



SOARING SAFETY FOUNDATION

Nov 1, 2011 – Oct 31, 2012

**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.nts.gov/nts/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 analysis information contained in this report represents data compiled by the SSF and reported in **Soaring** Magazine, at 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.

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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 FY12 (November 1, 2011 to October 31, 2012) reporting period. A review of the NTSB accident database shows a 11.1% increase in the number of US soaring accidents during this time period compared to the FY11 reporting period. However FY12 saw a 40% decrease in the number of fatal accidents. While the number of accidents reported to the NTSB increased slightly during this reporting period, the number of insurance claims was down by over 22%. Despite this decrease in insurance claims, there is general agreement that more steps must be taken to reduce the number of accidents and eliminate all fatal accidents..

For the twelve-month period ending October 31, 2012, twenty-four (24) gliders, seven (7) motor-gliders, and one (1) tow-plane were involved in thirty (30) separate accidents meeting the reporting requirements of NTSB Part 830 of the Code of Federal Regulation. This represents a 11.1% increase in the number of accidents reported during the previous reporting period. The five-year average for the FY08 – FY12 reporting period is 30.6 accidents per year, representing a 8.4% decrease 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 33.5/year in the 00's) the number of accidents each year remains too high. In addition, the average number of fatalities has remained nearly constant, at just over 6 per year since the mid 1990's. In the FY12 reporting period six (6) accidents resulted in fatal injuries to eight (8) pilots and passengers. In addition, six (6) pilots and one (1) passenger received serious injuries while twenty (20) pilots and three (3) passengers received minor or no injuries during the FY12 reporting period.

A review of the six (6) fatal accidents showed that three (3) accidents occurred during the launch phase of flight, one (1) motor-glider was in cruise flight, two (2) gliders crashed while making off-airport landings. It should also be noted that 42.9% of the PT3 accidents resulted in fatal injuries to at least one person (glider pilot, or passenger) involved in the accident. All fatal accidents are still under investigation by the NTSB, more details are given in the main report. There were two (2) mid-air collisions reported during the FY12 period, one occurred during the World Gliding Championships while the other occurred in northern Nevada.

Continuing a long historical trend, the largest number of accidents occurred during the landing phase of flight during this reporting period. In FY12 landing accidents represented 60.0% of all accidents. It should also be noted that only six (6) of the eighteen (18) landing accidents, or 33.3%, occurred while the pilot was attempting an off-field landing. The remaining twelve (12) accidents occurred while the pilot was attempting to land on their home airport. It should also be noted that two (2) of these on-airport landing accidents occurred while a CFIG was on-board providing instruction. Causes of these accidents include; a wing striking an object (fence post, tree, mail box) during the landing, making a last second change in the runway to use, and misjudged the approach due to improper use of the flight controls.

Proper training and an operational focus on safe arrivals can go a long way toward addressing the landing accident problem. The SSF continues to 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 predetermined point. In this approach, pilot continuously evaluates the gliders flight path taking into account wind speed/direction, lift/sink,

distance remaining to the landing spot, gliders performance, 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. Immediately evaluating how to respond 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.

Clubs and commercial operators are encouraged to evaluate their current training syllabus to determine how well they are teaching this important task. Does your organization ensure that the instructor has the ground time needed to discuss this technique with the student? Does your organization have the resources to view the SSF's on-line training videos that demonstrate this maneuver? Does your organization hold pilots accountable by critiquing and consoling pilots who make low/slow approaches? Does your organization praise pilots who make good decisions and those who recognize when changing conditions call for modifications to the pattern? Has your organization considered 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 launch accident, called PT3 (Premature Termination of The Tow) events, accounted for 23.3% of the FY12 accidents. Three (3) of these accidents involved the glider being aerotowed, two (2) accidents occurred while the glider was being winch launched, and the remaining two (2) accidents occurred while the motor-glider was self-launching. 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.

Seven (7) motor-gliders, were involved in two (2) launch, three (3) cruise, and two (2) landing accidents in the FY12 reporting period. One motor-glider cartwheeled after the left wing struck the ground during the downwind-base turn with the engine extended, but not running. One motor-glider began the self launch with the spoilers open, the gear collapsed when the glider rolled off the end of the runway. Motor-glider 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 activities 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 train everyone 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 of accidents.

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SOARING SAFETY FOUNDATION

ANNUAL SAFETY REPORT

FY 2012

This report covers the FY12 (November 1, 2011 to October 31, 2012) reporting period. A review of the NTSB accident database shows a 11.1% increase in the number of US soaring accidents during this time period compared to the FY11 reporting period. However FY12 saw a 40% decrease in the number of fatal accidents. While the number of accidents reported to the NTSB increased slightly during this reporting period, the number of insurance claims was down by over 22%. Despite this decrease in insurance claims, there is general agreement that more steps must be taken to reduce the number of accidents and eliminate all fatal accidents.. .

