

Attitudes Toward the Practical Incorporation of Scenario Based Training (SBT) into a Commercial Pilot Training Syllabus: A Preliminary Study

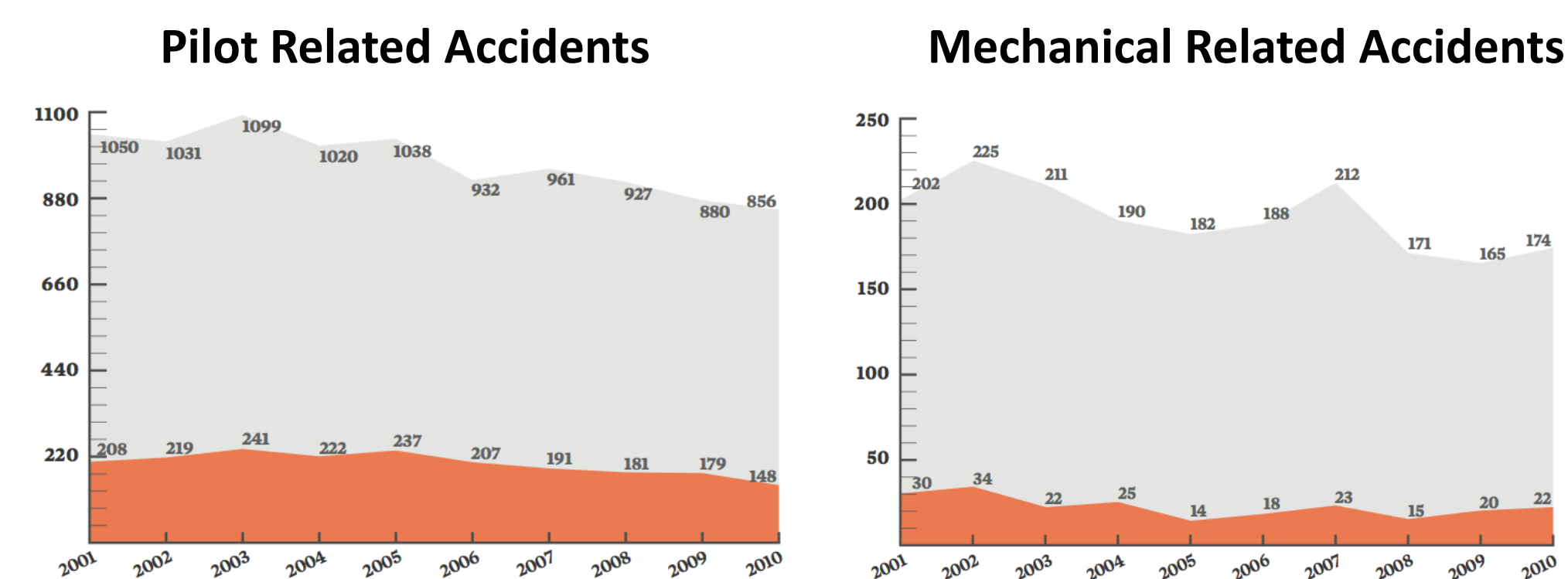
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Background

As aviation moves into its second century, aircraft accidents still occur, though at a very low rate. With that said, the rate of pilot-related accidents in General Aviation (GA) has not decreased when compared to the rate of mechanical-related accidents in GA. According to the 2010 Nall Report, the number of GA aircraft accidents that were pilot-related made up for 73.9% (857 accidents), mechanical-related accidents made up for 15.0% (174 accidents) and other unknown causes made up for 11.1% (129 accidents) of all accidents that year (Kenny, 2011). According to Kenny (2011), "Most pilot-related accidents reflect specific failures of pilot planning or decision-making or the characteristic hazards of high-risk phases of flight." As pilot-related accident rates continue to be higher than mechanical-related accidents, exploration and experimentation is being conducted to look for new ways to address this issue.

