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# General Aviation Accident Analysis

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**Darryl Trcka**

*Greater Houston Association of Flight Instructors*

*Flight Instructor Renewal Clinic*

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# **Part 2: Implications for Flight Instructors**

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# To Locate Part 1

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[www.ghafi.org](http://www.ghafi.org)

**FIRC Presentations:**

**“General Aviation Accident Analysis -- Part 1”**

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# Review of Part 1

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***Theme of Part 1:***  
**“80/87 and 5/50”**

**Of All Accident Causes**

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**80%**

**Pilot-Related Causes**

# Of the Pilot-Related Accident Causes

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**87%** are due to:

## **Three Piloting Deficiencies**

*Takeoff and Climb*

*Maneuvering*

*Landing*

## **Three Pilot-in-Command Deficiencies**

*Weather*

*Fuel Management*

*Approaches*

# Of the Total Accident Causes

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**Piloting Deficiencies**  
Cause more accidents

**Pilot-in-Command Deficiencies**  
Kill more people

# Compared to Our Favorite Fears, A Pilot-Caused Accident is:

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**5 Times**

more likely than mechanical / maintenance failure

**100 Times**

More likely than a mid-air collision

**200 Times**

More likely than a mid-air collision during personal flying

**300 Times**

More likely than a mid-air collision during flight instruction



**Measured by total, non-fatal, and fatal accidents per flight hour:**

**General aviation is about 50 times more dangerous than air carriers.**

**Measured by non-fatal accidents per mile:**

**General aviation is about 5 times safer than motor vehicle travel.**

**Measured by fatal accidents per mile:**

**General aviation is about 5 times more dangerous than motor vehicle travel.**

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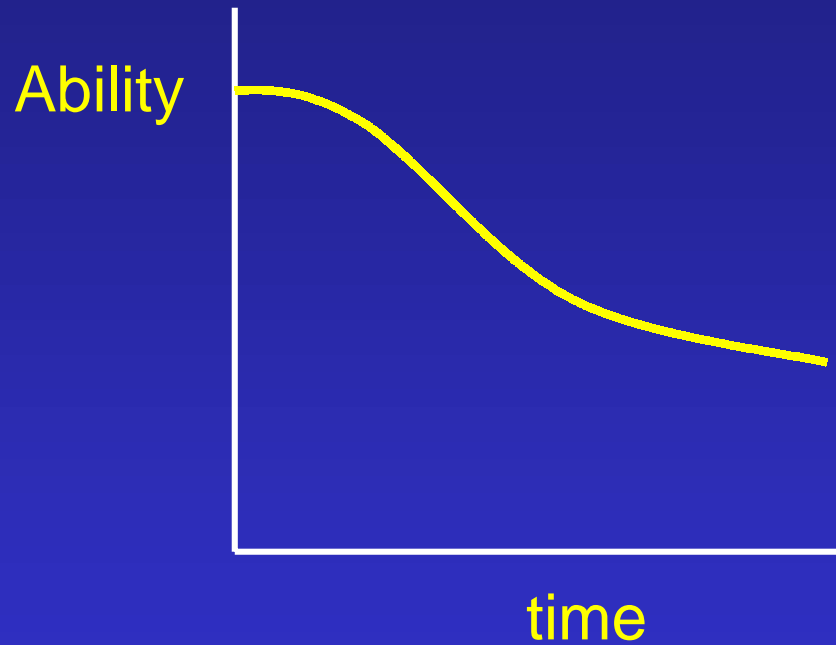
## **Part 2: Implications for General Aviation Flight Instructors**

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- **Learning Models**
- **Root Causes**
- **CFI Assignment**
- **Signposts and Techniques**

