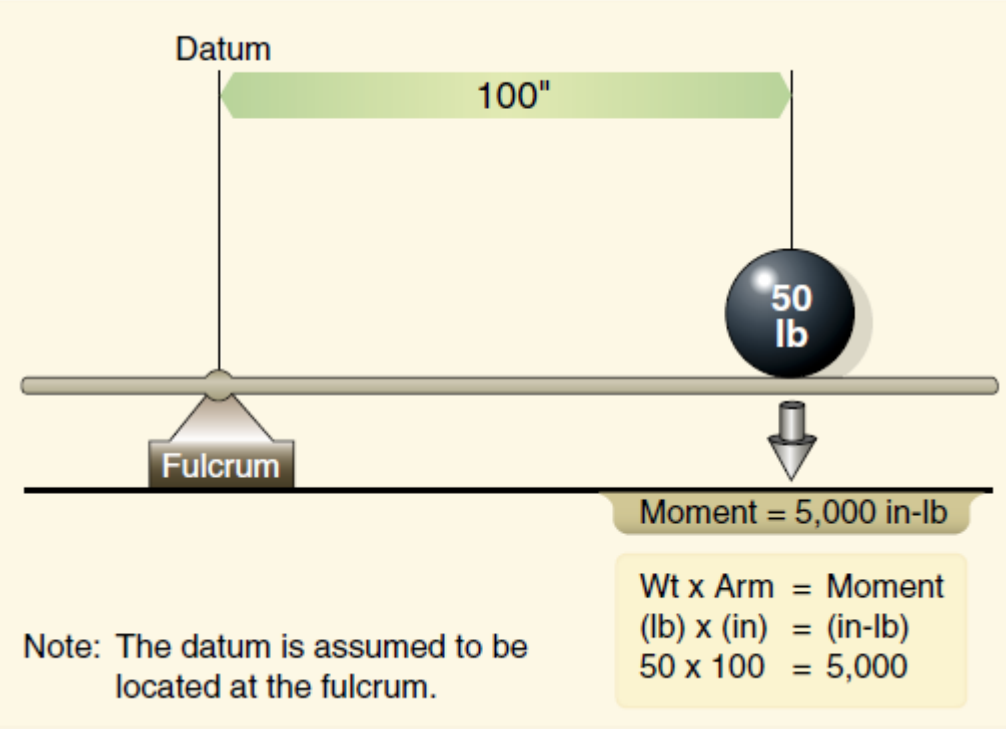

- Classic example is the playground seesaw:
  - Center bar is the fulcrum which is the center of gravity.
  - Heavier weight of “big” kid on one end overcomes lesser weight of “little” kid other end
  - This forces the “little” kid to go up
  - Is there a way to make the “big” kid go up without adding weight or changing kids?


Another Seesaw Example
Poppy N - 65 year old paternal grandpop functioning as CG "Governator"
Note the look of determination
Downward Force
Eli - 33 month old grandson
Note the look of determination
Mia - 14 month old granddaughter
Forward CG
The Poppy Effect Results in Slight Aft CG
Aft CG

# Weight & Balance Computation Concepts

# Weight & Balance Computation Concepts

- **Calculating the Moment**
  - Given
    - Arm = 100 inches
    - Weight = 50 pounds
  - Layout the formula
    - Wt x Arm = Moment
    - 50 x 100 = 5,000

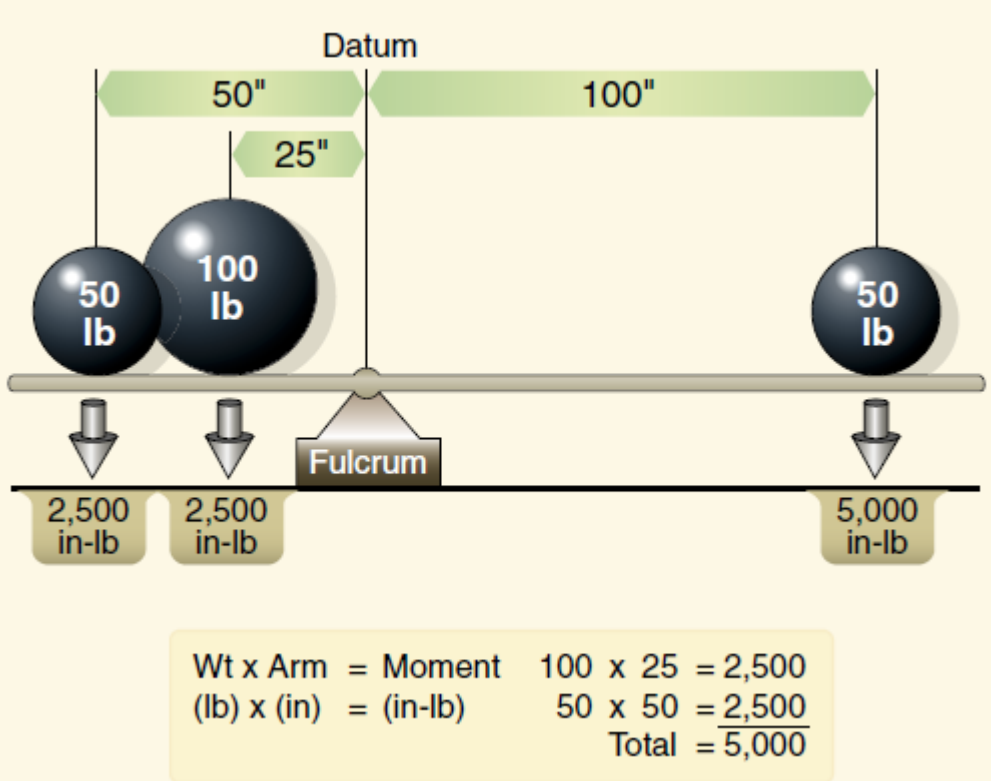


# Weight & Balance Computation Concepts

- **Calculating the Balance**
  - Given
    - Arm = 50 inches
    - Weight = 50 pounds
    - Arm = 25 inches
    - Weight = 100 pounds
  - Layout the formula
    - Wt x Arm = Moment
    - 50 x 50 = 2,500
    - 100 x 25 = 2,500
    - Total = 5,000
  - Arm to balance a 50 lb weight
    - Wt x Arm = Moment
    - 50 x ? = 5,000
    - Moment ÷ Weight = Arm
    - 5,000 ÷ 50 = 100

## Playground Seesaw Example

**Moving the little kid to balance the big kid**



# Effect of Weight on Flight Performance

- Each airplane has a limitation called the maximum gross takeoff weight.
  - Some airplanes also have a maximum gross landing weight.
- The takeoff/climb and landing performance of an aircraft are determined on the basis of its maximum allowable takeoff and landing weights.
  - A heavier gross weight results in a longer takeoff run and shallower climb, and a faster touchdown speed and longer landing roll.
  - Even a minor overload may make it impossible for the aircraft to clear an obstacle that normally would not be a problem during takeoff under more favorable conditions.

