SOARING SAFETY FOUNDATION

Nov 1, 2012 – Oct 31, 2013

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 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.

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 FY13 (November 1, 2012 to October 31, 2013) reporting period. A review of the NTSB accident database shows an 16.7% decrease in the number of US soaring accidents during this time period compared to the FY12 reporting period. In addition FY13 saw a 50% decrease in the number of fatal accidents. Finally the number of insurance claims was down another 20+%. Despite all these decreases, there is general agreement that more steps must be taken to continue reducing the number of accidents and to eliminate all fatal accidents..

For the twelve-month period ending October 31, 2013, twenty (20) gliders, three (3) motor-gliders, one (1) tow-plane, and one (1) airplane were involved in twenty-five (25) separate accidents meeting the reporting requirements of NTSB Part 830 of the Code of Federal Regulation. This represents a 16.7% decrease in the number of accidents reported during the previous reporting period. The five-year average for the FY09 – FY13 reporting period is 29.6 accidents per year, representing a 3.3% 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, 33.5/year in the 00's, and 28.5/year for the first 4 years of this decade) 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 FY13 reporting period three (3) accidents resulted in fatal injuries to five (5) pilots and passengers. In addition, four (4) pilots and one (1) passenger received serious injuries while nineteen (19) pilots and three (3) passengers received minor or no injuries.

A review of the three (3) fatal accidents showed that a private pilot with a pilot rated passenger were fatality injured during an aborted winch launch. The glider stalled and spun after the glider released below 300 ft AGL. A commercial pilot and passenger were fatality injured when the right wing of their wooden glider failed in-flight shortly after completing a loop. A private pilot was fatality injured after the glider stalled and spun with the pilot was making the base-to-final turn. All fatal accidents are still under investigation by the NTSB, more details are given in the main report (http://www.soaringsafety.org/prevention/reports.html).

Continuing a long historical trend, the largest number of accidents occurred during the landing phase of flight during this reporting period. In FY13 landing accidents represented 80% of all accidents. It should also be noted that ten (10) of the twenty (20) landing accidents, or 50%, occurred while the pilot was attempting an off-field landing. The remaining ten (10) accidents occurred while the pilot was attempting to land on their home airport. It should also be noted that three (3) of these landing accidents occurred while a CFIG was on-board providing instruction. Causes of these accidents include; a wing striking an object (tree, power lines, terrain) during the landing, landing in rain with wind gusts to 38 kts, and misjudging 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 promote 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, the pilot continuously evaluates the gliders flight path taking into account wind speed/direction, lift/sink, distance remaining to the landing spot, glider 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. Responding to even 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.

Two (2) aborted launch accident, called PT3 events, accounted for 8.0% of the FY13 accidents. A commercial pilot was seriously injured while conducting a maintenance flight with the rudder cables reversed. The remaining accident was the fatal aborted winch launch. 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, check rides and flight training.

Three (3) motor-gliders, were involved in one (1) cruise, and two (2) landing accidents in the FY13 reporting period. One motor-glider was damaged during an in-flight encounter with turbulence during powered flight. One motor-glider was damaged during an off-airport landing, the pilot had shutdown the engine after experiencing severe vibrations. The remaining accident occurred after the glider got low during a 1 mile final and failed to make the intended 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 activates also need to be trained to recognize and properly respond to any safety issues during the daily activity. Everyone, students, pilots, ground operations staff, 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 if accidents.

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ANNUAL SAFETY REPORT
FY 2013

This report covers the FY13 (November 1, 2012 to October 31, 2013) reporting period. A review of the NTSB accident database shows an 16.7% decrease in the number of US soaring accidents during this time period compared to the FY12 reporting period. In addition FY13 saw a 50% decrease in the number of fatal accidents. Finally the number of insurance claims was down another 20+%. Despite all these decreases, there is general agreement that more steps must be taken to continue reducing the number of accidents and eliminate all fatal accidents.

For many reasons[1], 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.

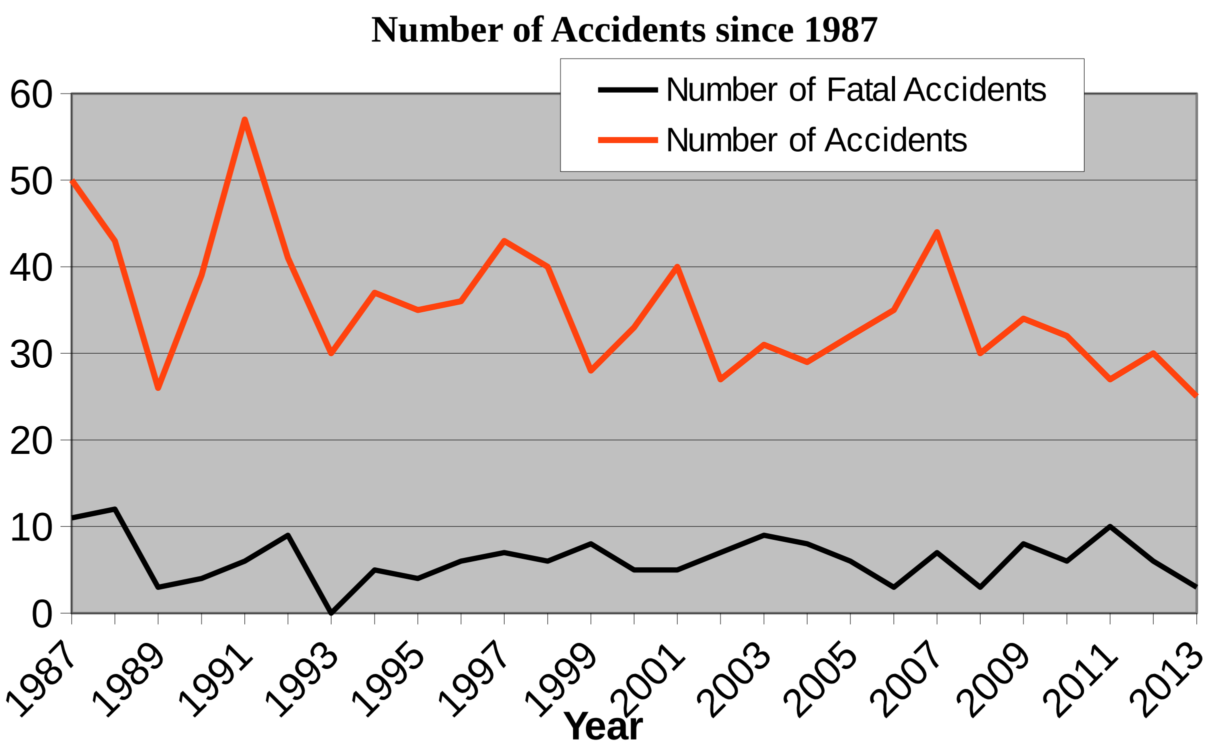

Figure 1 Total number of accidents and fatal accidents on a per year basis.