# Learning Models of Pilot Ability

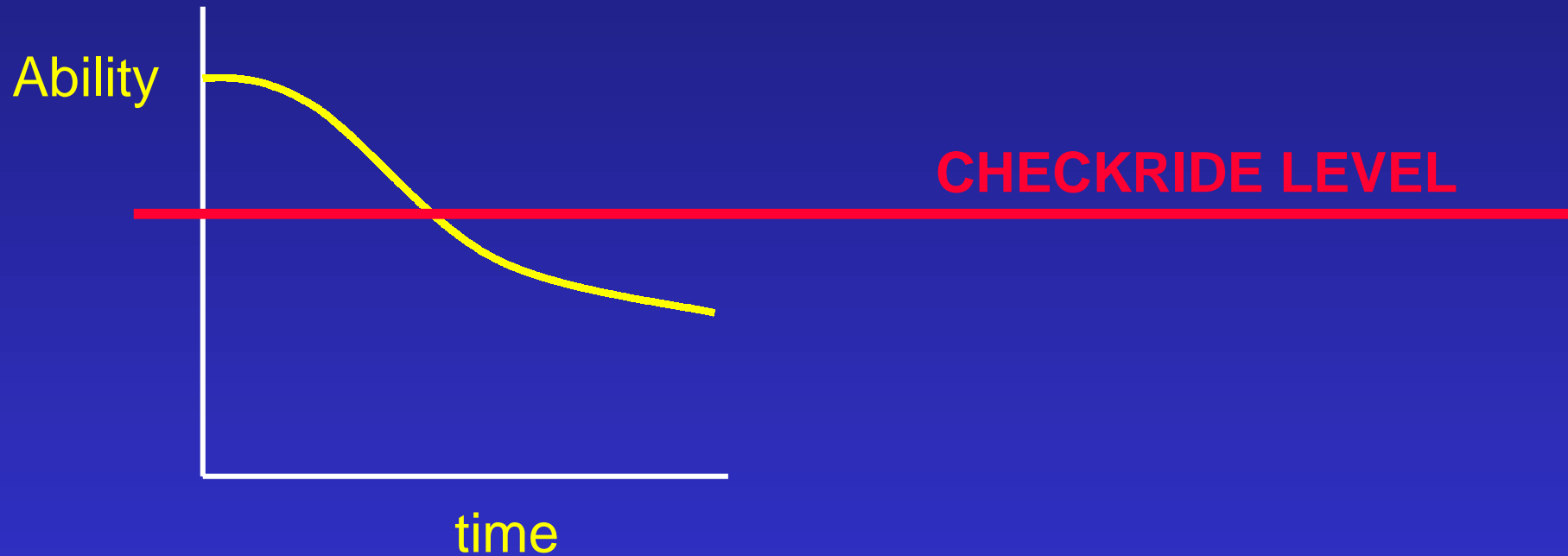
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**FY Model**