# Techniques for Determining Airplane Weight & Balance

# *Weight & Balance Data for Cessna 182T*

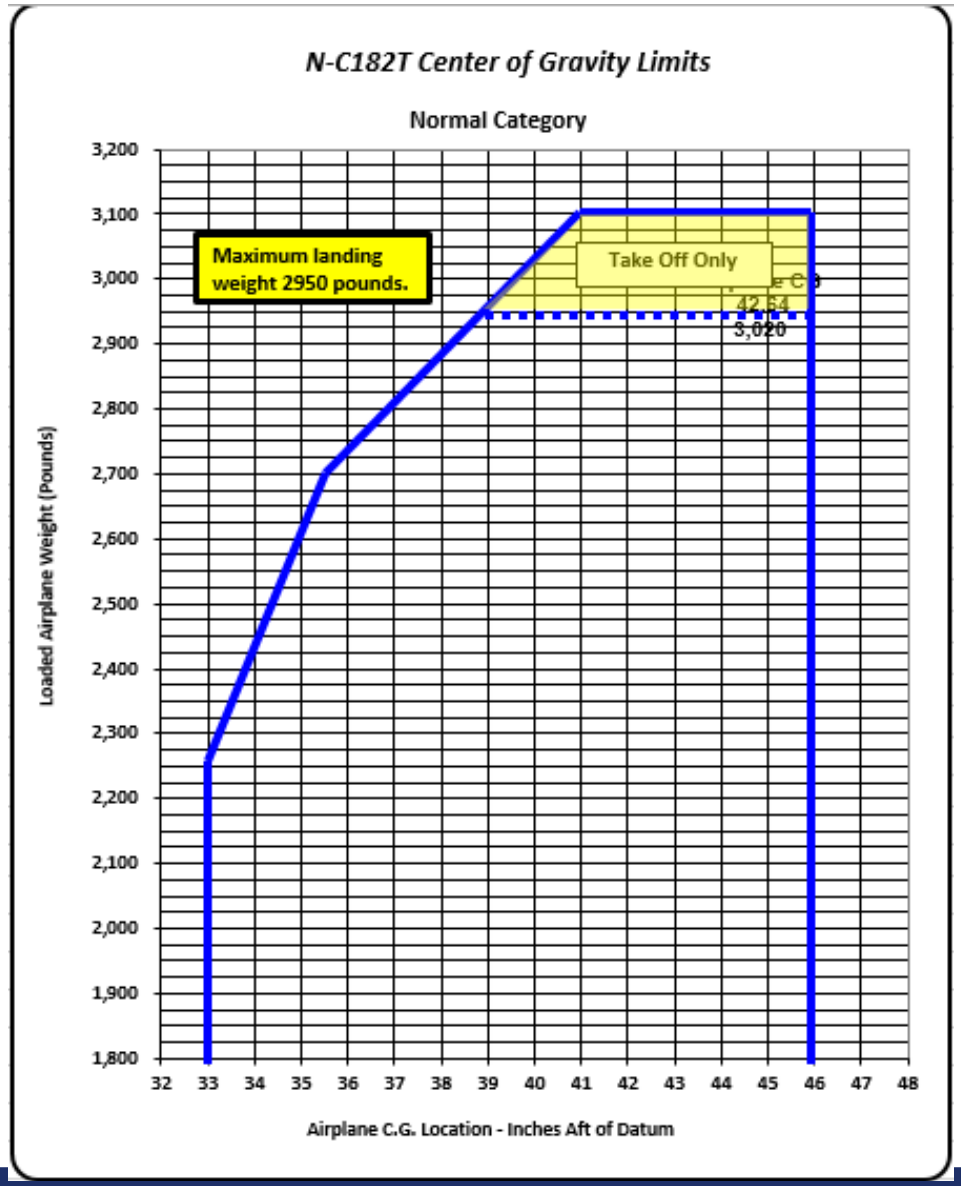
- Be sure to use accurate and current weight & balance data for pilot, passengers, cargo, and fuel

| Date | Destination | Route of Flight |
|---|---|---|
| | Doylestown Airport - KDYL | KVAY KPNE KDYL |
| **Aircrew** | **Name** | **Weight** |
| Pilot | PIC | 200 |
| Co-Pilot/Pax | Pax-1 | 175 |
| Passenger(s) | Pax-2 | 220 |
| | Pax-3 | 0 |
| **Baggage** | Main | 30 |
| **Fuel** | 64 gallons | 384 |

# Cessna 182T Weight & Balance Table - Spreadsheet

| C182T Skylane Weight & Balance | | | | |
|---|---|---|---|---|
| N-C182T | Input Data | Weight | Arm | Moment |
| Basic Empty Weight | 2,018 | 2,018 | 38.84 | 78.37 |
| Crew: Pilot | 200 | 200 | 37.00 | 7.40 |
| Co-pilot | 175 | 175 | 37.00 | 6.48 |
| Passengers: Left Rear | 220 | 220 | 74.00 | 16.28 |
| Right Rear | 0 | 0 | 74.00 | 0.00 |
| Baggage | 30 | 30 | 97.00 | 2.91 |
| Rear Baggage Area | 0 | 0 | 116.00 | 0.00 |
| Fuel in gallons (Max 87 gallons) | 64 | 384 | 46.00 | 17.66 |
| **Total Ramp Weight** | | **3,027** | **42.65** | **129.10** |
| Minus Runup Fuel | | -7 | 46.00 | -0.32 |
| **Total Take Off Weight** | | **3,020** | **42.64** | **128.78** |
| Maximum Gross Weight | 3,100 | Ok | | |
| Maximum Useful Load | 1082.2 | | | |
| Useful Load on this Flight | 1002.2 | | | |
| Available Useful Load | 80 | | | |
| | | | | |
| **Notes:** | | | | |
| 1. Moment = Weight x Arm / 1000 | | | | |
| 2. CG = Total Moment / Total Weight | | | | |
| 3. Maximum Gross Weight - Takeoff Only 3100 lbs; Landing 2950 lbs. | | | | |

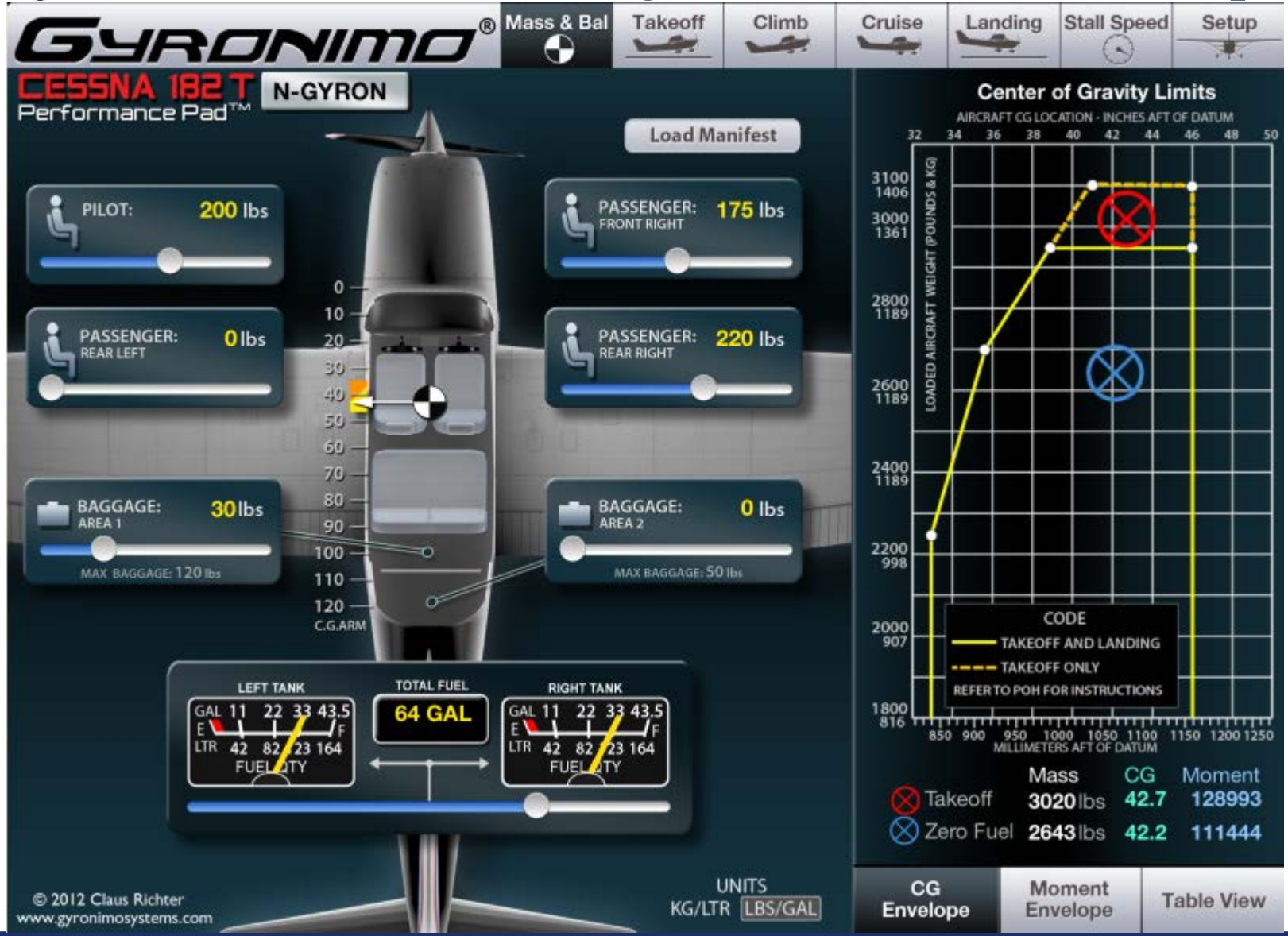
# Cessna 182T Weight & Balance Envelope - Spreadsheet



