SOARING SAFETY FOUNDATION

Nov 1, 2008 – Oct 31, 2009
SAFETY
REPORT

SOARING SAFETY FOUNDATION

PREFACE

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

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

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

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

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

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EXECUTIVE SUMMARY

This report covers the FY09 (November 1, 2008 to October 31, 2009) reporting period. A review of the NTSB accident database shows a 13% increase in the number of US soaring accidents during this time period compared to the FY08 reporting period. FY09 also saw a 167% increase in the number of fatal accidents. These numbers indicate that each member of the US soaring community must carefully evaluate their individual attitudes and organization's culture towards soaring safety. Only by accepting that we all must strive to change our individual attitude toward safety while promoting an "operational safety culture" inside our organization can we reduce the number of accidents that impact all of us.

For the twelve-month period ending October 31, 2009, twenty-four (24) gliders, eight (8) motorgliders, one (1) light-sport glider, and one (1) towplane were involved in thirty-four (34) separate accidents meeting the reporting requirements of NTSB Part 830 of the Code of Federal Regulation. This represents a 13% increase in the number of accidents reported during the FY08 reporting period. The five-year average for the FY05 – FY09 reporting period is 34.6 accidents per year, representing 3% increase in the average number of accidents from the previous five-year period.

While the average number of accidents per year has shown a steady decline since 1981 (averaging 45.6/year in the 80's, 38.6/year in the 90's and 33.3/year for 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 FY09 reporting period eight (8) accidents resulted in fatal injuries to nine (9) pilots and passengers. In addition, nine (9) pilots received serious injuries while twenty-six (26) pilots and eight (8) passengers received minor or no injuries during the FY09 reporting period.

A review of the fatal accidents failed to show any common themes among the eight (8) accidents. The NTSB is still investigating them and no probable cause has been determined for any of them yet. However, this dramatic increase in the number of FY09 fatal accidents, coupled with the historical trend for six (6) fatalities every year, should make us all pause. The US glider pilot community needs to identify and implement ways they can lower these alarming numbers. It should also be noted that this is a common problem facing both the US and European gliding communities.

One bright spot to note, the number of accidents that occur during the landing phase of flight has continued to decline. This year landing accidents represented 38.2% of all accidents. It should also be noted that only three (3) of the thirteen (13) landing accidents, or 23%, occurred while the pilot was attempting an off-field landing. Several reasons for the remaining accidents include; the pilot exercised poor judgment by launching in poor weather, delayed the landing in an attempt to 'save' the flight, or misjudged the approach due to improper use of the flight controls.

For the past few years the SSF has been promoting that pilots and instructors adopt a 'goal oriented approach' to pattern planning and execution. The 'goal' is to arrive at your selected landing spot, so that you can stop at a pre-determined point. In this approach, pilots continuously evaluate how the glider is progressing while taking into account wind speed/direction, lift/sink, distance remaining to the landing spot, and the height above the landing spot. The key to accomplishing this approach is to recognize that while most pilots have difficulty picking out a specific angle, every pilot is very adept at recognizing changes in angles. Responding to the slightest change, by making small changes in the gliders flight path or sink rate, will help the pilot remain on the intended glide path to the landing spot. This increases the pilot's chances of successfully dealing with unexpected conditions throughout the landing phase of flight.

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

Aborted take-off accidents, accounted for 35% of the FY09 accidents. Ground launch (winch and auto) and aerotow PT3 (Premature Termination of The Tow) events occurred to glider pilots while engine failures and an open canopy affected motorglider pilots. There was also 1 towplane involved in an aborted take-off accident. 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.

Eight (8) motorgliders were involved in a variety of accidents in the FY09 reporting period. Fully half of these accidents resulted in fatal injuries to the four (4) pilots and one (1) passenger. Motorglider pilots also have an additional responsibility during self-launch operations. They are the tow pilot and thus need to consider everything listed above. Fixing any problem before beginning a launch will help reduce the take-off type of accident.

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

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SOARING SAFETY FOUNDATION

ANNUAL SAFETY REPORT
FY 09

This report covers the FY09 (November 1, 2008 to October 31, 2009) reporting period. A review of the NTSB accident database shows the number of accidents during this time period increased by 13% compared to the FY08 reporting period. FY09 also saw a staggering 167% increase in the number of fatal accidents. These numbers indicate that the US soaring community needs to redouble its efforts to reducing both the number of accidents and the number of fatalities in the coming years. The SSF will begin this process by evaluating its programs to determine if there are better ways to 'get our message out'. Only by instilling an "operational safety culture" can we continue to reduce the number of accidents that impact us all.

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.