Figure 1 shows the total number of accidents and fatalities from 1987 to the present. The top line is the number of accidents each year, while the lower line is the number of fatal accidents. An analysis of this data shows two trends. One is that the total number of accidents is declining and

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

has been trending down since the SSF began recording this data. The rate of decline is not as rapid as we would like, but the long term trend is in the right direction. The other is that fatal accidents have reached a plateau. There are on average 6 fatal accidents each year. This report beings to explore this issue in more depth, see the **fatalities** and **Fatal Accident Trends** sections for these details.

To continue reducing all accidents and to eliminate all fatal accidents, 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 in 2011, 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 benefit, to the individual who makes the biggest contribution to the organizations safety culture each year.

FY13 ACCIDENT SUMMARY

Number of Accidents

For the twelve-month period ending October 31, 2013, twenty (20) gliders, three (3) motor-gliders, one (1) tow-plane, and one (1) airplane were involved in twenty-five (25) separate accidents meeting the reporting requirements of NTSB Part 830 of the Code of Federal Regulation. This represents a 16.7% decrease in the number of accidents reported during the previous reporting period. The five-year average for the FY09 – FY13 reporting period is 29.6 accidents per year, representing a 3.3% decrease in the average number of accidents from the previous five-year period.

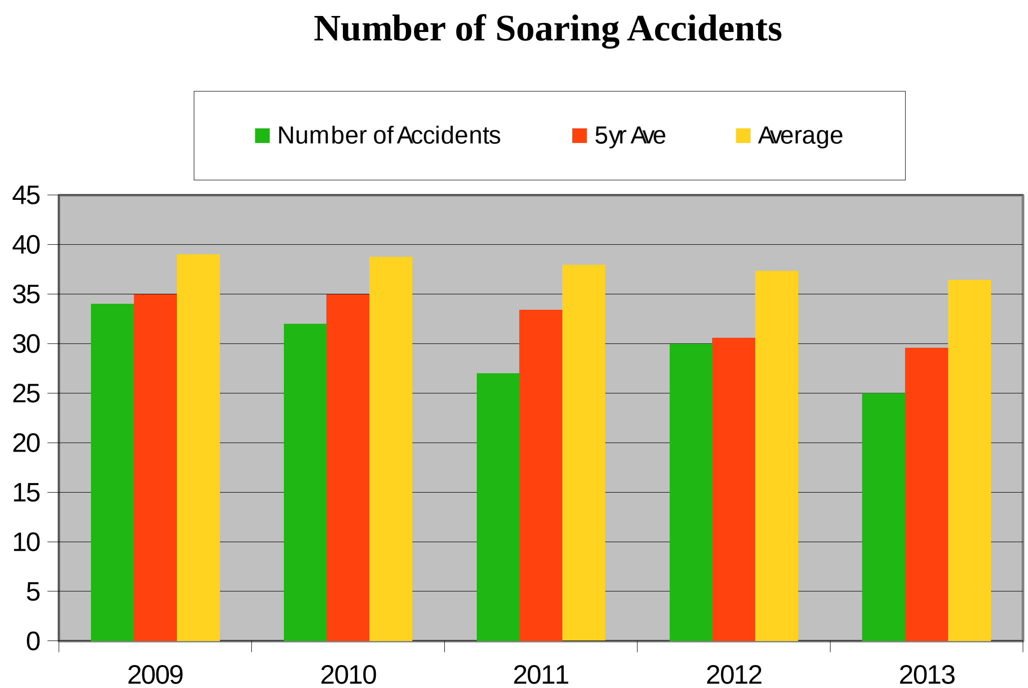

Figure 2 Number of accident, 5 year average 2008 - 2012

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, 33.5/year in the 00's, and 28.5/year for the first 4 years of this decade) 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 FY13 reporting period three (3) accidents resulted in fatal injuries to five (5) pilots and passengers. In addition, three (3) pilots and one (1) passenger received serious injuries while sixteen (16) pilots and four (4) passengers received minor or no injuries during the FY13 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 FY13 reporting period, approach and landing accidents were 80% of the total number of accidents reported for the year. These accidents are split 50/50 between pilots landing on an airport and pilots landing off-airport. Historically landing accidents contribute to the largest number of accidents year in and year out. Takeoff accidents accounted for just 8% of the number of accidents in this reporting period, meaning that 88% 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.