# Gyronimo Cessna 182T Weight & Balance Table

# Gyronimo Cessna 182T Weight & Balance Moment Envelope

# Gyronimo Cessna 182T Weight & Balance CG Envelope



# Techniques for Determining Airplane Takeoff Performance

# *ForeFlight Weather for KVAY*

**KVAY: South Jersey Regional**
Mount Holly, New Jersey, United States
39.94°N/74.85°W
Sunrise, set: 5:48 AM, 8:23 PM EDT

Taxiways | Nearby | Comments | FBOs

| | | | |
|---|---|---|---|
| Flight rules | VFR | ASOS | 119.325 |
| Elevation | 52' MSL | Grd Comm Outlet | 121.725 |
| Pattern altitude | 852' MSL | UNICOM | 122.8 |
| Fuel | Jet A, 100LL | CTAF | 122.8 |
| Procedures | GPS, VOR, RNAV | Appr, Dep | 124.15, 124.15 |

VFR 58m ago

KVAY 211954Z AUTO 08004KT 10SM BKN050 29/16 A3015 RMK AO2 SLP210 T02890161

| | |
|---|---|
| Time | 3:54 PM EDT |
| Winds | 080° at 4 kts |
| Visibility | 10 sm |
| Clouds (AGL) | Broken 5,000' |
| Temperature | 29°C (84°F) |
| Dew Point | 16°C (60°F) |
| Pressure | 30.15 in Hg |
| Humidity | 45% |
| Density Altitude | 1,663' |

NEARBY WEATHER

**N14: Flying W** 9m
160° at 5 kts, 10 sm
30.17 in Hg, 29°C (16°C dewpoint)
1.8 nm SE, course 118°M

# *Cessna 182T Takeoff Performance Chart – 3100 Pounds*

Flaps 20°
2400 RPM, Full Throttle and Mixture Set Prior to Brake Release
Cowl Flaps Open
Paved, Level, Dry Runway
Zero Wind
Lift Off: 49 KIAS
Speed at 50 Feet: 58 KIAS

| Press Alt - Feet | 0°C | | 10°C | | 20°C | | 30°C | | 40°C | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Grnd Roll Ft | Total Ft To Clear 50 Ft Obst | Grnd Roll Ft | Total Ft To Clear 50 Ft Obst | Grnd Roll Ft | Total Ft To Clear 50 Ft Obst | Grnd Roll Ft | Total Ft To Clear 50 Ft Obst | Grnd Roll Ft | Total Ft To Clear 50 Ft Obst |
| S.L. | 715 | 1365 | 765 | 1460 | 825 | 1570 | 885 | 1680 | 945 | 1800 |
| 1000 | 775 | 1490 | 835 | 1600 | 900 | 1720 | 965 | 1845 | 1030 | 1980 |
| 2000 | 850 | 1635 | 915 | 1760 | 980 | 1890 | 1055 | 2035 | 1130 | 2190 |
| 3000 | 925 | 1800 | 995 | 1940 | 1070 | 2090 | 1150 | 2255 | 1235 | 2435 |
| 4000 | 1015 | 1990 | 1090 | 2150 | 1175 | 2325 | 1260 | 2515 | 1355 | 2720 |
| 5000 | 1110 | 2210 | 1195 | 2395 | 1290 | 2595 | 1385 | 2820 | 1485 | 3070 |
| 6000 | 1220 | 2470 | 1315 | 2690 | 1415 | 2930 | 1520 | 3200 | 1635 | 3510 |
| 7000 | 1340 | 2785 | 1445 | 3045 | 1560 | 3345 | 1675 | 3685 | - - - | - - - |
| 8000 | 1480 | 3175 | 1595 | 3500 | 1720 | 3880 | - - - | - - - | - - - | - - - |

# Gyronimo Cessna 182T Performance Pad for iPad

# A Hypothetical Flight Scenario

-

# Ask Yourself:

# “Could this happen to me?”

# *Hypothetical Flight Scenario - Background*

- Pilot and two passengers intend to fly from South Jersey Regional Airport (KVAY), NJ to Millville Airport (KMIV), NJ for an early evening proficiency flight in Cessna 182T
- Pilot completes the weight & balance as follows
  - Crew weights:
    - Pilot enters accurate weight for self
    - Pilot understates passenger weights by 15 pounds each
  - Fuel:
    - Pilot enters 55 gallons (330 pounds)
    - Preflight fuel check shows 64 gallons in tanks (384 pounds)
- Final weight & balance situation
  - Actual weight = 84 pounds higher than pilot's calculations
  - Actual takeoff weight = 3,020 pounds, 80 pounds below max of 3,110 pounds

# *Hypothetical Flight Scenario - Environment*

- Runways
  - 26 and 8: 3,911 feet x 50 feet
- Weather Conditions

KVAY 211954Z AUTO 08004KT 10SM BKN050
29/16 A3015 RMK AO2 SLP210 T02890161

| | |
|---|---|
| Winds | 080° at 4 kts |
| Visibility | 10 sm |
| Clouds (AGL) | Broken 5,000' |
| Temperature | 29°C (84°F) |
| Dew Point | 16°C (60°F) |
| Pressure | 30.15 in Hg |
| Humidity | 45% |
| Density Altitude | 1,663' |

# *Hypothetical Flight Scenario - Flight*

- Pilot taxis onto active runway and begins takeoff roll
  - Airplane feels sluggish, not getting the amount of power that pilot is expecting
  - What would you do?
- Pilot does the following:
  - Continues with the takeoff
  - Straight out climb to 500 feet MSL
  - At 500 feet MSL pilot becomes concerned that there may be a problem with the engine
  - What would you do?
  - Pilot turns back toward VAY
  - Is there anything wrong with this?