For many reasons¹, 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 1987

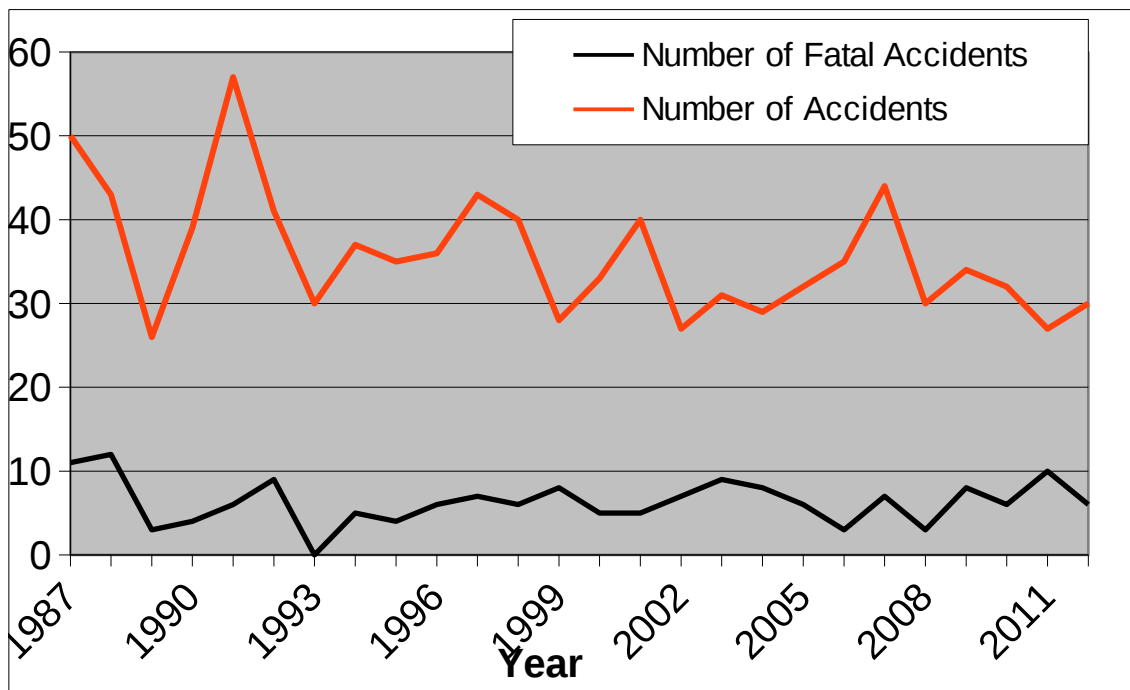


Figure 1 Total number of accidents and fatal accidents on a per year basis.

Figure 1 shows the total number of accidents and fatalities from 1987 to the present. As the figure shows, there is a large variation in the number of accidents each year. The top line is the

¹ See Appendix A for a detailed list of reasons and steps you can take to address these issues.

number of accidents each year, while the lower line is the number of fatal accidents. Any analysis of this data shows two disturbing trends. One is that the number of fatal accidents is a large percentage of the total number of accidents each year. The other is that both fatal and nonfatal accidents have reached a plateau. Breaking through this plateau will require a shift in our societies safety culture.

To break through this plateau, ALL glider pilots must realize that this is not a problem with individual pilots. These accidents are typically not caused by pilots ignoring the rules or taking incredible risks. Instead we must recognize that pilots are responding to situations in the manner in which they were trained. These Human-Factors errors are symptoms of a deeper systemic problem with our training environment and club/commercial operator safety culture.

Changing this culture will require effort from everyone from ground crews to pilots to the organizations management. Flight instructors must be provided with the tools, equipment, and most importantly TIME, needed to properly train pilots to an adequate level of proficiency. The organization must have a written training syllabus (paper or electronic) that all instructors embrace and use. The organization must demonstrate that safety is not something that is just talked about, but really practiced. Flight reviews must not be treated as a burden for the pilot, but as an opportunity for pilots to learn new skills. Spring checkouts should provide more than an opportunity to sit in the cockpit, ground time should be included to review standard operating procedures and emergency procedures.

As the SSF recommended last summer, take a video camera out to your field and film your operation. Then evaluate that video with an eye toward looking for problems. Pull out a copy of your organizations standard operating procedures and see if your pilots and crews are doing what they said they would do. If not FIX this problem. Pull your flight instructor training syllabus off the shelf and really look at it. Does it mandate your instructors provide both ground and flight training to students and rated pilots. Does it give them the time and resources they need to do as effective a job on the ground as they do in the air?

Are students and rated pilots recognized when they make good decisions? If you do not have a system in place to recognize and reward pilots for making good decisions, should we be surprised when they don't? One approach would be to award a free tow, or some other tangible award, to the individual who makes the biggest contribution to the organizations safety culture each year.

FY12 ACCIDENT SUMMARY

Number of Accidents

For the twelve-month period ending October 31, 2012, twenty-four (24) gliders, seven (7) motor-gliders, and one (1) tow-plane were involved in thirty (30) separate accidents meeting the reporting requirements of NTSB Part 830 of the Code of Federal Regulation. This represents a 11.1% increase in the number of accidents reported during the FY11 reporting period. The five-year average for the FY08 – FY12 reporting period is 30.6 accidents per year, representing a 8.4% decrease in the average number of accidents from the previous five-year period.

Number of Soaring Accidents

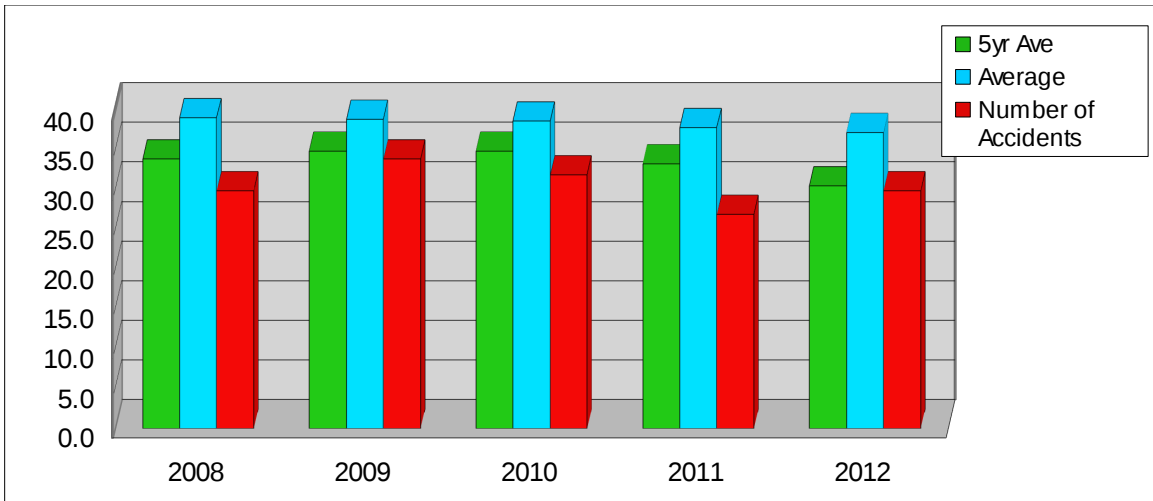


Figure 2 Number of accident, 5 year average 2008 - 2012

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 33.5/year in the 00's) the number of accidents each year remains too high. In addition, the average number of fatalities has remained nearly constant, at just over 6 per year since the mid 1990's. In the FY12 reporting period six (6) accidents resulted in fatal injuries to eight (8) pilots and passengers. In addition, six (6) pilots and one (1) passenger received serious injuries while twenty (20) pilots and three (3) passengers received minor or no injuries during the FY12 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 FY12 reporting period, approach and landing accidents attributed approximately 60.0% of the total number of accidents reported for the year. This continues a historical trend where landing accidents contribute to the largest number of accidents year in and year out. Takeoff accidents account for just over 23% of the number of accidents, meaning that over 83% of the number of accidents occurred during the takeoff and landing 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. Pilots need to become proficient in dealing with launch emergencies, having a pre-planned set of actions that they will execute if the launch starts to go wrong. Pilots should conduct a proper pre-launch checklist and use a pre-launch briefing to mentally prepare for contingencies. Pilots should also learn how to deal with problems and emergencies in the landing phase of flight. The SSF Goal Oriented Approach, described below, provides guidance on how to accomplish this task.

