SOARING SAFETY FOUNDATION

Nov 1, 2009 – Oct 31, 2010
SAFETY
REPORT

SOARING SAFETY FOUNDATION

PREFACE

In 1985 the Soaring Society of America (SSA) formally created the Soaring Safety Foundation (SSF). The SSF was tasked with 2 major objectives, (1) to develop methods and techniques that would promote soaring safety in the United States; and (2) review and disseminate flight training information and material. These tasks had previously been performed by several subcommittees of the SSA Board of Directors. The creation of the SSF allowed these tasks to be focused in a single organization whose main mission is the promotion of soaring safety.

Accident data included in this report was obtained from two primary sources: the National Transportation Safety Board (NTSB) accident reports (http://www.ntsb.gov/ntsb/query.asp) and the Federal Aviation Administration (FAA) daily reporting system. These sources were selected because of the specific reporting requirements specified in the Code of Federal Regulations NTSB Part 830. Although it would be ideal to include all accident and incident reports involving gliders, it becomes extremely difficult to confirm accurate reporting from the various entities involved. Consequently, the SSF elected to take advantage of the standardized reporting requirements of NTSB Part 830 to develop its data base of soaring accident information. This data base is then used to develop accident prevention strategies and to continuously improve training methods to reduce the number of soaring accidents.

The information contained in this report represents data compiled by the SSF and reported in **Soaring** Magazine, Flight Instructor Refresher Clinics, at pilot safety seminars, and on the **SSF web site (http://www.soaringsafety.org)**.

Funding for the SSF is obtained through donations from individuals and organizations interested in the promotion of soaring safety. These funds are then used to develop and promote programs such as soaring safety seminars, flight instructor refresher clinics, posters, safety-related articles in *Soaring* Magazine, the SSF web site, and the newsletter of the SSF, *Sailplane Safety*. The Trustees of the Soaring Safety Foundation sincerely hope that this report and the publication of accident data are beneficial in assisting members of the soaring community in developing a greater awareness of current issues and emerging trends in soaring safety.

Additional copies of this report may be obtained from the Soaring Safety Foundation web site http://www.soaringsafety.org. Select the “Accident Prevention – SSF Reports” tab or write to:

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EXECUTIVE SUMMARY

This report covers the FY10 (November 1, 2009 to October 31, 2010) reporting period. A review of the glider accidents listed in the NTSB accident database shows a 6% decrease in the number of US soaring accidents during this time period compared to the FY09 reporting period. FY10 also saw a 25% decrease in the number of fatal accidents. However, the long term trends indicate that each member of the US soaring community must carefully evaluate their individual attitudes and organization's culture towards soaring safety. Only by accepting that we all must strive to change our individual attitude toward safety while promoting an "operational safety culture" inside our organization can we reduce the number of accidents that impact all of us.

For the twelve-month period ending October 31, 2010, twenty-nine (29) gliders, three (3) motorgliders, five (5) towplanes, and one (1) airplane were involved in thirty-two (32) separate accidents considered to have metthe reporting requirements of NTSB Part 830 of the Code of Federal Regulation. The five-year average for the FY06 – FY10 reporting period is 34.6 accidents per year, representing no change in the average number of accidents from the previous five-year period.

While the average number of accidents per year has shown a steady decline since 1981 (averaging 45.6/year in the 80's, 38.6/year in the 90's and 33.3/year in the 00's) the number of accidents each year remains too high[1]. In addition, the average number of fatalities has remained nearly constant, at just over 6 per year since the mid 1990's. However, in the FY10 reporting period six (6) accidents resulted in fatal injuries to nine (9) pilots and passengers. In addition, two (2) pilots and one (1) passenger received serious injuries while twenty-seven (27) pilots and three (3) passengers received minor or no injuries during the FY10 reporting period.

A review of the six (6) fatal accidents showed that three (3) accidents were midair collisions, two (2) gliders crashed in mountainous terrain and the remaining glider crashed in the midwest. The NTSB investigation reported one (1) midair was the result of a failure of the pilots to see and avoid each other, the remaining accidents are still under investigation. While six is a slight decrease from the FY09 period, these accidents do nothing to reduce the historical trend of six (6) fatalities every year, and if our activity is less, that makes it even worse. This should make us all pause. The US glider pilot community needs to identify and implement ways they can lower these alarming numbers. It should also be noted that this is a common problem facing both the US and European gliding communities.

Reversing a 2 year trend, the number of accidents that occur during the landing phase of flight increased again this period. In FY10 landing accidents represented 59.4% of all accidents. It should also be noted that eight (8) of the nineteen (19) landing accidents, or 42%, occurred while the pilot was attempting an off-field landing. The remaining eleven (11) accidents occurred while the pilot was attempting to land on their home airport. NTSB causes of these accidents indicate the pilot: exercised poor judgment by launching in poor weather, delayed the landing in an attempt to 'save' the flight, or misjudged the approach due to improper use of the flight controls.

For the past few years the SSF has been promoting that pilots and instructors adopt a 'goal oriented approach' to pattern planning and execution. The 'goal' is to arrive at your selected landing spot, so that you can stop at a pre-determined point. In this approach, the pilot

[1]It is unknown whether the recent decline is a measure of decreased activity.

continuously evaluates the gliders flight path taking into account wind speed/direction, lift/sink, distance remaining to the landing spot, and the height above the landing spot. The key to accomplishing this approach is to recognize that while most pilots have difficulty picking out a specific angle, every pilot is adept at recognizing changes in angles. Responding to the slightest change, by making small changes in the gliders flight path or sink rate, will help the pilot remain on the intended glide path to the landing spot. This increases the pilot's chances of successfully dealing with unexpected conditions throughout the landing phase of flight.

Instructors should also consider the use of hand-held GPS based flight recorders to capture the landing profile of the glider. The student's flights can be displayed on the computer and used as an aid in critiquing the student's performance. Students can also be encouraged to download flight traces off the Internet, i.e., the OLC web site contains thousands, and these traces can be used to show how other pilots solve this challenging flight maneuver.

Aborted take-off accidents, accounted for 12.5% of the FY10 accidents. Three (3) of the four (4) accidents in the category were aerotow PT3 (Premature Termination of The Tow) events involving gliders. The remaining accident was a tow-plane involved in an aborted cross-wind take-off. Pilots can, and should, mentally prepare for a failed launch by developing a specific set of action plans to deal with several contingencies. The task is then to execute the proper plan at the proper time. Flight instructors should continue to emphasize launch emergencies during flight reviews, club check rides and flight training.

Three (3) motorgliders were involved in two (2) accidents in the FY10 reporting period. One accident was a midair collision during a sanctioned contest while the other followed a failed in-flight engine start. Motorglider pilots must consider the possibility that the engine will fail to start or may not continue to operate after it has started. A suitable landing site must be kept within range anytime the engine is operating.

Flight instructors play an important safety role during everyday glider operations. They need to supervise flying activities and serve as critics to any operation that is potentially unsafe. Their main job is to provide the foundation upon which a strong safety culture can be built. Other pilots and people involved with the ground and flying activates also need to be trained to recognize and properly respond to any safety issues during the daily activity. Everyone, students, pilots, ground operations, and instructors, should continuously evaluate both ground and flight operations at US chapters, clubs, commercial operations and at contests. An operations safety culture should encourage anyone to raise safety issues with fellow pilots, club officers, and instructors. By addressing issues before they become accidents, we can improve soaring safety. Only by the combined efforts of ALL pilots can we reduce the number if accidents.