Number of Accidents since 1981

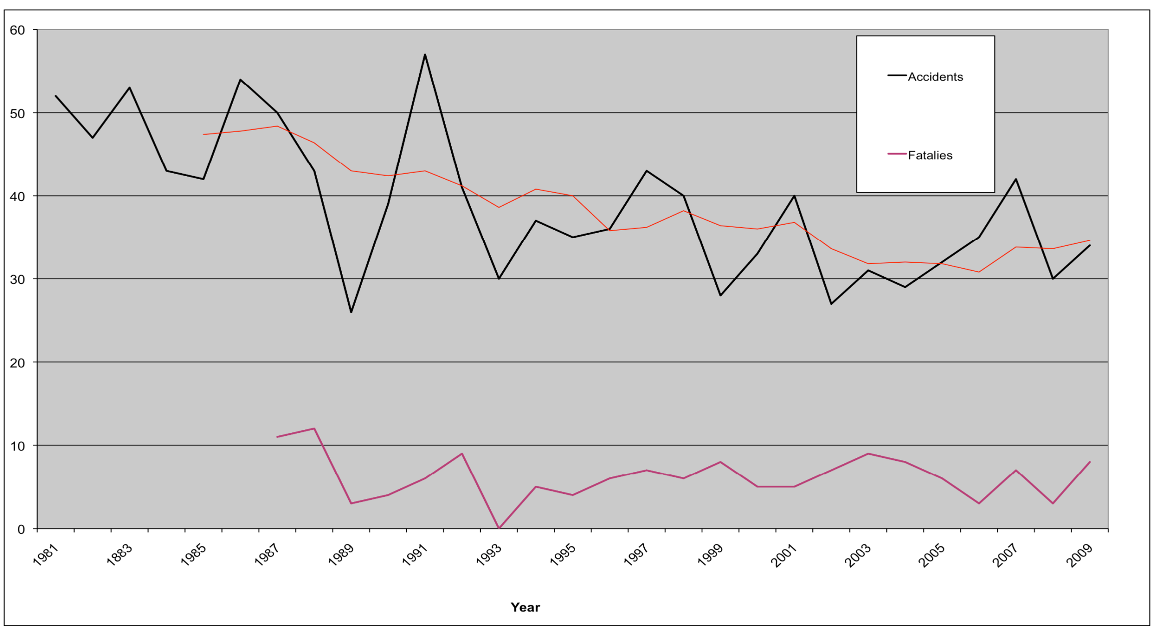

Figure 1 Number of total (with 5 year ave trend line) and fatal accidents on a per year basis.

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

Figure 1 shows the total number of accidents and fatalities from 1981 to the present. As the figure shows, there is a large variation in the number of accidents each year. The top line is the number of per-year accidents, while the lower line is the number of fatal accidents. The line overlaying the "accident" line shows the moving 5-year average number of accidents. This trend line shows that a plateau has been reached. Breaking through this plateau will require a shift in our thinking and/or procedures. This will require that glider clubs and commercial operators create a strong safety culture. Increased rules and regulations may not provide the means or motivate individuals to reduce these accidents. A safety culture requires everyone, pilots, line-crews, and passengers to be involved examining both flying and ground handling operations. Only by stopping accidents before they happen can we hope to break through this plateau and further reduce the number of soaring accidents.

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

FY09 ACCIDENT SUMMARY

NUMBER OF ACCIDENTS

For the twelve-month period ending October 31, 2009, twenty-four (24) gliders, eight (8) motorgliders, one (1) light-sport glider, and one (1) towplane were involved in thirty-three (33) separate accidents meeting the reporting requirements of NTSB Part 830 of the Code of Federal Regulation. This represents a 13.3% increase in the number of accidents reported during the FY08 reporting period. The five-year average for the FY05 – FY09 reporting period is 34.6 accidents per year, representing 3% increase in the average number of accidents from the previous five-year period.