Percentage of accidents that occur in various Phases of Flight

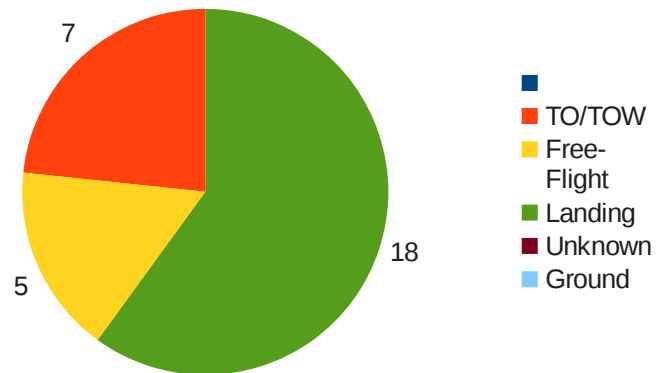


Figure 3 Accident phase of flight

Launch Accidents

Aborted launch accident, called PT3 (Premature Termination of The Tow) events, accounted for 23.3% of the FY12 accidents. Three (3) of these accidents involved the glider being aerotowed, two (2) accidents occurred while the glider was being winch launched, and the remaining two (2) accidents occurred while the motor-glider was self-launching. 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 initial flight training.

Fatal and Non-Fatal PT3 Accidents

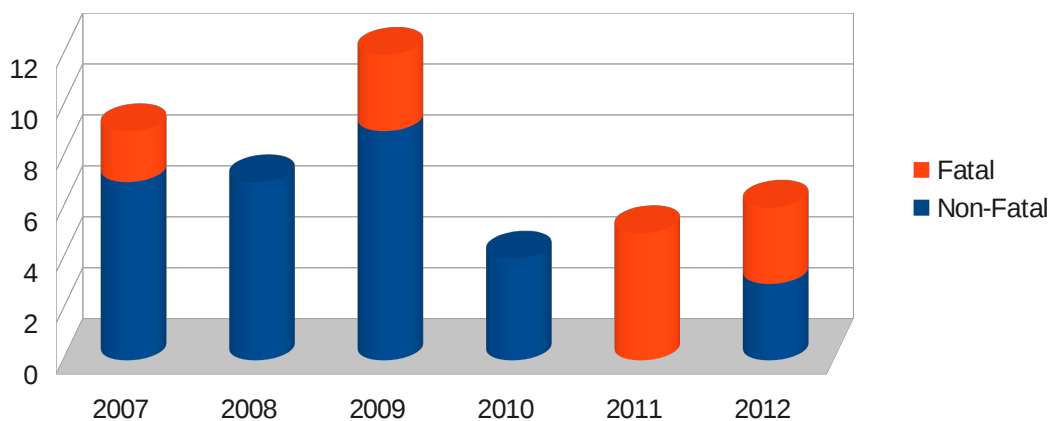


Figure 4: Number of fatal and non-fatal launch accidents

Soaring operations (clubs and commercial operators) should evaluate their training syllabus to ensure that this training is provided to both students and rated pilots. It should also be noted that just 'pulling the release' to simulate a rope break is not sufficient. Accident reports indicate that over 60% of PT3 accidents occur after the pilot intentionally pulled the release. A better approach is to have the instructor evaluate and critique the pilots decision making skills in addition to the in-flight piloting skills.

Figure 4 shows the number of fatal (orange) and non-fatal (blue) accidents reported during the 2007 – 2012 reporting periods. This figure shows that historically, PT3 accidents are fatal about 25% of the time. In 2008, none of the PT3 accidents were fatal, in 2011 ALL of them were.

The pilot of a SZD-55-1 began the aerotow takeoff with the glider's heading differing from the tow-planes by approximately 5 degrees. During the initial ground roll, the glider's right wing dropped to the ground, causing the glider to yaw 70 degrees to the right. The pilot released shortly after the glider became airborne and then touched down sideways. The tail boom broke off due to the sever side-load during the landing sequence. *NTSB ERA12CA378*.

The commercial rated pilot and non-pilot passenger were not injured, but the SGS 2-33 was substantially damaged when it struck a runway sign during an aborted aerotow launch. The pilot stated that a gust of wind from behind kept the flight from launching normally. The pilot realized that the glider would have trouble avoiding a runway sign, so he released. He was unable to raise the left wing to clear the sign. *NTSB WPR12LA285*.

The CFG and ATP rated pilot were seriously injured and the Grob 103 glider was substantially damaged while practicing a simulated cable break during a winch launch. The glider collided with trees while executing a 180 degree turn to return to the airport. *NTSB ERA12LA455*.

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 every aerotow and winch to accident occurred after the pilot actuated the tow release in their aircraft. Every glider pilot should have a predetermined plan of action that can be executed immediately if the launch does not go as planned.

An analysis of PT3 accidents identified 3 major causal factors. 1) the glider pilot launched with the spoilers open, 2) the glider pilot got out of position, and 3) there was a mechanical problem with the tow-plane. The instructor could begin to evaluate the pilots decision making and flying skills by describing these 3 potential issues and then asks the pilot (student or rated pilot receiving a flight review) to pick one. The pilot should then describe how they would recognize this event, what their response would be, and how they would complete the flight. The instructor should guide this discussion to ensure the pilot recognizes all of the internal and external factors that must be counted for. The pilot and instructor should then develop an initial plan to safely practice this maneuver. With this initial plan in place, the pilot and instructor must then talk with the tow-pilot to get agreement between all 3 pilots that the plan can be safely executed. The final step is to fly this flight. The instructor can now evaluate the pilots flight skills and his/her decision making skills.

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 two ground launch accidents during the FY12 reporting period. One accident is reported here, the second is covered in the PT3 section above.

The commercial pilot of a Grob 103 was fatally injured while conducting a winch ground launch. The pilot aborted the first winch launch and landed uneventfully when the glider overran the winch cable. During the second launch attempt, the glider again overran the winch cable and the pilot again released. The glider had drifted downwind due to a crosswind and the glider landed hard damaging the tail section. *NTSB CEN12LA605*.

