SOARING SAFETY FOUNDATION

Nov 1, 2017 – Oct 31, 2018

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 glider/tow-plane accident information. This data base is then used to develop accident prevention strategies and to continuously improve training methods to reduce the number of glider/tow-plane accidents.

The analysis information contained in this report represents data compiled by the SSF and reported in **Soaring** Magazine, at Flight Instructor Refresher Course, 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 courses, 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.

Richard Carlson - Chairman
Burt Compton
Stephen Dee
Thomas Johnson
Ron Ridenour

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:

Soaring Safety Foundation
P.O. Box 2100
Hobbs, NM 88241-2100
Richard Carlson <rcarlson501@comcast.net>

EXECUTIVE SUMMARY

For the twelve-month period ending October 31, 2018, fourteen (14) gliders, seven (7) motorgliders, and three (3) tow-planes were involved in twenty-four (24) separate accidents meeting the reporting requirements of NTSB Part 830 of the Code of Federal Regulation. This represents a 41.2% increase in the number of accidents reported during the previous reporting period. The five-year average for the FY14 – FY18 reporting period is 21.0 accidents per year, representing a 0.95% 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 24.3/year for the first 9 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 under 6 per year since the mid 1990's and is also considered too high. In the FY18 reporting period seven (7) accidents resulted in fatal injuries to seven (7) pilots and four (4) passengers. Two of these fatal accidents occurred while commercial pilots were taking passengers on commercial rides. In addition, two (2) pilots received serious injuries while fifteen (15) pilots and three (3) passengers received minor or no injuries.

A review of the Seven (7) fatal accidents showed that the ATP rated pilot of a SZD-48 glider in FL was fatally injured during a failed aerotow launch. A pilot of an IS 29D glider in CA was fatally injured following an in-flight separation of the wings. A commercial pilot and passenger were fatally injured in WY when the Blanik L23 impacted mountainous terrain for unknown reasons. The pilot of a standard Cirrus was fatal injured after the glider stall/spun while the pilot was attempting to land. The private pilot was fatally injured when the Ventus 3F motorglider impacted terrain in NM for unknown reasons. The commercial pilot and 2 passengers were fatally injured in VT when the SGS 2-32 impacted mountainous terrain for unknown reasons. The private pilot and passenger in a Duo Discus T motorglider were fatally injured in NV after the Duo's wings failed for unknown reasons. All fatal accidents are still under investigation by the NTSB, more details may be given in this report (http://www.soaringsafety.org/accidentprev/ssfreports.html).

Continuing a long historical trend, the largest number of accidents occurred during the landing phase of flight during this reporting period. In FY18 landing accidents represented 54% of all accidents. Reversing a recent trend, more landing accidents occurred during off airport landings (62%) that landings at the home field (38%). Details of these accidents are given in this report.

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 stop at a predetermined point. This same procedure should be used during every landing, either at an airport or in a field. In addition, for off-airport landings it is important that the pilot mentally transition from cruise flight mode to landing mode with enough altitude to examine the prospective field to determine what obstacles the pilot must deal with. A good rule of thumb is 3-2-1, at 3,000 ft AGL the pilot should have at least one landable field within gliding range. At 2,000 ft AGL the pilot should select a specific field and examine it for obstacles and obstructions. At 1,000 ft AGL the pilot is committed to an out-landing, and mentally switches to landing mode. Making last minute changes while on short final to deal with obstructions is a leading cause of off-airport landing accidents.

Three (3) non-fatal and one (1) fatal aborted launch accidents, called PT3 (premature termination of the tow) events, occurred in FY18 accounted for 16.7% of the accidents. The fatal accident involving the ATP rated pilot was mentioned above. Other accidents are: A commercial tow-pilot received minor injuries after the Callair A-9 tow-plane impacted terrain after the glider kited during the launch. The commercial pilot of a Pawnee tow-plane was not injured after the tow-plane impacted terrain after the glider kited on tow. The CFI and student were not injured after their SGS 2-33 impacted trees after releasing due to an inadequate initial climb. See the full report for more detail.

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.

There were seven (7) motorgliders involved in accidents during the FY18 reporting period. In addition to the two (2) fatal accidents noted above, the following accidents occurred. The private pilot of a RF 5B received minor injuries when the left wing struck a freeway barrier while landing on an interstate freeway. The commercial pilot and passenger received minor injuries after bailing out of a Arcus M after a loss of rudder control. The pilot of a JS1-C was not injured when the right wing struck the ground while landing on uneven terrain. The private pilot of a Virus SW was not injured after the left wing struck a hedge while landing on a runway. The private pilot of a Sirrus 912 was not injured but the motorglider was destroyed after a fire started following a precautionary landing. See the full report for more details.

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. Flight instructors also need to emphasize aeronautical decision making (ADM) and risk management (RM) principles during initial and recurrent training, including flight reviews. The FAA “Wings” program provides an excellent recurrent training platform which also meets the flight review requirements. The emphasis on ADM and RM can be seen in the new Airman Certification Standards (ACS). The FAA is currently revising all Practical Test Standards (PTS) to this new standard which will eventually include glider training and testing.

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.

The Soaring Safety Foundation offers both anonymous Site Surveys as well as Safety Seminars at your location as a part of our ongoing commitment to safety. The SSF also offers Flight Instructor Refresher Courses for Flight Instructor recurrent training. More information on these and our growing collection of on-line safety and training programs can be found on our website. http://www.soaringsafety.org

TABLE OF CONTENTS

SOARING SAFETY FOUNDATION

ANNUAL SAFETY REPORT
FY 2018

This report covers the FY18 (November 1, 2017 to October 31, 2018) reporting period. A review of the NTSB accident database shows a 41.2% increase (24 vs 17) in the number of US soaring accidents during this time period compared to the FY17 reporting period. The number of fatal accidents in FY18 increased dramatically (7 vs 3) compared with FY17. Seven (7) pilots and four (4) passengers lost their lives in these seven (7) fatal accidents. It should also be noted that while there was a significant increase in the number of accidents reported to the NTSB, the number of insurance claims only increased by 4% in 2018 compared to 2017. While the long term trend in accidents reported to the NTSB continues to decline, there is general agreement that more steps must be taken to continue reducing the number of accidents and to eliminate all fatal accidents.