Number of Soaring Accidents

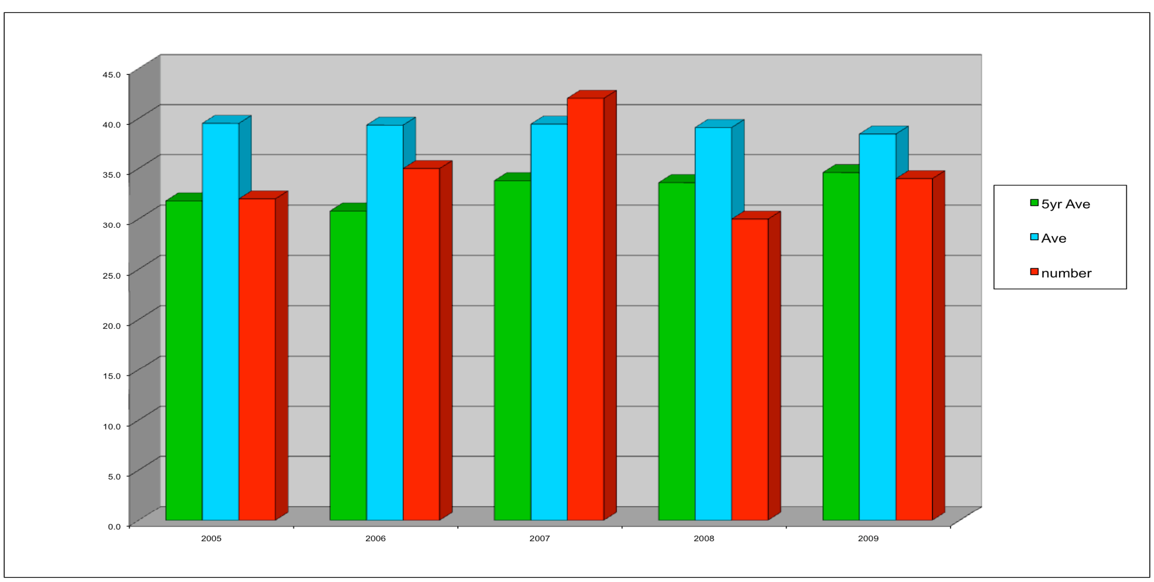

Figure 2 Number of accident, 5 year average 2005 - 2009

While the average number of accidents has shown a steady decline since 1981 (averaging 45.6/year in the 80's, 38.6/year in the 90's and 33.3/year for this decade) the number of accidents each year remains unacceptably 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 FY09 reporting period eight (8) accidents resulted in fatal injuries to nine (9) pilots and passengers. In addition, nine (9) pilots received serious injuries while twenty-six (26) pilots and eight (8) passengers received minor or no injuries during the FY09 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 FY09 reporting period, approach and landing accidents attributed to approximately 38% of the total number of accidents reported for the year. This percentage represents a significant decrease from the 52% recorded during the FY08 reporting period. Takeoff accidents account for just over 35% of the number of accidents, meaning that over 73% of the number of accidents occurred during the takeoff and landing phase of flight.

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

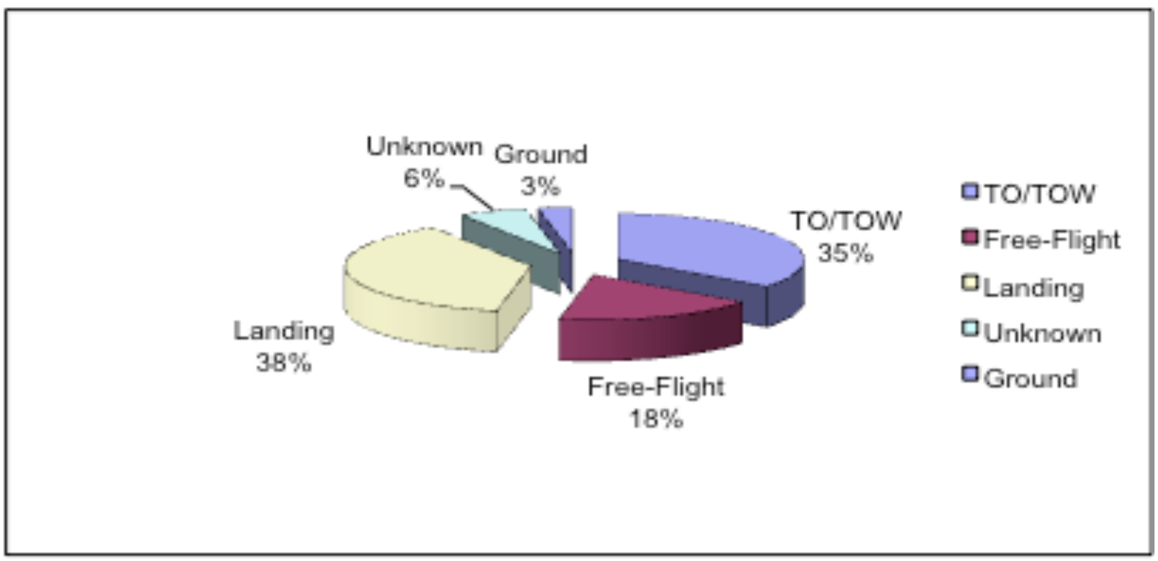

Figure 3 Accident phase of flight

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

TAKEOFF ACCIDENTS

Nine gliders, two motorgliders, and one towplane were damaged/destroyed in eleven Premature termination of the tow (PT3) take-off accidents that occurred during the FY09 reporting period. Five of the gliders involved in these accidents were being aerotowed, the remaining three were conducting ground launch operations. A sample of the PT3 accidents illustrate this years trends.

The pilot of an AMT200 motorglider was not injured but the aircraft was substantially damaged following a return to the airport after the canopy opened in flight. The pilot reported that after leveling off from the initial climb, the left canopy loosened and the canopy opened about 2 inches. The pilot returned to the airport and landed left of the runway centerline. During the landing roll, the glider veered left and struck runway signage and lights, punching a hole in the left wing *NTSB ERA09CA534*.

The pilot of a LS3-A was seriously injured, but the glider received minor damaged following a low altitude release. The pilot reported that the take-off began with the flaps in the 0^{O} setting, as per the POH. However during the initial ground roll the left wing dropped and the pilot moved his left hand from the flap handle to the release handle with the intention of aborting the launch. Instead the pilot used vigorous control motions that got the glider airborne, but caused it to move high and to the right of the towplane. After returning to the normal tow position, the pilot planned to reset the flap to the POH recommended $+10^{O}$ setting, but he pulled the release instead. The pilot landed off field, but failed to flare properly causing the glider to impact the ground nose first *NTSB WPR09LA313*.

The pilot of a Discus CS was seriously injured and the glider was substantially damage following a low altitude release. The tow operator reported that a double tow was being conducted. At 100 ft AGL the 2nd glider pilot reported feeling a bump and seeing his tow rope go slack. This pilot released and landed straight ahead. The accident pilot also released, but then executed a right turn, possibly to return to the runway. The right wing tip of the Discus struck a flooded rice field and then cart wheeled before coming to a rest submerged in the water *NTSB WPR09LA3817*.

The pilot of a HP-16 was uninjured but the glider was substantially damaged following a low altitude release. The pilot reported he was high so he pushed forward on the stick to get back into position. However the glider descended until the wheel struck the ground. The went through another oscillation until the pilot pulled the release *NTSB CEN09CA577*.