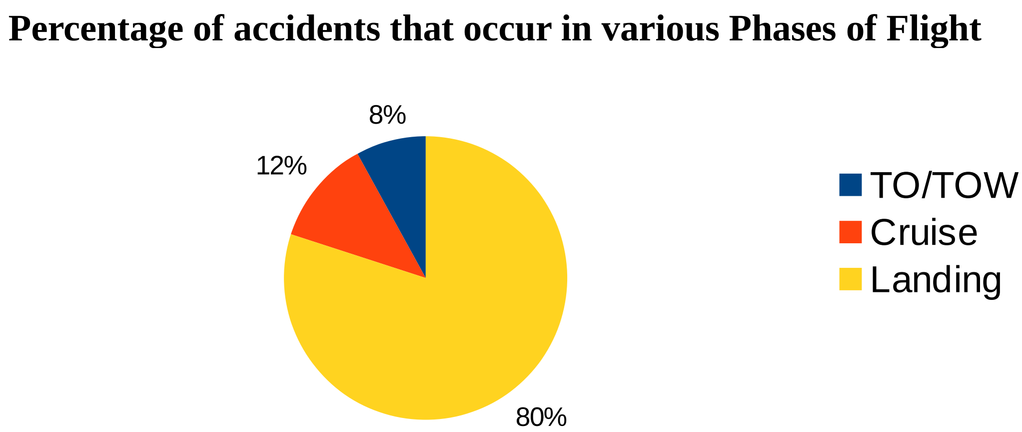

Figure 3 Accident phase of flight

Launch Accidents

Two (2) aborted launch accident, called PT3 (Premature Termination of The Tow) events, accounted for 8% of the FY13 accidents. One (1) accident involved the glider being aerotowed while the other occurred while the glider was being winch launched. 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.

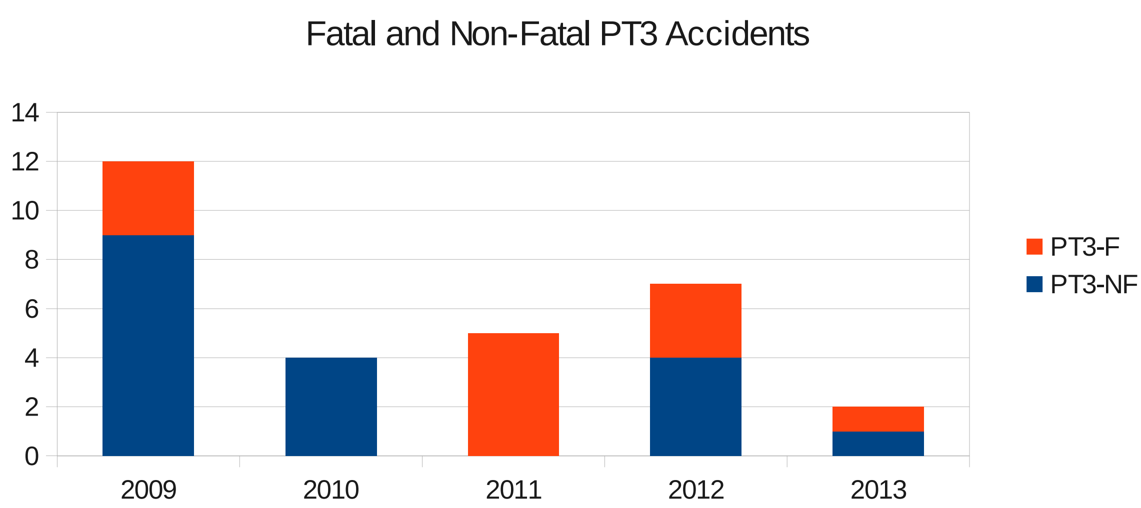

Figure 4: Number of fatal and non-fatal launch accidents

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.

The commercial pilot of a SGS 2-33A was seriously injured after the pilot intentionally released about 400 ft AGL while conducting a glider maintenance flight. The tow-pilot observed the glider yawing left and right on tow with the nose pointing up to 45 deg to the side while in a normal tow position. A post flight examination of the glider revealed that the rudder cables had been rigged incorrectly. *NTSB ERA13LA229*.

The fatal launch accident will be discussed later in this report.

As can be seen by the above accident, 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 and rigged, the pilot/passenger is briefed on possible actions, and the pilot is operating within their abilities. It should also be noted that both aborted launch accidents 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 asking 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 accounted 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 was one ground launch accident during the FY13 reporting period. It will be discussed in the fatal accidents section of this report.

Cruise Flight Accidents

In the FY13 reporting period, three (3) accidents were reported during the in-flight (cruise flight) phase, after release and before entering the landing pattern. One of these accidents resulted in fatal injuries to the pilot. One accident occurred while a motorglider was in cruise flight with the engine operating and the aircraft encountered turbulence. The remaining accident occurred while a glider was ridge soaring and the glider struck the trees while maneuvering.

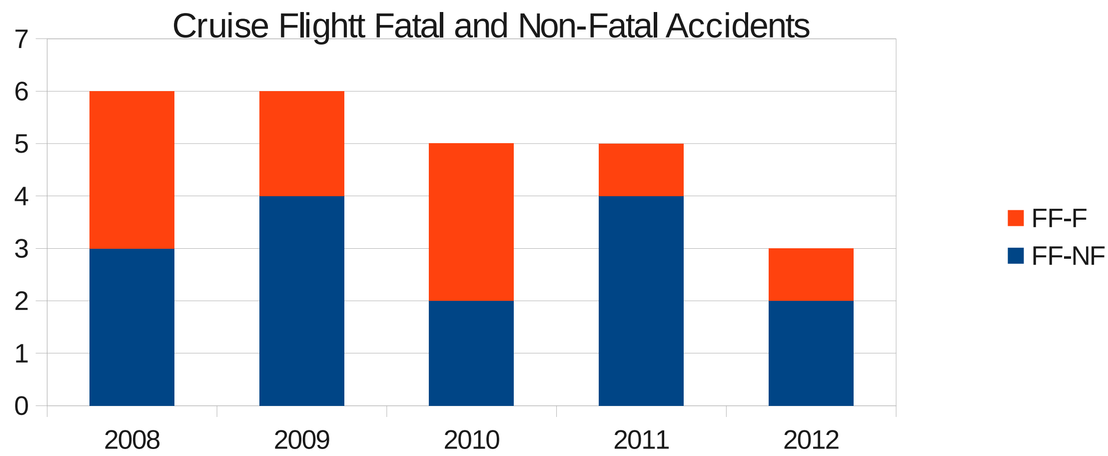

Figure 5: Number of Fatal and Non-Fatal Free-Flight (cruise) accidents

Figure 5 shows the number of fatal and non-fatal Free-Flight (cruise flight) accidents. As can be seen, a significant percentage 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 Phoenix Air U15 motorglider was not injured but the glider was substantially damaged after in in-flight encounter with clear air turbulence. The pilot reported he was cruising under power at 6000 ft MSL when he noted a WX report showing turbulence along his flight path. He climbed to 6500 ft MSL and continue the flight towards his destination. The glider encountered severe turbulence which lasted for several seconds. The pilot reported hearing a cracking noise at the time and upon landing he discovered a 12-inch crack under the right side of the vertical stabilizer.   *NTSB ERA13CA195*.