Cruise Flight Accidents

In the FY12 reporting period, five accidents were reported during the in-flight (free flight) phase, after release and before entering the landing pattern. One of these accidents resulted in fatal injuries to the pilot. Two of these accidents were mid-air collisions between 2 single place gliders. One mid-air took place during the World Gliding Championships in Uvalde TX, the other occurred while pilots were flying in northern Nevada. Neither of these mid-airs resulted in fatal injuries to pilots or passengers.

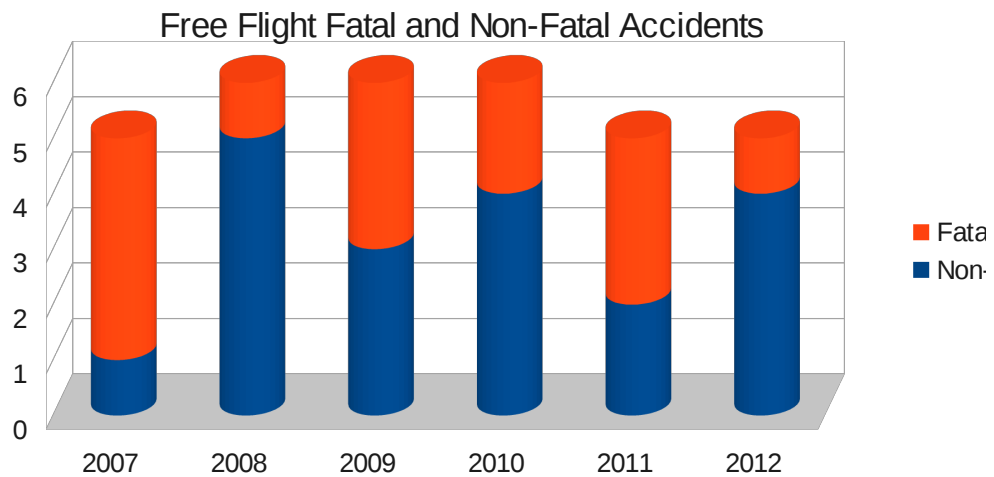


Figure 5: Number of Fatal and Non-Fatal Free-Flight (cruise) accidents

Figure 5 shows the number of fatal and non-fatal Free-Flight (cruise flight) accidents. As can be seen, the majority of these accidents typically result in fatal injuries to the pilot due to the high speeds or high 'G' loads involved in the impact. The non-fatal accidents are listed here, the fatal accidents are listed in the Fatalities section..

The pilot of a JS-1B received minor injuries after bailing out of his damaged glider. The pilot reported hearing a loud noise and both rudder pedals went to the floor. The pilot was able to maintain partial control over the glider using aileron and elevator controls, but he concluded that the terrain was unsuitable for a forced landing. The pilot then bailed out and parachuted safely to the ground. *NTSB CEN12LA265.*

The pilot of a Ventus 2CT was seriously injured and the glider was substantially damaged following a collision with trees on a ridge-line. The pilot reported that he had successfully flown for 2 hours and was making 'S' turns in front of a ridge. The pilot encountered a thermal and decided to circle instead of continue the 'S' turns. After completing 180 degrees of turn the glider flew out of the thermal and into strong sink. The glider stalled and descended into the trees. *NTSB ERA12CA352..*

The private pilot of a Standard Cirrus and the commercial pilot of a Pegasus were not injured, but both gliders were substantially damaged as the result of a mid-air collision. Both pilots reported maneuvering over hilly terrain searching for lift when the accident occurred. Both pilots flew their damaged gliders a short distance back to the launch airport where they landed safely. *NTSB WPR12LA250A/B.*

A French registered ASG-29 and a German registered ASG-29 were involved in a mid-air collision while participating in the World Gliding Championships in Uvalde TX. The right horizontal stabilizer of the German registered glider was severed when it collided with the French registered glider. The German pilot received minor injuries after bailing out of his damaged glider. The French pilot managed to fly the 19 miles back to the launch airport where he landed safely. *NTSB CEN12LA553A/B.*

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 FY12 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/short landings, and stall/spin accidents. Two thirds of the reported landing accidents occurred at the completion of flights while the pilot was landing at their home airport.

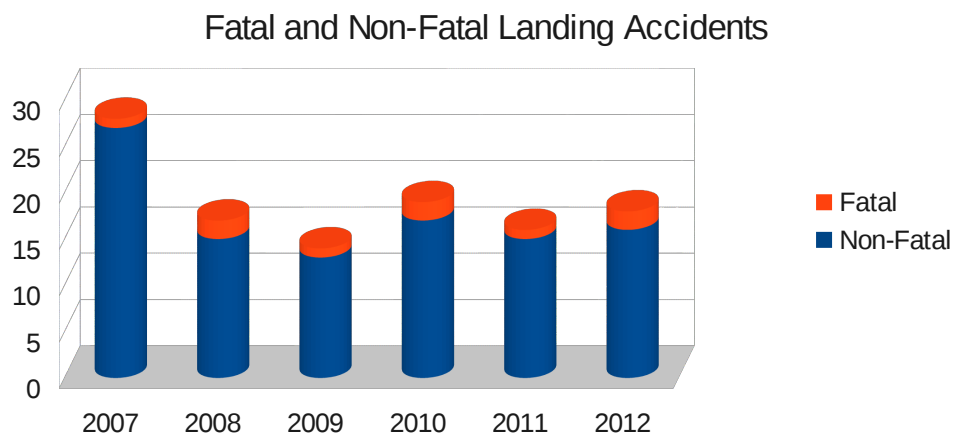


Figure 6: Number of Fatal and non-Fatal Landing Accidents

Figure 6 shows the total number of landing accidents from 2007 – 2012 broken down by fatal and non-fatal accidents. This figure shows that the vast majority of landing accidents do not result in fatal injuries to the pilot. A sample of the landing accidents in FY12 indicate the accident trends where the glider struck an object during the final approach or while on the ground roll.