As can be seen by the above accidents, not every PT3 event comes as a ‘surprise’ to the glider pilot. In some cases the pilot chooses to terminate the tow because of the flight conditions while at other times equipment failure or accidental activation of the release leaves the glider without a tow plane. However, this should not mean that the glider pilot is without a plan of action. Pilots should practice, with a proficient instructor, how to respond to these various types of situations.

Another continuing cause for concern is pilots misinterpreting the tow pilot’s in-flight signals. It appears that most glider pilots are ’geared up’ for a ‘release immediately’ signal from the tow pilot, and will activate the release if ANY signal is given. Every glider pilot needs to recognize, and practice with a proficient instructor, how to respond to various signals. The SSF recommends that tow pilots not give the ‘rudder waggle’ signal at low altitudes if the tow plane is able to maintain or gain altitude. If possible, tow pilots should continue climbing while remaining close to the gliderport. The rudder waggle signal should be given at an altitude where the glider pilot may have some time to correct the situation if the tow release is activated.

Glider pilots must respond quickly and correctly to the tow pilot's signals. The rudder waggle signal was added to the standard SSA signals to allow the tow pilot to inform the glider pilot that 'something is wrong with the glider'. In most cases this could mean that the spoilers are open, but other conditions such as the tail dolly is still on or a disconnected spoiler has deployed, may also result in a rudder waggle signal being given. Upon seeing the rudder waggle signal the glider pilot should check the airspeed and climb rate of the tow, while verifying that the spoiler handle is in the closed and locked position. If everything appears to be normal, wait until the glider is in a position to safely return to the runway before activating the release. If the glider and tow plane are radio equipped, a brief call can be made to determine why this signal is being given.

In addition to practicing these 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

Ground launch operations have received more attention as fuel prices climb. The SSF Trustees have long advocated that all individuals involved in ground launch operations need adequate initial training and also a good program to maintain proficiency in this launch method. There were three (3) ground launch accidents during the FY09 reporting period. A sample of landing accidents shows the common trends in FY09.

The pilot of a Libelle H201B was seriously injured and the glider was substantially damaged following a failed winch launch. The computer control system for the hydrostatic drive system was suppose to limit the acceleration to 50% of the winch capability. Instead it limited the max speed to 50% of the Libelle's max winch launch speed or 32 mph. Video evidence shows the glider reaching an altitude of 20ft AGL before the winch stopped producing power *NTSB CEN09LA278*.

The instructor and student aboard a Schweitzer SGU 2-22CK received minor/no injuries during a failed auto tow launch. The wing runner gave a premature launch signal while there was still slack in the line. The sudden acceleration caused the glider to kit into the air, the instructor attempted to control the glider while simultaneously pulling the release. The glider struck the ground once while still attached to the tow line, and again a second time after the line was release *NTSB WPR09CA368*.

Ground operations present different challenges to pilots, winch/auto drivers, and the ground crew. The pilot will typically experience sudden accelerations that can easily cause the glider to kit or may cause the pilot to 'fall behind the aircraft'. The winch/auto driver and the ground crew are also major players in the launch operation, yet there are no FAA licensing requirement for these critical individuals. Soaring operations involved in, or contemplating conducting, ground launch operations must provide the initial and recurrent training for these individuals. The SSF is currently working on an initial training guide for these individuals; visit the SSF web site for more details.

INFLIGHT ACCIDENTS

In the FY09 reporting period, six accidents were reported during the in-flight (free flight) phase, after release and before entering the landing pattern. Three of these accidents resulted in fatal injuries to the pilot. A sample of the in-flight accidents show the common trends.

The pilot and 2 passengers in a SGS 2-32 were not injured but the glider was substantially damaged following a tree strike in mountainous terrain. The pilot reported that while overflying a ridge line the he felt a "jolt" and the glider yawed to the left. The pilot then initiated a straight in approach to the airport. After landing damage to the left wing spar and aileron, consistent with a tree strike, was found *NTSB WPR09CA272*.

The student pilot was seriously injured and the Blanik L-13 glider was substantially damaged after it impacted the ground in a spin condition. The pilot reported that he entered an inadvertent spin, but he was uncertain as to how to recover from this maneuvered. After somehow recovering, the student started back for the airport when a 2nd inadvertent spin occurred. The student was unable to recover a 2nd time and the glider struck the ground in a nose low, left wing low spin *NTSB ERA09CA434*.

The pilot of a light sport motor glider was uninjured, but the aircraft was substantially damaged following a forced landing in a dry lake bed. The pilot reported that the engine quit while in cruise flight and the pilot executed a forced landing in the dry lake after rejecting an approach to a residential street. Examination of the engine revealed improper maintenance caused the engine to fail due to lack of oil *NTSB NYC08217*.

These accidents demonstrate the need to continuously evaluate how the flight is progressing and what options the pilot may have at his/her disposal. External or internal factors, such as pointing out objects on the ground, or handling multiple tasks while flying can lead to distractions. Fixations on a specific task or goal can also lead to conditions where safe flight conditions can no longer be maintained. Pilots should monitor their flight activities and use task-shedding schemes to reduce pilot workload during times of stress.

LANDING ACCIDENTS

Accidents occurring during the landing phase of flight again accounted for the majority of injuries to pilots and damaged or destroyed gliders. For the FY09 reporting period, gliders hitting objects on final or during the landing roll accounted for the majority of the landing accidents. This was followed closely by stall or spin accidents. The majority of the reported land short accidents occurred at the completion of local flights at the pilot's home airport. A sample of the landing accidents in FY09 inlcude.