The pilot of a Ventus 2B received minor injured and the glider was substantially damaged following a collision with trees on a ridge-line. The pilot reported that he was blown into trees while ridge-soaring near a mountain peak in gusty wind conditions. *NTSB CEN13CA336*..

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 FY13 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. Half of the reported landing accidents occurred at the completion of flights while the pilot was landing at their home airport.

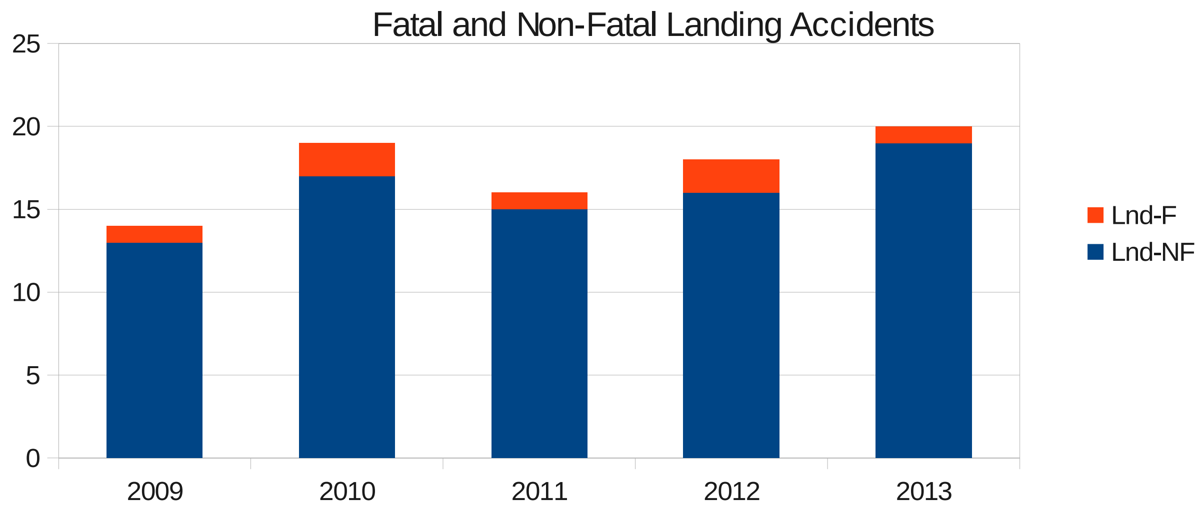

Figure 6: Number of Fatal and non-Fatal Landing Accidents

Figure 6 shows the total number of landing accidents from 2009 – 2013 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 FY13 indicate the accident trends where the glider struck an object during the final approach or while on the ground roll.

The CFI and glider rated pilot of a SGS 2-32 received minor or no injuries, but the glider was substantially damaged after the left wing struck a powerline during an off-airport landing. The pilot they had been flying westward through areas of lift and sink when they entered an area of sink indicating 1000 fpm down. The flight instructor took control and headed east in an attempt to return to lift. The glider failed to contact lift and sink rates varied from 1000 to 1600 fpm down. They selected a field to land in and maneuvered the glider to a landing on that field. The left wing struck a power line which spun the glider 180 deg before coming to a rest about 200 ft short of the intended landing area. *NTSB CEN13CA079.*

The student pilot of a SGS 2-33A was not injured and the glider was substantially damaged when it collided with a tree while attempting to land. The pilot reported he was high on downwind and used more spoilers and extended the downwind leg to compensate. While on base the pilot then realized that we was going to be 'quite' low and he closed the spoilers. While turning final the left wing clipped a tree which spun the glider around and it cam to rest about 25 ft above the ground.. *NTSB ERA13CA077.*

The pilot of a Pawnee received minor injured while the tow-plane was substantially damaged when it flipped over while landing. The pilot was towing at a contest which required landing downwind on the main runway. On base the pilot increased the airspeed from 60 to 80 mph and kept the speed up until touchdown. The airplane was going too fast as it rolled towards the glider grid and the pilot applied heavy braking which caused the airplane to nose over and come to rest inverted on the runway. *NTSB ERA13CA164*.

The pilot of an ASH 26E was not injured but the motor-glider was substantially damaged when it struck a tree while landing. The pilot reported he was on a one mile final at 800 ft AGL with the engine stowed. The pilot deployed spoilers to begin the descent when the glider began to descent at a high rate. The pilot closed the spoilers but the glider was too low to make the intended runway. The glider collided with a tree short of the intended runway. *NTSB ERA13CA310*.

The student pilot and CFI were not injuries but the SGS 2-33A glider was substantially damaged when it impacted trees off the departure end of the runway. The instructor was simulating a simultaneous spoiler **and** altimeter failure, requiring the student pilot to make a no spoiler landing. The glider was high and fast while the pilot attempted to lose altitude by performing both slide slips and S-turns on final. The glider overran the 2800 ft long turf runway and impacted trees at the departure end of the runway. *NTSB CEN13CA385*.