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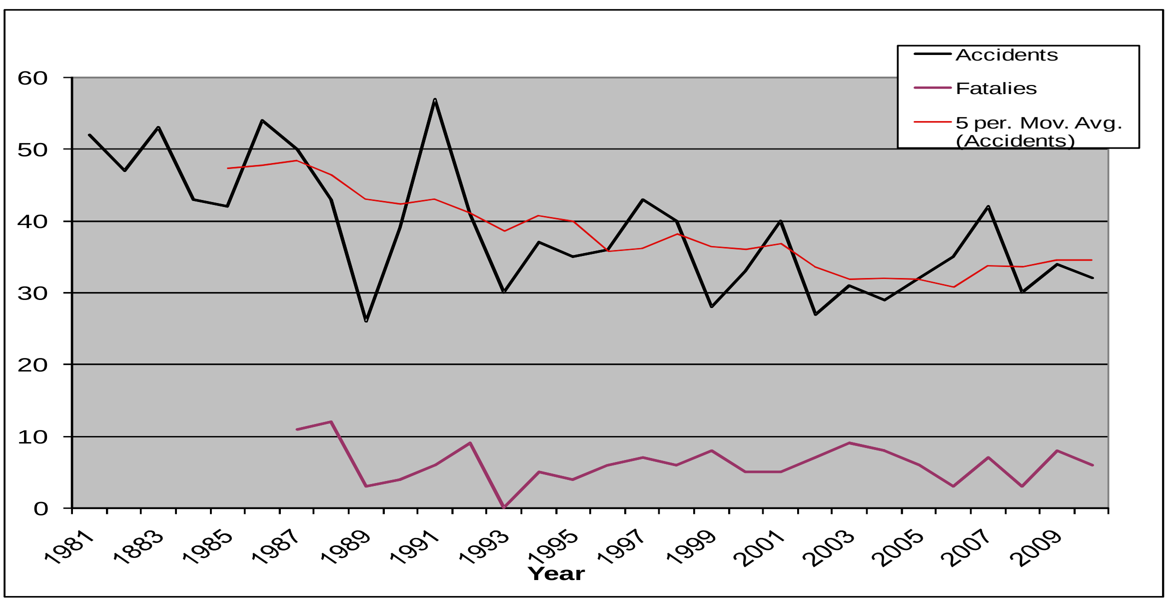
FY 10

This report covers the FY10 (November 1, 2009 to October 31, 2010) reporting period. A review of the glider accidents listed in the NTSB accident database shows a 6% decrease in the number of US soaring accidents during this time period compared to the FY09 reporting period. FY10 also saw a 25% decrease in the number of fatal accidents. However, the long term trends indicate that each member of the US soaring community must carefully evaluate their individual attitudes and organization's culture towards soaring safety. Only by accepting that we all must strive to change our individual attitude toward safety while promoting an "operational safety culture" inside our organization can we reduce the number of accidents that impact all of us.

For many reasons[2], this report represents an incomplete view of the accidents involving US glider pilots. Despite these limitations, this annual report is published to highlight some of the glider accidents listed in the NTSB aviation accident database. Examination of these accidents can help point out trends and issues that need to be resolved. Safety is everyone's business, every pilot must continuously evaluate their flying skills, proficiency, and decision making skills to ensure every flight ends with a safe arrival at the intended point of landing.



Number of Accidents since 1981

Figure 1 Number of total (with 5 year ave trend line) and fatal accidents on a per year basis.

Figure 1 shows the total number of accidents and fatalities from 1981 to the present. As the figure shows, there is a large variation in the number of accidents each year. The top line is the number of per-year accidents, while the lower line is the number of fatal accidents. The line overlaying the "accident" line shows the moving 5-year average number of accidents. This line

[2] See Appendix A for a detailed list of reasons and steps you can take to address these issues.

shows a disturbing growth trend that can be attributed to the 42 accidents that occurred in the FY07 reporting period. However, any analysis shows that the number of accidents, both fatal and nonfatal, have reached a plateau. Breaking through this plateau will require a shift in our thinking and/or procedures. This will require that glider clubs and commercial operators create a strong safety culture. Increased rules and regulations may not provide the motivation individuals need to reduce these accidents. A safety culture requires everyone, pilots, line-crews, and passengers to be involved examining both flying and ground handling operations. Only by stopping accidents before they happen can we hope to break through this plateau and further reduce the number of soaring accidents.

As this figure also shows, the long-term trend for fatal accidents has also reached a plateau. However note that in 1993 there were zero fatalities, and the SSF trustees see no reason why we can't return to this number. Every US glider pilot should dedicate themselves to obtaining the goal of ZERO fatal soaring accidents.

FY10 ACCIDENT SUMMARY

NUMBER OF ACCIDENTS

For the twelve-month period ending October 31, 2010, twenty-nine (29) gliders, three (3) motorgliders, five (5) tow-planes, and one (1) airplane were involved in thirty-two (32) separate accidents considered to have met the reporting requirements of NTSB Part 830 of the Code of Federal Regulation. This represents a 6% decrease in the number of accidents reported during the FY09 reporting period. The five-year average for the FY06 – FY10 reporting period is 34.6 accidents per year, representing no change in the average number of accidents from the previous five-year period.

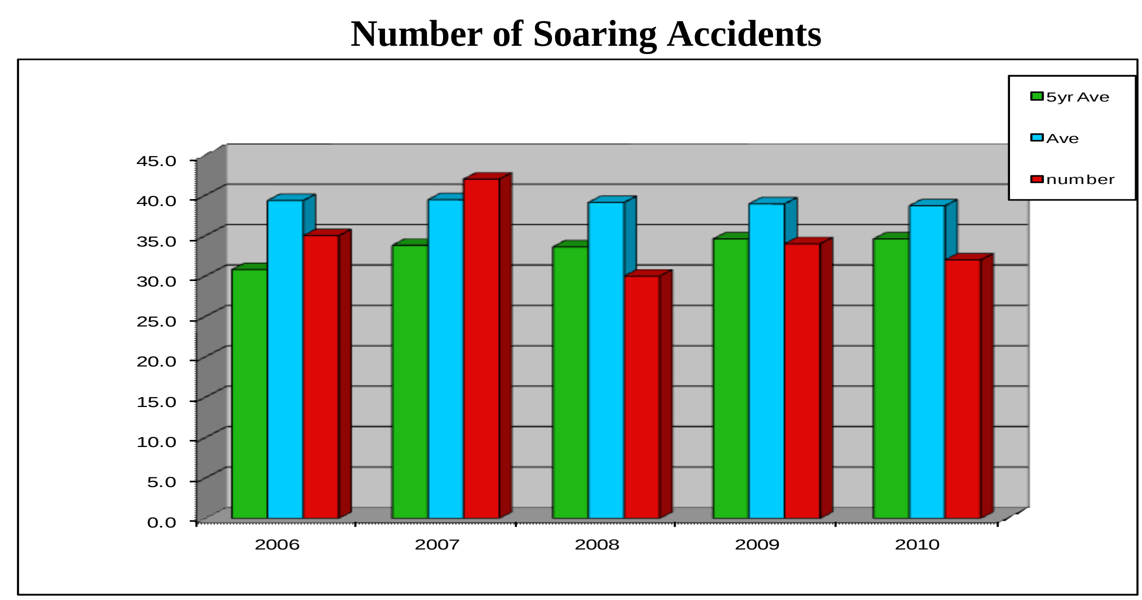


Figure 2 Number of accident, 5 year average 2006 - 2010

While the average number of accidents has shown a steady decline since 1981 (averaging 45.6/year in the 80's, 38.6/year in the 90's and 33.3/year in the 00's) the number of accidents each year remains unacceptably high[3]. In addition, the average number of fatalities has remained nearly constant, at just over 6 per year since the mid 1990's. In the FY10 reporting period six (6) accidents resulted in fatal injuries to nine (9) pilots and passengers. In addition, two (2) pilots and one (1) passenger received serious injuries while twenty-seven (27) pilots and three (3) passengers received minor or no injuries during the FY10 reporting period.