# Learning Models of Pilot Ability

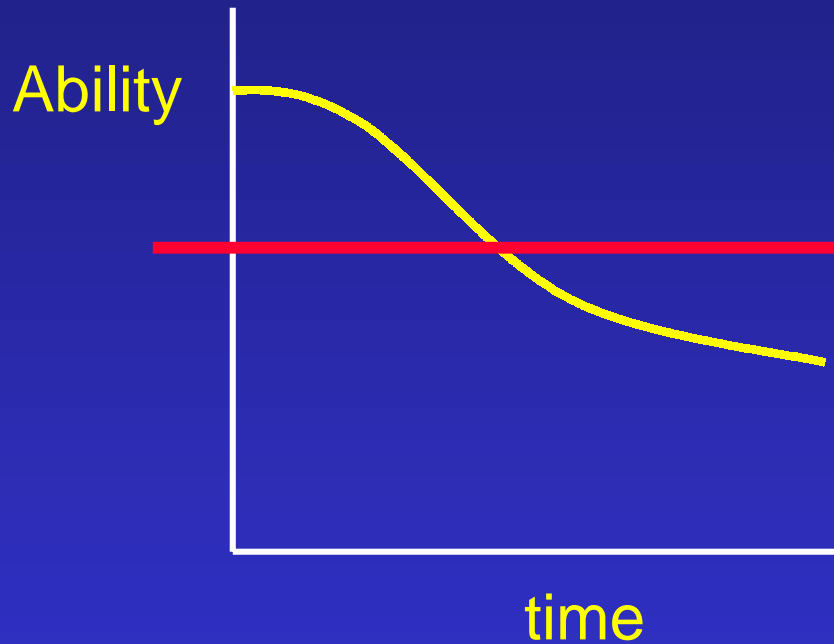
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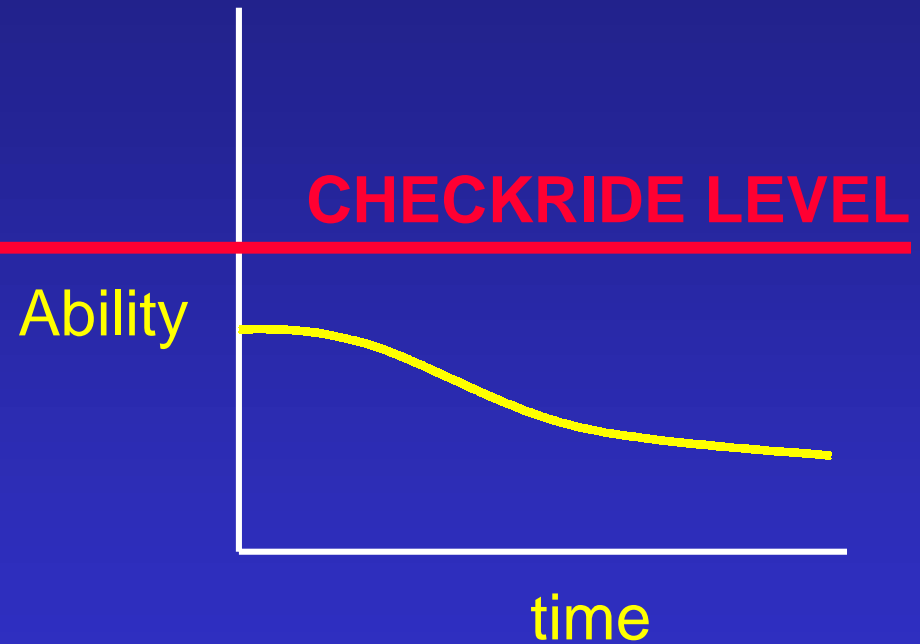
**FY Model**

# Learning Models of Pilot Ability

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**FY Model**



**PBN Model**

# How then is it possible to pass the check ride if the PBN model is correct?

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- **Check ride is a mediocre testing experience**

  - Depends on current conditions (weather, wind, traffic, time)

  - Element of personal risk to examiner produces conservatism

  - Payment implies that commercial considerations are involved

- **Skill levels and standards of performance focused on the check ride are narrow and thin**

- **Overall result:**

  - Paint-by-numbers piloting ability (PBN model of learning)

  - Passing the check ride

  - Safety record of 80/87 and 5/50

# A Moment of Retrospective

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- **Twenty years of instructing**
- **100 recommendations (P, C, I, M, FI)**
- **Two failures**
  - One should have failed
  - One shouldn't have
- **Another two or three should not have been recommended**

# Why did I recommend them?

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**I made the decision let the examiner's judgement substitute for mine.**

**(Although I didn't realize it at the time)**



# Why did I do that?

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**I had not yet recognized ...**

**That the check ride is an  
inconsequential part of the training experience,**

**That it is the instructor, not the examiner, who sets the  
standards for skill level and performance and has the  
greatest influence on the safety of the pilot's future  
flight operations,**

**That what the examiner wants doesn't make any  
difference. It's what the instructor wants that makes  
the difference in what kind of pilot the  
student becomes.**

# Results of Over-Focus on the Check Ride

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- **Over emphasis on examiner selection**  
**“Who? What does he want to see?”**
- **Teaching for the check ride**  
**“Would that pass the the check ride?”**  
(How many times have you heard that?)
- **Teaching down the middle -- Instructor timidity in asking for better performance in the corners of the flight exercise envelope**