Pilot vs. Mechanical Related Accidents in General Aviation



ALL ACCIDENTS
FATAL ACCIDENTS

Data from the 2010 Joseph T. Nall Report shows General Aviation accidents from 2001-2010 comparing pilot-induced accidents and mechanical induced accidents.

One Method to Address Pilot-Related Accident Rates is Scenario Based Training

- Scenario Based Training is a training system that is structured to use real-world scenarios to meet flight training standards in an operational environment

Effectiveness of Scenario Based Training

- Studies have been conducted which show that students trained using Scenario Based Training (SBT) outperformed students trained with traditional Maneuver Based Training (MBT)
 - Middle Tennessee State University (MTSU): Students in the SBT program completed training in 45 less hours than MBT students
 - University of North Dakota (UND): SBT students demonstrated higher performance on stage checks and Aeronautical Decision Making (ADM)
 - The Federal Aviation Administration (FAA): The FITS training program creates scenario-based, learner-focused training materials that encourage practical application of knowledge and skills

The Underutilization of Scenario Based Training

- The current FAA Standard Test Standards (PTS) is maneuver based
 - In an effort to promote SBT curriculum, the FAA is working on revising the current PTS to incorporate more scenarios and pilot decision-making
- FAA handbooks such as the Aviation Instructors Handbook, Pilot's Handbook of Aeronautical Knowledge and The Airplane Flying Handbook encourage the use of SBT but offer very little guidance on how to implement SBT
- After reviewing several 14 CFR Part 61 and Part 141 Commercial Pilot Airplane Training syllabi, it is evident that MBT is still the more prevalent method of instructing

Attitudes Toward Scenario Based Training

- The reason SBT is underutilized may be because of the attitudes, lack of knowledge and misconceptions of flight instructors and students towards SBT

Methods

Current attitudes towards the addition of Scenario Based Training into a typical Commercial Pilot Airplane Training Syllabus will be examined. Attitudes of past, current and future commercial pilot applicants such as ERAU flight instructors, faculty and students will be evaluated through the use of a qualitative, 12 question survey. Below is an example of the survey.

Sample Survey (Pending IRB Approval)

- What is your Institutional Affiliation?
 - ERAU
 - Other _____
- What best describes you? (Select all that apply).
 - Faculty
 - Student
 - Flight Instructor
 - Other _____

Please fill in the circle which best describes your answer to the statement.

- I understand the definition of Scenario Based Training (SBT).
Strongly Agree Agree Neutral Disagree Strongly Disagree Don't Know/ N/A
- Scenario Based Training (SBT) has been effectively integrated into commercial pilot certification training by flight schools and flight instructors.
Strongly Agree Agree Neutral Disagree Strongly Disagree Don't Know/ N/A
- I have experienced Scenario Based Training (SBT) in commercial pilot training course.
Strongly Agree Agree Neutral Disagree Strongly Disagree Don't Know/ N/A
- I believe Scenario Based Training (SBT) is important to include into a commercial pilot training course.
Strongly Agree Agree Neutral Disagree Strongly Disagree Don't Know/ N/A
- Scenario Based Training (SBT) methods should be used for both instruction and evaluation in a commercial pilot training course.
Strongly Agree Agree Neutral Disagree Strongly Disagree Don't Know/ N/A
- Flight Instructors should increase Scenario Based Training (SBT) in commercial pilot training courses.
Strongly Agree Agree Neutral Disagree Strongly Disagree Don't Know/ N/A
- Scenario Based Training (SBT) should be incorporated in all phases of flight training such as flight lessons, ground lessons, and simulator lessons.
Strongly Agree Agree Neutral Disagree Strongly Disagree Don't Know/ N/A
- Guidance for instructors is adequate for implementation of Scenario Based Training (SBT).
Strongly Agree Agree Neutral Disagree Strongly Disagree Don't Know/ N/A
- The FAA should require use of Scenario Based Training (SBT) in commercial pilot courses.
Strongly Agree Agree Neutral Disagree Strongly Disagree Don't Know/ N/A
- Scenario Based Training (SBT) decreases "stick and rudder" skills.
Strongly Agree Agree Neutral Disagree Strongly Disagree Don't Know/ N/A