# *Hypothetical Flight Scenario – Flight (cont'd)*

- Pilot climbs to pattern altitude (852 feet MSL) over VAY
  - Decides that engine is probably okay
  - Continues flight to MIV
  - What would you do?
- Over MIV Pilot sees fog encroaching on MIV airport
  - Returns to VAY
  - Lands uneventfully
  - Worries that there may really be an engine problem
  - Contacts mechanic
- Would you have done anything differently?

# Are All Airplane Takeoff Performance Issues Due to Density Altitude, Weight & Balance

# *9/9/1992 Takeoff Performance Issue in an American General Tiger*


# *9/9/1992 Takeoff Performance Issue in an American General Tiger*

- VFR flight from Doylestown Airport (KDYL) to Pennridge Airport (KCKZ)
  - Pilot started takeoff from KDYL runway 23 in an American General Tiger
    - At the time pilot had logged 164 hours total time and 9 hours in the Tiger
  - Preflight run-up completed successfully
  - Pilot taxied onto the active runway and applied takeoff power
  - Tiger did not exhibit expected takeoff power
  - Pilot checked engine instruments, confirmed power not putting out as expected
    - Decided to abort takeoff
    - Pulled throttle to idle
    - Applied gentle brakes
    - Made first turnoff

# *9/9/1992 Takeoff Performance Issue in an American General Tiger*

- Pilot called person he was supposed to pick up at Pennridge
- Pilot called flying club mechanic
  - Mechanic found separated throttle linkage
- Lessons Learned
  - If something feels wrong on takeoff, it probably is
  - Abort the takeoff sooner rather than later
  - Pilot learned how to inspect the throttle linkage and made that a part of his preflight inspection
  - Make sure you know the procedures for aborting a takeoff
  - Practice them with your CFI

# *Takeoff Stall in SR20 "Six Pack" with Avidyne MFD*


# *Takeoff Stall in SR20 "Six Pack" with Avidyne MFD*

- SR20 VFR cross country flight from Franklin County (FSO), VT to Heritage (PTW), PA (FAA Ferry Permit)
  - Departure FSO Runway 19 (3000 feet x 60 feet)
    - The winds were worsening with forecast wind shear
    - Pilot initiated takeoff roll with 50% flaps, rotating at 70 KIAS
      - Wind shear occurred between 300 – 400 feet AGL
      - Stall warning horn went off and the airplane started to sink
    - Pilot pushed the nose down and watched the airspeed build as the Runway 1 approach light stanchions loomed in the windscreen
    - Pilot rocked the airplane up to 2,500 feet
      - Pushed the nose down to build some airspeed
      - Pulled the nose up to gain some altitude
  - Lesson Learned
    - Don't forget your training

# 6/17/2003 Takeoff Performance Issue in a Cirrus SR20


# *6/17/2003 Takeoff Performance Issue in a Cirrus SR20*

- Training flight (SR20 transition), departed Doylestown Airport (DYL) in VMC, calm wind conditions, Runway 5 (3000 feet x 60 feet)
- At rotation speed of 70 KIAS, pilot lifts off, controls get mushy
  - What would you do?
- Flaps were set to 0% not to 50%
  - What would you do?
- CFI on board instructs Pilot to do the following:
  - Do not apply 50% flaps while on the takeoff roll
  - Level the nose and execute soft field takeoff procedure
  - At 80 KIAS smoothly bring up the nose and execute climb out
- Lessons Learned:
  - Complete and verify all items on takeoff checklist

# Good Judgment:
# Truth
# or
# Consequences

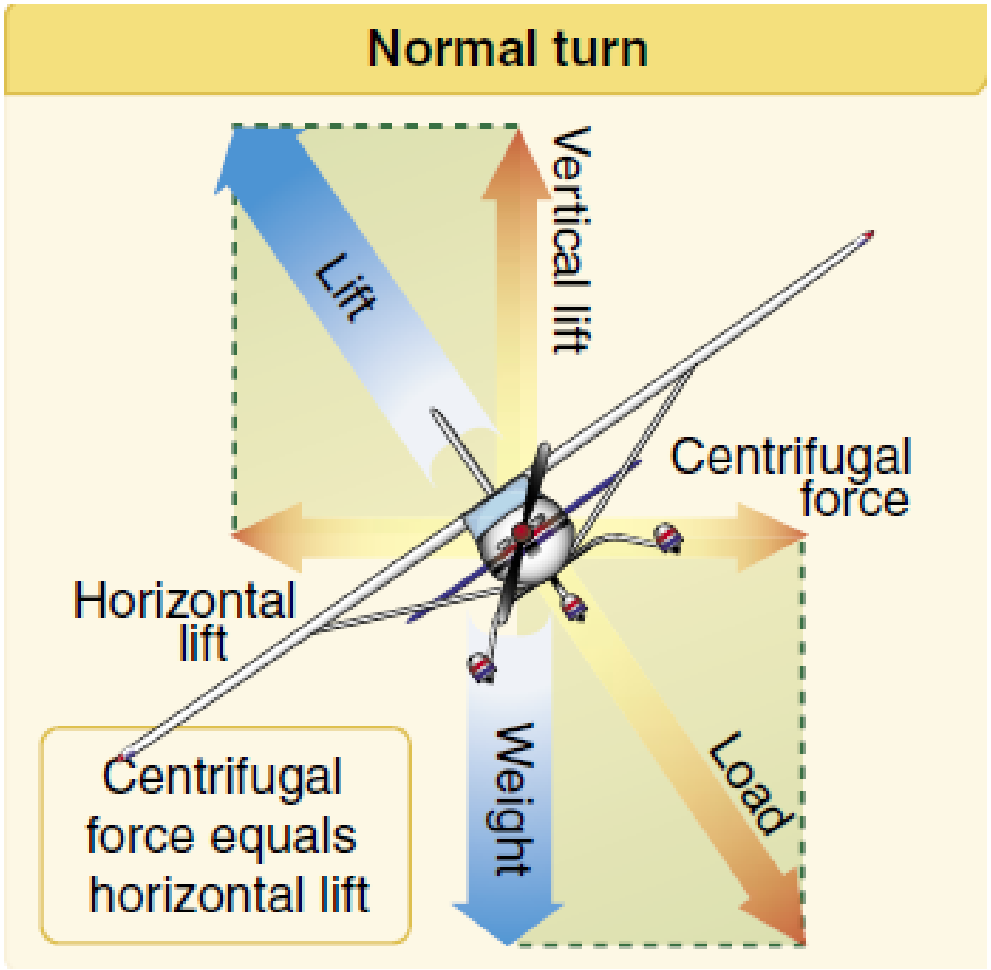
# *Always Exercise Good Judgment!*

- Be thorough in your preflight planning
  - Use accurate data for crew weights and fuel
  - Calculate the length of your takeoff roll
  - Determine visual point on runway for rotation and lift-off
- If the airplane doesn't feel right, you probably should not continue the takeoff
  - Refer to your airplane's POH, which should include
    - Pull throttle to idle
    - Apply brakes
    - Retract wing flaps
    - Turn off runway as soon as practicable