PHASE OF FLIGHT

The number of accidents that occur during the approach and landing phase of flight again surpass those recorded during any other phase of flight. For the FY10 reporting period, approach and landing accidents attributed approximately 59% of the total number of accidents reported for the year. This percentage reverses a 2 year trend that had seen landing accidents drop to the 38% level. Takeoff accidents account for just under 13% of the number of accidents, meaning that over 72% of the number of accidents occurred during the takeoff and landing phase of flight.

Percentage of accidents that occur in various Phase's of Flight

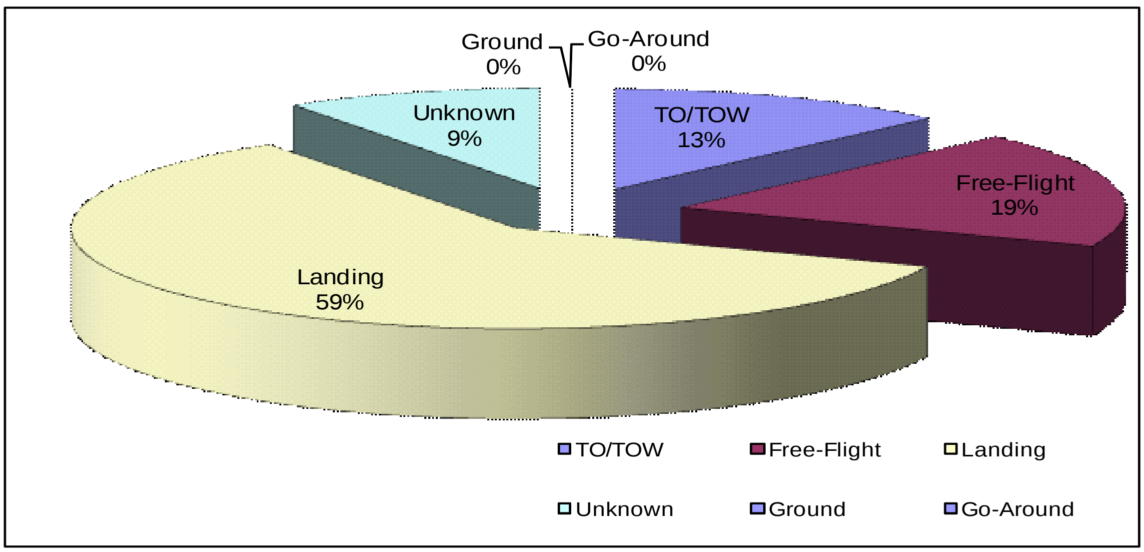


Figure 3 Accident phase of flight

It should come as no surprise that a majority of accidents occur during takeoff and landing, where the tolerance for error is greatly diminished and opportunities for pilots to overcome errors in judgment and decision-making become increasingly limited. This trend coincides with a 1985 National Transportation Safety Board study initiated to determine the phases of flight in which aircraft accidents are most likely to occur. The study concluded that approximately 60% of all aircraft accidents occur during the first two minutes or the last four minutes of the average flight, even though these flight phases typically account for less than 16% of actual flight time.

TAKEOFF ACCIDENTS

Three gliders and one towplane were substantially damaged in the four Premature Termination of The Tow (PT3) take-off accidents that occurred during the FY10 reporting period. All of the

[3] It is unknown whether the recent decline is a measure of decreased activity

gliders involved in these accidents were being aerotowed. The PT3 accidents illustrate this year's trends.

The pilot of a Piper Pawnee tow-plane received minor injuries while the airplane was substantially damaged after it collided with terrain following an aborted crosswind take-off. The pilot reported he started the tow operating with a 15 kt left crosswind. After lifting off, the airplane rolled right and the towpilot activated the tow release. The pilot was unable to regain control and the airplane collided with terrain damaging the right wing and empennage. *NTSB WPR10CA067*.

The student pilot and flight instructor were seriously injured, and the Blanik L-13 glider was substantially damaged following a low altitude stall/spin accident. The instructor reported that he recognized a wave-off signal from the tow-plane and he assumed control of the glider. He executed a turn to return to the runway and lowered the nose to maintain airspeed. The student panicked and pulled back on the stick. The instructor was unable to regain control and the glider impacted terrain after entering a left hand spin. *NTSB CEN10LA035*.

The pilot of an ASC-20 was uninjured, but the glider was substantially damage following a ground loop during launch. The glider pilot reported that the right wing dropped during the tow. The pilot released and the glider struck a pole on the side of the runway. *NTSB CEN10CA505*.

The pilot of a RS-15 received minor injuries while the glider was substantially damaged following a low altitude release. The pilot reported assembling the glider for flight and visually checked that the ruddervator locking pin was properly installed. After reaching 6 – 10 feet AGL on tow, the right ruddervator moved toward the vertical position. The pilot released but was unable to control the glider, which impacted the ground. *NTSB ERA10CA477*.

As can be seen by the above accidents, every pilot should be prepared for a failed launch. This includes making sure the launch area is free of obstructions, the aircraft is properly assembled, the pilot/passenger is briefed on possible actions, and the pilot is operating within their abilities. It should also be noted that in each case one of the pilots actuated the tow release in their aircraft. Every glider pilot should have a pre-determined plan of action that can be executed immediately if the launch does not go as planned.

In addition to practicing tow signals with your instructor, the pilot and instructor can simulate numerous situations and talk through the possible solutions without actually making a flight. These simulations can help build up a 'mental store' of possible actions, that you can use in the event of a real PT3 event. A quick review of these scenarios just before launch can prime the pilot to react appropriately when the launch isn't going as expected. Finally, but most importantly, it is critical for pilots to understand that a pilot's most basic responsibility is control of the aircraft. Regardless of the circumstances, FLY THE AIRCRAFT!!

GROUND LAUNCH ACCIDENTS

There were no ground launch accidents listed in the NTSB database for the FY10 reporting period.

INFLIGHT ACCIDENTS

In the FY10 reporting period, six accidents were reported during the in-flight (free flight) phase, after release and before entering the landing pattern. Three of these accidents involved midair collisions between 2 or 3 aircraft, the remaining 3 occurred when the glider struck trees in mountainous terrain. A sample of these in-flight accidents shows two common trends.

The pilot of an ASH-26E and the pilot of a Ventus 2CT were both uninjured while the ASH was substantially damaged and the Ventus received minor damage following a midair collision while thermaling. The glider pilots were participating in a sanctioned contest, and while about 75 miles out on the return leg, the both entered the same thermal. After 1 turn, the left wing of the ASH came into contact with the nose of the Ventus. The ASH lost 3 ft of wing, but both gliders were able to successfully return to the launch point. *NTSB WPR10FA294A/B*.

The pilot of a Piper Pawnee and the pilot/passenger of a Cirrus SR20 were fatally injured and the airplanes were destroyed following a midair collision. The Pawnee was towing a Schweizer SGS 2-32 on a demonstration ride when the glider pilot noticed the Cirrus approaching from the right. The glider pilot released and the Cirrus collided with the Pawnee. The glider was not damaged in the accident and landed safely back at the airport. *NTSB CEN10FA115A/B/C*.

The pilot of an ASW-20 was seriously injured and the glider was substantially damaged following a in-flight collision with trees. The pilot was attempting to cross a 5 mile gap in the ridge. Unable to climb in a thermal, the pilot attempted to us a 'spur' in the ridge line to cross the gap. The pilot was unable to find more lift and the glider subsequently impacted trees before coming to rest inverted. *NTSB ERA10CA260*.

The student pilot of a Scheizer SGS1-26B was not injured, but the glider was substantially damaged following a collision with trees and terrain. The glider was towed to 3,000 ft AGL about 2 miles from the airport. The pilot was unable to find lift and eventually she started back toward the gliderport. The glider contacted trees and terrain while the pilot was attempting to return. *NTSB CEN10CA388*.