Number of Accidents since 1987

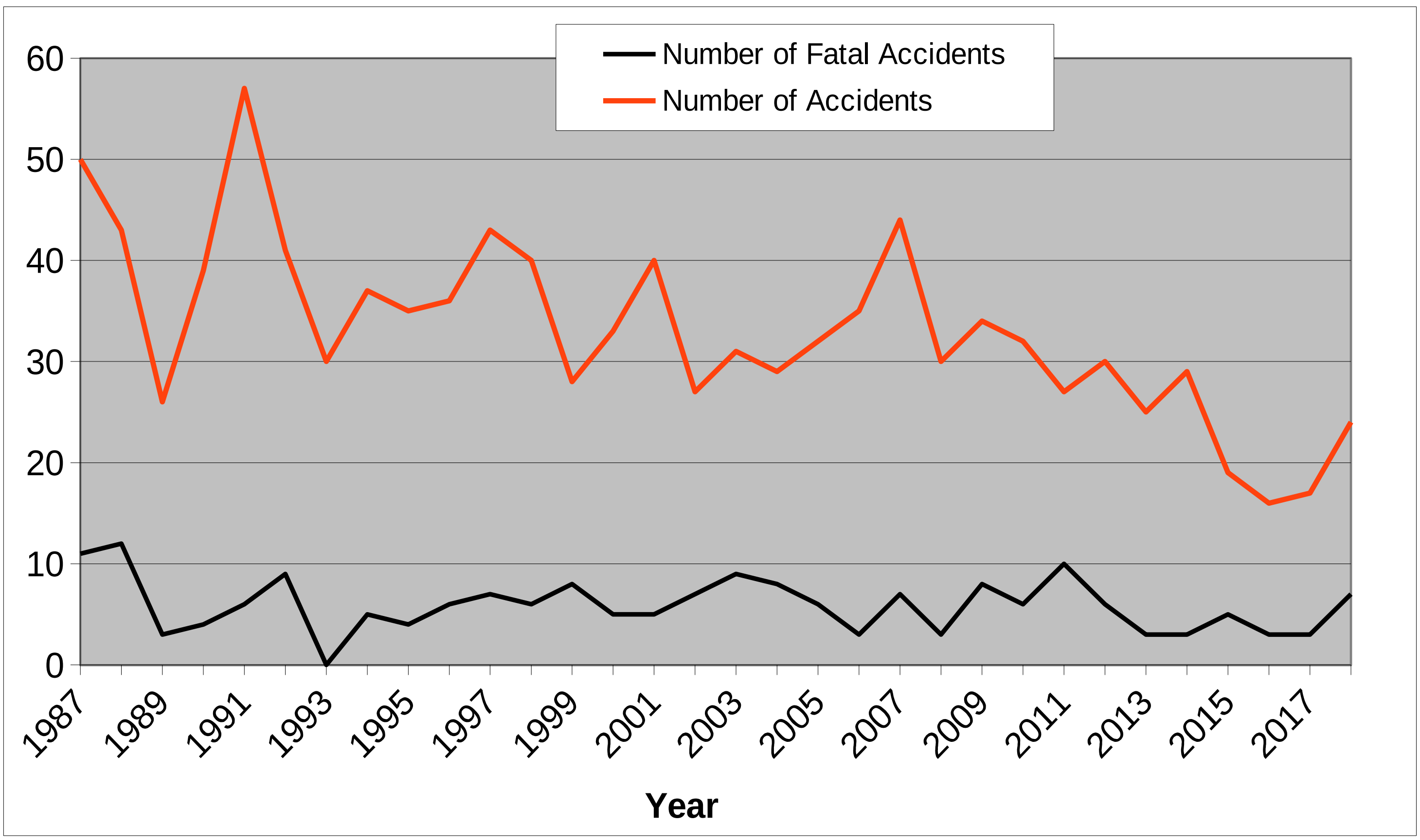

Figure 1 Total number of accidents and fatal accidents on a per year basis.

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 glider/tow-plane accidents

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

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 begins with a safe departure and ends with a safe arrival at the intended point of landing.

Another important point to make is that figure 1 shows the number of accidents, it does not show the accident statistics. To make a statistically significant figure the SSF would need to know the number of flights or the number of hours flown in the US. While this information has been hard to collect at the national level, it is believed that every club and commercial operation have this information (at least they know the number of launches they do). See the **SSF Trustee Action: Glider Flight Data** section for more details. In the summer of 2018 SSF mailed letters and send emails to every club, chapter, and commercial operator in the U.S. asking for flight data information. As a result of this request approximately 33% of the recipients responded with their organization's data. In February of 2019 the SSF again sent letters to every club, chapter, and commercial operator in the US. See the **SSF Trustee Action: Glider Flight Data** section for the results from 2017 data. Please do your part and make it an annual task to submit this data to the SSF when you receive this request.

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 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. See the **Fatal Accidents** section for more details on this topic.

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 cultures. In other words, this is a cultural problem within the soaring community.

For the past few years the SSF has been promoting the use of Scenario Based Training (SBT) as a viable method for establishing and maintaining a strong safety culture. The use of SBT in primary training establishes a habit pattern that new pilots will adopt and use throughout their aviation career. The use of SBT with rated pilots during flight reviews and spring check-outs will help them understand how risks are evaluated and mitigated. The more flight instructors use SBT the better we will all be in the soaring community. Using SBT, you can help change the safety culture of your club or commercial operation, and help the SSA membership reach its goal of zero fatal accidents each year. For more details see the **SBT training** section later in this report.

FY18 ACCIDENT SUMMARY

Number of Accidents

For the twelve-month period ending October 31, 2018, fourteen (14) gliders, seven (7) motorgliders, and three (3) tow-planes were involved in twenty-four (24) separate accidents meeting the reporting requirements of NTSB Part 830 of the Code of Federal Regulation. This represents a 41.2% increase in the number of accidents reported during the previous reporting period. The five-year average for the FY14 – FY18 reporting period is 21.0 accidents per year, representing a 0.95% 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 24.3/year for the first 9 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 under 6 per year since the mid 1990’s and is also considered too high. In the FY18 reporting period seven (7) accidents resulted in fatal injuries to seven (7) pilots and four (4) passengers. Two of these fatal accidents occurred while commercial pilots were taking passengers on commercial rides. In addition, two (2) pilots received serious injuries while fifteen (15) pilots and three (3) passengers received minor or no injuries.