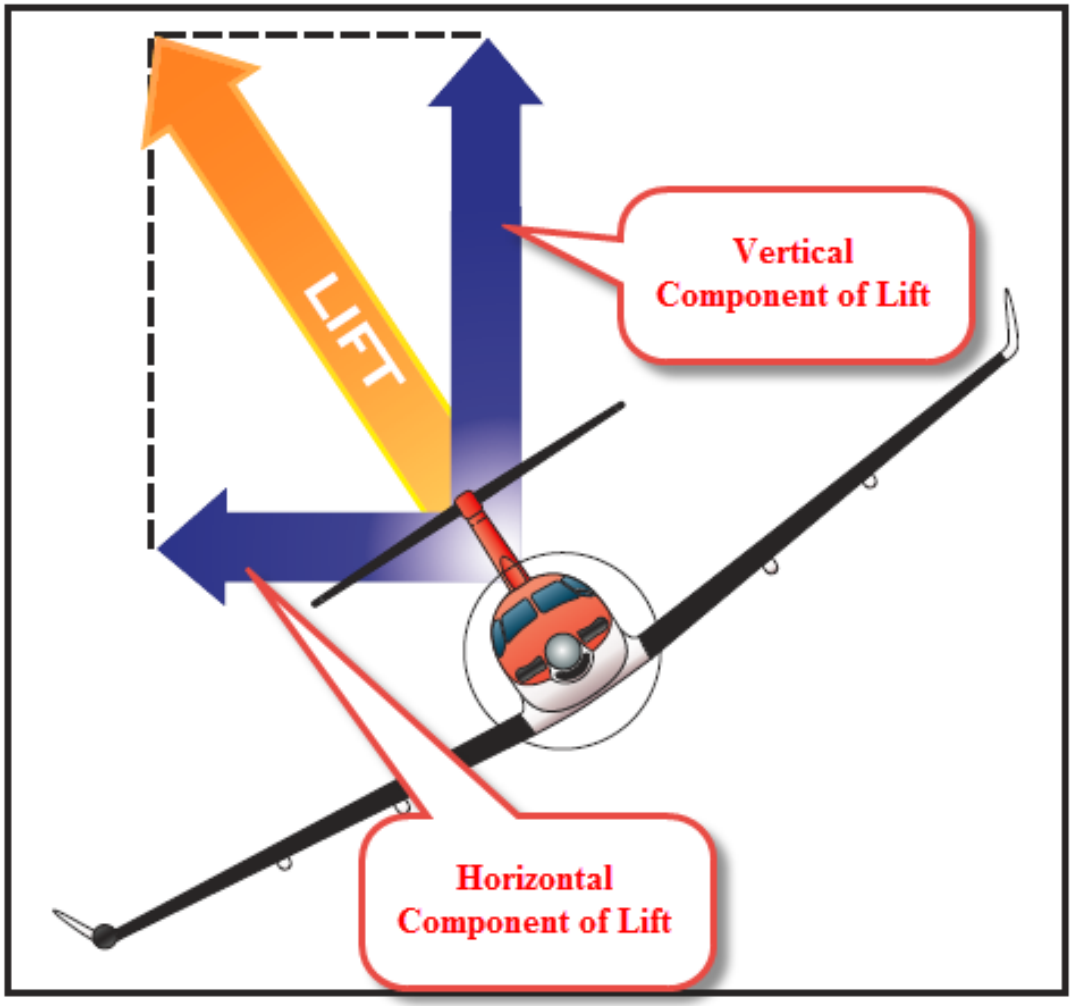
# *If You Continue The Takeoff …*

- If you choose to continue the takeoff, ask yourself …
  - Is this "Get-there-it is" and what are its risks?
    - From personal injury to self, passengers, and people on the ground
    - From insurance carrier(s)
    - From FAA
    - From NTSB
- Execute straight-out climb, unless told otherwise by ATC
  - Pitch for $V_Y$ – see your airplane's POH for details
  - Use AI for 7½° of "up" pitch to approximate $V_Y$
- Turning back to airport below 1,000 feet is **not** recommended
  - Refer to the next three slides from the FAA Pilot's Handbook of Aeronautical Knowledge and the FAA Airplane Flying Handbook for additional information

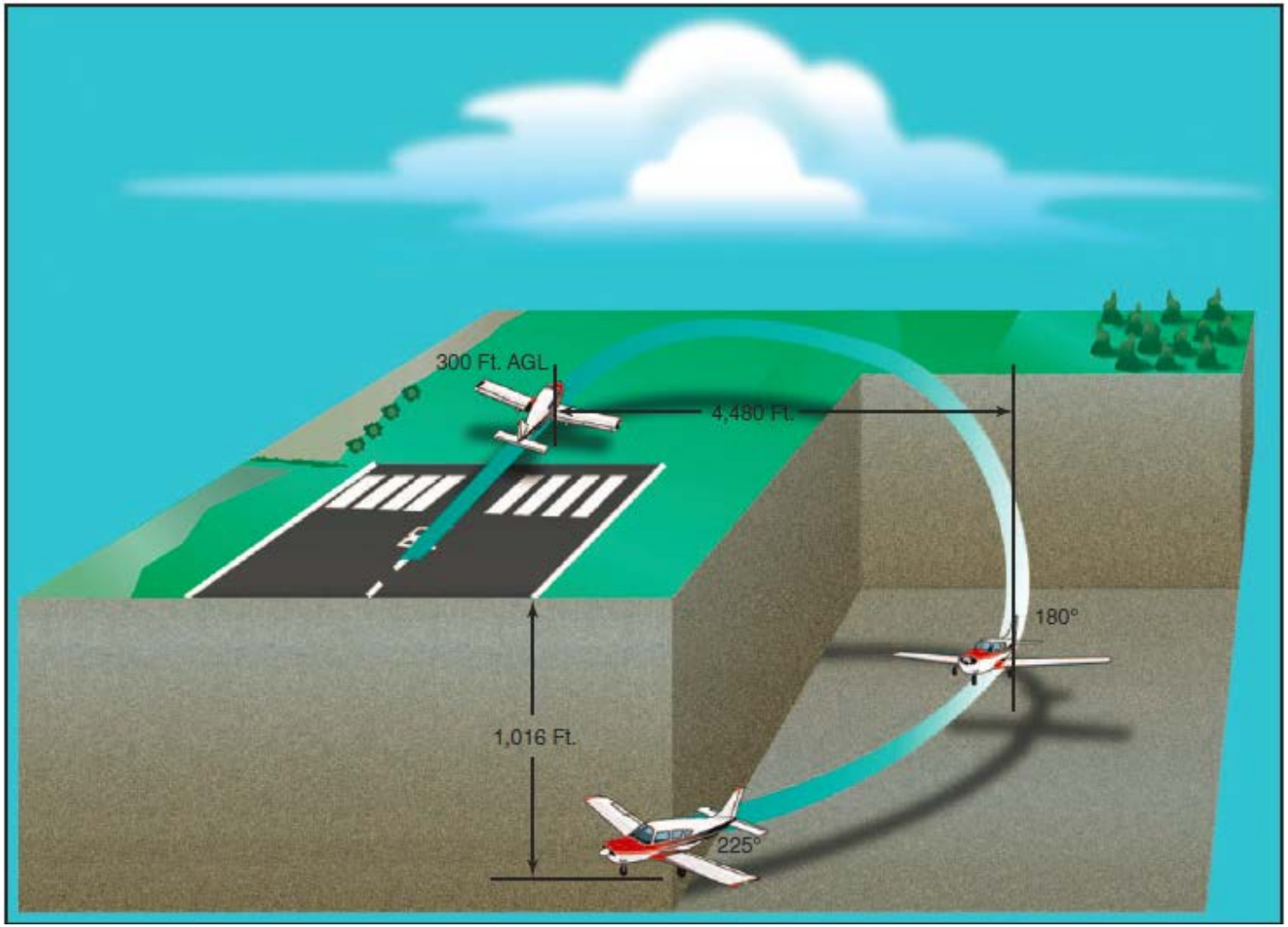
# *Aerodynamics of Turns*
# *FAA Pilot's Handbook of Aeronautical Knowledge*



# *Aerodynamics of Turns*
# *FAA Airplane Flying Handbook*



# *Turning Back to Airport After Engine Failure*
# *FAA Airplane Flying Handbook*



# How to Query the NTSB Database

# Accessing the NTSB Database

- Use your web browser to access the NTSB Database
  - http://www.ntsb.gov/aviationquery/index.aspx

**Aviation** **Accident Database & Synopses**

The NTSB aviation accident database contains information from 1962 and later about civil aviation *accidents* and selected *incidents* within the United States, its territories and possessions, and in international waters. Generally, a **preliminary** report is available online within a few days of an accident. **Factual** information is added when available, and when the investigation is completed, the preliminary report is replaced with a **final** description of the accident and its probable cause. Full narrative descriptions may not be available for dates before 1993, cases under revision, or where NTSB did not have primary investigative responsibility.