## **It's not what we say, it's what we don't say ...**

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**“We’re going to prepare for the check ride, but the check ride itself is an inconsequential part of your becoming a capable and competent pilot.”**

**“It’s me, not the examiner, who sets the standards for your skill level and performance and who has the greatest influence on the safety level of your future flight operations.”**

**“What the examiner wants doesn’t make any difference. It’s what I want that makes the difference in what kind of pilot you are.”**

**“There is a reason for my attitude -- 80/87 and 5/50.”**

# **Symptoms of Over Emphasis on the Check Ride**

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**Selecting an examiner.**

**The moment you select a particular examiner you automatically begin to narrow your teaching.**

**If you don't decide up front who the examiner will be you have to prepare the student with broad skills and a higher level of performance.**

# Common Reasons for “Selecting” an Examiner

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- **He doesn't fail applicants and embarrass flight instructors**
- **Familiarity with the examiner makes teaching easy**
  - “He likes to see it like this.” -- It's not a question of what he likes to see, it's what you want to see that is important.
- **Advance preparation for examiner quirks**
  - Quirks don't result in check ride failures, they result in suggestions and discussion. Fear of examiner quirks indicates that the instructor is unsure of his teaching.

# Method of Random Check Ride Scheduling

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- **Explain to the student that when the time comes for the check ride, the student will get on the phone and find an examiner who can do the ride when the student wants to do it.**
- **It doesn't matter where the examiner is located.** (The student can fly the plane over to him, can't he?)
- **It doesn't matter who the examiner is.** (It doesn't matter if Hitler himself is in the right seat. The student's skill and knowledge pass your high standards and he's ready to be a command pilot. He's ready to fly to another airport, pass the oral, plan and fly the cross country exercise to an unfamiliar airport, and demonstrate well thought out pilot-in-command procedures and skilled aircraft handling along the way.)

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# **Flight Instructor's Assignment**

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# Flight Instructors' Assignment

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- **Accept total, not shared, responsibility and authority for student's piloting skill and PIC behavior**
- **Expand our ground school instruction to emphasize:**
  - **Accident Analysis**
  - **Pilot-in-Command Training**
- **Re-energize our flight training program to broaden our pilot skills curriculum and elevate our performance standards for:**
  - **Airplane Handling**
  - **Command Pilot Behavior**



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# Accident Analysis

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# Accident Analysis

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We must teach “80/87”.

# Accident Analysis

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**That 80% of all accidents have pilot-related causes. That 87% of those are due to:**

**3 BASIC piloting deficiencies:**

**Takeoff and Climb  
Maneuvering  
Landing**

**3 BASIC pilot-in-command deficiencies:**

**Weather  
Fuel management  
Approaches**

# Accident Analysis

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We must teach “5/50”.

# Accident Analysis

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**That without extra effort by the instructor and student to develop and maintain a high level of piloting skills and pilot-in-command ability, it is:**

- 5 times safer to drive**
- 50 times safer to fly commercial.**

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# Piloting Ability

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*Automatic stick-and-rudder  
responses resulting from  
basic training*

# Piloting Ability

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## Piloting Ability Maturity Signposts

# Piloting Ability

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## Maneuvers the airplane with the ball centered

### Learning Exercises / Opportunities:

- Teaching the nose response sight picture

- Dutch rolls

- Point rolls, chop turns

- Point rolls in a 45 degree banked turn

- Final approach and runway centerline alignments

### Produce:

- Effective, “comfortable” airplane handling

- Final approach alignment corrections that work

- Touchdown corrections that work

- Elimination of fishtailing that shakes confidence



# Piloting Ability

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**Maneuvers the airplane with the stick controlling airspeed and power controlling altitude**  
(maneuver vs. cruise)

Learning Exercises / Opportunities:

- Airplane configuration and phase transitions
- Pattern work
- Variation in approach paths
- Short field / obstacle clearance approaches

Produce:

- Habit of airspeed and altitude control
- Eliminate sink-down in pattern
- Eliminate airspeed bleed and automatic glide stretch on final
- Short field and obstacle clearance approach skill