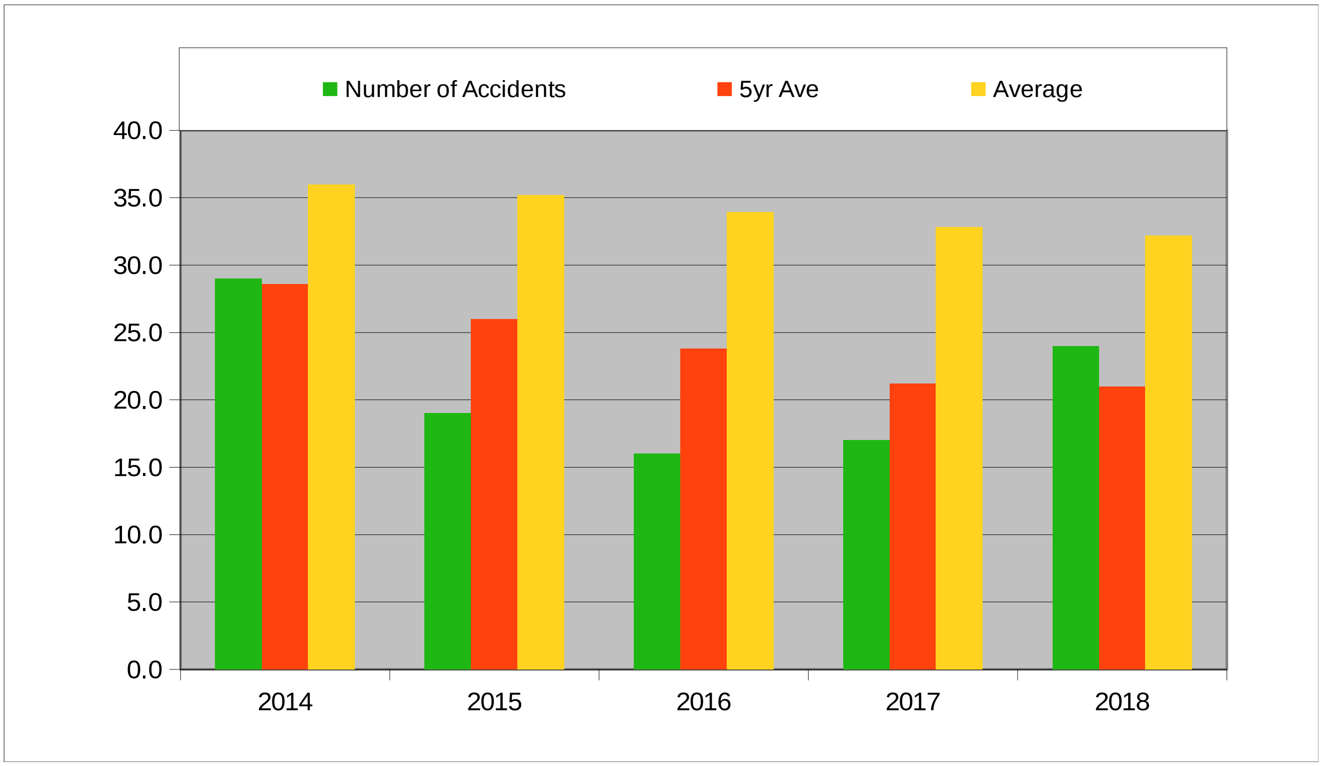

Figure **2 Number of accident, 5 year average 2014 - 2018**

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 FY18 reporting period, approach and landing accidents were 54.2% of the total number of accidents reported for the year. Reversing a trend from the previous few years, more accidents occurred when the pilots attempted an-off airport (8 or 62%) than landing on the home airport (5 or 38%). Historically landing accidents contribute to the largest number of accidents year in and year out. Takeoff accidents accounted for 16.7% of the number of accidents in this reporting period, meaning that 70.9% of the number of accidents occurred during the takeoff or landing phase of flight. The NTSB data show that remaining 29.1% of the accidents occurred while the glider was in cruise flight (20.8%), during ground operations (4.2%), or for unknown reasons (4.2%).

It should come as no surprise that a majority of accidents occur during the takeoff and landing phase of flight, 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.

Take-off scenarios can help students and pilots mentally walk though numerous failed launches. What would you do if the launch failed while the glider was still on the ground, just lifting off, somewhere above 500 ft, or just prior to release? What would you do if the tow-plane pilot fanned the rudder during tow (Check Spoilers!)? How would a cross-wind affect the tow-plane and glider (weather-vane on the ground, drift downwind in the air), or what would you do in the self launching glider who's engine just sputtered (pitch to a best glide speed attitude)? Can you explain to your instructor why these answers are correct? How can you and your instructor develop a realistic scenario to safely practice these potentially hazardous events? NTSB accident reports are also an excellent resource for creating these scenarios. Remember, the better the learning the more the pilot will get out of the training.

Figure 3 shows the percentage of accidents that occur in the various phases of flight. TO/Tow accidents are classified as an aborted launch up until the time/altitude the pilot intended to end the tow. Landing accidents are classified as those where the pilot is clearly attempting to land, eye witness reports or other indications such as a retractable gear being extended or GPS trace data are used to validate this decision. Cruise accidents are classified as those where the pilot had released and it is not apparent that there was an intent to land. Unknown accidents are classified as such by NTSB reports providing little or no factual data.

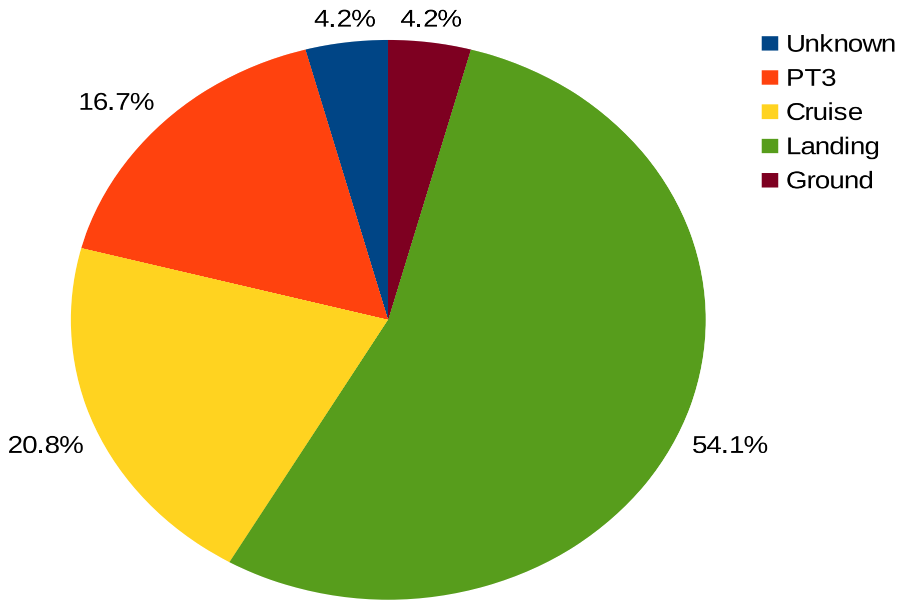

Figure 3 Percentage of FY18 Accidents in defined phase of flight

As shown in figure 3, the largest number of soaring accidents occurs during the landing phase of flight. However, if we look at where fatal accidents occur, we see an entirely different picture. It may surprise SSA members that more fatal accidents occur during the cruise phase of flight than during the landing phase of flight. Table 1 shows the number of fatal and non-fatal accidents for the years 2013 – 2018. The suffix notation "-F" (fatal) and "-NF" (nonfatal) is attached to each of the 3 major phases of flight Launch (PT3), Cruise (FF), Landing (Lnd), and Unknown (Unk). Accidents during ground handling are not broken out, but are included in the totals. Figure 4 shows the the distribution of fatal accidents during these 4 phased of flight. Note that more fatal accidents occur during the Cruise phase of flight than during takeoff or landing.