- Monthly lists - accidents sorted by date, updated daily.
- Investigations Nearing Completion - List of investigations with estimated dates of publishing probable cause.
- Downloadable datasets - one complete dataset for each year beginning from 1982, updated monthly in Microsoft Access 2000 MDB format; this site also provides weekly "change" updates and complete documentation.
- GILS record - complete description of the accident database, including definition of "accident" and "incident".
- FAA incident database - complete information about incidents, including those not investigated by NTSB, is provided by the Federal Aviation Administration.
- Data & Information Products - lists other sources of information about aviation accidents, including publications, dockets, and press releases

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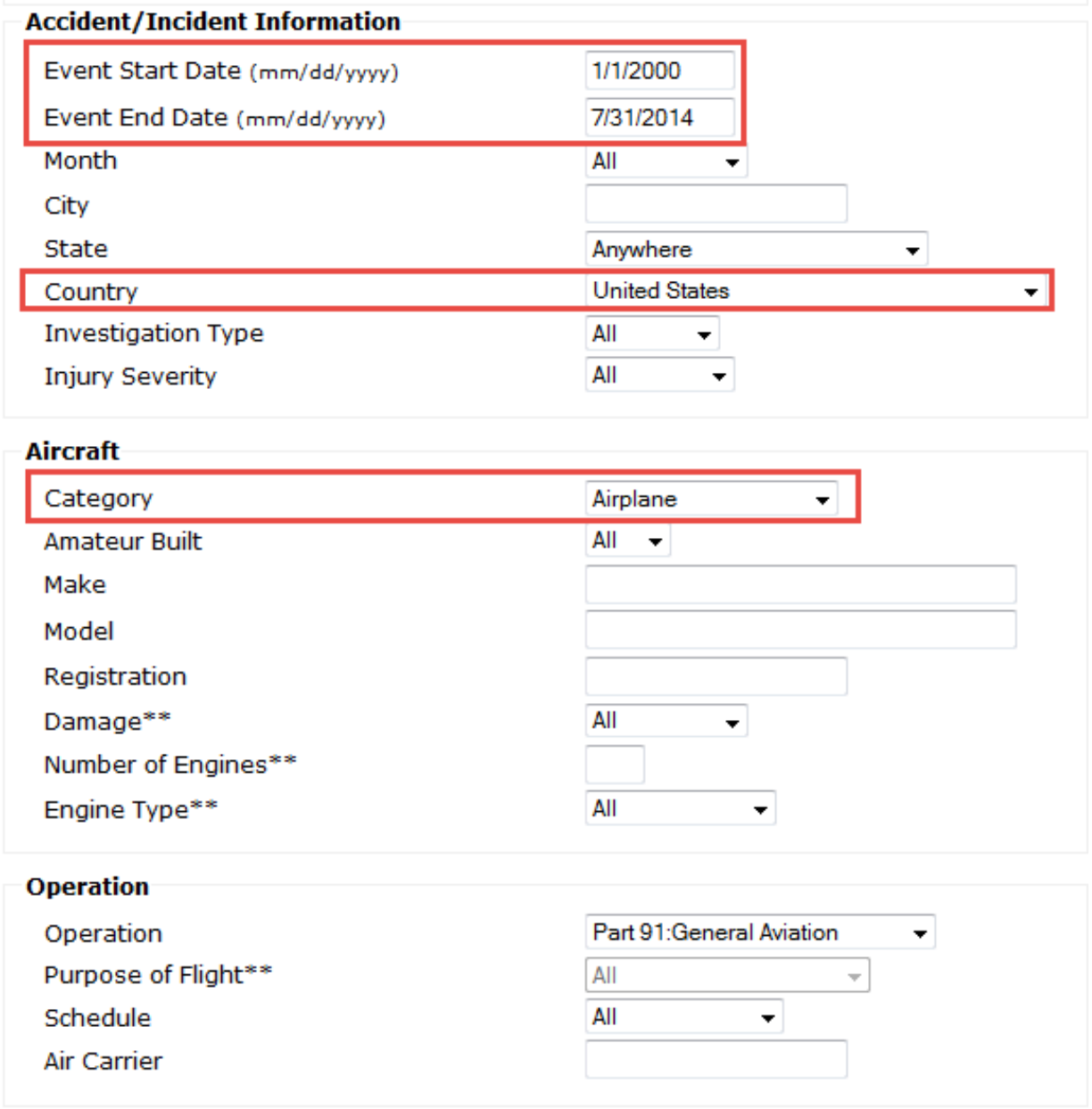
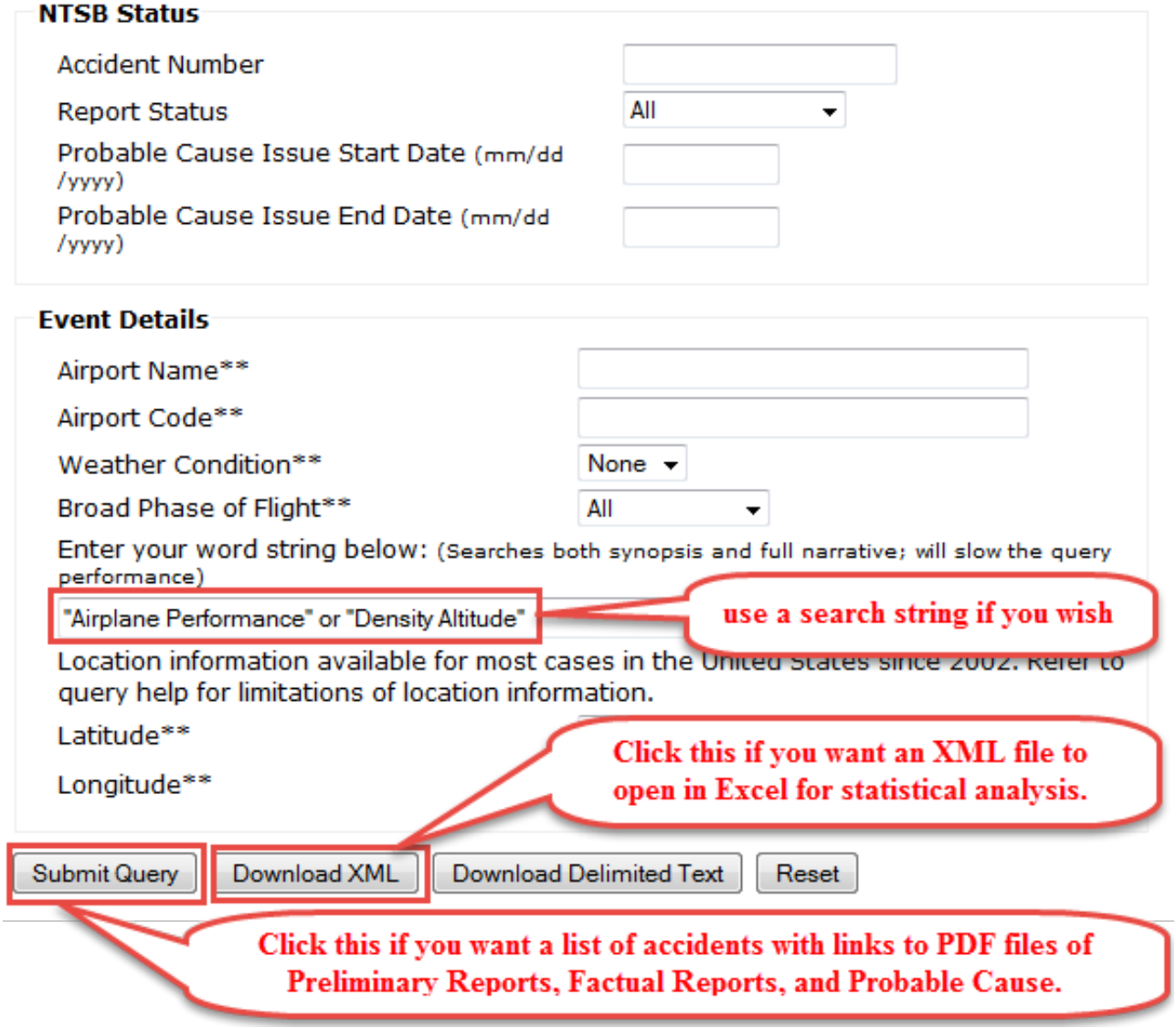
This interactive search capability for the NTSB database, updated daily; see the and **data dictionary** before using the form for the first time.