The pilot of a LS8-18 was seriously injured with unreported damage to the glider when it crashed approximately 400 yards short of the runway. Witnesses reported the glider was seen thermaling low off the end of the runway. The glider was then seen to make a steep left turn to enter final, when it stalled and spun into the ground *NTSB ERA09259*.

The flight instructor and student pilot were not injured, but the Blanik L-23 was substantially damaged when it struck a runway sign while landing in a thunderstorm. The instructor observed the approaching storm and decided to demonstrate a cross-wind landing before shutting down operations. The adverse weather arrived over the airport while the pattern tow flight was being conducted resulting in the instructor landing with reduced visibility (heavy rain) and with a strong cross-wind (42 kt gust 30^{O} right x-wind) *NTSB CEN09CA269*.

Accidents during the Approach and Landing Phase of Flight

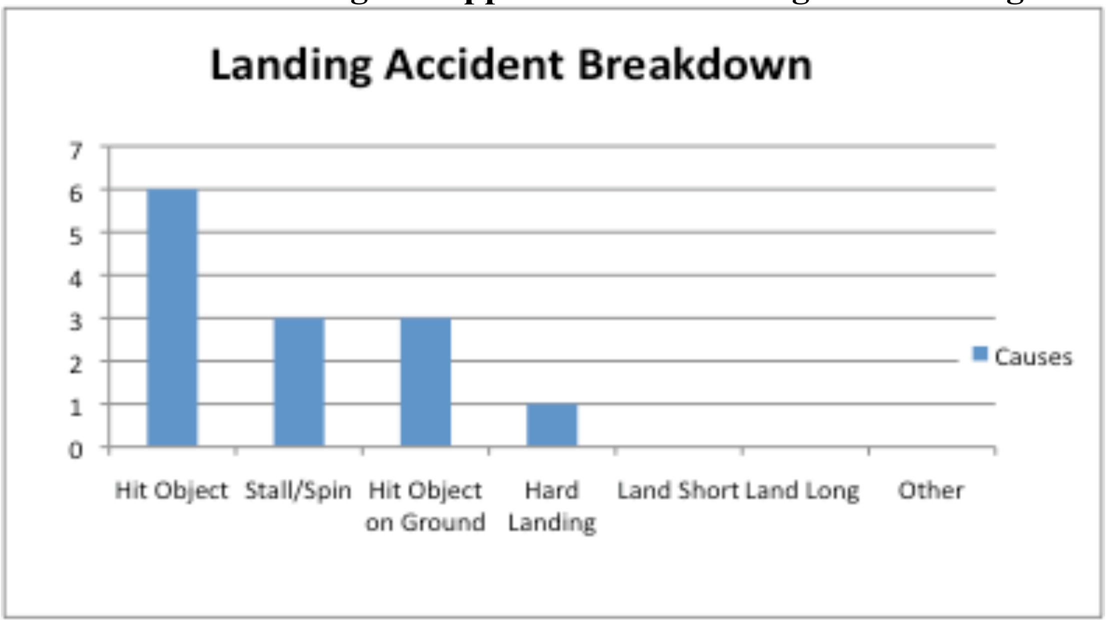

Figure 4: Reported result from landing accident

The pilot of a LAK-17A was seriously injured and the glider was substantially damaged after the pilot crashed on the runway. The pilot reported setting up to land with a 15 to 20 kt right crosswind. The pilot reported that he was flying to slowly for conditions and the glider stalled about 8 ft AGL before dropping onto the runway, breaking the tail boom *NTSB ERA09CA320*.

The pilot of a SZD-59 was seriously injured and the glider was destroyed after it struck trees while maneuvering to land. The pilot reported he flew a right hand pattern to land north at the airport. After turning final, the pilot noticed a towplane beginning a take-off roll to the south. The glider struck trees when the pilot made an abrupt 360^{O} turn at 80 ft AGL *NTSB CEN09CA434*.

The pilot of a standard Libelle received minor injuries while the glider was substantially damaged when the glider crashed on the runway. The pilot reported that this was the 2nd flight of the day and after a 2.5 hr flight she entered the pattern for landing. The pre-landing checklist was completed, include a check of the spoilers. On downwind the pilot had difficulty opening the spoilers, "as sometimes happens in this glider". The pilot was then unable to close the spoilers, resulting in a steep approach. The right wing tip struck the ground and the glider landed hard breaking the tail boom *NTSB CEN09CA475*.

The pilot of a PIK-20B was not injured but the glider was substantially damaged when it struck a tree while executing an off-airport landing. The pilot reported encountering sink while on a X-C flight so he elected to make an off-airport landing. The glider struck a tree about 12 ft AGL and then impacted the ground on the nose. The wings separated from the fuselage during the impact *NTSB WPR09CA389*.

The pilot was uninjured but the JS-1B was substantially damaged after it struck the ground short of the runway. The pilot was making a pattern tow in the newly purchased glider. He reported that after turning final the glider was "high" and the runway was "easily made". The pilot then noted a suddenly noticed the glider was low and he would not clear the trees prior to the runway. The pilot managed to clear the trees, but the glider impacted the parking lot short of the runway. Witnesses on the ground reported a noticeable decrease in wind speed while the glider was on final *NTSB ERA09CA479*.