Year	PT3-NF	PT3-F	FF-NF	FF-F	Lnd-NF	Lnd-F	Unk-NF	Unk-F
2013	1	1	2	1	19	1	0	0
2014	5	1	0	0	21	1	0	1
2015	4	1	3	1	7	1	0	2
2016	2	1	2	2	9	0	0	0
2017	2	2	5	0	7	0	0	1
2018	3	1	1	4	12	1	0	1
	17	7	13	8	75	4	0	5

Table 1: Nunber of fatal (F) and Non-Fatal (NF) accidents from 2013 through 2018

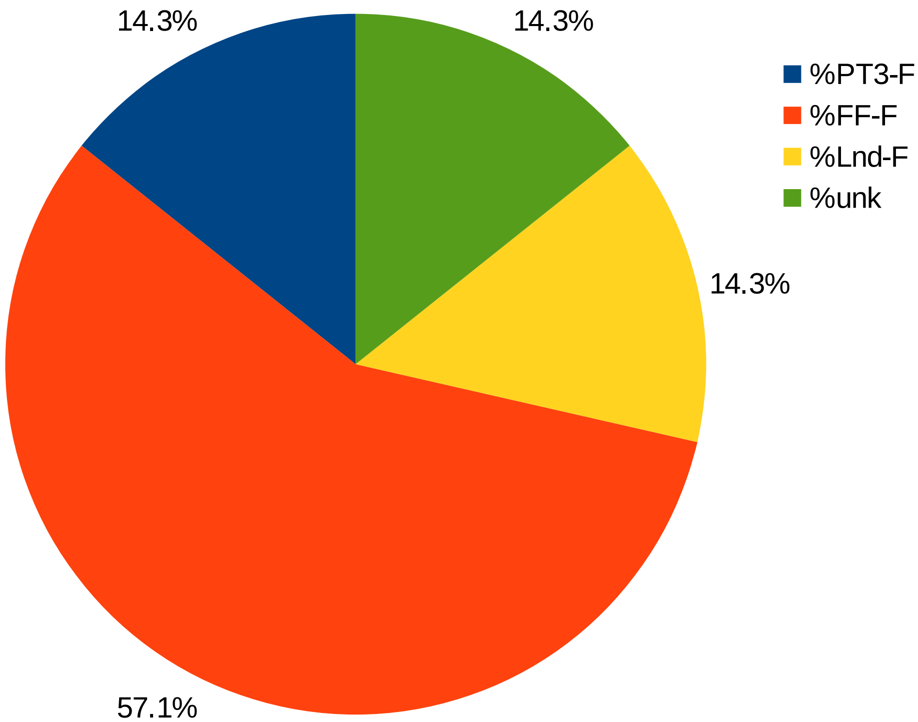

Figure 4: Fatal accidents in 2018 by phase of flight

Launch Accidents

Three (1) non-fatal and one (1) fatal aborted launch accidents, called PT3 (Premature Termination of The Tow) events, accounted for 16.7% of the FY18 accidents. All four (4) of the accidents involved the glider being aerotowed.. Pilots must be mentally prepared 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.

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. In 2018 all 4 accidents occurred after the glider pilot intentionally pulled the release! A better approach is to have the instructor evaluate and critique the pilots decision making skills in addition to the in-flight piloting skills.

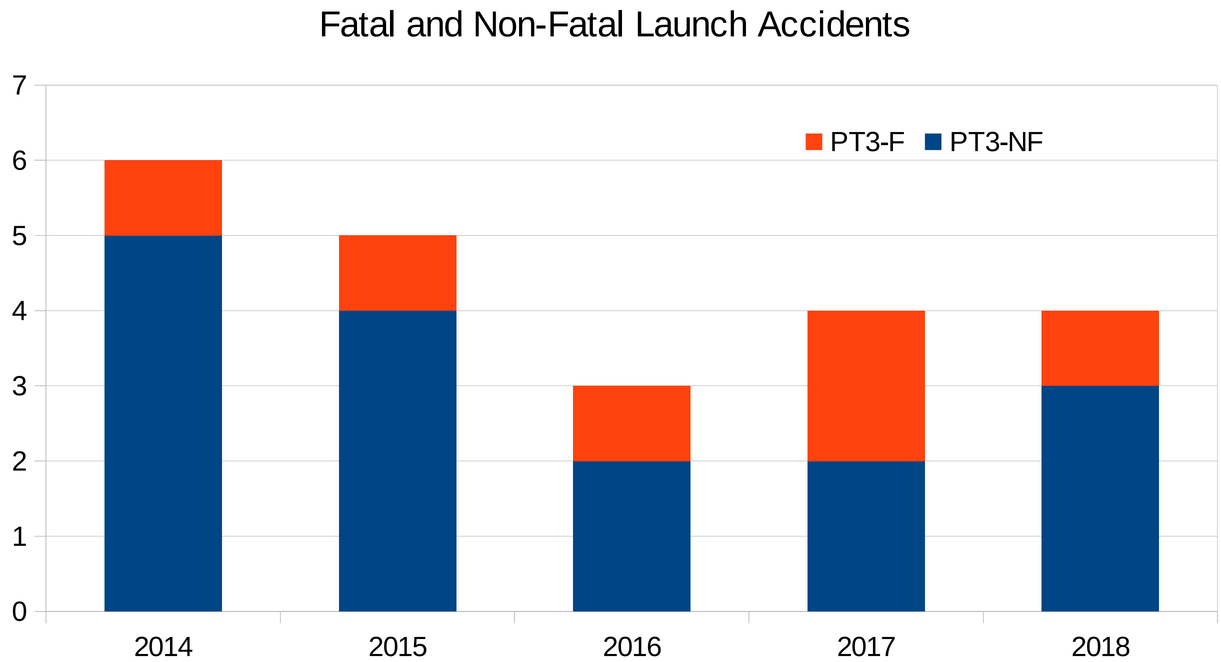

Figure 5: Number of fatal and non-fatal launch accidents

Aerotow non-fatal Launch Accidents

The commercial pilot of a Cxallair A-9 received minor injuries, but the tow-plane was substantially damaged after the left wingtip struck trees before the tow-plane came to rest fully inverted on the ground. The CFI aboard the SGS 2-33 being towed reported that the student was flying when slack developed approximately 300 ft AGL. The CFI took control of the glider after the student was unable to maintain control, and managed to release on the 3rd attempt. The tow-pilot stated that he had attempted to release the glider, but was unable to reach his tow release before the CFI successfully released. The glider returned to the airport, but the tow-plane pilot reported that he was approximately 75 ft AGL when the glider released in a nose low left wing low configuration. The tow-pilot was unable to recover before the left wing struck trees and impacted terrain fully inverted. *NTSB ERA18LA087*

The pilot of a Pawnee was not injured, but the tow-plane was substantially damaged after it struck a runway light and runway sign after being forced into the ground by a kiting glider. The tow-pilot reported that at about 25 ft AGL the tow-plane pitched nose down. He attempted to activate the tow release but the tow-plane impacted the runway before he could regain a positive rate of climb. The glider pilot reported that the C.G. hook equipped glider abruptly pitched up into a steep nose high attitude during the launch. He lost sight of the tow-plane, released, and landed on the grass adjacent to the runway. *NTSB GAA18CA222*

The CFI and Student pilot were not injured, but the SGS 2-33A glider was substantially damaged after it impacted trees during a aborted aerotow launch. The CFI reported that during the initial climb he did not think they would clear a tree line 1,300 ft beyond the departure end of the runway. The CFI released and turned right to land in a field, but the left wing struck the trees after completing 130 – 150 degrees of the turn. The tow-pilot reported that it was a hot humid day (high density altitude) and they were using the grass area beside runway 28 that was uphill and wet in some areas, due to the main runway being rain soaked. The tow-pilot also reported that he “kept it low to build up airspeed” before climbing out. *NTSB ERA18LA211*

The fatal launch accident will be discussed below in the fatal accident section.