# Piloting Ability

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**Can fly the airplane  
and do something else  
at the same time**

Learning Exercises / Opportunities:

High workload exercises

File flight plans in the hold or steep turn

Produce:

Scan ability

The ability to handle a high pilot work load

The ability to handle distractions

# Piloting Ability

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## Can fly a traffic pattern at a predetermined airspeed and altitude

### Learning Exercises / Opportunities:

- Airplane trimmed to hands-off flight w/ half flaps on downwind
- Automatic stick vs. power habit is fundamental
- Night approaches to isolated short field - fly the box

### Produces:

- Effective trimming to target airspeed
- Effective power management for no drift down in the pattern
- Knowledge of magic numbers for the airplane
- Well-behaved (hands-off) airplane provides the opportunity to look, transmit, and sight the approach

# Piloting Ability

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**Can fly a final approach at a constant, predetermined  
airspeed using power for descent path control**

Learning Exercises / Opportunities:

Calling the approach speed for each approach in advance  
Variations in speed and descent path

Produces

Vigilant eyes - one for airspeed, one for runway  
Quick hand for power variations (descent path control)  
Calibrated eye for nose attitude and pitch (speed control)  
Ability to handle approach traps --  
    Wind effects on final (sinks, balloons, gusts)  
    Automatic glide stretch

# Piloting Ability

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**Ability to maneuver the airplane, in the flare,  
close to the runway,  
using coordinated control and power inputs**

Learning Exercises / Opportunities:

Severe landing perturbations

One wheel landings

Multiple and side-step landings with stall warning sounding

Produces:

Skill and confidence in the touchdown phase

Eliminates the two-hand-on-the-control-wheel landings

Ability to handle the touchdown traps

Crosswinds and gusts

Sinks, balloons, shear, turbulence, deer, cows, or airplanes  
that get in the way

Go-arounds

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# Pilot-in-Command Ability

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*Knowledge*  
*Procedures*  
*Judgement*  
*Leadership*

# Pilot-in-Command Ability

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## Command Pilot Maturity Signposts

# Pilot-in-Command Ability

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Searches for knowledge beyond  
what is required

Learns his lessons

Learns more lessons



# Pilot-in-Command Ability

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## Makes, uses, and improves checklists and procedures

Makes and uses appropriate cockpit checklists particular to the N-number

Performs the right steps,  
in the right order, in the right way --  
without forgetting anything.

# Pilot-in-Command Ability

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**Understands and manages  
the progress of the flight  
and anticipates the next step**

Flight Management

Where am I?

Where am I going?

What do I do next?

Uses the systems (resources) available

Accepts limitations (weather, fuel, ability)

Accepts the obvious

# Pilot-in-Command Ability

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**Suspects trouble and  
accepts *personal* responsibility  
for avoiding it**

Double checks

Avoids blue-sky assumptions

Maintains vigilance and situational awareness

Designs options

# Pilot-in-Command Ability

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## Uses conservative judgement

Makes decisions that err on the side of caution  
Maintains options

# Pilot-in-Command Ability

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## Takes the lead

Acts like a command pilot without being prompted  
Does PIC things without being asked

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# **Check Ride Maturity Signposts**

# The Bottom Line

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**Would I ask him to take the plane and pick up my daughter at Dallas Love Field at 8:00 p.m. on the evening of the day of his private check ride?**

# The Bottom Line

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**The pilot's license is not a “license to learn.”**

**It is a license to be the command pilot of a  
passenger-carrying airplane.**



# Conclusion

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**The statistics of today are a reflection of the flight training practices of today. Flight instructors play the largest part in this story.**

**We, as individual flight instructors, cannot influence the overall general aviation accident statistics. *We can, however, influence our students' statistics.***

**If we are going to elevate the safety level of our graduates' flight operations, we have to expand the content of and elevate the standards of our training programs. We must ask more of our students -- both as pilots and as command pilots - - and ask more of ourselves as instructors.**