# *Accessing the NTSB Database*



# Creating an NTSB Database Query



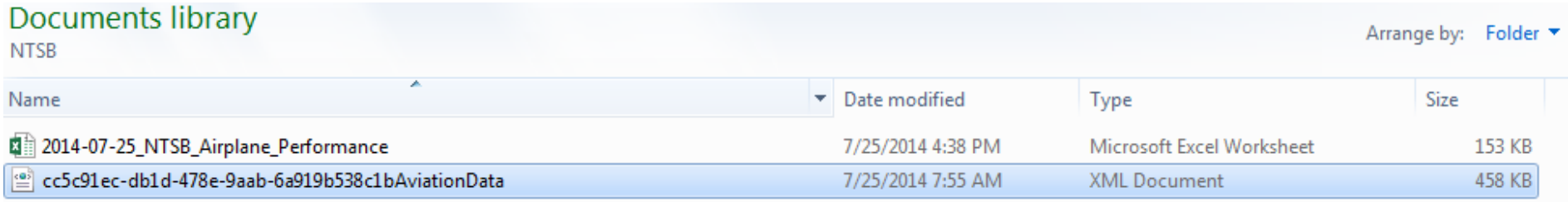
# *Database Query Results (Partial)*

Accident Database & Synopses  Download XML  Download Delimited Text

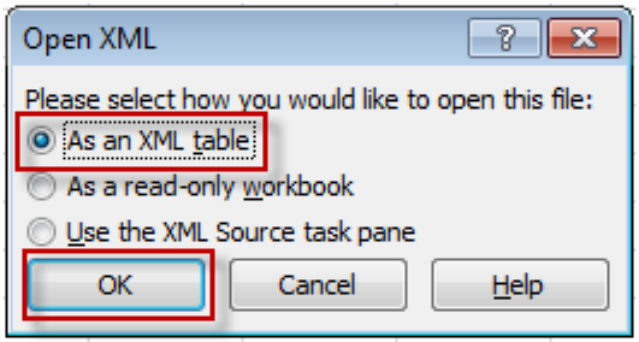
| Current Synopsis | PDF Report(s) (Published) | Event Date | Location | Make/Model | Regist. Number | NTSB No. | Event Severity |
|---|---|---|---|---|---|---|---|
| Probable Cause | Factual (04/02/2014)<br>Probable Cause (04/23/2014) | 3/19/2014 | Ruidoso, NM | PIPER PA 28R-201 | N3398M | CEN14CA164 | Nonfatal |
| Probable Cause | Factual (12/09/2013)<br>Probable Cause (12/19/2013) | 9/28/2013 | Big Bear, CA | CESSNA 182Q | N759UP | WPR13CA428 | Nonfatal |
| Probable Cause | Factual (09/25/2013)<br>Probable Cause (12/05/2013) | 9/7/2013 | Gallup, NM | CESSNA 180 | N561AT | CEN13LA541 | Nonfatal |
| Factual | Factual (03/11/2014) | 9/2/2013 | Mitchellville, MD | MOONEY AIRCRAFT CORP. M20C | N78951 | ERA13LA391 | Nonfatal |
| Preliminary | Preliminary (09/03/2013) | 8/24/2013 | Tehachapi, CA | PIPER PA 28 | N32582 | WPR13FA386 | Nonfatal |
| Probable Cause | Factual (09/25/2013)<br>Probable Cause (12/05/2013) | 8/24/2013 | Concord, WI | CESSNA 182A | N5131D | CEN13LA503 | Nonfatal |
| Probable Cause | Factual (04/02/2014)<br>Probable Cause (04/23/2014) | 7/22/2013 | South Lake Tahoe, CA | MOONEY M20C | N6709U | WPR13FA335 | Fatal(1) |
| Probable Cause | Factual (04/17/2014)<br>Probable Cause (07/30/2014) | 7/16/2013 | Pulaski, TN | THOMPSON BRUCE D SONERAI II | N788T | ERA13LA320 | Fatal(1) |

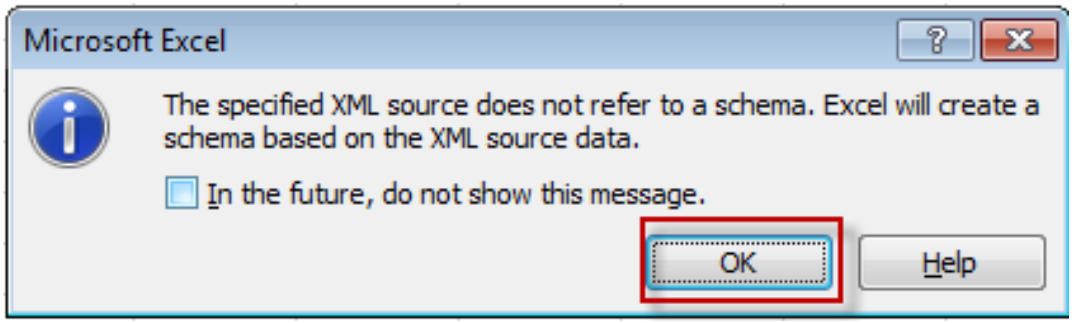
# *Download of Airplane Performance Accidents in XML Format (1 of 2)*

- Download the XML file




- After you download the XML file, launch Excel and open the XML file



# Download of Airplane Performance Accidents in XML Format (2 of 2)

- Your XML file will look similar to the screen shown below.
- You can save your XML file as an Excel workbook.