These accidents demonstrate two major tasks that the pilot must continuously perform. The first task is to effectively scan for traffic during all phases of flight. While the human visual system can be an effective tool for detecting other aircraft, it does little good if the pilot is focused on the instruments inside the glider. All pilots must use effective scanning techniques to 'see and avoid' other traffic.

The other task is the need to continuously evaluate how the flight is progressing and what options the pilot may have at his/her disposal. In a straight glide, the pilot can use this simple method to determine if the destination is reachable. Look at an object on the ground while maintaining a constant airspeed. If the object is disappearing under the nose, the glider will over fly that object. If the object is not moving or is moving up on the canopy, the pilot will need to find lift or make other plans. External or internal factors, such as pointing out objects on the ground, or handling multiple tasks while flying can lead to distractions. Fixations on a specific task or goal can also lead to conditions where safe flight conditions can no longer be maintained. Pilots should monitor their flight activities and use task-shedding schemes to reduce pilot workload during times of stress.

LANDING ACCIDENTS

Accidents occurring during the landing phase of flight again accounted for the majority of injuries to pilots and damaged or destroyed gliders. For the FY10 reporting period, gliders hitting objects on final or during the landing roll accounted for the majority of the landing accidents. This was followed by hard landings, long landings, and stall/spin accidents. The majority of the reported landing accidents occurred at the completion of local flights at the pilot's home airport. A sample of the landing accidents in FY10 indicate the accident trends:

The pilot of a SGS 1-34 received minor injuries while the glider was substantially damage while attempting to land on a grass runway. The pilot reported he entered a steep turn at a low altitude and low airspeed. The glider stalled and the left wing dropped. The pilot responded with right rudder. The right wing of the glider impacted terrain damaging the wing and empennage, *NTSB CEN10CA225*.

The pilot of a SGS 1-36 received minor injuries while the glider was substantially damaged when it struck a glider trailer while attempting to land. The student pilot had received an area check-out and was soloed in the 1-36. After a 1.5 hour local flight the pilot returned to the airport for a landing. The pilot underestimated the strength of the wind and decided to land downwind on runway 03, the runway used for the check flights. The pilot attempted to slip to a landing, but failed to maintain the runway heading. The glider flew between a hanger and a clubhouse before striking a parked glider trailer with the left wing. *NTSB WPR10CA244*.

Accidents during the Approach and Landing Phase of Flight

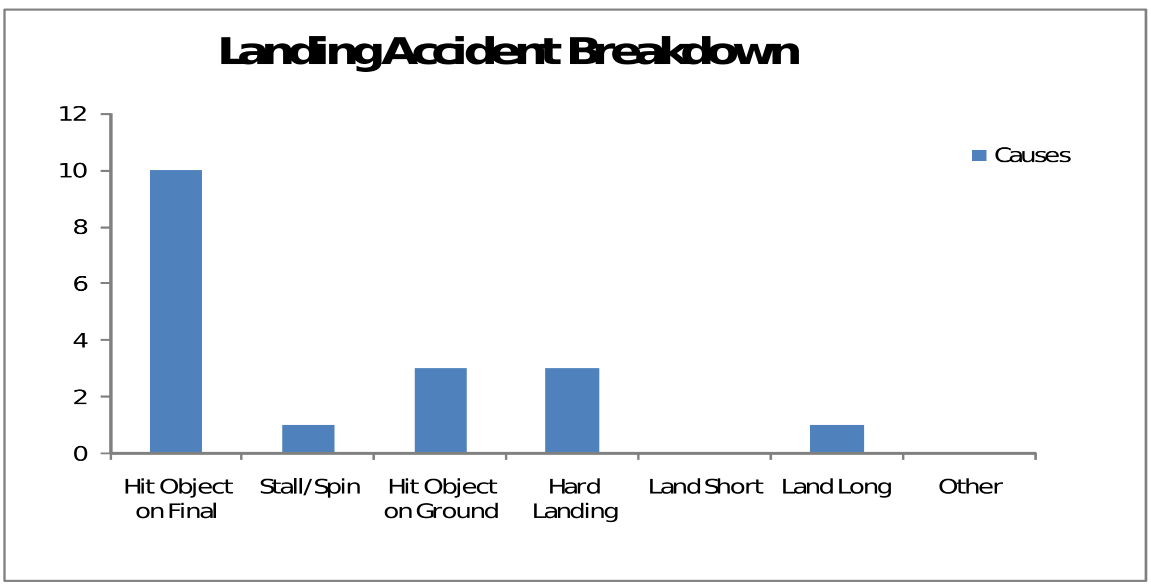


Figure 4: Reported result from landing accident

The pilot of a SGS 1-26 received minor injuries while the glider was substantially damaged after the glider struck an airport perimeter fence. The pilot reported he had climbed to 6,000 ft AGL about 13 miles from the gliderport. He encountered sinking air, so he obtained a landing clearance at an airport about 8 miles away. The glider struck the airport perimeter fence short of the landing runway. *NTSB ERA10CA291*.

The pilot of a Cessna 182M was not injured and the tow-plane was substantially damaged after a hard landing. The pilot reported he made 2 landing attempts on runway 03, but rejected both due to a shimmy in the main landing gear. He then switched to a dirt runway (34) and elected to go-around again after bouncing. The pilot then made a second hard landing on runway 34, bouncing 3-4 times, before going around again. The pilot then successfully landed on runway 03, but noticed that the plane pulled to the right on the ground roll. A subsequent inspection revealed damage to the gear, airframe, and propeller. *NTSB CEN10LA383*.

The pilot of a SGS 1-34 received minor injuries while the glider was substantially damaged when the glider struck a tree short of the runway. The pilot reported he was attempting to land on runway 18 using a left hand traffic pattern. He reported turning base at 450 ft AGL, and felt that he was too high to successfully land. The pilot then performed a 360 deg turn to lose altitude and continued on the approach. At approximately 100 ft AGL and mid-field, the pilot decide he was still too high and he attempted to reverse direction to land on runway 36. The glider struck a tree while maneuvering with spoilers deployed. *NTSB ERA10CA419*.

The pilot of a Grob 103 was not injured but the glider was substantially damaged during a hard landing. The pilot had completed a 1 hour flight and was landing at the home airport in gusty/turbulent conditions. The glider touched down on the nose wheel about 300 ft from the end of the runway. The glider then PIO'ed several times before slowing down and coming to a stop. The pilot noticed the damage after exiting the glider. *NTSB WPR10CA422*.

The pilot of a Standard Cirrus received minor injuries while the glider was substantially damaged after it struck a fence post during an off-airport landing. The pilot reported that the canopy came open on tow, so she released. After attempting to close the canopy for about 20 minutes the pilot entered the traffic pattern to land on the runway. The pilot attempted a no spoiler approach as she was holding the canopy closed with her left hand. The glider crossed the runway threshold about 300 ft AGL, and continued to fly the runway heading until the right wing struck a fence post when the glider was approximately 1 mile past the end of the runway. *NTSB CEN10CA542*.

The pilot of a Ventus B was not injured but the glider was substantially damaged after it struck trees on final. The pilot reported that he encountered lift on downwind so he deployed full dive brakes. After exiting the lift, the pilot was unable to retract the dive brakes, and subsequently the pilot decided to make an off-airport landing. The glider collided with trees during this landing attempt. A post accident inspection showed that the dive brakes would bind when fully deployed. *NTSB ERA11LA025*.

The remaining landing accidents include problems associated with striking objects on final or during the landing roll and off-airport landings.

While a detailed look at all landing accidents is beyond the scope of this report, the reader is encouraged to review the NTSB reports for additional details. One point that should be made is that many pilots report encountering 'heavy sink' on short final. There are numerous reasons for this, and one of the most insidious is a condition known as wind gradient. It is well know that wind speeds can, and do, vary with altitude. A wind gradient is a change in wind speed with altitude.

