# The National FAA Safety Team Presents

Federal Aviation Administration

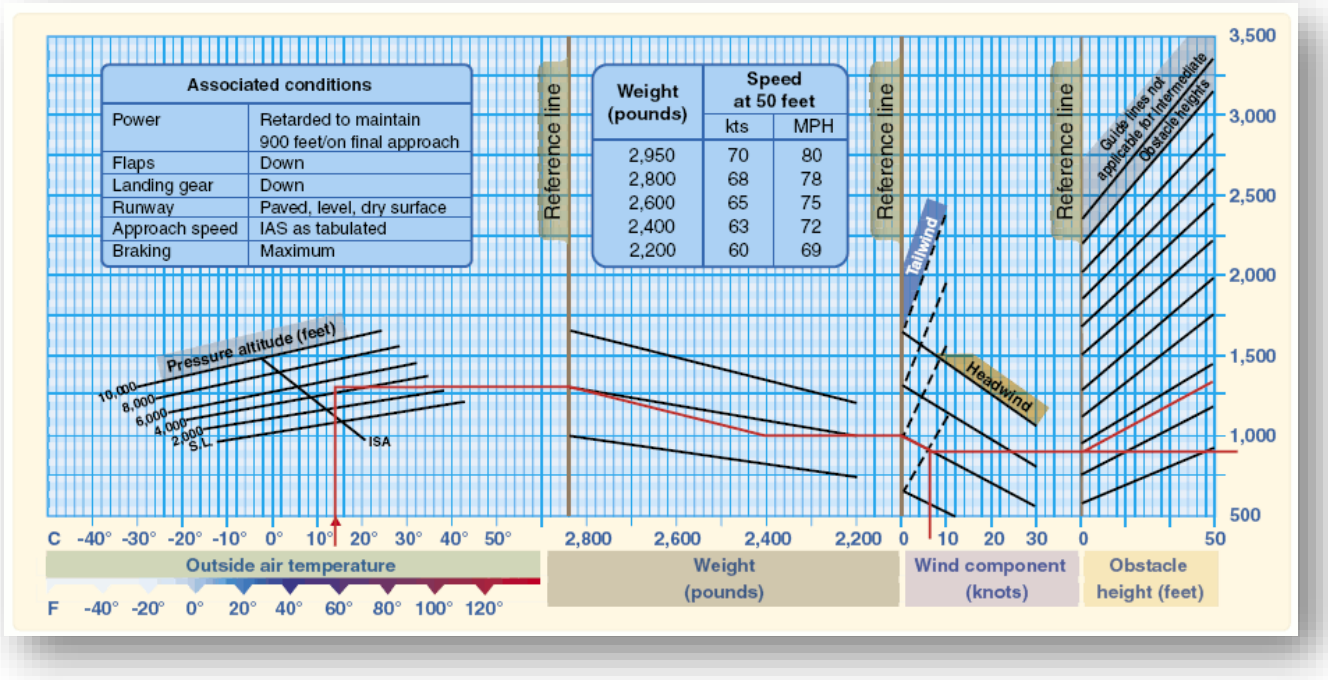
## Topic of the Month – December

## Aircraft Performance Calculation

Presented to: **EAA Apalachicola Chapter 1646**

By: **Bruce Graham FAAST Rep KAAF / X13**

Date: **10 December 2022**



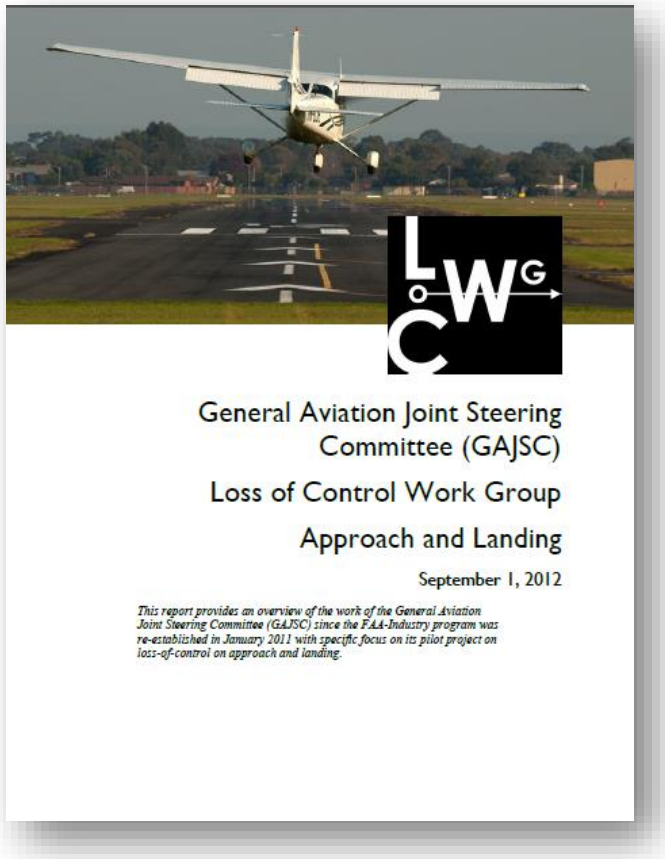

**Produced by:**
**The National FAA Safety Team (FAASTeam)**

# Welcome


- Exits
- Restrooms
- Emergency Evacuation
- Breaks
- Thanks to the EAA Apalachicola Chapter 1646 for your continued support of Aviation Safety
- Set phones and pagers to silent or off
- Other information

# Overview

- Aircraft Performance Awareness
- *GAJSC safety enhancements
- Human Solutions
- Technology Solutions
- Recommendations




*GAJSC – General Aviation Joint Steering Committee

# Know Your Plane / Know Your Numbers!

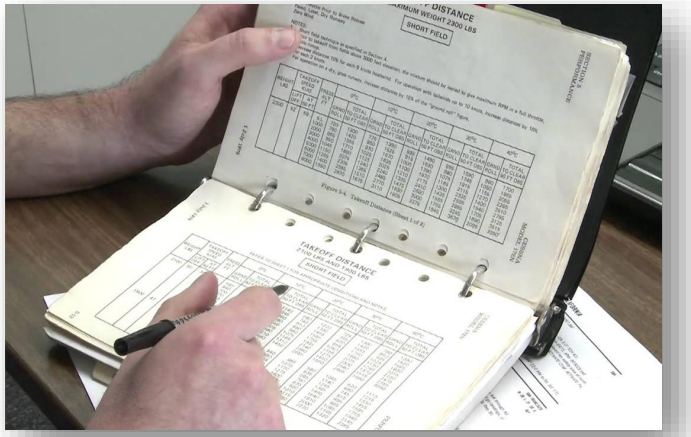
- **Fatal Crash of Mooney M20K Following Aborted Takeoff**
- **21 April 206, Mooney M20K, N97119**
- **https://youtu.be/NvjuglBoWO0**
- **Report_WPR16FA095_93051_12_1_2022 2_29_34 PM.pdf**

# NTSB Probable Cause and Findings

- **The pilot's delay in recognizing that the airplane was not performing as expected and aborting the takeoff, which resulted in collision with a berm beyond the end of the runway. Contributing to the accident were the pilot's exceedance of the airplane's gross weight and the underperformance of the engine due to governor setting and magneto timing deficiencies. Contributing to the severity of the rear passenger's injuries was his decision to forego use of his shoulder harness and/or the absence of head rests.**

# How often have you heard….

- She'll haul anything you can fit in the door
- Relax - It flew in here – it'll fly out
- We've got plenty of fuel