The student pilot was seriously injured and the Blanik L-13 was substantially damaged after it struck a Joshua tree on final. The student's instructor reported completing several dual flights before sending the student up solo. The student released at 2000 ft AGL and then deployed spoilers to descend to pattern altitude. The student then forgot to close the spoilers while flying a 'normal' pattern. The glider impacted trees about 500 ft short of the runway *NTSB WPR10A015*.

The remaining landing accidents include problems associated with striking objects on final or during the landing roll and off-airport landings. Note also, that only 1 of the accidents listed above occurred while the pilot was attempting an off-airport landing. Of the 12 gliders and 1 motorglider involved in landing accidents 10 of them occurred while the pilot was attempting to land on an airport runway.

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 increase in the gliders sink rate with a reduction in wind speed, resulting in a tendency to land short. 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

Nine (9) individuals were fatally injured in eight (8) separate accidents while participating in glider operations during the FY09 reporting period. This represents a significant increase from the three (3) fatalities reported for the previous reporting period. Three (3) of these accidents occurred while the glider was in free flight, that is not involved in a launch or landing operation, three (3) of them occurred during the launch phase of flight and two (2) occurred during an unknown phase of flight.

Two glider pilots, one tow-plane pilot, four motorglider pilots, and two passengers were involved in fatal accidents during the FY09 reporting period. In addition the number of seriously injured individuals participating in glider operations increased slightly from the previous reporting period. A significant reduction in minor injury accidents was again observed, continuing a trend observed in the FY08 reporting period.

Fatalities 2005 – 2009

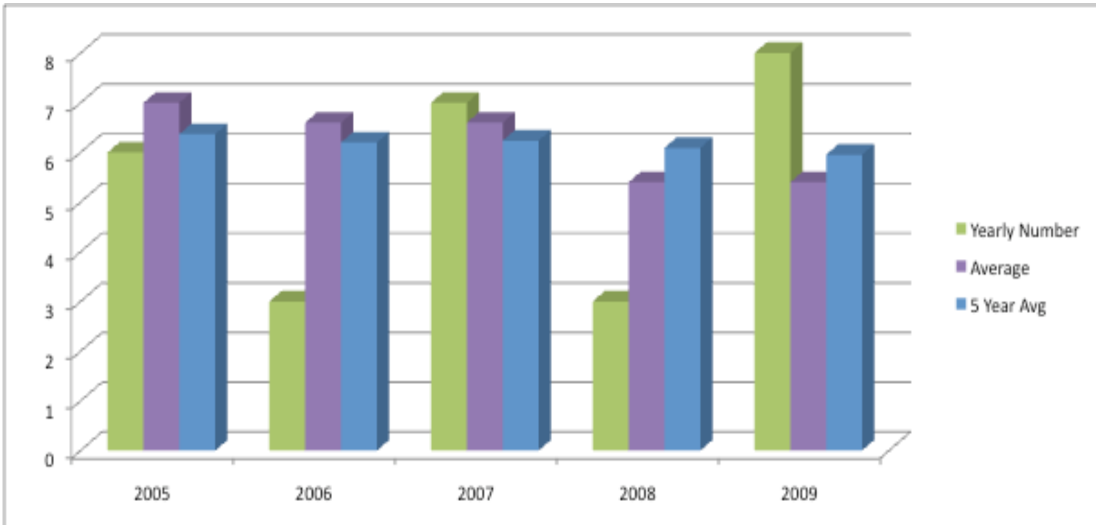

Figure 5: Number of fatal accidents, 5 year average, and average since 1987

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

The ATP rated pilot of a DG-400 was fatally injured after impacting mountainous terrain while conducting a wave flight. The last radio report from the pilot indicated that he was at 28,000 ft MSL and was moving to a new location. A wreckage was found after the pilot failed to return that evening *NTSB WPR09LA089*.

The private pilot and passenger in a Taifun 17 E were fatally injured after the motorglider impacted terrain for unknown reasons. A search was begun after the pilot failed to return from a personal X-C flight. The wreckage was found 1 week later in the bottom of a gully in mountainous terrain about 8,000 ft MSL *NTSB WPR01LA222*.

The commercial pilot was serious injuries and the passenger was fatally injured during a failed winch launch. Witnesses reported that the winch cable broke during the launch, and the glider crashed while attempting to perform a 180^{O} turn to the airport *NTSB CEN09LA353*.

The private pilot of an ASW 27-18 (ASG 29) was fatally injured after the glider broke apart while maneuvering in thermals. Another glider pilot reported the nose of the accident glider pitched up before entering a stall/spin. The spin changed to a high-speed spiral and the glider broke apart in flight *NTSB WPR09LA318*.

The pilot of a Ventus 2CM was fatally injured after crashing shortly after releasing from an aerotow. Witnesses reported that shortly after release from the tow-plane the glider pitched up and down before descending to impact the ground *NTSB WPR09LA317*.

The pilot of a Stemme S10-VT was fatally injured after it crashed in mountainous terrain. Fellow pilots reported they were in radio contact with the accident pilot who reported he was soaring near a reservoir. The accident pilot failed to respond to radio calls 45 minutes later, the wreckage was later found on the western face of a mountain at 9,700 ft MSL *NTSB WPR09FA409*.