The student pilot of a SGS 1-26B was not injured, but the glider was substantially damaged after the right wing struck a mailbox post during an off-airport landing. The pilot reported he was unable to glide back to the airport so he prepared for a field landing. On final, the pilot noticed signs in the flight path, so he decided to land on a road. The gliders right wing struck an unobserved mailbox post during the landing. *NTSB WPR12CA072.*

The pilot of a PIK 20D was seriously injured and the glider was substantially damaged when it collided with a cedar tree and terrain about 1000 ft short of the runway. The pilot stated that he was preparing to land to the north, but he observed another glider being positioned on the runway. To avoid overflying the other glider, the pilot decided to land south. The pilot reported encountering strong sink on final (potentially a wind shear event) and the glider descended into the trees and terrain short of the runway. *NTSB ERA12CA321.*

The CFIF and rated pilot of a Stemme S10-VT were not injured while the glider was substantially damaged when it ground looped during a cross-wind landing. The pilot was receiving a flight review in his glider. He had received several hours of flight instruction in the motor-glider prior to beginning the flight review process. During the final phase of a cross-wind landing the left wing contacted the ground causing a ground loop, separating the tail boom and collapsing the main landing gear. *NTSB WPR12CA258.*

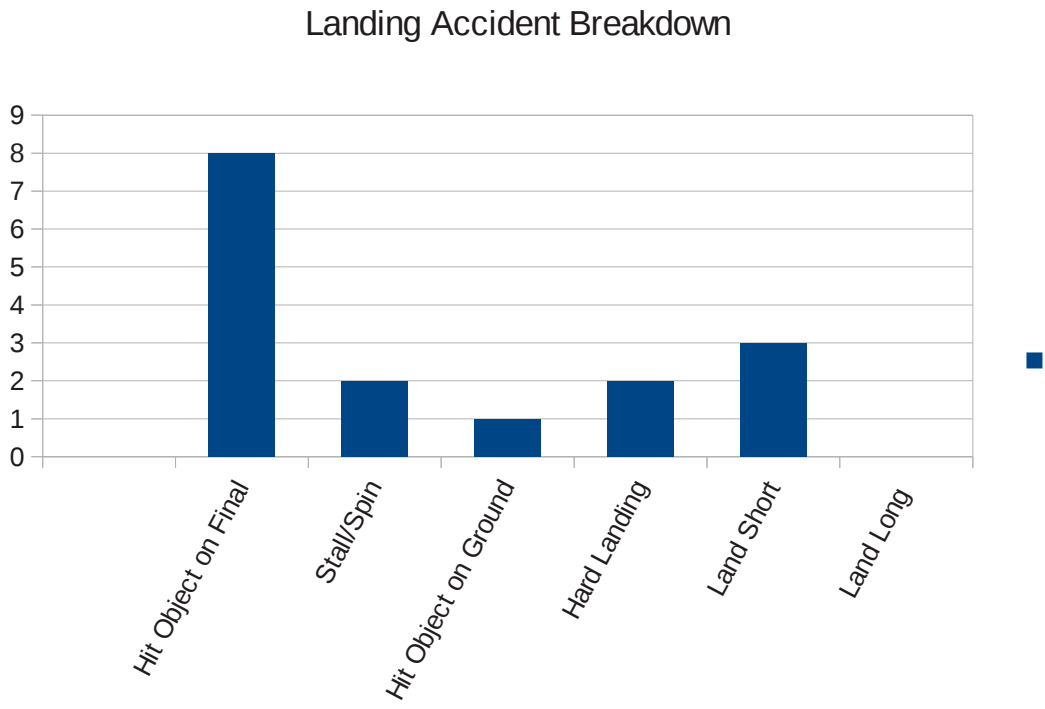


Figure 7: Reported result from landing accident

The commercial pilot of a DG-500MB received minor injuries while the glider was substantially damaged after it struck a railroad embankment short of the runway. The pilot stated that the gliders sink rate was excessive and moving the spoiler handle had no effect on the spoilers position. A post accident examination noted that the lower left spoiler plate had been rubbing on the spoiler box. The plate had scraped off the resin allowing the plate to catch on the fabric seam, jamming the spoiler in the 1/2 open position. *NTSB WPR12CA288*.

The student pilot of an Blanik L-23 received minor injuries while the glider was substantially damaged while landing at the home airport. The pilot reported being lower and further away from the runway than intended on base. She adjusted the spoilers and turned final. The glider impacted terrain short of the runway damaging the left spar and rear cockpit bulkhead. The spoilers were observed to be fully extended and the pilot reported that she opened instead of closed them by mistake. *NTSB ERA12CA454*.

The pilot of a Zuni II was seriously injured and the glider was substantially damaged when the glider impacted trees and terrain while on the downwind leg to runway 36. *NTSB CEN12LA490*.

The pilot of a LS-3A was not injured while the glider was substantially damaged during a field landing. The pilot reported that he was unable to make it back to the airport and he decided to make an off-airport landing. The right wing tip struck tall grass while the glider was several feet in the air, causing it to yaw and impact terrain nose first. *NTSB CEN12CA608*.

The pilot of a HP-14 was not injured but the glider was substantially damaged after it landed short of the runway. The pilot reported being high on final so he lowered the flaps beyond 40 deg. The gliders sink rate increased and the glider touched down hard short of the runway. The main gear collapsed and the fuselage buckled during the landing sequence. The pilot noted that the flaps were fully deployed (90 deg) which was more than he intended. *NTSB WPR12CA157*.

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 known 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 pushes 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

Four (4) glider pilots, two (2) passengers, and two (2) motor-glider pilot were involved in six (6) fatal accidents during the FY12 reporting period. This represents a 40.0% decrease in the number of accidents (6 vs 10) from previous reporting period. Three (3) of the accidents occurred during the launch phase of flight (one accident each while self-launching, aerotow launching, and winch launching), one (1) of these accidents occurred in the cruise phase of flight, two (2) accident occurred in the landing phase of flight.

It should also be noted that this report continues showing the breakdown of fatal and non-fatal accidents in the launch, cruise, and landing phase of flight. Figures 4, 5, and 6 (above) show the number of non-fatal accidents (blue cylinder) and the number of fatal accidents (orange cylinder). The total number of accidents is the sum of both fatal and non-fatal accidents. Figure 8 displays the number of fatal accidents in all phases of flight.