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | EventId | InvestigationType | AccidentNumber | EventDate | Location | Country | AirportCod | AirportName | InjurySeveri | AircraftDamage | AircraftCategory |
| 2 | 20140320X02459 | Accident | CEN14CA164 | 03/19/2014 | Ruidoso, NM | United States | SRR | SIERRA BLANCA RGNL | Non-Fatal | Substantial | Airplane |
| 3 | 20130928X54829 | Accident | WPR13CA428 | 09/28/2013 | Big Bear, CA | United States | L35 | Big Bear City Airport | Non-Fatal | Substantial | Airplane |
| 4 | 20130911X05138 | Accident | CEN13LA541 | 09/07/2013 | Gallup, NM | United States | GUP | Gallup Municipal Airport | Non-Fatal | Substantial | Airplane |
| 5 | 20130903X84628 | Accident | ERA13LA391 | 09/02/2013 | Mitchellville, MD | United States | W00 | Freeway Airport | Non-Fatal | Substantial | Airplane |
| 6 | 20130824X13110 | Accident | WPR13FA386 | 08/24/2013 | Tehachapi, CA | United States | L94 | Mountain Valley | Non-Fatal | Substantial | Airplane |
| 7 | 20130826X24422 | Accident | CEN13LA503 | 08/24/2013 | Concord, WI | United States | PVT | Private | Non-Fatal | Substantial | Airplane |
| 8 | 20130722X51944 | Accident | WPR13FA335 | 07/22/2013 | South Lake Tahoe, CA | United States | KTVL | South Lake Tahoe | Fatal | Substantial | Airplane |
| 9 | 20130709X80600 | Accident | ERA13CA317 | 07/08/2013 | Bronston, KY | United States | 08KY | Boss Airport | Non-Fatal | Substantial | Airplane |
| 10 | 20130502X33418 | Accident | WPR13CA213 | 07/02/2013 | Fort Smith, MT | United States | | | Non-Fatal | Substantial | Airplane |
| 11 | 20130623X22239 | Accident | WPR13CA282 | 06/23/2013 | Rawlins, WY | United States | RWL | Rawlins | Non-Fatal | Substantial | Airplane |
| 12 | 20130619X35956 | Accident | CEN13LA358 | 06/18/2013 | Durango, CO | United States | DRO | Durango - la Plata County | Non-Fatal | Substantial | Airplane |
| 13 | 20130601X53019 | Accident | ERA13LA264 | 06/01/2013 | Williamson, SC | United States | SC82 | Oakhill Airpark | Non-Fatal | Substantial | Airplane |
| 14 | 20130531X00049 | Accident | ERA13LA258 | 05/31/2013 | Herndon, VA | United States | | N/A | Non-Fatal | Substantial | Airplane |
| 15 | 20130519X61317 | Accident | WPR13FA236 | 05/18/2013 | Auburn, CA | United States | AUN | Auburn Municipal | Fatal | Substantial | Airplane |
| 16 | 20130428X00603 | Accident | WPR13LA209 | 04/28/2013 | Henderson, NV | United States | HND | Henderson Executive | Non-Fatal | Substantial | Airplane |
| 17 | 20130318X45644 | Accident | CEN13LA199 | 03/15/2013 | Broomfield, CO | United States | BJC | Rocky Mountain Metropolitan | Non-Fatal | Substantial | Airplane |
| 18 | 20130306X15132 | Accident | ANC13CA028 | 03/05/2013 | Flat, AK | United States | | | Non-Fatal | Substantial | Airplane |
| 19 | 20130303X91231 | Accident | CEN13FA183 | 03/03/2013 | Angel Fire, NM | United States | KAXX | Angel Fire Airport | Fatal | Substantial | Airplane |
| 20 | 20130123X73100 | Accident | ERA13LA117 | 01/22/2013 | Danbury, CT | United States | DXR | Danbury | Non-Fatal | Substantial | Airplane |
| 21 | 20121202X23953 | Accident | WPR13FA061 | 11/25/2012 | Aurora, UT | United States | | N/A | Fatal | Substantial | Airplane |
| 22 | 20121115X23258 | Accident | WPR13FA041 | 11/15/2012 | Morgan, UT | United States | 42U | Morgan County | Fatal | Substantial | Airplane |

# Parting Thoughts

# Just a Real Nice Picture of a Cessna 172S

# *The Three Most Useless Things to a Pilot*

- **The runway behind you**
  - **Moral: know your aircraft's take-off minimums and calculate the weight and balance for your flight, your airport's runway length, density altitude, any obstacles to be cleared**
- **The altitude above you**
  - **Moral: know your aircraft's power settings for climb, cruise, and descent**
- **The fuel on the ground below you**
  - **Moral: know your aircraft's fuel capacity, fuel system, GPH burn rate, and winds aloft for the route of flight.**
- **Utilize superior judgment to avoid needing to use superior skill**
  - **Moral: know your aircraft's systems and how to use them**

# Credits and Information

# *References and Information*

- **Author of Presentation**
  - William J. Doyle, Jr., CFI A&I, AGI, IGI, Cessna CFAI
    - FAA FAAST Team Representative, PHL FSDO
- **Downloading This Presentation**
  - Uses PowerPoint 2003 and later
  - Password-protected, so click on the “Read Only” button
  - http://williamjdoylejr.net/FAAST - all of my FAAST Team presentations
  - http://williamjdoylejr.net/FAAST/What_IF/Airplane_Performance/What_If_Airplane_Performance_ADM.ppt
  - http://williamjdoylejr.net/FAAST/What_IF/What_If_VFR_into_IMC.ppt
  - http://williamjdoylejr.net/FAAST/Cirrus/Cirrus_SR20_and_SR22.ppt
  - http://williamjdoylejr.net/FAAST/W&B/Weight_&_Balance_Cirrus_SR20.xls
  - http://williamjdoylejr.net/FAAST/Cessna/Cessna_172_182_and_206.ppt
  - http://williamjdoylejr.net/FAAST/W&B/Weight_and_Balance.ppt
- **Maj Tom Woods, FAAST Rep PHL FSDO and NJWG/DO/Air**
  - for creating the W&B spreadsheets for Cessna 172S and 182T

# *References and Information*

- **FAA Pilot's Handbook of Aviation Knowledge**
  - http://www.faa.gov/regulations_policies/handbooks_manuals/aviation/pilot_handbook/media/FAA-H-8083-25A.pdf - full handbook, 109 MB
  - http://www.faa.gov/regulations_policies/handbooks_manuals/aviation/pilot_handbook/media/PHAK%20-%20Chapter%2009.pdf – Chapter 9, Weight & Balance
  - http://www.faa.gov/regulations_policies/handbooks_manuals/aviation/pilot_handbook/media/PHAK%20-%20Chapter%2010.pdf – Chapter 10, Aircraft Performance
- **FAA Airplane Flying Handbook**
  - http://www.faa.gov/regulations_policies/handbooks_manuals/aircraft/airplane_handbook/media/FAA-H-8083-3B.pdf - full handbook, 42 MB

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- **NTSB Accident Database**
  - http://www.ntsb.gov/aviationquery/index.aspx
- **Electronic Code of Federal Regulations – Title 14 Aeronautics and Space**
  - http://www.ecfr.gov/cgi-bin/text-idx?sid=fd0d4ed9821626f95caf8cad8372ce03&c=ecfr&tpl=/ecfrbrowse/Title14/14tab_02.tpl
- **Electronic Code of Federal Regulations – Title 14 Chapter I-- Federal Aviation Administration, Department of Transportation, Subchapter D – Airmen**
  - http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?sid=fd0d4ed9821626f95caf8cad8372ce03&c=ecfr&tpl=/ecfrbrowse/Title14/14cfrv2_02.tpl

# Just a Real Nice Picture of a Cessna 182T

# FAASTeam
# on
# Don’t Be Dense!
# What If You Encountered Poor Performance on Takeoff?

## Questions?
## Comments?
## Ideas?

# This Completes
# Don't Be Dense!
# What If You Encountered Poor Performance on Takeoff?

**Be sure to sign in so your attendance is record validated!**

## FAA Customer Feedback Website

http://www.faa.gov/about/office_org/headquarters_offices/avs/offices/afs/qms/

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