The pilot of Pawnee PA-25 was fatally injured after the tow-plane crashed during a failed aerotow launch. Witnesses reported the accident airplane departed runway 33 with a Schweizer glider in tow. Shortly after takeoff the tow-plane impacted terrain and burst into flames. The glider returned to the airport and landed without incident *NTSB WPR09FA414*.

The pilot of a Schweizer 1-34 was fatally injured after it impacted the ground following a low altitude release from aerotow. The tow pilot reported he felt a 'surge' and looked back to see the glider in a sharp turn. The tow pilot further reported his altitude was between 225 and 250 ft AGL. Witnesses then reported seeing the glider release before nose diving into the ground *NTSB WPR09LA449*.

For the five-year period 2005 – 2009, 27 fatalities occurred. This equates to a five-year average of 5.4 fatalities per year, no change from the previous 5-year period. 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. While the long-term trend in the number of accidents has shown a steady decline over the past 3 decades, the average number of fatal accidents has remained nearly constant, at 6 per year, for the past 20 years.

DAMAGE TO AIRCRAFT

Four (4) gliders, two (2) motorgliders, and one (1) tow-plane were destroyed as a result of accident in the FY09 reporting period. An additional eighteen (18) gliders, one light-sport motorglider, and six (6) motorgliders received substantial damage while another two (2) gliders received minor or no damage during this reporting period.

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

Damage to Aircraft

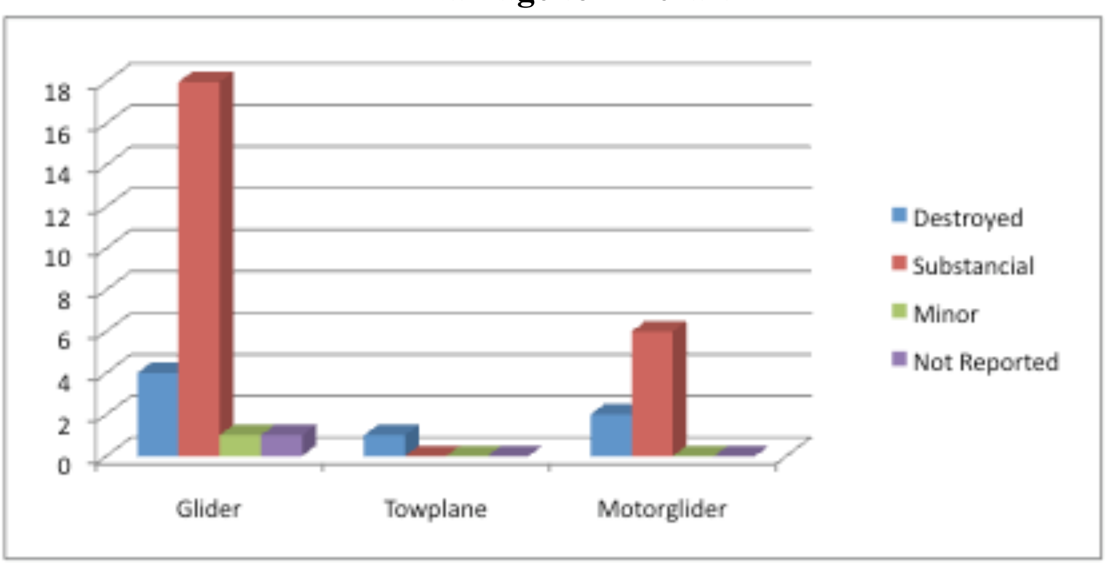

Figure 6: Types of damage to gliders, towplanes, and motorgliders

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, 2000 eight (8) accidents involving auxiliary powered sailplanes were reported to the National Transportation Safety Board. Four pilots received fatal injuries, one (1) pilot received serious injuries, while the remaining pilots were uninjured. This represents a substantial increase (63%) in the number of accidents when compared to the previous reporting period. A sample of the motorglider accidents illustrates the common themes.

The pilot of the Stemme S-10 motorglider was not injured, but the motorglider was substantially damaged after the left wing tip made contact with a hangar while taxiing. The pilot reported he was taxing to the takeoff area when he observed 3 airplanes in the run-up area. The motorglider's left wing tip then struck a hanger causing the aircraft to rotate into the hangar *NTSB WPR09CA093.*

The pilot of an Aeromot AMT-200 motorglider was not injured, but the glider was substantially damaged after it swerved off the runway while landing. The pilot reported that the left wing struck some bushes along side the runway while on the landing roll. The glider then departed the right side of the runway and came to rest n a ravine. The bushes were 8-12 feet from the edge of the 50 ft wide runway, not enough for the gliders 60 ft wingspan *NTSB WPR10CA050*.

ACCIDENTS INVOLVING TOW AIRCRAFT

During FY09, one accident involving tow aircraft occurred resulting in fatal injuries to the pilot. As noted above, tow-plane was towing a Schweizer glider when it crashed shortly after takeoff. All tow-pilots need to be proficient in tow operations. Both the climb phase and descent phase of flight require pilots remain vigilant and visually scan for other traffic at all times. Having a standard set of procedures for this flight operation can help pilots maintain their situational awareness by recognizing when extra vigilance is required.

ACCIDENTS BY SSA REGION

A comparison of the geographic locations of accidents in relation to SSA Regions tends to reflect the geographic distribution of the SSA membership. In general, those regions having the greatest populations of SSA members and soaring activity tend to record the highest numbers of accidents[2].