When a gradient, or shear, is encountered the forces acting on the glider change and the glider responds to those changes. One noticeable change is an apparent increase in the gliders sink rate with a reduction in wind speed, resulting in a tendency to land short. This occurs as the glider attempts to maintain its trimmed airspeed or as the pilot pushed forward to maintain the desired airspeed. An analysis shows that a glider will land 53% shorter than expected when landing into a 20 Kt wind gradient. All pilots need to be trained to recognize and respond to wind gradient/shear conditions. The SSF's goal orientated approach (see below) can help pilots accomplish this task.

FATALITIES

Seven glider pilots, two tow-plane pilots, one airplane pilot, and three passengers were involved in six fatal accidents during the FY10 reporting period. In all nine (9) individuals were fatally injured in these 6 separate accidents. This represents a 25% decrease in the number of accidents (6 vs 8) but no change in the number of fatalities from previous reporting period. Three (3) of these accidents were mid-air collisions between 2 aircraft, in one case an airplane collided with a tow-plane while it was towing a glider, in one case the glider and tow-plane collided in the pattern, and the 3rd midair occurred when 2 gliders collided during a sanctioned contest flight. The remaining three fatal accidents occurred to gliders, in 2 the glider crashed in mountainous terrain, and the 3rd glider crashed in a field in the midwest.

Fatalities 2006 – 2010

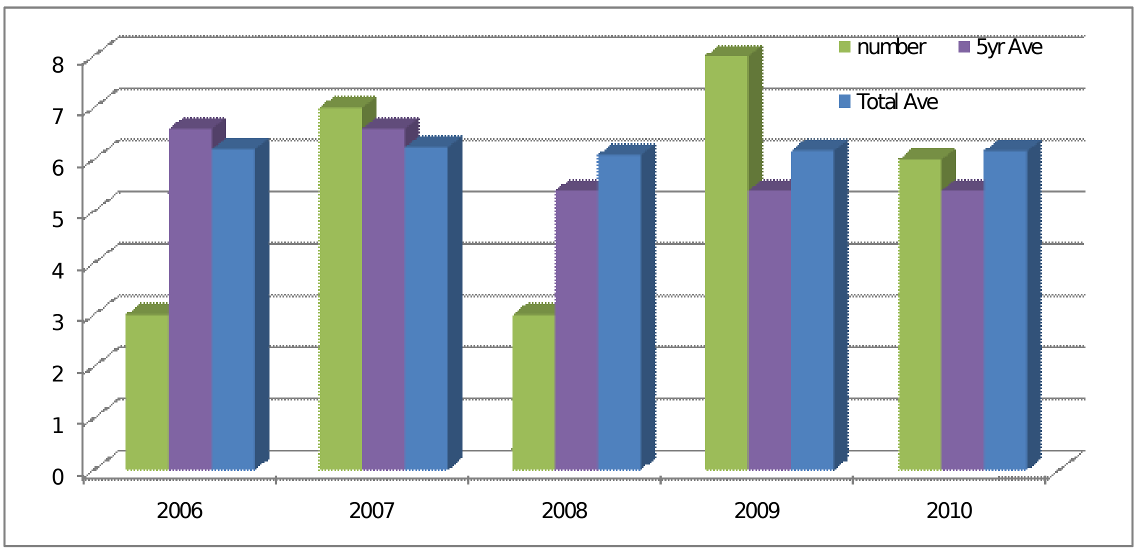


Figure 5: Number of fatal accidents, 5 year average, and average since 1987

The NTSB is still investigating these fatal accidents and no probable cause has been issued for any of these accidents. The reports below are summaries of the NTSB report.

The pilot of an ASW-27 and the pilot of a Piper Pawnee were both fatally injured and their aircraft were substantially damaged following a midair collision while turning final. The glider pilot was unable to find lift and entered a right downwind to land back at the airport. The tow-plane, which was not equipped with a radio, was also returning from this tow and it entered a left downwind to land on the same runway. The tow-plane and glider turned their respective base legs about the same time and collided while turning final. *NTSB WPR10FA068A/B*

The pilot of a Piper Pawnee and the pilot/passenger of a Cirrus SR20 were fatally injured and the airplanes were destroyed following a midair collision. The Pawnee was towing a Schweizer SGS 2-32 on a demonstration ride when the glider pilot noticed the Cirrus approaching from the right.

The glider pilot released and the Cirrus collided with the Pawnee. The glider was not damaged in the accident and landed safely back at the airport. *NTSB CEN10FA115A/B/C*.

The private pilot of an ASW-20 was fatally injured after the glider impacted terrain for unknown reasons. A search was begun after the pilot failed to return from a personal X-C flight. The wreckage was found that evening in a field of high vegetation. *NTSB CEN10LA368*.

The private pilot of a RS-15 was fatally injured after the glider impacted mountainous terrain for unknown reasons. The wreckage was found the day after the accident after the pilot failed to return from the flight. The glider was found inverted on a small plateau at the 7,800 ft MSL level. *NTSB WPR10LA356*.

The private pilot of a DG-300 was fatally injured after the glider impacted mountainous terrain for unknown reasons. A flight instructor reported observing the accident glider thermaling and he reported talking to the accident pilot over the radio within 1 hour of the accident. The accident pilot failed to return, and a search quickly located the wreckage in a canyon about 6.5 miles SE of the airport. *NTSB WPR10LA377*.

The commercial pilot of a Ventus 2Bx was fatally injured while the private pilot of an ASW 27-18 was not injured after a midair collision during a sanctioned contest flight. The Ventus was on final glide northbound with several other competitors when the ASW passed southbound into the turnpoint. The Ventus fuselage came in contact with the right horizontal stabilizer on the ASW causing the tail boom of the Ventus to separate from the fuselage pod. The Ventus crashed while the ASW landed with the right stabilizer missing. *NTSB CEN10LA459A/B.*

For the five-year period 2006 – 2010, 37 pilots and passengers received fatal injuries while soaring. This equates to a five-year average of 7.4 fatalities per year, a 73% increase in the number of souls lost from the previous 5-year period. Looking at the number of accidents, the data shows a 5-year average of 5.4 accidents per year, the same as the past 2 5-year periods, and 6.2 fatal accidents per year since the SSF began collecting fatal accident data in 1987. While the 5-year average is down from the initial rate of 7.2 fatalities per year recorded in 1991, the long-term trend is not encouraging. All glider pilots need to evaluate their skills and procedures with an eye toward determining how we can eliminate fatal accidents from our sport.

DAMAGE TO AIRCRAFT

A total of three aircraft, 1 glider, 1 tow-plane, and 1 airplane, were destroyed as a result of accidents in the FY10 reporting period. An additional twenty-seven (27) gliders, two (2) motorgliders, and four (4) tow-planes received substantial damage while another glider and a motorglider received minor damage during this reporting period.

The large number of damaged gliders has a significant impact on club and commercial operators flight operations. Not only is there the immediate issue of dealing with the injuries resulting from the accident but also the long-term impact cannot be forgotten. Typically the damaged glider will be out of service for several months while it is being repaired. During this time flight operations may be reduced, or suspended if this is the operation's only glider. This can place a significant financial strain on the club or commercial operator.

A strong 'safety culture' is a large part of the solution to reducing the number and severity of glider accidents. Every pilot must continuously evaluate the ground and flight operations with an eye toward preventing incidents from becoming accidents. The SSF web site now contains an incident reporting form http://www.soaringsafety.org/incident.html that individuals can use to anonymously report issues that might impact a pilot's or passenger's safety. The SSF will use this information to aid in identifying accident trends and to formulate procedures to assist pilots and instructors in preventing future accidents.