As can be seen by the above accidents, every pilot should be prepared for a failed launch. This includes making sure the launch area is free of obstructions, the aircraft is properly assembled and rigged, the pilot/passenger is briefed on possible actions, and the pilot is operating within their abilities. Every glider pilot must have a predetermined plan of action that can be executed immediately if the launch does not go as planned.

It should also be clear that kiting on tow is an extremely hazardous situation for the tow-pilot. Two tow-planes were substantially damaged but luckily the tow-pilots were not seriously injured or killed in these accidents. Kiting accidents typically start when the glider pilot becomes distracted or fails to control the gliders pitch attitude. Any action, external by running into a thermal, or internal, pulling back on the stick, can cause the glider to rapidly climb on tow. The tension on the rope makes it difficult or impossible for a Schweitzer tow hook (glider or tow-plane) to be released. In addition, the rapid pitching motion of the tow-plane can make it difficult for the tow-pilot to reach the release handle in the tow-plane.

It should also be clear that all pilots (glider and tow-plane) need to consider the density altitude and runway configuration/surface when planning a take-off. Both pilots should have a predetermined abort point that once reached requires the glider to release and land straight ahead. Without the glider in tow the tow-plane should be able to continue the take-off, or it can be maneuvered on the ground in a manner that provides the glider with some maneuvering room of it’s own.

Finally, all tow operations need to have a Standard Operation Procedure for tow. This SOP should define the normal tow procedures and set the expectations for both the glider and tow-plane pilots. Any deviation from these SOPs needs to be communicated between both pilots before the launch begins. Abnormal operations like holding the tow-plane in ground effect before zoom climbing at the end of the runway need to be completely discussed before the launch begins. Failure to do so leaves the glider pilot is a difficult situation not knowing if the tow-plane is having a performance problem or if both aircraft will clear any obstacle off the end of the runway.

Once a decision to abort the launch is make and a decision to turn back toward the field is made, the most important skill to concentrate on in that turn is the **quality** of the turn, pitch attitude and proper coordination. DO NOT SKID THE TURN!

Using SBT techniques pilots can be taught to deal with these situations. Pilots and instructors can practice these scenarios at a safe altitude and with the full knowledge and involvement of the tow pilot. Using a guided discussion format the instructor can 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.

Finally, but most importantly, it is critical for pilots to understand that a pilot's most basic responsibility is control of the aircraft. Loss of Control is the leading cause of fatal Glider and General Aviation accidents in the US. Remember, Regardless of the circumstances, FLY THE AIRCRAFT!!

Ground Launch Accidents

There were no ground launch accident during the FY18 reporting period.

Self-Launch Accidents

There were no self-launch accident during the FY18 reporting period.

Cruise Flight Accidents

There were four (4) fatal and one (1) non-fatal cruise flight accidents reported during the FY18 reporting period.

The pilot and passenger in an Arcus M motorglider receive minor injuries but the motorglider was substantially damaged following an in-flight breakup. The pilot reported that while in cruise flight approximetly 17,000 ft MSL one of the rudder pedals 'slammed back' and threw his foot off the pedal. The glider then began to roll and pitch forward, entering a spiral dive. The pilot was unable to control the aircraft and told his passenger to bail out. The pilot jettisoned the canopy and both occupants bailed out. *NTSB WPR18LA177*

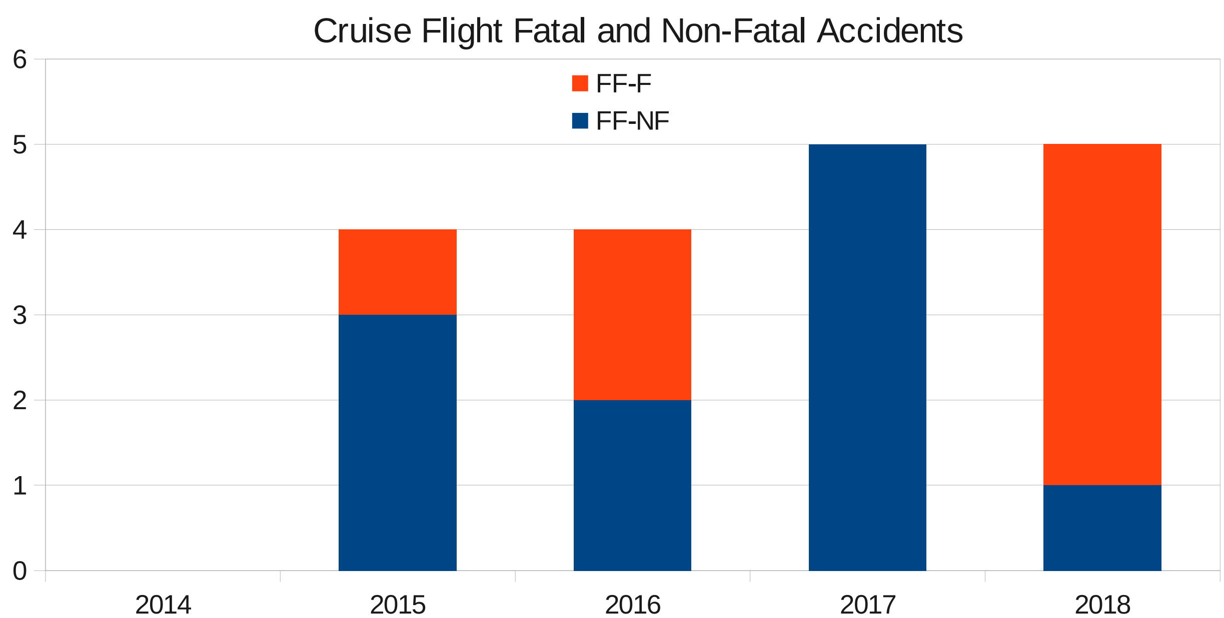

Figure **6: Number of Fatal and non-Fatal Cruise flight Accidents**

The four (4) fatal cruise flight accidents will be described in the **Fatal Accidents** section below..