# Pilots need to know

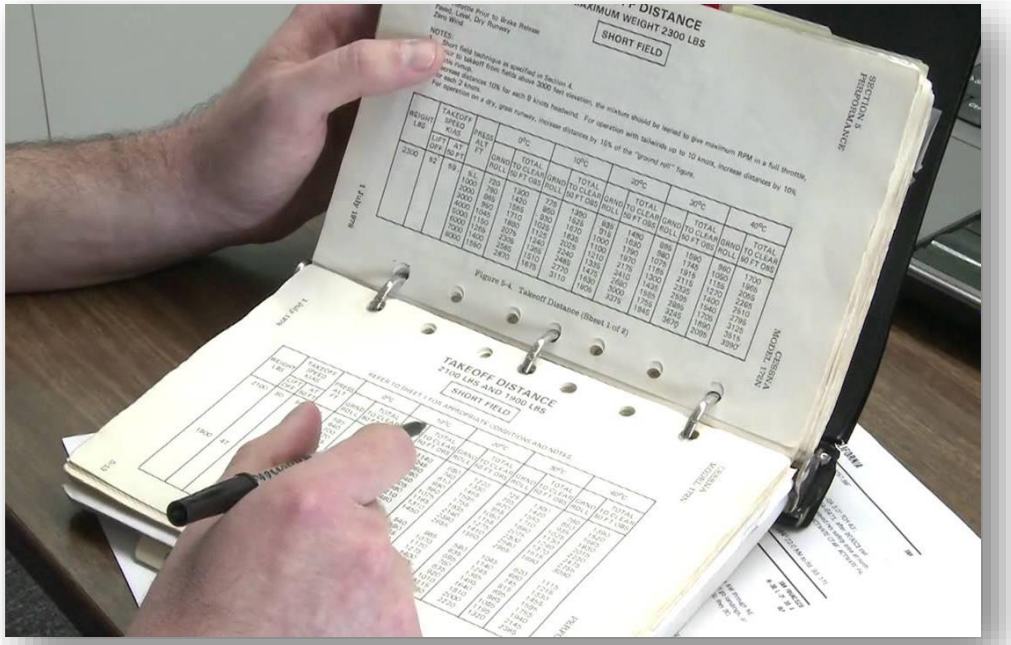
- **Weight and Balance calculations**

– **Takeoff weight and CG location**

  - **Don’t guess – weigh it!**
  - **Location, location, location**
  - **Objects may shift ……**

# Pilots need to know

- **Takeoff and climb calculations**
  - **Density Altitude**
  - **Runway length, composition, condition, and slope**
  - **Obstacle clearance**
  - **Aircraft configuration**
    - **Normal, short field, soft field**



# Pilots need to know

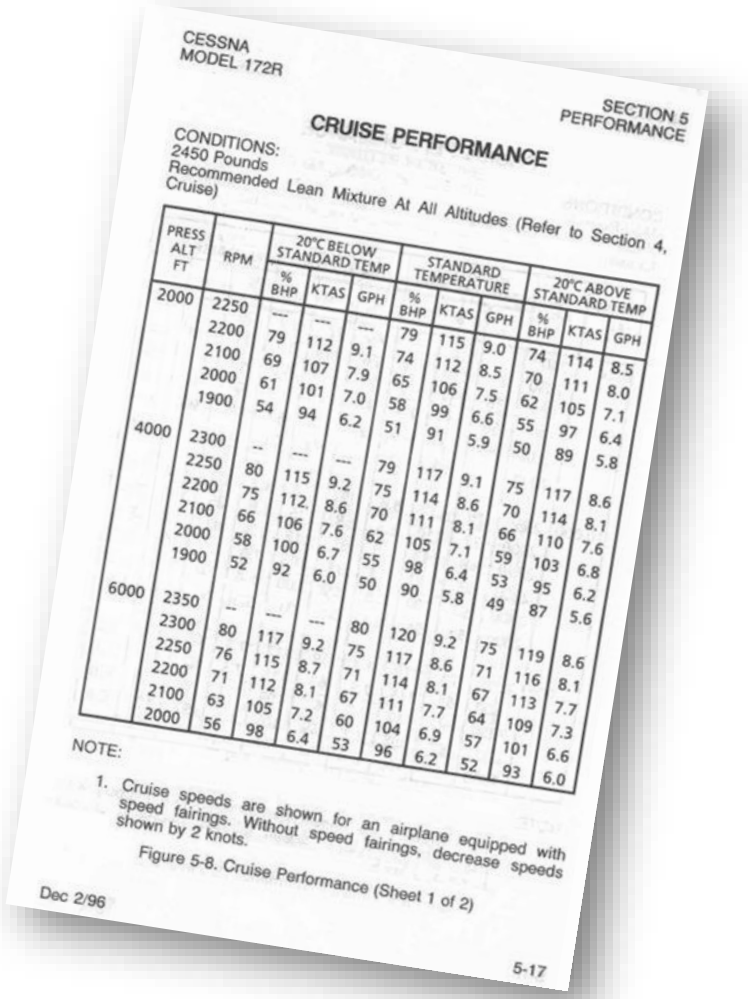
- Takeoff and departure calculations
- Rejected takeoff decision point
  - 50/70 rule
    - 60 Kts or Mph rotation speed
      - 60 x 70% = 42
    - 2,200 ft. available
      - 2,200 x 50% = 1,100
- Terrain and obstructions
- Forced landing opportunities