Damage to Aircraft

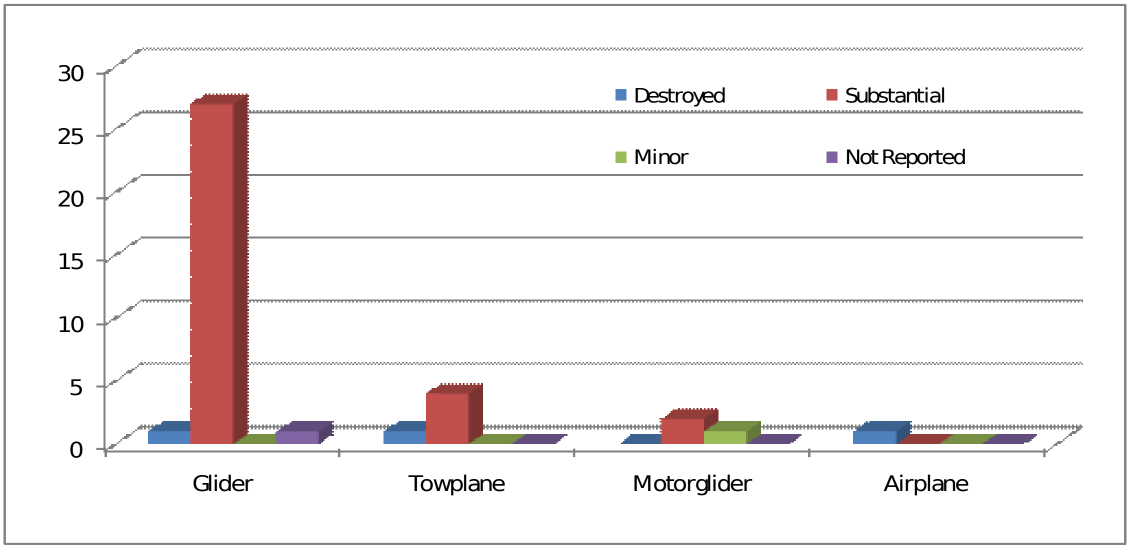


Figure 6: Types of damage to gliders, towplanes, motorgliders, and airplanes

AUXILIARY-POWERED SAILPLANES

For the twelve-month period ending October 31, 2010 two (2) accidents involving three (3) auxiliary powered sailplanes were reported to the National Transportation Safety Board. One pilot received minor injuries while the other 2 pilots were uninjured. This represents a substantial decrease (38%) in the number of accidents when compared to the previous reporting period.

The pilot of an ASH-26E and the pilot of a Ventus 2CT were both uninjured while the ASH was substantially damaged and the Ventus received minor damage following a midair collision while thermaling. The glider pilots were participating in a sanctioned contest, and while about 75 miles out on the return leg, they both entered the same thermal. After 1 turn, the left wing of the ASH came into contact with the nose of the Ventus. The ASH lost 3 ft of wing, but both gliders were able to successfully return to the launch point. *NTSB WPR10FA294A/B.*

The commercial pilot of an ASH-26E motorglider received minor injuries, but the glider was substantially damaged as the result of a hard off-airport landing. The pilot reported using the engine several times during a non-soaring flight. While returning to the departure airport at 1,000 ft AGL the pilot raised the engine. The engine failed to start and the pilot continued to 'troubleshoot' the electrical problem while preparing for an off-airport landing. The pilot abandoned the landing after the engine started, but the engine only ran for 10-20 seconds before quitting. The pilot was unprepared, and the glider landed hard damaging the fuselage. *NTSB ERA10LA325*.

ACCIDENTS INVOLVING TOW AIRCRAFT

During the FY10 reporting period five accidents involving tow aircraft occurred resulting in fatal injuries to 2 of the pilots. As noted above, both of these accidents were midair collisions. One collision involved the glider the tow-plane just released, and the other involved a collision with an airplane while towing a glider. Two of the accidents occurred while the tow-plane was landing, while the remaining accident occurred during the take-off phase of flight.

All tow-pilots need to be proficient in tow operations. Both the climb phase and descent phase of flight require pilots remain vigilant and visually scan for other traffic at all times. Having a standard set of procedures for this flight operation can help pilots maintain their situational awareness by recognizing when extra vigilance is required.

ACCIDENTS BY SSA REGION

A comparison of the geographic locations of accidents in relation to SSA Regions tends to reflect the geographic distribution of the SSA membership. In general, those regions having the greatest populations of SSA members and soaring activity tend to record the highest numbers of accidents[4].

Accidents by SSA Region

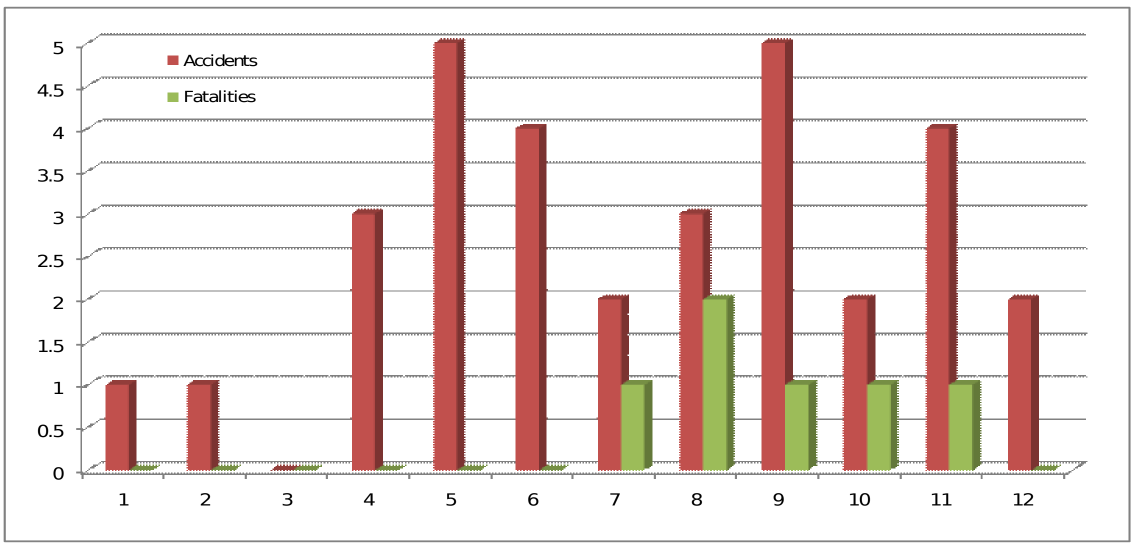


Figure 7: Number of accident per SSA Region

FLIGHT TRAINING AND SAFETY REPORT

The SSF Trustees would like to highlight two major issues that the US glider population needs to address.

1) The number of accidents occurring on an annual basis has reached a plateau. All US glider pilots need to seriously consider ways to reduce both the number of accidents and the number of fatalities.

[4] See Appendix A for more details

2) It appears that a large percentage of the fatal accidents occurred while the pilot was maneuvering close to the terrain.

In FY10 report there was a slight decrease in the number of fatal accidents (down from 8 in FY09 to 6 in FY10), but no change in the number of fatalities. A review of these fatal accidents shows half of them involved midair collisions and the remaining half involved single place gliders which impacted the terrain. All pilots should recognize the potential hazards of thermaling close to the ground (in mountainous terrain or over flat terrain). The glider is operating at a high angle of attack and in turbulent conditions. Any sudden gust or abrupt flight control motion could cause the glider to stall and spin out of this turning flight condition.

SSF RECOMMENDATION

As aviation accident statistics show, low altitude stall/spin accidents are often fatal. All pilots should evaluate their skill and proficiency in stall/spin recognition. Practice at a safe altitude with a competent instructor and also learn how the glider you fly reacts to stalls while thermaling. Have your instructor create a realistic distraction or do something to create an 'inadvertent stall'. Pay particular attention to the altitude loss after you recover, now imagine this happening while you are thermaling close to the ground in mountainous terrain. It should be noted that a windshear stall is quicker and more violent than the type of stall that can be practiced using the elevator to stall the aircraft.