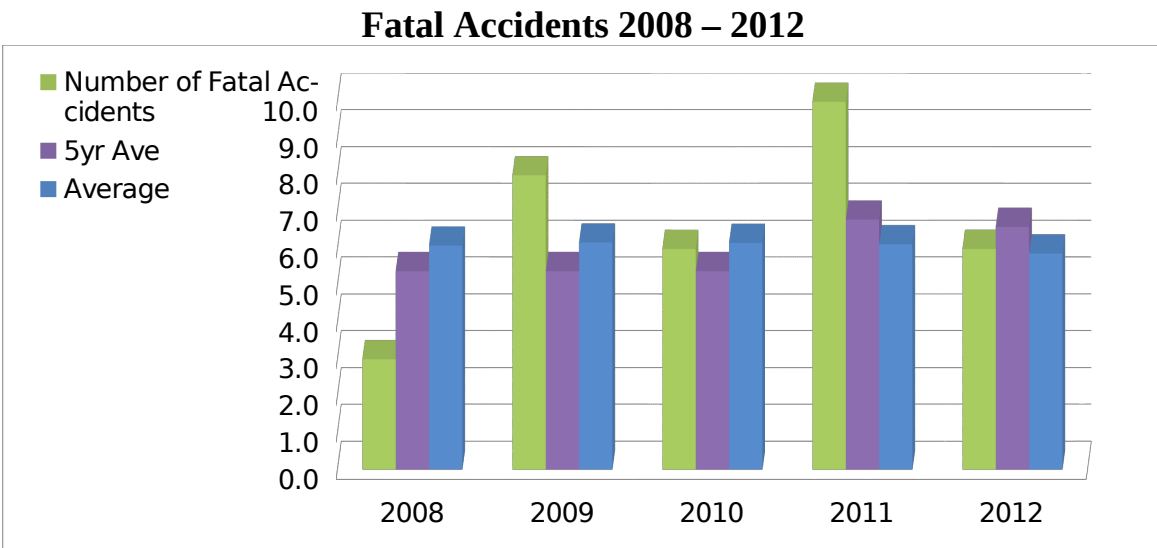


Figure 8: Number of fatal accidents, 5 year average, and average since 1987

The NTSB is still investigating these fatal accidents and no probable cause has been issued for any of these accidents. The reports below summarize the six (6) accidents that occurred during this reporting period.

The private pilot of a Pipistrel Virus 912 was fatally injured and the glider was substantially damaged during a forced landing following a loss of engine power event. A witness reported that the engine sounded like it was missing during the run-up and take-off. The GPS reported that the motor-glider reached an altitude of 200 ft AGL before descending again. The aircraft impacted a golf course within 1 mile of the airport. The pilot had failed an FAA medical exam in October 2006 and purchased the Pipistrel in December 2007, receiving an experimental certificate in June 2008. The reporting tachometer showed 298 hours during the annual inspection about 3 weeks before the accident occurred. *NTSB CEN12LA149*

The commercial pilot of a Avia Stroitel AC-5M Motor-glider was fatally injured and the aircraft was substantially damaged after the pilot failed to open his personal parachute during the accident sequence. According to witnesses the motor-glider was 500-600 ft AGL when it entered a steep

left turn and began to climb. While in this turn, the pilot was either ejected or bailed out of the aircraft. The pilot failed to pull the ripcord and deploy the parachute. *NTSB WPR12LA218.*

The commercial pilot and two passengers in a IAR Brasov Lark IS-28B2 glider were fatally injured after the glider kited, stalled and spun in from an aborted aerotow. The pilot was giving family members rides in the glider. On the second flight the pilot launched with the tail dolly still attached. The glider was observed kiting on tow and both the glider pilot and the tow-plane pilot released. Witnesses estimated the glider reached an altitude of 150 ft AGL before it stalled and spun into the ground just off the end of the runway. *NTSB CEN12FA378.*

The private pilot of a Schleicher ASW-27 was fatally injured after the glider collided with trees and terrain short of the runway. The pilot was participating in a SSA sanctioned glider contest and had launched on a contest flight. Conditions were poor and the accident occurred while the pilot was attempting to land back at the airport *NTSB CEN12LA330.*

The commercial pilot of a Schleicher ASW-19 was fatally injured and the glider was substantially damaged after it collided with terrain after entering a low-altitude stall/spin. The glider was observed about 1 mile from the approach end of the runway at a low altitude in a steep right turn. The witness then reported the glider appeared to level out on final to the runway before beginning a left turn. The glider subsequently stalled and spun into the ground. An examination of the wreckage showed the landing gear was in the down and locked position. *NTSB ERA12LA528.*

The commercial pilot of a Grob G-103 Twin II was fatally injured and the glider was substantially damaged when it landed hard during an aborted winch launch. According to witnesses the pilot aborted the 1st winch launch when the glider overran the winch cable. After re-positioning the glider a second launch was begun. During this launch at approximately 75 ft AGL the glider again overran the winch cable and the pilot released. Due to a cross-wind, the glider landed hard off the left side of the runway. *NTSB ERA12LA455.*

For the five-year period 2008 – 2012, 38 pilots and passengers received fatal injuries while soaring. This equates to a five-year average of 7.6 fatalities per year, a slight 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 6.6 fatal accidents per year, a slight decrease from the 6.8 rate from the past 5-year period, and 5.9 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 twenty-four (24) gliders, seven (7) motor-glidern, and one (1) tow-plane received structural or substantial damage during this reporting period. This was the only type of damage reported during this 12 month 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 and makes it harder for members/customers to obtain and maintain both currency and proficiency.

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.

Auxiliary-Powered Sailplanes

For the twelve-month period ending October 31, 2012 seven (7) accidents involving auxiliary powered sailplanes were reported to the National Transportation Safety Board. Two pilots received fatal injuries, three pilots received serious injuries, while the remaining two pilots were not injured. This represents a substantial increase (450%) in the number of accidents when compared to the previous reporting period.

The pilot of a Zealot motor-glider was seriously injured and the glider sustained structural damage after the glider stalled during the left base/final turn. A witness reported hearing the pilot yell over the radio "Oh No" as the stall occurred.. *NTSB ERA12LA171.*

The pilot of Super Dimona was not injured but the motor-glider received substantial damage during a bounced landing. The pilot reported that he maintained excess speed during the landing, causing the glider to bounce several times. The landing gear collapsed on the third bounce, substantially damaging the glider. *NTSB CEN12CA363.*

The pilot of an ASW-22 as not injured but the motor-glider was substantially damaged when it rolled off the end of the runway while self-launching during the World Gliding Championships. The pilot reported that the motor-glider was not accelerating properly so he decided to reduce power and taxi off the end of the runway to allow other contestants to continue launching. The gear collapsed when the glider ran through a ditch at the end of the runway. Witnesses reported seeing the spoilers deployed during the ground roll, which was the reason for the poor acceleration. *NTSB CEN12CA548.*

The private pilot of an ASH-25M was seriously injured and the motor-glider was substantially damaged when the left wing tip struck the ground while turning onto base leg. Witnesses reported that the engine was extended but not running during the landing approach. *NTSB WPR13LA007.*

Accidents Involving Tow-Aircraft

During the FY12 reporting period one (1) accident involving a tow-plane occurred resulting in no injuries to a tow-pilot.

The pilot of a PA-18 was not injured but the airplane was substantially damaged after it ground looped and impacted terrain during an after-landing taxi. The tow-plane had just returned from a glider tow operation when the accident occurred. *NTSB CEN12LA522.*

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 accidents².