Future Directions

- Examine preliminary survey results for the purpose of refining questions and more specific demographic questions to increase the range of results
- Move the study from investigating attitudes towards incorporating Scenario Based Training into a Commercial Pilot Training Syllabus into investigating attitudes towards incorporating Scenario Based Training into flight training in general
- Further exploration into utilization of Scenario Based Training in flight training



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Abstract

As aviation moves into its second century, aircraft accidents have become less common, but the rate of decision-based accidents has not decreased in comparison with mechanical-failure based accidents. This is especially true of General Aviation accidents, both in single engine and light twin aircraft. While the Federal Aviation Administration has emphasized the use of Scenario Based Training (SBT) in General Aviation flight instruction to address this issue, SBT lessons are not widely utilized and descriptions in associated handbooks of how to incorporate SBT are considered vague by many. In this preliminary study, attitudes of ERAU Prescott faculty, staff and students toward the practical addition of Scenario Based Training to Commercial Pilot Training are examined by use of a short, qualitative survey..

Attitudes Toward the Practical Incorporation of Scenario Based Training (SBT) into Commercial Pilot Training: A Preliminary Study

As aviation moves into its second century, aircraft accidents still occur, though at a very low rate. With that said, the rate of pilot-related accidents in General Aviation (GA) has not decreased when compared against the rate of mechanical-related accidents in GA. According to the 2010 Nall Report, the number of GA aircraft accidents that were pilot-related made up for 73.9% or 857 accidents, mechanical-related accidents made up for 15.0% or 174 accidents and other unknown causes made up for 11.1% (129 accidents) of all accidents that year (Kenny, 2011). According to Kenny (2011), “Most pilot-related accidents reflect specific failures of flight planning or decision-making or the characteristic hazards of high-risk phases of flight.” As pilot-related accident rates continue to be higher than mechanical-related accidents, exploration and experimentation is being conducted to look for new ways to address this issue.

One Method to Address Pilot-Related Accident Rates is Scenario Based Training

While there are many ideas and opinions regarding the best approach to decreasing pilot-related accidents, Scenario Based Training (SBT) has become prominent amongst these. Scenario Based Training is a training system that is structured to use real-world situations or scenarios, to meet flight training standards in an operational environment. Currently, multiple studies are being conducted evaluating the effectiveness of SBT after it has been introduced into a pilot training syllabus. Preliminary results from these studies are finding that SBT has a favorable effect on pilot performance and can actually be an aid to developing pilot decision-making skills.

Effectiveness of Scenario Based Training

Studies have been conducted which show that students trained using Scenario Based Training (SBT) outperformed students trained with traditional Maneuver Based Training (MBT) in several areas.

One such study involves the integration of SBT into a combined Private Pilot and Instrument Pilot training syllabus as part of the Small Aircraft Transportation System Aerospace Flight Education Research (SAFER) (Craig, P.A., Bertrand, J.E., Dornan, W., Gossett, S., & Thorsby, K. K., 2005). This study is being conducted by The Aerospace Department at Middle Tennessee State University (MTSU) and NASA Langley Research Center. As part of this research, the FAA granted an exception from 14 CFR 61.65 to allow students to take a single practical test to gain both Private and Instrument Pilot privileges (Craig et. al, 2005).

The SAFER curriculum was designed to target decision making skills through the analysis of NTSB accident reports, and hazardous pilot attitudes. During the course of training, the student pilots were expected to obtain proficient “stick and rudder” skills, equivalent to or better than students learning via traditional methods. Upon completion of the SAFER course, students participated in a flight evaluation that was designed to test their skills through the use of realistic scenarios which included or could include: Changing destinations and clearances, failed equipment, emergencies, stick and rudder skill demonstration and realistic distractions. The curriculum also included the basic pilot knowledge required for the FAA Private Pilot and Instrument Rating knowledge tests. A unique part of the SAFER syllabus was that no minimum hour requirements were required to be met (Craig, et. al, 2005). SAFER students averaged 88.74 hours of training time to complete the combination private and instrument flight training course.