Landing Accidents

Accidents occurring during the landing phase of flight again accounted for the majority of injuries to pilots and damaged or destroyed gliders. During the FY18 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 and stall/spin accidents. Reversing what had been a trend over the past few years, only four of the thirteen landing accidents (38%) occurred while the pilot was landing at their home airport. The remaining seven accidents occurred while the pilot was making an off-airport landing.

Figure 7 shows the total number of landing accidents from 2014 – 2018 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 deeper analysis of the landing accidents in FY18 indicate pilots continue to strike objects during the final approach (2 accidents) or while on the ground roll (6 accident). See figure 8 for a complete breakdown of landing accident factors.

The student pilot in a Blanik L23 was not injured while the glider was substantially damaged after it struck a hangar . The pilot reported that the glider's fuselage was not aligned with the runway during the landing flare. She applies right rudder to yaw the glider into position, but over controlled and the glider veered right and struck a hangar damaging both wings and the fuselage.   *NTSB GAA18CA093*

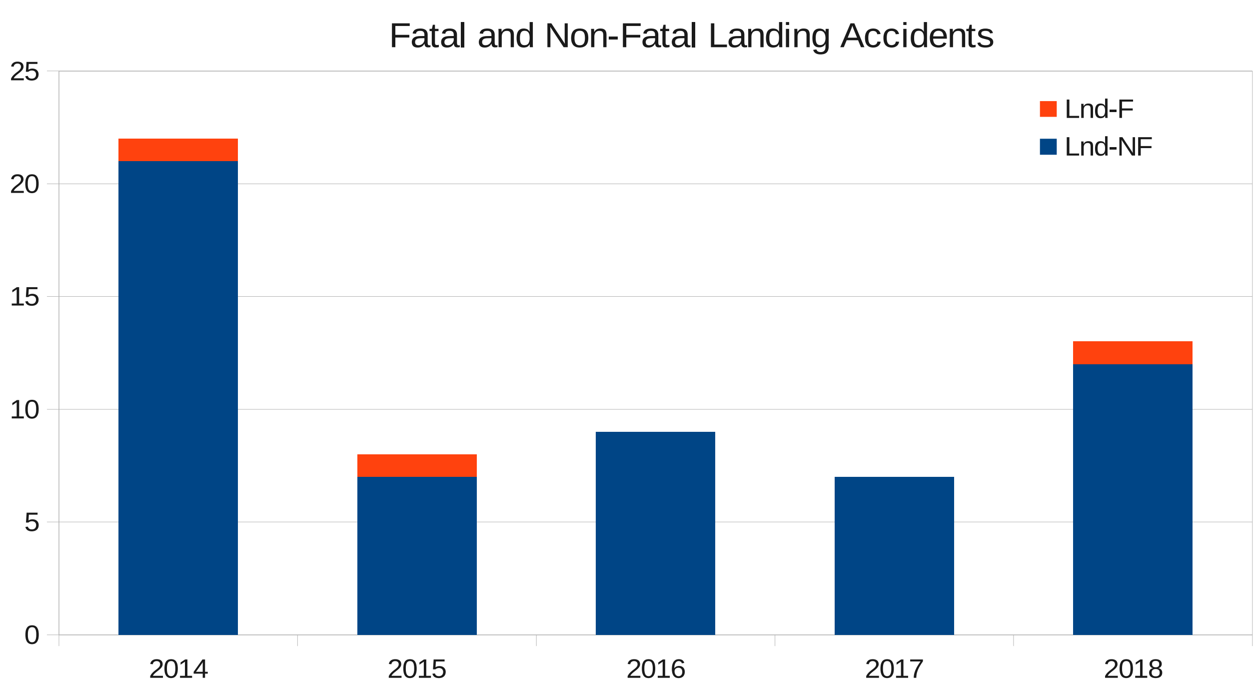

Figure **7: Number of Fatal and non-Fatal Landing Accidents**

The pilot of a LAK 12 was not injured while the glider was substantially damaged after striking a highway road signs while making an off-airport landing. The pilot reported that he was at 8,800 ft (presumably MSL in mountainous terrain in western OR) when he encountered strong sink. Unable to find lift and unable to make it back to the airport the pilot chose to land on a highway. Both wings struck road signs and the glider came to a rest on the right side of the road. *NTSB GAA18CA172*

The pilot of a SGS 1-26 received minor injuries while the glider was substantially damaged after striking trees while attempting an off-airport landing. The pilot reported after 90 minutes of flight he encountering sink and began flying back to the airport. Seeing that he did not have enough altitude to make the airport, he decided to make an off-airport landing. During the approach the glider struck trees on the west side of the selected field.   *NTSB GAA18CA263*

The student pilot was not injured but the SGS 1-23 glider was substantially damaged after it impacted terrain while making an off-airport landing. The solo student reported that he was unable to find lift and determined that he did not have enough altitude to cross a section of forest between his location and the airport. He selected a landing field and flew a pattern. While in the turn from downwind to base he determined that he would not clear the line of trees at the threshold of the field. He decided to land straight ahead (on base). The glider impacted terrain in a small clearing damaging the left wing and empenage. *NTSB GAA18CA283*

The private pilot of a RF 5B received minor injuries while the touring motor glider (TMG) was substantially damaged after it struck a freeway barrier during an off-airport landing. The pilot reported that he was attempting to cross a mountain pass when he encountered a downdraft. Unable to arrest the descent he initiated a landing on the I-90 Interstate highway. While on final, just prior to touchdown, the left wing struck a freeway barrier causing the motorglider to yaw left and come to rest on the freeway. A post impact fire ensued that was extinguished by witnesses.   *NTSB WPR18LA145*

The pilot of a SZD 36A was not injured while the glider was substantially damaged while making an off-airport landing. The pilot reported that he was skirting rain showers and was unable to find lift so he decided to make a straight in approach to a field. He noticed power line poles lined the west side of the field so he made the approach just to the east side of the poles as this would allow easy access for the retrieve crew. During the landing roll the glider drifted to the west and the left wing struck a guide wire that ran in a N/S direction. *NTSB GAA18CA305*

The pilot of a Cessna 150L was seriously injured and the tow-plane was substantially damaged after an in-flight collision with power lines and terrain. A witness reported that the tow-plane was returning from a tow flight when pilot executed a missed approach. During the go-around from runway 27 (3,000 x 50 ft turf) the tow-plane impacted power lines about 600 ft past the departure end of the runway. The aircraft came to rest in an agricultural field about 200 ft past the power lines. *NTSB CEN18LA205*