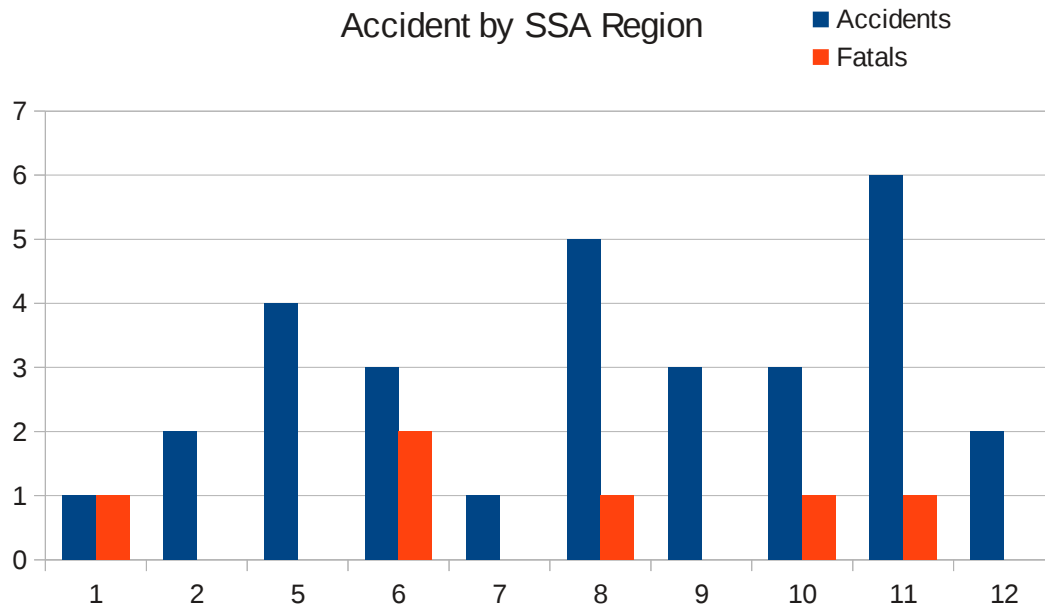


Figure 9: Number of accident per SSA Region

Flight Training and Safety Report

In August of 2010 the SSF sent every member a letter indicating that we had a problem. This letter, and the subsequent actions by the SSF, lead to a lot of questions and comments from the membership. While some progress has been made, insurance claims were down 22% in 2012 over 2011, there are still more things we all need to do.

First and foremost, we all need to accept the fact that the causal factor behind most soaring accidents is a Human Factor error. The question then is how can we reduce these errors? Fortunately for us, there is a body of knowledge on this topic that we can tap into. If we accept a new premise and follow a few simple guidelines we can significantly reduce the number of accidents.

According to Sidney Dekker³ author of “The Field Guide to Understanding Human Error” we all need to accept the, apparently, radical view that simple human error is not the cause of an

² See Appendix A for more details

³Professor of Human Factors and System Safety at Lund University, Sweden and Director of the Leonardo Da Vinci Laboratory for Complexity and Systems Thinking.

accident. Rather, the error is a symptom of a deeper problem (education, knowledge, and proficiency). If we accept this view, then we can begin to identify the underlying causes that lead to the accident and fix them. Rejecting this viewpoint will relegate us to more years of 30 plus accidents per year with a 30% fatality rate.

The traditional view of a human error accident is that the pilot having the accident failed in some way. Either this pilot failed to learn a key fact (a mid-air occurred because the pilot failed to clear his turn), or the pilot ignored a rule or regulation (a stall/spin turning to final because the pilot entered the pattern too slow/low). While it might be comforting to accept that this single pilot was at fault, in reality this is not the case.

If a pilot fails to clear his turns, then how many times did he successfully make turns without looking? It could be thousands. Thus the problem is not simply that the pilot failed to clear his turns, the problem is that the soaring operation he trained in failed to emphasize the importance of this task, The operations training syllabus did not emphasize this task and instructors may not have been given the post-flight time to evaluate and critique the pilots actions on this critical skill. The soaring operations also failed to catch this sub-par performance during recurrent training (flight review) and fellow pilots failed to critique the pilots performance of this critical task if/when it was noticed. It is this structural problem with the organizations initial and recurrent training programs that needs to be fixed. Thus the solution is to ensure that pilots are taught to clear turns and that their proficiency at this task is verified on a regular basis.

If a pilot continues to fly a 'normal' landing pattern despite being low, how many times has he successfully done this before? Again the problem is that the soaring operations training syllabus did not provide the pilot with the analysis skills needed to recognize both normal and abnormal landing patterns. The syllabus did not allow the instructor the time to practice multiple normal and abnormal approaches to build the pilots proficiency levels up to the point they should be. The operation also failed to notice, and provide the recurrent training necessary to correct this poor performance. The solution is to ensure that the pilot is trained to modifying the pattern as necessary to deal with normal and abnormal situations.

This new view of human factors errors can help us break through the accident plateau we currently suffer from. However, it will take an effort from each of us to examine our operations current initial and recurrent training program to determine what is broken and how to fix these problems.

SSF Recommendation, Risk Management Training

As noted above, pilot decision-making skills are an important factor in reducing the number of accidents in the US, and throughout the global soaring community. A review of the relevant sections of Part 61 will show that each pilot must receive Aeronautical Decision Making (ADM) training in preparation for a pilot license. Pilots who received their training prior to 1978 may not have receive this type of training, as it was not mandated by the FARs. Unfortunately even now most pilots do not receive adequate training in this task which leads to a lack of skill and some pilots have never been exposed to this training. It also appears that most pilots fail to evaluate this skill during a Flight Review, instead focusing on the mechanical skills needed to manipulate the gliders flight controls. The SSF recommend that pilots and flight instructors place a greater focus on these ADM skills.

It is now recognized that ADM skills are a learned behavior, just as you need to learn how to keep the yaw string centered, you need to learn how to make good decisions. Also, just as you have to continuously practice keeping the yaw string centered, you need to practice making good decisions. The SSF's role is to provide you, your instructor, and your club's management with the resources and support systems needed to help you obtain and maintain good ADM skills.

For the past few decades the airlines and military have recognized this fundamental concept, that the key to reducing accidents is better ADM training. They also recognize that pilots must deeply integrate this ADM training into their daily operations and practice it in the cockpit. It is not sufficient to do some classroom exercises and then forget about it once you get into the cockpit. All pilots need to take this same approach to heart if we want to lower the number of accidents.