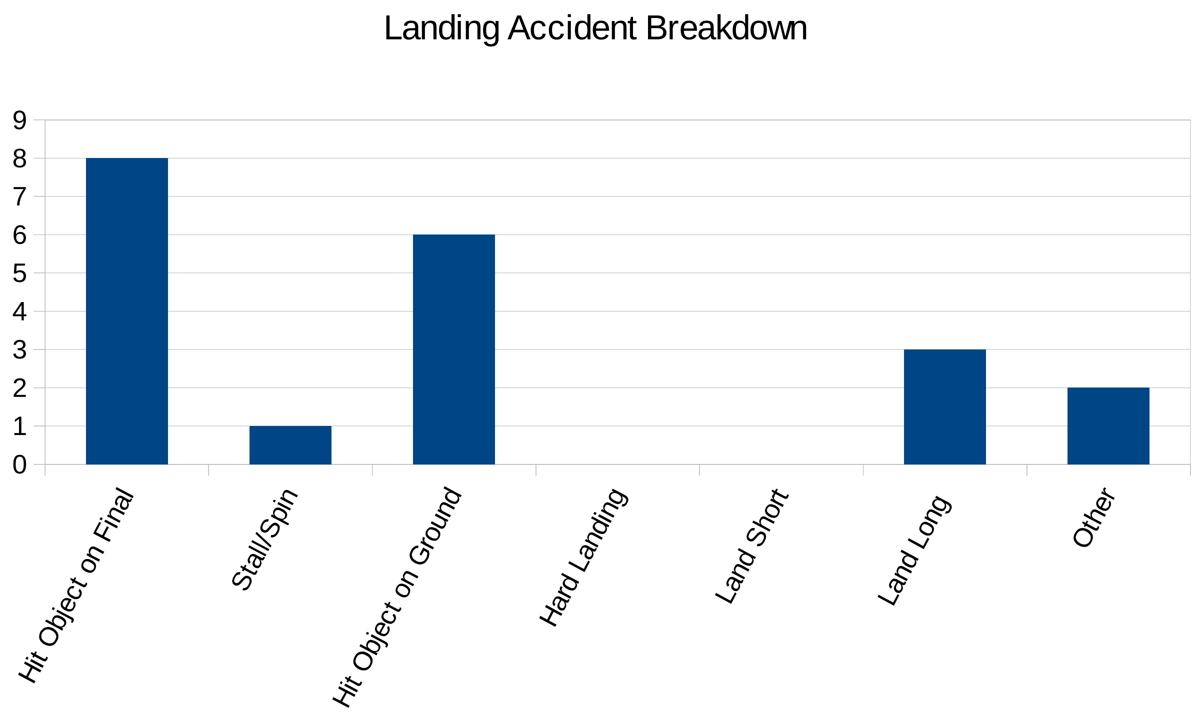

Figure 7: Reported result from landing accident

The student pilot of a SGS 2-33A was not injuries but the glider was substantially damaged when the left wing struck a tree while on final for runway 23. The pilot reported being high when enterning the pattern and a little high opposite the touchdown point. On base leg the pilot thought he was high so he performed a forward slip to lose altitude. Turning final the pilot though it would be close. The left wing struck a tree about 25 ft AGL and the glider came to rest short of the runway. *NTSB ERA13CA352*.

The student pilot of a SGS 2-33A was not injured but glider was substantially damaged when the glider struck a small tree while conducting an off-airport landing. The student reported he encountered sink while attempting to fly back to the airport. As he approached the runway he determined that he would not be able to clear the power lines at the edge of the runway so he decided to make an off airport landing in a large field bordered by several obstructions. The right wing struck a small tree while the glider was still several feet in the air, causing the glider to land abruptly.   *NTSB CEN13CA573*.

Neither the student pilot nor the flight instructor were injured but the Grob G-103 Twin II glider was substantially damaged after it it landed short of the runway. The instructor reported that the student realized he was high on final and responded by lowering the nose and deploying the spoilers. The instructor intervened and had the student close the spoilers but the glider encountered turbulence and a sink rate that put them on a low approach. The flight instructor then took control and performed an off-airport landing. The right wing struck a large shrub bush causing the glider to yaw and slide into a 2nd bush sideways. *NTSB WPR13CA418*.

The transition pilot was seriously injured and the SGS 1-26E was substantially damaged when it impacted trees after a hard landing. The pilot was conducting his 2nd solo in the 1-26 and he reported being high and fast on final. He lowered the nose and attempted a forward slip but the glider touched down hard about midfield on the 2260 ft runway. The glider became airborne again and the pilot flew into trees off the left side of the runway. *NTSB ERA14CA031*.

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 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 descreasing 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

Three (3) glider pilots, and two (2) passengers, were involved in three (3) fatal accidents during the FY13 reporting period. This represents a 50.0% decrease in the number of accidents (3 vs 6) from previous reporting period. One (1) accident occurred during the launch phase of flight (winch launching), one (1) accident occurred in the cruise phase of flight, the remaining accident occurred during 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 column) and the number of fatal accidents (orange column). 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.

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 three (3) accidents that occurred during this reporting period.