The commercial pilot of an ASW 20 was not injured while the glider was substantially damaged while intentionally making a hard off-airport landing. The pilot reported that he was on a local flight when the ‘lift died’ while he was 3-4 miles from the airport. The pilot reported moderate to severe sink and decides to land in a nearby field. At about 200 ft AGL the pilot reported encountering a strong updraft and even with full spoilers he did not think he could land in the chosen field. He stowed the spoilers and decided to land in a different field. On final the pilot notices that there were ‘sprinkler pipes and wheels' in the field and fearing that he would hit them he pitched the nose down and made a hard landing damaging the wings, fuselage, and empennage. *NTSB GAA18CA314*

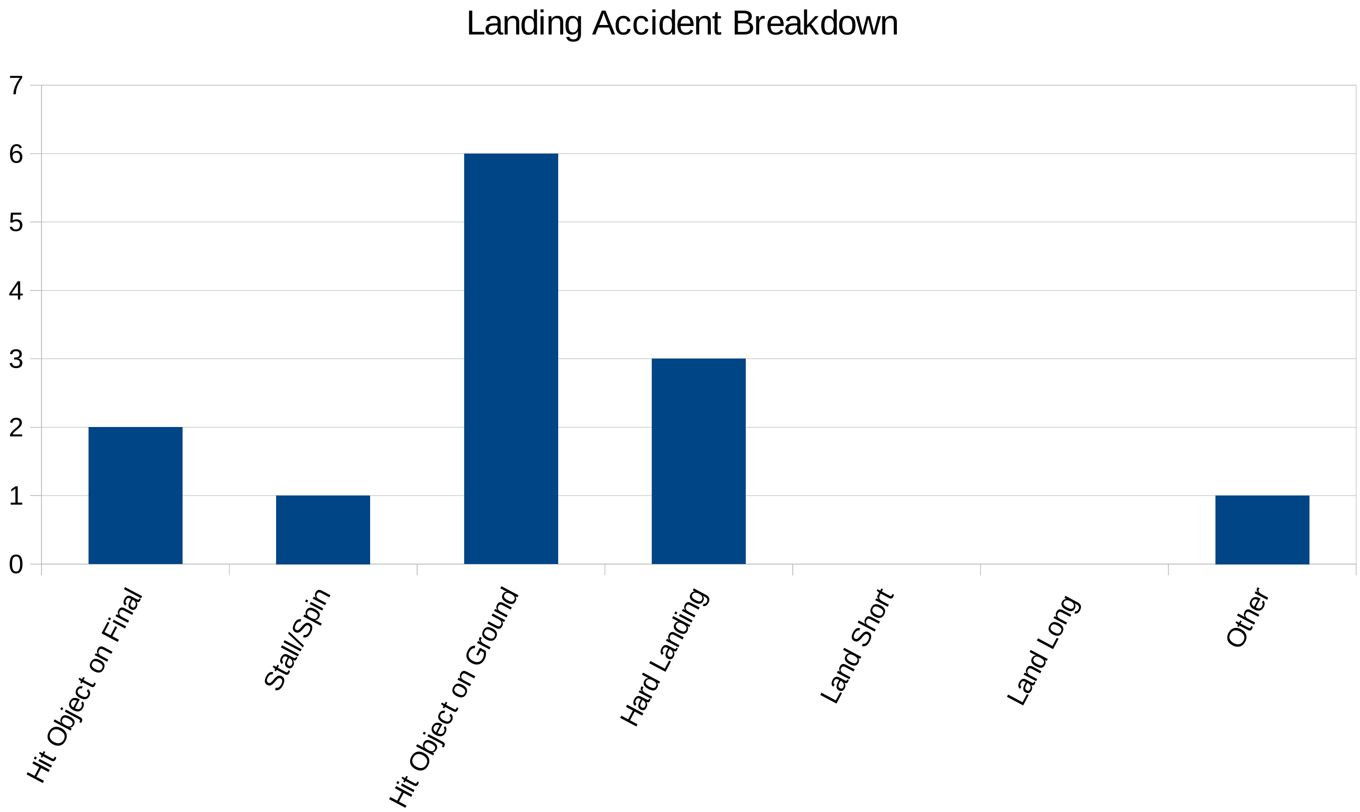

Figure 8: Reported factors in landing accident

The pilot of a JS1-C was not injured while the glider was substantially damaged while making an off-airport landing. The pilot reported that he was between 10,000 and 11,000 ft MSL in mountainous terrain when he failed to find the expected lift. Descending to 9,000 ft he started the sustainer engine and climbed back up to his initial altitude where he shutdown the engine. He then continued flying towards the home airport. About 4 miles from the airport the glider began sinking at 1,000 fpm and the pilot attempted to restart the engine. The engain failed to start so the pilot selected a field and made an off-airport landing. The ground was uneven resulting in the right wing dragging causing the glider to veer right damaging the horizontal stabilizer and elevator. *NTSB GAA18CA377*

The student pilot of a SGS 1-34 was not injured while the glider was substantially damaged while landing at the home airport. The pilot reported that while on final about 10 ft AGL the glider was 'hit by a tail wind gust and/or downdraft'. This caused the glider to land hard damaging the fuselage. The pilot was landing on runway 8G (Grass) while the winds were 170 deg at 10G14. *NTSB GAA18CA389*

The commercial pilot of a Discus was seriously injured and the glider was substantially damaged while making an off-airport landing. The pilot reported that during a lon cross-country flight he deviated to an alternate airport due to deteriorating weather. While flying towards this airport he encountered continuous sinking ari and determined that he could not make the airport. He decided to land on a nearby road. While on final the right wing struck a dirt berm that paralleled the road causing the glider to cartwheel and come to rest inverted. *NTSB WPR18TA192*

The pilot and passenger in a Virus SW were not injured while the motorglider was substantially damaged while making an airport landing. The pilot reported that while on final about 10 – 20 ft AGL the descent rate was higher than normal. The pilot moved his hand from the spoiler handle to the throttle but was unable to arrest the descent. The motorglider landed hard, bounced back into the air, and rolled to the left. He applied full power and attempted a go-around, but the left wing struck a hedge causing the motorglider to yaw and impact the ground. *NTSB GAA18CA458*

During the FY18 reporting period twelve non-fatal landing accidents met the reporting requirements of NTSB part 830. The NTSB reports indicate that three solo students, three private pilot, and two commercial pilot were involved in eight of these accidents while pilot certificate level of the remaining four was not reported. Eight of these non-fatal landing accidents occurred while the pilot as making an off-airport landing. On six of these the glider struck an object (sign, berm, guide wire) either just before touchdown or during the landing roll. A common theme among all of these accidents appears to be that the pilot was on a soaring flight when conditions changed and the pilot did not have a safe off-field landing area in mind. This lead to the pilot having to make a rapid decision to pick a field and execute an approach/landing without sufficient time to plan.

Even pilots on local flights should consider using good ADM/RM skills to consider the possibility of an off-airport landing. Picking a field that has sufficient length even when obstacles like trees and power lines is a primary task. Being able to judge the landing without reference to the altimeter and without reference to specific objects on the ground (e.g., turn base over the field where Joe's garage used to be) are essential skills all pilots need to develop.