# Pilots need to know

- **Return to airport decision criteria**
  - **Loss of control accidents are usually fatal**
  - **Go/No-go – what's your number?**
  - **Determine with a CFI**
    - **In each airplane you fly**
    - **At operational weight at altitude**
    - **Consider Startle Response**
      - **3-second delay**
  - **Brief return to airport criteria for each takeoff**

# Pilots need to know

- **Cruise performance**
  - **Power setting & fuel consumption**
  - **Altitude, wind, & ground speed**
  - **En-route fuel availability**

CESSNA
MODEL 172R

SECTION 5
PERFORMANCE

## CRUISE PERFORMANCE

CONDITIONS:
2450 Pounds
Recommended Lean Mixture At All Altitudes (Refer to Section 4, Cruise)

| PRESS ALT FT | RPM | 20°C BELOW STANDARD TEMP | | | STANDARD TEMPERATURE | | | 20°C ABOVE STANDARD TEMP | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | % BHP | KTAS | GPH | % BHP | KTAS | GPH | % BHP | KTAS | GPH |
| 2000 | 2250 | --- | --- | --- | 79 | 115 | 9.0 | 74 | 114 | 8.5 |
| | 2200 | 79 | 112 | 9.1 | 74 | 112 | 8.5 | 70 | 111 | 8.0 |
| | 2100 | 69 | 107 | 7.9 | 65 | 106 | 7.5 | 62 | 105 | 7.1 |
| | 2000 | 61 | 101 | 7.0 | 58 | 99 | 6.6 | 55 | 97 | 6.4 |
| | 1900 | 54 | 94 | 6.2 | 51 | 91 | 5.9 | 50 | 89 | 5.8 |
| 4000 | 2300 | -- | --- | --- | 79 | 117 | 9.1 | 75 | 117 | 8.6 |
| | 2250 | 80 | 115 | 9.2 | 75 | 114 | 8.6 | 70 | 114 | 8.1 |
| | 2200 | 75 | 112 | 8.6 | 70 | 111 | 8.1 | 66 | 110 | 7.6 |
| | 2100 | 66 | 106 | 7.6 | 62 | 105 | 7.1 | 59 | 103 | 6.8 |
| | 2000 | 58 | 100 | 6.7 | 55 | 98 | 6.4 | 53 | 95 | 6.2 |
| | 1900 | 52 | 92 | 6.0 | 50 | 90 | 5.8 | 49 | 87 | 5.6 |
| 6000 | 2350 | -- | --- | --- | 80 | 120 | 9.2 | 75 | 119 | 8.6 |
| | 2300 | 80 | 117 | 9.2 | 75 | 117 | 8.6 | 71 | 116 | 8.1 |
| | 2250 | 76 | 115 | 8.7 | 71 | 114 | 8.1 | 67 | 113 | 7.7 |
| | 2200 | 71 | 112 | 8.1 | 67 | 111 | 7.7 | 64 | 109 | 7.3 |
| | 2100 | 63 | 105 | 7.2 | 60 | 104 | 6.9 | 57 | 101 | 6.6 |
| | 2000 | 56 | 98 | 6.4 | 53 | 96 | 6.2 | 52 | 93 | 6.0 |

NOTE:

1. Cruise speeds are shown for an airplane equipped with speed fairings. Without speed fairings, decrease speeds shown by 2 knots.

Figure 5-8. Cruise Performance (Sheet 1 of 2)

Dec 2/96

5-17

# Pilots need to know

- **Cruise performance**
  - **Power setting & fuel consumption**
  - **Altitude, wind, & ground speed**
  - **En-route fuel availability**



# Recommendations:


- **Be aware of en route fuel state**
  - **Confirm “time in your tanks” hourly**
- **Don’t wait to land & refuel**
  - **Too easy to press on**
- **Don’t land with less than one hour of fuel**
  - **You’ll always have VFR reserves**


# Recommendations:


- **Brief each takeoff, approach, and landing**
  - **Runway and available distance for takeoff or landing**
  - **Aircraft configuration and target airspeeds**
  - **Rejected takeoff or landing decision point**
  - **Departure/approach path**
  - **Return to airport altitude**
  - **Forced landing opportunities**

# Questions?

# Have you earned your *WINGS*?

- **Proficient Pilots are:**
  - **Confident**
  - **Capable**
  - **Safe**
- ***WINGS* will keep you on top of your game**

# http://www.mywingsinitiative.org/


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

The ***WINGS*** Sweepstakes mission is to reduce the nation's accident and incident rate by increasing pilot participation in the *WINGS* FAASTeam Pilot Proficiency Program. The *WINGS* program has courses based on real world accident and incident causes so flight instructors, pilots and student pilots get training that can truly make a difference.