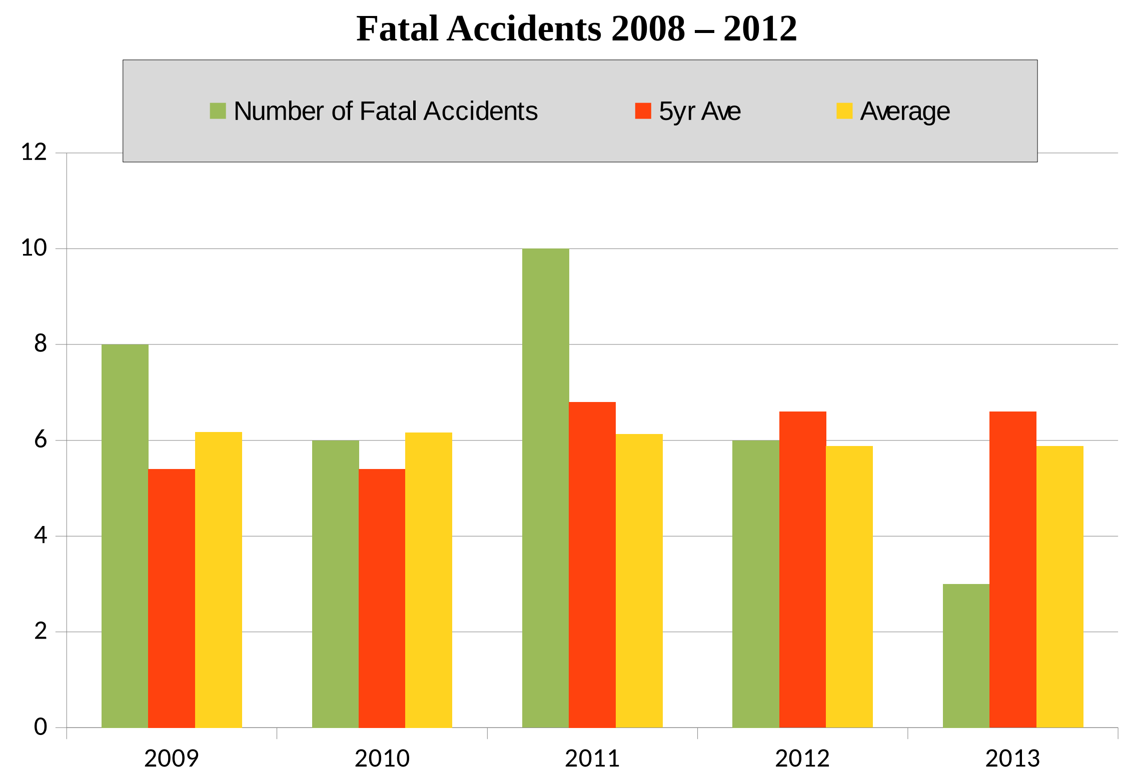

Figure 8: Number of fatal accidents, 5 year average, and average since 1987

The commercial pilot and passenger in a Schleicher Ka7 glider were fatally injured and the glider was destroyed when it impacted terrain after an in-flight separation of the right wing. According to witnesses, the glider was thermalling when it appeared to exit a thermal and execute a tight loop. They heard a loud sound and saw the glider spinning to the ground. The glider made 2 rotations when a portion of the right wing separated and fell to the ground. The glider continued to spin into the ground. *NTSB CEN1FA213*

The private pilot of a SGS 2-32 glider was fatally injured and the aircraft was substantially damaged after impacted terrain after it stalled while on final for a landing at the pilots home airport. A club instructor reported that the pilot had just successfully completed a club check flight in the accident glider and was approved for solo flight. Witnessed reported seeing the glider on final with 1/2 spoilers when the left wing suddenly dropped, consistent with a stall. The glider impacted terrain 1/2 mile short of the runway with the tail in a tree and the nose on the ground. *NTSB ERA13FA215*.

The private pilot and ATP rated passenger in a SZD-54-2 Perkoz glider were fatally injured after the glider impacted terrain following an aborted winch launch. Multiple witnesses reported the ground roll, rotation, and initial climb were uneventful. At an altitude between 150 and 300 ft AGL the towline released from the glider. The glider banked right, stalled and entered a right hand spin from which it never recovered. *NTSB WPR13FA300*.

For the five-year period 2009 – 2013, 41 pilots and passengers received fatal injuries while soaring. This equates to a five-year average of 8.2 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[2], no change 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 fatal accidents 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.

In 2011 the SSF began taking a closer look at fatal soaring accidents. At the 2013 SSA convention the SSF began discussing the results of this analysis. From 2002 – 2013 there were 69 fatal soaring accidents in the US involving 79 pilots and passengers and 75 aircraft (mid-air collisions account for the additional aircraft). The NTSB database contains a probable cause (PC) for 64 of these accidents leaving 5 still under investigation.

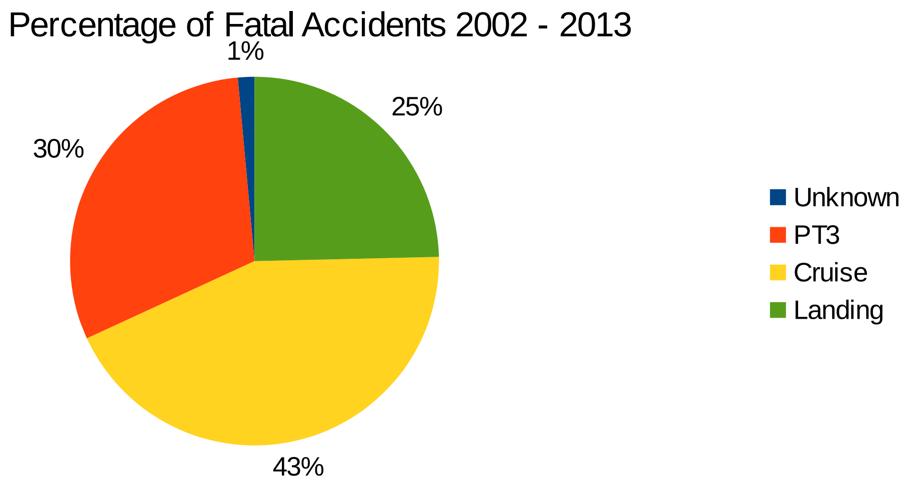

Figure 9: Percentage of Fatal Accidents in various phases of flight

Figure 9 shows the percentage of fatal accidents in the 3 major phases of flight (launch, cruise, and landing). It is instructive to compare these percentages to the percentage of accidents as shown in Figure 3. While the majority of accidents occur in the landing phase of flight and the fewest percentage of accidents occur in the cruise phase of flight, fatal accidents should a complete different trend. In this case fatal accidents occur most often in the cruise phase of flight.

[2]Note that the difference between the 5-year average number of fatal accidents (6.6) and the 5-year average number of fatalities (8.2) is due to multiple individuals being involved in these accidents.