Risk Management is now recognized as one of the basic ADM skills that a pilot needs to learn and practice before, during, and after every flight. This is another major issue that the airlines and military learned over the past few decades. That is, pilots make mistakes and often fail to evaluate Risks properly. In the 1950's a large increase in the pilot population resulted in a large increase in the number of accidents. The response was to perform an in-depth analysis of a series of accidents to find a common cause. Then a rule was developed to prevent pilots from making the same mistakes, with the result – a lower accident rate. As an example, pilots use pre-launch checklists to ensure that the aircraft is properly configured before beginning the take-off roll.

While this concept worked for a while, in the early 1980's it had become apparent that the aviation accident rate had reached a plateau and further rules were not reducing the accident rate. Studies by several institutions discovered that trying to prevent pilots from making mistakes was not effective. We make errors for a wide variety of reasons. This led to the realization that if we can't eliminate mistakes, we can develop mechanisms to improve the chances of us detecting when we have made one. This is known as the Swiss Cheese model of ADM.

A good example of this is the glider assembly process. The process starts with having sufficient knowledge to complete the process successfully, sufficient room, a knowledgeable assistant and no distractions. There are then multiple checks after the assembly process is completed, including a walk-around inspection, positive control checks (PCC), and critical assembly checks (CAC) to ensure that the assembly process was correctly completed. These multiple barriers allow the pilot to catch errors or mistakes.

Imagine that during the assembly process you are installing the horizontal stabilizer and after putting it in place you realize you forgot the assembly tool in the cockpit side pocket. No problem you think, I'll just walk around the wing and get it. While digging in the cockpit a fellow pilot comes up and asks you a question about the day's task. You interrupt your assembly process and begin to answer his question when you notice the weather is changing so you decide to go into the clubhouse and check the radar returns. The check reveals that things will be OK, but the day will be shorter than you expected so you need to hurry if you are to get a short X-C flight in. You go back out and rush through the rest of the prep work before pushing the glider out to the flight line for your launch. Being rushed, the pilot also decides the PCC and CAC checks are not needed, as they have never found anything before and he needs to get going now.

In this scenario you can see that the pilot failed to finish the assembly process, and due to the distraction he failed to notice this mistake. We all need to realize that this mistake is not because the pilot was inexperienced, but that distractions caused the pilot to miss an important step and then the changing conditions caused him to ignore the other actions that would have caught this

mistake. It should also be noted that the pilot failed to adequately evaluate the potential risks he was facing. In this case the changing conditions and need to rush the launch created increased risks that the pilot needed to manage.

As noted above, pilots need to be trained to recognize and evaluate potential risks. Risk Management (RM) skills are the 1st step in building an effective ADM program. Not performing this RM task can be as deadly as entering a stall/spin at 100 ft AGL. The airlines and military have found that scenario based training, such as the scenario presented above, is an effective RM/ADM training method. Pilots who receive this type of training, and then continue to practice it have fewer accidents than pilots who ignore or avoid this training.

When reading this type of scenario, you should begin by identifying the potential risk factors and then determine how they are changing. You then need to determine what actions you can take to mitigate those risks. Note that eliminating the risks is one strategy, but reducing them to an acceptable level is also a reasonable approach. In the scenario above, the risk mitigation or elimination actions could include, but are not limited to: (1) decide not to fly after all, (2) perform the PCC and CAC checks; (3) have the wing runner ask every pilot if they have completed the PCC/CAC checks, (4) remove the horizontal stabilizer from the tail when you go to get the assembly tool, (5) check with other pilots about the changing weather, (6) change your flight plan to conduct a local flight. The list can go on, and needs to be tailored to the skill and experience level of the pilot.

Also notice that action's 3 and 5 uses good Single Pilot Resource Management (SPRM) skills, where the pilot involves others in helping to evaluate and manage the potential Risks.

The SSF has begun to build a scenario library, both text based and video clips, to help pilots and instructors provide better RM/ADM instruction and training. Visit the SSF web site and navigate through the On-Line Learning tab to the RM/ADM Resources page or follow this link <http://www.soaringsafety.org/school/adm.html> directly to the page.

Only by improving, and continuously practicing, your RM/ADM skills will the number of accidents in the US soaring community be reduced.

SSF Recommendation, Stall Recognition Proficiency

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 FY12 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, glider performance, 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 unacceptably low or high 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, this angle 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 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.

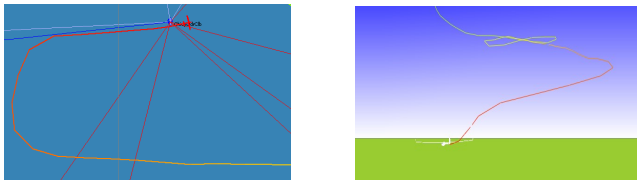


Figure 10: 2D and 3D view of a glider landing showing pattern and decent profile

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 FY12, takeoff accidents accounted for just over 23% 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 top pilot can see the glider on the ground before launch and during the aerotow is highly recommended. Radios in both the glider and tow-plane are 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 glider accident rate.

SSA REGIONS

- Region 1 Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont.
- Region 2 New Jersey, New York (south of 42nd parallel), Pennsylvania (east of 78th meridian).
- Region 3 New York (north of 42nd parallel), Pennsylvania (west of 78th meridian).
- Region 4 Delaware, District of Columbia, Maryland, Virginia, West Virginia.
- Region 5 Alabama, Florida, Georgia, Mississippi, North & South Carolina, Tennessee, Puerto Rico, The Virgin Islands.
- Region 6 Indiana, Kentucky, Michigan, Ohio.
- Region 7 Illinois, Iowa, Minnesota, Missouri (east of 92nd meridian), North & South Dakota, Wisconsin.
- Region 8 Alaska, Idaho, Montana, Oregon, Washington.
- Region 9 Arizona, Colorado, New Mexico, Utah, Wyoming.
- Region 10 Arkansas, Kansas, Louisiana, Missouri (west of 92nd meridian), Nebraska Oklahoma, Texas.
- Region 11 California (north of 36th parallel), Guam, Hawaii, Nevada.
- Region 12 California (south of 36th 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](mailto:rcarlson501@comcast.net)>, Burt Compton <[burtcompton at aol.com](mailto:burtcompton@aol.com)>, Stephen Dee <[Motorgliderman at aol.com](mailto:Motorgliderman@aol.com)> Ron Ridenour <[ronsnimbus3 at aol.com](mailto:ronsnimbus3@aol.com)>, Bernald Smith <bernal 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.

Definitions

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.