[2] See Appendix A for more details

Accidents by SSA Region

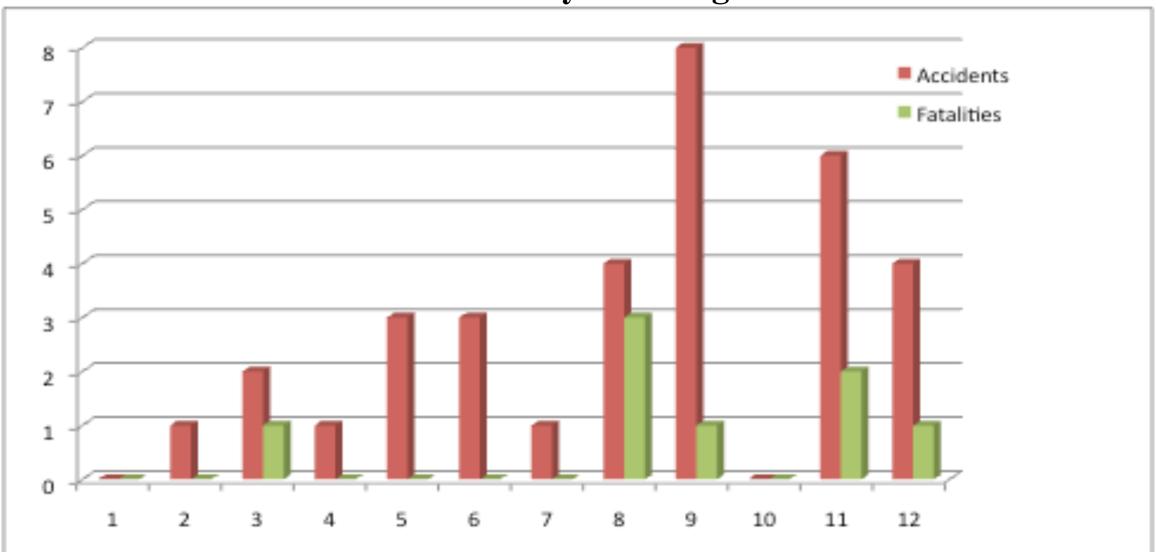

Figure 7: Number of accident per SSA Region

FLIGHT TRAINING AND SAFETY REPORT

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

1) The number of accidents occurring on an annual basis may have reached a plateau. All US glider pilots need to seriously consider ways to reduce both the number of accidents and the number of fatalities.
2) It appears that a large fraction of the fatal accidents occurred while the pilot was flying in mountainous terrain.

In the FY07 reporting period there were seven fatal accidents. In more than half of the NTSB reports, witnesses reported seeing what appeared to be the accident glider thermaling low to the ground in mountainous terrain. In this FY09 report we again see a dramatic increase in the number of fatal accidents (up from 3 in FY08 to 8 in FY09). A review of these fatal accidents shows several accidents where the wreckage was found in mountainous terrain. All pilots should recognize the potential hazards of thermaling close to the ground (in mountainous terrain or over flat terrain). The glider is operating at a high angle of attack and in turbulent conditions. Any sudden gust or abrupt flight control motion could cause the glider to stall and spin out of this turning flight condition.

SSF RECOMMENDATIONS

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 wuing the elevator to stall the aircraft.

As the FY09 statistics show, the majority of soaring accidents continue to occur in the approach and landing phase of flight. For one reason or another, the pilot fails to make it to the landing area. Pilots need to consider multiple factors including: other traffic, wind, lift/sink, location, and distance remaining to the landing area in order to safely land a glider. Failure to account for one or more of these factors can leave the pilot low on the approach with very few corrective options available.

SSF GOAL ORIENTATED APPROACH

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 become 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.

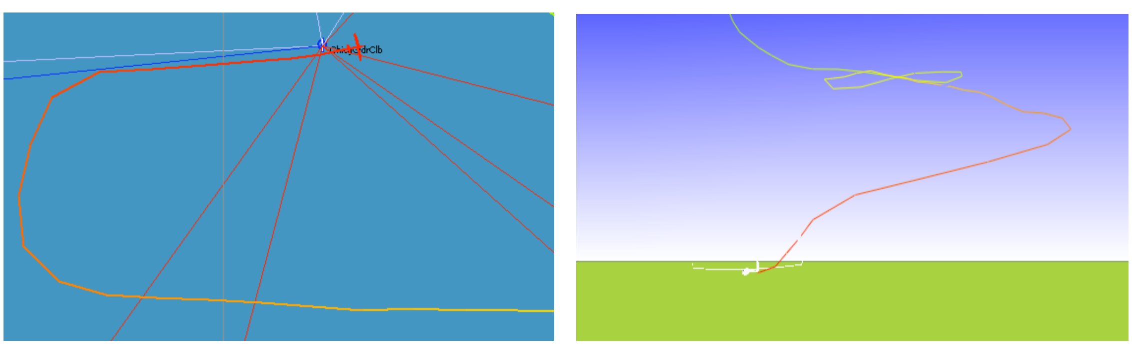

Figure 8: 2D and 3D view of a glider landing showing pattern and decent profile

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

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

In FY09, takeoff accidents accounted for over 35% 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 towplane are highly recommended.

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

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

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> Gene Hammond <grauchy at sbcglobal.com>, Bernald Smith <bernald at juggernaut.com>, or the generic SSF Webmaster <webmaster@soaringsafety.org>.

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 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.