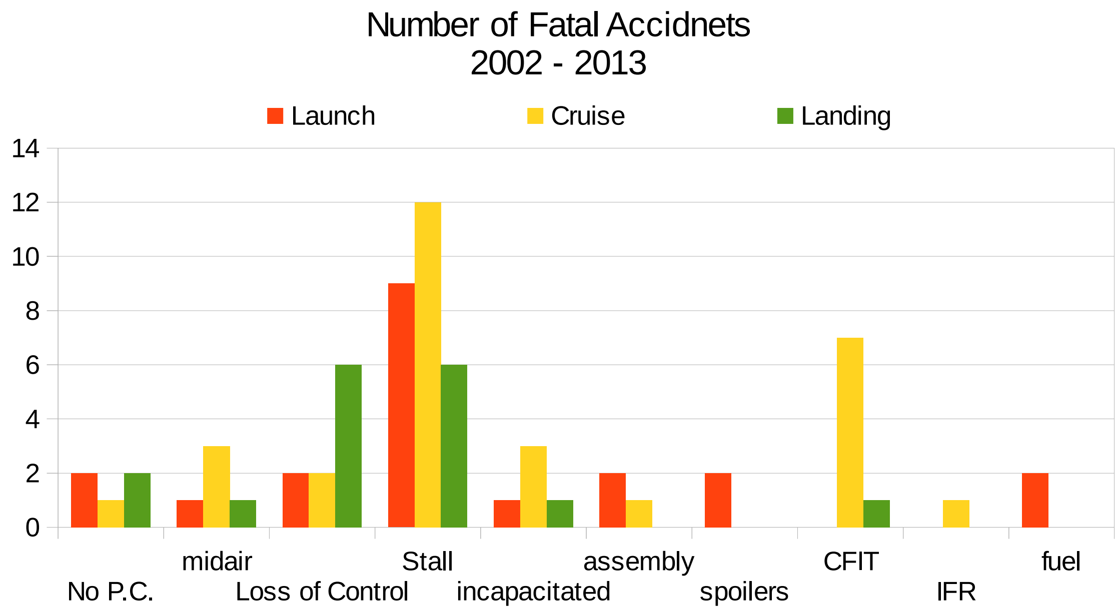

Figure 10: Number of fatal accidents by NSTB defined Probable Cause

As shown in Figure 10, the NTSB has determine the probable cause of the accident in 64 of the 69 accidents. These causes break down into 9 major areas, with a 10th (no P.C.) meaning the accident is still under investigation. It is informative to see that the majority of fatal accidents occur after the glider stalled and/or spun. As described later in this report, stall/spin recognition and recovery should be a major flight training activity each instructor performs.

The SSF Trustees will continue to explore this issue and will engage the soaring community to find ways to eliminate fatal soaring accidents.

Damage to Aircraft

A total of ninteen (19) gliders, three (3) motor-gliders, one (1) tow-plane, and one (1) airplane received structural or substantial damage during this reporting period. One (1) glider was destroyed following an in-flight separation of the right wing following an aerobatic maneuver in a non aerobatic certified glider.

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, 2013 three (3) accidents involving auxiliary powered sailplanes were reported to the National Transportation Safety Board. One pilot received serious injuries, while the remaining two pilots and passenger were not injured. This represents a substantial decrease (42.9%) in the number of accidents when compared to the previous reporting period.

The pilot of Stemme S10-VT was seriously injured while the passenger was not injured and the motor-glider received substantial damage during a forced off-airport landing. The pilot reported he was at an altitude of 4000 ft on a long straight-in approach to his destination airport when he heard a loud bang. The motor-glider began a severe vibration so the pilot shutdown the engine. Just prior to landing the motor-glider struck 2 dead trees and landed inverted. *NTSB CEN13LA524*..

The other motor-glider accidents are summarized elsewhere in this report. It should be noted that 2 appear to show the motor-glider being used as an airplane. In one accident the pilot reported climbing from 6000 ft to 6500 ft to avoid turbulence. In another accident the pilot was conducting a long X-C flight apparently under power the entire time. While glider pilots are not required to hold medical certificates, they must be medically fit (FAR 61.53 (b)). Motor-gliders are not a substitute for powered airplanes. Refer to the aircraft POH for details on how to properly operate your motor-glider.

Accidents Involving Tow-Aircraft

During the FY13 reporting period one (1) accident involving a tow-plane occurred resulting in no injuries to a tow-pilot. As described elsewhere in this report the pilot of a Pawnee flipped the towplane on it's back while landing downwind toward a contest launch grid of gliders waiting to take-off.

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[3].

[3] See Appendix A for more details

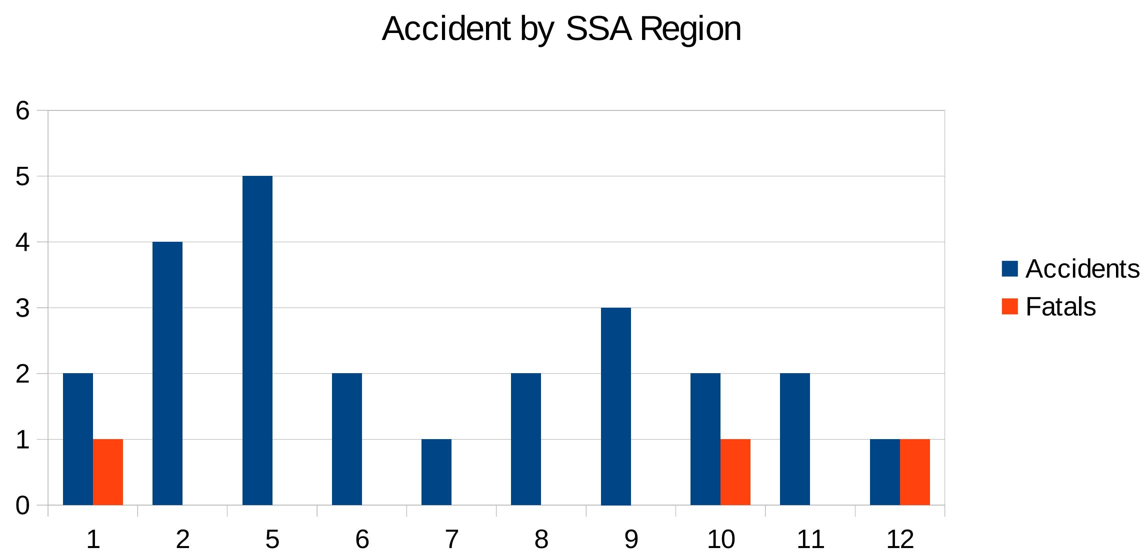

Figure 11: Number of accident per SSA Region

Flight Training and Safety Report

The SSF generates this safety report based on data present in the NTSB aviation accident database. We also receive summary and trend information from the SSA's group insurance program. While progress continues to be made, insurance claims were down again in 2013 over 2012, 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 Dekker[4] 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 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.