SSF Goal Orientated Approach

As the FY10 statistics show, the majority of soaring accidents continue to occur in the approach and landing phase of flight. For one reason or another, the pilot fails to make it to the landing area. Pilots need to consider multiple factors including: other traffic, wind, lift/sink, location, and distance remaining to the landing area in order to safely land a glider. Failure to account for one or more of these factors can leave the pilot low on the approach with very few corrective options available.

The SSF promotes a 'Goal Orientated' approach to landing a glider. This means that the pilot should select a point on the ground that will become the touchdown point for this landing. The pilot should then control the decent rate and flight path to maximize the chance of reaching this spot. If it becomes apparent that the spot will not be reachable, the pilot should select an alternate landing spot, and continue using the procedures described below to make a safe landing.

Pilots should consider that the best way to judge if a successful landing is imminent is to maintain a constant descent angle throughout the pattern. Picking the initial angle that will safely get you to the landing spot is a learned skill that depends in part on the glider's performance and configuration. The TLAR (That Looks About Right) technique can help you learn this skill. Work with a proficient instructor to learn ways to pick this initial angle.

Once a specific angle is selected, the pilot can control the sink rate and/or flight path to keep this decent angle constant throughout the approach and landing. While most pilots may have difficulty identifying a specific angle, they will intuitively recognize when an angle changes. If the angle starts to go flatter, the pilot needs to adjust the gliders sink rate (by easing the spoiler handle slightly forward) or flight path (by turning the glider slightly toward the landing spot) until the angle stops changing. If the angle starts to get steeper, then increase the sink rate (ease the spoiler handle back) or adjust the flight path (turn the glider slightly away from the landing spot). By making a small adjustment at the first sign that the angle is changing, the glider pilot will find it easier to keep the glider on the proper glide-slope.

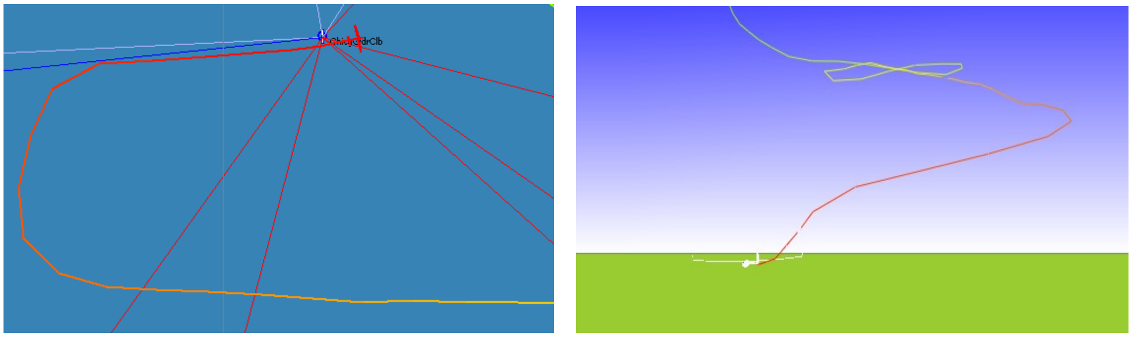


Figure 8: 2D and 3D view of a glider landing showing pattern and decent profile

The SSF ‘goal orientated’ approach does not require that the pilot fly the British Gliding Associations diagonal leg pattern. However, this pattern may be used if it makes it easier for the pilot to consistently make better landings. Pilots should consult a proficient instructor to learn this BGA technique or how to modify this idea slightly so it can be used by those pilots wishing to fly a traditional rectangular pattern.

Another tool that pilots and instructors should consider is that GPS recorder you installed to document your flight. Low-cost hand-held GPS units are available on the used market and can be carried in the training glider. The approach and landing portion of the flight can be extracted from the recorder and displayed to determine how the pilot is handling various conditions. It is also possible to download other pilot’s traces from multiple Internet web sites (e.g., OLC) and examine how others tackle this demanding task.

Reducing Launch accidents

In FY10, takeoff accidents accounted for just over 12% of the number of accidents. This is particularly frustrating because both glider and launch vehicle are sitting on the ground before the launch begins. Additionally, as the reports show, several PT3 accidents occurred after the glider pilot intentionally terminated the tow at low altitude and then failed to execute the appropriate emergency landing procedures. Pilots can mentally prepare for an emergency and develop a specific set of action plans to deal with several contingencies. The task is then to execute the proper plan at the proper time. Flight instructors should continue to emphasize launch emergencies during flight reviews, club check rides and flight training.

Adding the letter "E" to the pre-takeoff checklist is a helpful reminder to concentrate on the emergency plan of action. Treating the wing runner as a member of the launch crew and using good Single Pilot Resource Management (SPRM) techniques can reduce the pilot’s pre-launch workload. The wing runner can help prevent the possibility of a launch emergency by being observant for various discrepancies such as: dive brakes left open, canopy unlatched, tail dolly left on, or positive control check not accomplished. Fixing any problem before beginning a launch will help reduce the take-off type of accident.

The tow pilot also needs special training to be alert for signs of potential trouble. Is the glider pilot being hurried? Are conditions too gusty; is there fuel in the tow plane? In 2005 two tow-planes were substantially damaged when they ran out of fuel during a tow operation. Is the takeoff area clear of people and other obstructions? Has the tow pilot added the letter "E" to the pre-takeoff checklist and is he/she prepared for an emergency? Rear view mirror(s) located such that the tow pilot can see the glider on the ground before launch and during the aerotow is highly recommended. Radios in both the glider and towplane are also highly recommended.

Flight Instructor roles

Flight instructors play an important safety role during everyday glider operations. They need to supervise flying activities and serve as critics to any operation that is potentially unsafe. Other pilots and people involved with the flying activity also need to be trained to be alert to any safety issues during the daily activity.

The FAA has mandated that all instructors must include judgment training in the flight training process. Examiners will check for this training during the flight test. The FARs require that all flight instructors provide some kind of aeronautical judgment training during pilot training flights (student, private, commercial, and flight instructor). FAR 61.56 flight reviews also offer the flight instructor an opportunity to reach the glider pilot population on a continuing basis. Stressing judgment skills, as well as piloting skills, can help reduce the accident rate in the United States.

SSA REGIONS

<u>Region 1</u> Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont.

<u>Region 2</u> New Jersey, New York (south of 42^{nd} parallel), Pennsylvania (east of 78^{th} meridian).

<u>Region 3</u> New York (north of 42^{nd} parallel), Pennsylvania (west of 78^{th} meridian).

<u>Region 4</u> Delaware, District of Columbia, Maryland, Virginia, West Virginia.

<u>Region 5</u> Alabama, Florida, Georgia, Mississippi, North & South Carolina, Tennessee, Puerto Rico, The Virgin Islands.

<u>Region 6</u> Indiana, Kentucky, Michigan, Ohio.

<u>Region 7</u> Illinois, Iowa, Minnesota, Missouri (east of 92^{nd} meridian), North & South Dakota, Wisconsin.

<u>Region 8</u> Alaska, Idaho, Montana, Oregon, Washington.

<u>Region 9</u> Arizona, Colorado, New Mexico, Utah, Wyoming.

<u>Region 10</u> Arkansas, Kansas, Louisiana, Missouri (west of 92^{nd} meridian), Nebraska Oklahoma, Texas.

<u>Region 11</u> California (north of 36^{th} parallel), Guam, Hawaii, Nevada.

<u>Region 12</u> California (south of 36^{th} parallel).

APPENDIX A

Request for Club, Chapter, and Commercial Operator information

The Soaring Safety Foundation is tasked with evaluating US soaring accidents and developing plans that can help reduce these accidents. Since 1981 the SSF has developed and implemented numerous programs and ideas. While the accident rates are trending in the right direction, one serious question remains. How can the SSF generate meaningful accident statistics which can then be used to devise appropriate response plans?