Studies indicate that pilots who complete *WINGS* phases are safer aviators. Please join us in saving lives.

**Captain Sully endorses the *WINGS* Pilot Proficiency Program**
**View the video**
learn about the program and its many benefits.

**The 2020 Sweepstakes awards 10 cash prizes! Prize levels include:**

**Four (4) $1,500**
**Four (4) $750**
**Two (2) $500**

WINGS
Industry Network

# How To Win – It's Easy

- **Whenever you complete a *WINGS* phase, select *WINGS* Sweepstakes on the Team Member Award section of your My *WINGS* page**
- **Or Visit www.mywingsinitiative.org & click on "Sweepstakes Entry"**
- **Complete the form, get chances to win one of 10 cash prizes!**

***Four $1,500, Four $750,Two $500 Winners***

WINGS
Industry Advisory Committee

# Safety Management Systems (SMS) Coming to General Aviation


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

# Thank you for attending

- **You are vital members of our GA safety community**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Federal Aviation Administration

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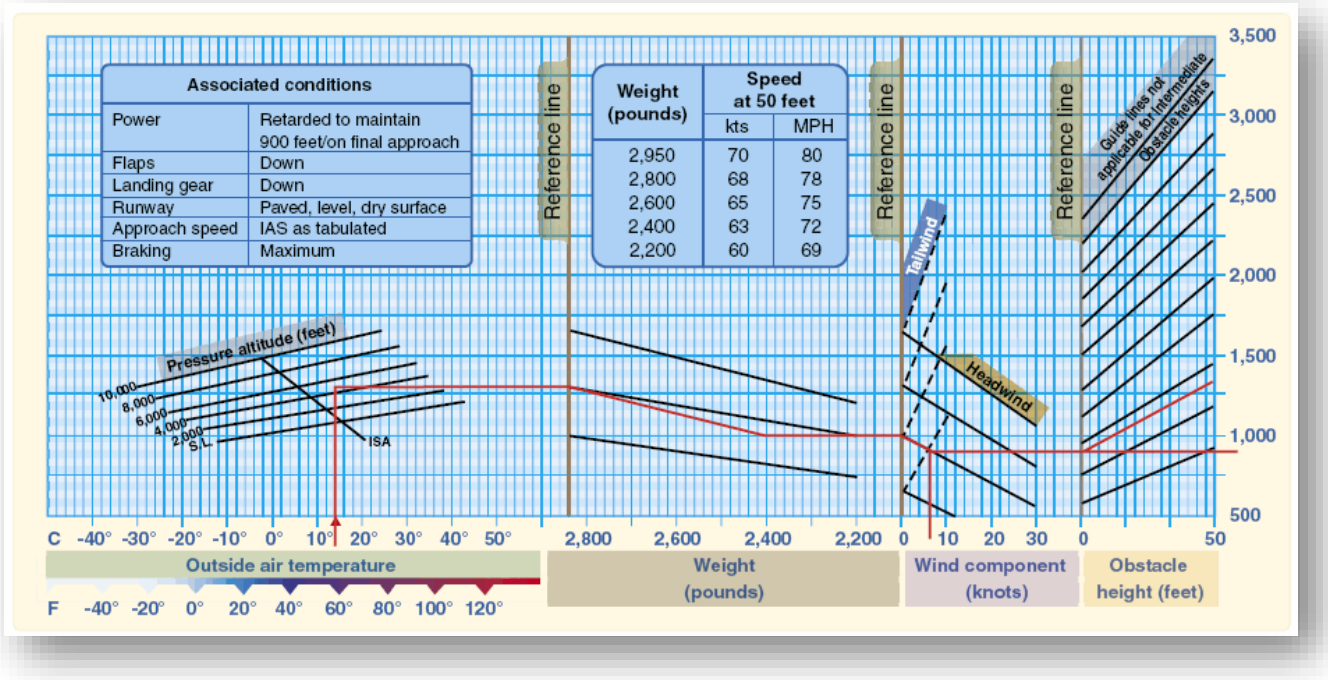
## Aircraft Performance Calculation

Presented to: <Audience>

By: <Presenter>

Date: < >

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