[4]Professor of Human Factors and System Safety at Lund University, Sweden and Drictor of the Lenardo Da Vinci Laboratory for Complexity and Systems Thinking.

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 emphasis 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 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: 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 practices using the elevator to stall the aircraft.

Finally it should be noted that optical illusions can seriously impact our ability to control the glider when operating close to the ground. Airplane pilots practice ground reference maneuvers at different altitudes to learn how these illusions manifest themselves and how pilots can train themselves to manage these illusions. Glider pilots do not get the training as the glider is not capable of flight at a constant altitude. Talk to your instructor and seek out the guidance of an airplane instructor to learn more about these illusions.

When training pilots to recognize and recover from stalls and spins, instructors should recognize that there are multiple entry methods. A review of fatal accidents shows that there are different entry procedures for failed launch, landing, and low altitude maneuvering stall/spin accidents.

In the launch phase of flight, the highest risk of a stall/spin accident occurs when the glider releases (intentionally or unintentionally) between 100 and 300 ft AGL. At this altitude the pilots first reaction is to immediately perform a 180 deg turn in an attempt to land downwind on the runway. The stall results when the pilot fails to adjust the pitch of the glider to maintain an adequate airspeed. Instead the pilot executes a coordinated steep turn and the load factor on the glider caused the stall speed to exceed the airspeed. The result is a sudden departure toward the low wing and a spin in the direction of the turn. See the condor video http://www.soaringsafety.org/school/SSF-2.wmv for an example of this stall/spin entry.

The remedy for this stall/spin entry is to avoid immediately making the turn. The proper action during a low-altitude failed launch is to adjust the gliders pitch attitude to maintain the proper flight speed (lower the nose with forward stick pressure). Then 'Wind Your Watch'. This is a euphemism to mean slow down and consider what your next step should be. Even a basic trainer like the 2-33 with a descent rate of 200 fpm at best L/D speed will have 60 seconds or so of flight time from 200 ft AGL. Take 2-3 seconds to review the plans you made just before launch so you can pick the best option. Then execute the plan while maintaining an adequate airspeed to prevent the glider from stalling.

In the landing phase of flight, the highest risk is a stall/spin while skidding the base-final turn. In this situation the pilot enters a shallow turn to avoid putting the wing close to the terrain. With the shallow bank angle the gliders turn rate is lower than the pilot expects. This leads to an overshooting of the turn to final, so the pilot begins stepping on the inside rudder in a mistaken belief that this will help the glider turn faster. What happens instead is that the rudder accelerates the outside wing tip, causing the bank to increase. The pilot doesn't want the bank to increase so he applies opposite aileron to stop this change. This uncoordinated flight makes the glider sink faster and the landing spot rises on the canopy. The pilot responds to this by adding some back pressure in the mistaken belief that he can 'hold the glider in the air'. The glider returns to this slower than needed turn rate, leading the pilot to add more inside rudder, more opposite aileron, and more back pressure. This continues until the critical angle of attack is reached and the glider stalls and spins. The condor video at http://www.soaringsafety.org/school/SSF-8.wmv shows what happens next.

The remedy for this stall/spin entry is to monitor the gliders airspeed and maintain coordinated flight. A coordinated 30 – 45 deg banked turn is the best option for making the base-final turn. Pilots should also learn to recognize how the wind is effecting the glider flight path during the landing. A tailwind on base will typically cause the pilot to start the turn late resulting in an overshoot of the runway centerline. Starting the turn earlier will help the pilot overcome this situation.

It should also be recognized that low slow approaches are hazardous and should be avoided at all costs. Gliders have spoilers or other glide path controls and most gliders slip well too. An approach that requires 1/2 to 3/4 spoilers on final results in a good descent rate and if the airspeed is maintained, the glider can land and stop in a reasonably short distance. Pilots should practice the SSF's Goal Oriented Approach with a qualified instructor to become proficient at this task.

Low altitude maneuvering is the 3rd stall/spin scenario that causes fatal accidents. Unlike the take-off and landing entries described above, there is no one entry procedure for this stall/spin accident. As always, the glider stalls when the critical angle of attack (AOA) is exceeded. As you learned during primary training, the AOA is the angle between the relative wind and the wings cord line. It should be recognized that the relative wind can change quite rapidly due to vertical gusts. Imaging your glider is circling at 45 kts on the edge of a 5 kt thermal. Every time the glider hits the edge of the thermal the AOA increase 5 deg. before dropping back as the glider fully enters the updraft. If the pilot pulls back at this instant or if the airspeed is a few knots slower, the glider can stall without any warning signs. The condor video http://www.soaringsafety.org/school/SSF-11.wmv show what happens when an ASW-28 stalls at 200 ft AGL.

The remedy for this condition is to avoid maneuvering at low altitudes. The chances of successfully climbing out from a low altitude are small. Yet the risk of an inadvertent gust induced stall is high. The best course of action is to create your own personal minimum maneuvering altitude (a hard deck) and don't allow yourself to violate that altitude. Committing to a landing with enough altitude to examine the landing area will be safer and you will probably have a great story to tell the next time you meet your friends at the club.

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 in 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 lead to the realization that if we can't eliminate mistakes, we can develop mechanism to improve the chances of us detecting when we have made one. This is know 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 pilots 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 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 though 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 that 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 Goal Orientated Approach

As the FY13 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.

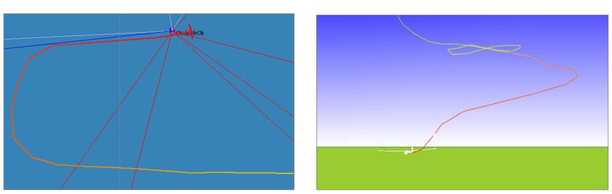

Figure 12: 2D and 3D view of a glider landing showing pattern and decent profile

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 FY13, takeoff accidents accounted for just over 8% 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, both 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 their 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 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>, 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.