The SAFER program trials began in September of 2004 with 14 students and upon completion performance results were compared with archival data of 19 random MTSU students who had completed traditional Private Pilot and Instrument Pilot training courses. (Craig et.al, 2005). Of the pilots examined that trained with the traditional MBT syllabus, completion times to obtain the Private Pilot Certificate and Instrument rating averaged 134 hours, while students using the SAFER syllabus to obtain both ratings had an average completion time of 89 hours, which was estimated to save approximately

\$6,000 in flight training costs. (Pendleton, 2014). This data reinforces the idea that SBT is an effective method of training new pilots.

It is important to note that the data collected by MTSU to date, depicts that students using a traditional MBT syllabus suffer less setbacks (repeat lessons) during pre-solo, than students using SBT. However, students training with the SBT/SAFER syllabus begin to excel after their first solo and complete their private and instrument training much sooner than students using MBT. At the conclusion of this research, Craig et. al (2005) states that, “The evidence at this point tends to support the claim that all the time and money spent on formal maneuver training in traditional syllabi appears to be immaterial when applied to scenario training ...SAFER students perform admirably in the real world to the extent that the evaluative flights were able to mimic it and appear, in addition, to cope on levels more associated with two or three hundred hours total time, rather than 85 to 90-hour pilots.” The final recommendations of the research included that, “The pilots in the SAFER Project do not perform worse than their contemporaries who have received formal, repetitive maneuver training; rather, they perform as well or better. Further, their ability to cope with changes, amendments, and demands for performance seems more than up to the various tasks.”

In addition to the research done at MTSU, a similar study was conducted at the University of North Dakota (UND). Flight training at UND at the time this study was conducted was primarily maneuver based . A problem with this was that new pilots could usually master the individual required tasks but would have a very difficult time correlating these maneuvers to the real-world environment (Lease, 2007). UND’s study compared the performance of two groups of Private Pilot students. One group was trained using SBT and the other group used MBT. The results show that the students who were trained with scenarios out-performed the students who were trained solely by practicing maneuvers in six out of the seven research measures that were conducted. Final words from Lease (2007) include, “Examination of the Ground and Flight Training Time data shows that SBT students required 3.1 fewer aircraft hours and approximately 2.9 fewer pre- and post-lesson briefing hours than the MBT group. They

also experienced fewer repeat lessons and demonstrated higher performance on stage checks, Aeronautical Decision Making, and dead reckoning navigation.”

The Underutilization of Scenario Based Training

Although the FAA and other organizations emphasize the use of SBT in GA flight instruction as a way to address the issue of decision-based accidents, the actual use of SBT in flight instruction and evaluation may not be as prevalent. An example of this is the reliance on the current Practical Test Standards (PTS) issued by the FAA, in training and evaluation. The current PTS documents lend themselves to be used as maneuver-based testing guides. This poses the following question: How can flight instructors be influenced to train their students using one method such as SBT, when they know their student’s will be evaluated using a prominently, maneuver based guide? It has also been noted that there are few resources and handbooks on SBT (namely the Aviation Instructors Handbook and Pilot’s Handbook of Aeronautical Knowledge) and those that exist can be considered vague when it comes to descriptions of SBT and how to incorporate it into flight training on a practical level.

To exemplify this, several 14 CFR Part 61 and Part 141 Commercial Pilot Training syllabi were examined and it is evident that MBT is still the more prevalent method of instructing.

Attitudes Toward Scenario Based Training

While there may be many reasons why SBT is seen as vague or underutilized, one possibility is the attitudes of flight instructors and/or students who would be directly affected by the incorporation of SBT. It is hypothesized that there may be a lack of knowledge and/or misconception by flight instructors and students about SBT and this leads to the development of certain beliefs or attitudes towards this method of training. A qualitative, 10 question survey, that is currently in development will be used to further evaluate attitudes towards SBT by faculty, flight instructors and students at both Embry-Riddle Aeronautical University (Prescott) and other institutions.

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