The difficulty is that the SSF can easily obtain the raw number of accidents (the accident rate), but it has few, if any, means to turn these raw numbers into meaningful statistics. Most aviation accident statistics are reported as a fraction or percentage of accidents per flights or accidents per flight hours. To obtain these statistics the SSF needs to know the number of flights or the number of flight hours. Historically, these flight numbers/hours have not been made available to the SSF.

Other general aviation groups calculate their flight numbers/hours by noting the gallons of aviation gas sold throughout the US. Statistical analysis methods can be used to determine the average fuel burn rate for the fleet of general aviation airplanes. Thus, these aviation groups can compute meaningful accidents statistics. Since gliders use little or no fuel, we do not have an easy way to generate the flight number/hours valued needed to create meaningful statistics.

The SSF needs the support of a majority of the clubs, chapters, and commercial operators in the US to help correct this problem. Only by voluntarily submitting this information can the SSF really achieve its goal of reducing accidents. Once the SSF trustees have these number we can combine them with the raw NTSB accident numbers to generate meaningful statistics.

What can your club, chapter, or commercial operator do? At a minimum use the pilot/club flight time form on the SSF web site http://www.soaringsafety.org/forms/pilot-times.html annually to report the number of launches and the total flight time that your club ships performed. If you also launch private gliders, then determine their total flight time as well. This information should easily come from your club records, and these two numbers would greatly help the SSF and they will be considered strictly confidential unless otherwise specified.

Do you want to do more? Then send us as much additional detail as you feel comfortable doing. One option would be to extract your club records into an Excel spread sheet and email the file to the SSF. The more details we have, the more analysis we can perform.

One word of caution, in order for these numbers to be statistically valid, we must get details from a majority of the clubs, chapters, and commercial operators. If not, then the number will be skewed and could reflect specific operator issues instead of national trends. Thus, the SSF needs the support from a large portion of the soaring community.

Email your report to any SSF trustee. Rich Carlson <rcarlson501 at comcast.net>, Burt Compton <burtcompton at aol.com>, Stephen Dee < Motorgliderman at aol.com> Ron Ridenour <ronsnimbus3 at aol.com>, Bernald Smith <bernald at juggernaut.com>, or the generic SSF Webmaster <webmaster@soaringsafety.org>.

APPENDIX B

NTSB Part 830

The responsibility for investigation of aircraft accidents in the United States was mandated by Congress to the National Transportation Safety Board (NTSB) through The Department of Transportation Act of 1966. This act tasked the NTSB with determining the probable cause of all civil aviation accidents in the United States.

From 1991 - 94, the general aviation community alone accounted for approximately 1,800 aircraft accidents per year. Due to this high level of investigative workload and limited available resources, the NTSB often delegates to the Federal Aviation Administration (FAA) the authority to investigate accidents involving aircraft weighing less than 12,500 pounds maximum certified gross weight. Consequently, many glider accidents meeting the NTSB reporting criteria are investigated by representatives of the FAA.

All aircraft accidents involving injury to passengers or crewmembers or substantial damage to the aircraft must be reported to the NTSB.

The terms used in this report to define injury to occupants and damage to aircraft are included in NTSB Part 830 of the Code of Federal Regulations.

<u>Definitions</u>

Aircraft - a device that is used or intended to be used for flight in the air.

Operator - Any person who causes or authorizes the operation of an aircraft.

Aircraft Accident - An occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight and all such persons have disembarked, and in which any person suffers death or serious injury, or, in which the aircraft receives substantial damage.

Fatal Injury - Any injury that results in death within 30 days of the accident.

Serious Injury - Any injury which:

1) Requires hospitalization for more than 48 hours, commencing within 7 days from the date the injury was received;
2) Results in the fracture of any bone except simple fractures of fingers, toes, or nose;
3) Causes severe hemorrhages, nerve, muscle, or tendon damage;
4) Involves any internal organ; or
5) Involves second- or third-degree burns, or any burns affecting more than 5 percent of the body surface.

Minor Injury - Injury not meeting the definition of fatal or serious injury.

Substantial Damage - Damage or failure which adversely affects the structural strength, performance, or Flight characteristics of the aircraft, and which would normally require major repair or replacement of the affected component. Engine failure or damage limited to an engine if only one engine fails or is damaged, bent fairings or cowling, dented skin, small punctured holes in the skin or fabric, ground damage to rotor or propeller blades, and damage to landing gear, wheels, tires, flaps, engine accessories, brakes, or wingtips are not considered substantial damage for the purpose of this part.

Destroyed - Damage to an aircraft which makes it impractical to repair and return it to an airworthy condition. This definition includes those aircraft which could have been repaired, but were not repaired for economic reasons.

Minor Damage - Damage to an aircraft that does not meet the definition of Substantial or Destroyed.

APPENDIX C

Phase of Operation

Ground Movement - Repositioning of the glider while on the ground. To meet the definition of an accident, occupants must be onboard the glider and movement must be conducted immediately preceding or subsequent to a flight operation that demonstrates the intention of flight. This includes taxi operations of auxiliary-powered sailplanes.

Takeoff - Begins at initiation of the launch operation, including aero-tow, ground launch, and self-launch, and is concluded at the point the glider reaches the VFR traffic pattern altitude. For ground launch operations, the takeoff phase continues until release of the towline.

Assisted Climb - Begins at the conclusion of the takeoff phase or point at which an auxiliary powered sailplane or a sailplane using an aero-tow launch climbs above traffic pattern altitude. This phase of operation is not included in ground launch operations.

In-flight - Begins at the point of release of the towline for all launch types and concludes at the point of entry into the traffic pattern or landing approach pattern for an off-airport landing.

Approach/Landing - Begins at the point of entry into the traffic or landing approach pattern and concludes as the glider is brought to a stop at the completion of the ground roll.

APPENDIX D

Accident Category Definitions

Hit Obstruction - Accident occurring during a ground or flight phase as a result of the glider colliding with a fixed object. This classification does not include bird strikes or ground / in-flight collisions with other aircraft.

Ground Collision - Collision of two or more aircraft while being repositioned or taxied while on the ground.

Loss of Directional Control - Accident which occurs as a result of a loss of directional control of the glider during takeoff or landing operations while the glider is on the ground.

Premature Termination of the Tow (PT3) - Any event, pilot, mechanical, or otherwise induced, which results in a premature termination of the launch process. This classification includes ground, aero-tow, and self-launch.

Mechanical - An event that involves a failure of any mechanical component of the glider. This classification includes accidents that result from faulty maintenance or a failure to properly install or inspect primary flight controls. In-flight structural failures caused by fatigue of structural components or pilot induced overstress of the airframe are included in this classification category.

Loss of Aircraft Control - An accident which occurs as a result of the loss of control of the glider for any reason during takeoff, assisted climb, in-flight, or approach / landing. This classification includes failure to maintain proper tow position during assisted climb.

Mid-air Collision - A collision of two or more aircraft which occurs during the takeoff, assisted climb, in-flight, or approach / landing phase of flight. This classification includes collisions involving gliders and other categories of aircraft (airplane, rotorcraft, etc.).

Land Short - Any accident which occurs as a result of the glider being landed short of the physical boundaries of the intended runway or landing area. This classification includes off airport landing operations.

Land Long - Any accident which occurs as a result of the glider being landed beyond the physical boundaries of the intended runway or landing area. This classification includes off airport landing operations.

Stall / Spin - Any accident which results from the inadvertent stall and/or spin of the glider during takeoff, assisted climb, in-flight, or approach / landing phases of flight.

Hard Landing - Any accident caused by a hard landing during the approach / landing phase of flight.

Other – Any accident caused by factors not defined within the previous categories.