Picking a landing field based on the easy of the retrieve vs the safety of the landing has lead to many accidents and incidents. It is always better to land and stop safely and then figure out how to get the glider next to the trailer.

Scenario based training techniques can be used to help pilots develop the necessary ADM/RM skills they need. In addition, the SSA ABC/Bronze Badge program can help all pilots develop the piloting skills needed to make off-airport landings. The Bronze Badge program required the pilot to demonstrate some soaring skills (2 – 2 hour flights) and the landing skills (spot landings and landings without reference to the Altimeter). Talk to your clubs/schools SSA-Instructor (SSAI) to participate in this program and develop/demonstrate your skills.

Remember, that all skills atrophy if not used so practice them on a regular basks. Make every landing a spot landing. Don't allow yourself to simply 'stop somewhere on the airport'. Before launch, or before entering the pattern, pick a specific stopping spot on the runway. Then use the skills you developed during your primary training to land and stop at this spot. Talk to you instructor if you have trouble accomplishing this task and re-develop these skills, remember you demonstrated them to the pilot examiner when you initially got your license.

Another fun way to practice is to hold a spot landing contest. Pick an afternoon when conditions are calm and put an orange highway cone on the runway. Give everyone a pattern tow and have classes for students, private, and commercial pilots. See who can get the closest without overrunning the cone. You may be amassed with the results.

Fatal Accidents

Seven (7) glider pilots and four (4) passengers were involved in seven (7) fatal accidents during the FY18 reporting period. This represents a significant increase (41.2%) in the number of fatal accidents (7 vs 3) from previous reporting period.   One (1) accident occurred during the launch phase of flight (aerotow), one (1) accident occurred during the landing phase of flight, four (4) occurred during the cruise phase of flight, and the remaining accident occurred for unknown reasons.

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 5, 6, and 7 (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 9 shows 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 seven (7) accidents that occurred during this reporting period.

Fatal Accidents 2014-2018

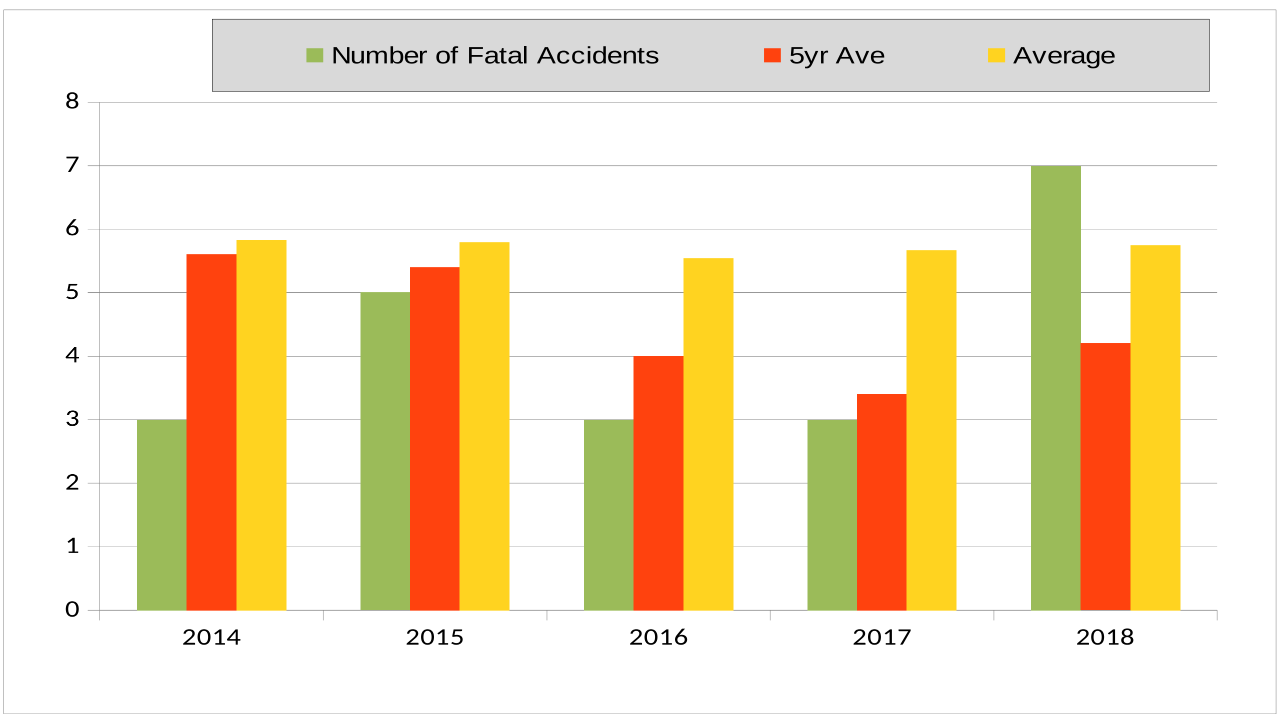

Figure 9: Number of fatal accidents, 5 year average, and average since 1987

The ATP rated pilot in a SZD 48 Jantar Std 2 was fatally injured and the glider was substantially damaged after impacting terrain after a failed aerotow launch. The tow-pilot reported that the tow began normally but the glider quickly began to depart from the normal tow position, which was unusual for this glider pilot. Around 400 ft AGL the glider entered a thermal and kited on tow, lifting the tow-plane's tail. The tow-pilot was about to release when the glider pilot released. The tow-pilot reported beginning to clear the area and when he looked around he saw the glider about 200 ft AGL descending in a spin. The spin continued until the glider impacted the terrain. *NTSB ERA18FA128*

The pilot of an IS-29D Lark was fatally injured and the glider was destroyed after it experienced an in-flight separation of the wings.   According to the co-owner, he and the accident pilot had recently purchased the glider. The accident pilot, a certified aircraft mechanic and inspector inspected the glider carefully as it had not flown in the precious 7 years. After assembling the glider the accident pilot was aerotowed aloft and released about 1227 PST. Approximately 1 hour later the pilot reported over the radio that all was well and he was continuing to fly. When the pilot did not return a search was conducted and the wreckage spotted about 5 miles southwest of the field. Examination of the wreckage indicated that the left wing separated in-flight and that the pilot had attempted to bail out. *NTSB WPR18FA143*

The commercial pilot and ride passenger in a Blanik L23 were fatally injured and the glider was destroyed after it impacted terrain during a sightseeing flight. According to the tow-pilot he and the glider pilot conducted a detailed pre-flight briefing and discussed the plan route of flight and altitudes needed to safely return from various locations. The glider released after a 47 minute tow to 13,800 MSL (7,569 ft above the airport). When the glider failed to return attempts were made to contact the pilot via radio. After this failed, the commercial operator contacted the FAA and they issued an Alert Notice. The commercial operator then flew a private helicopter into the area and spotted the wreckage about 11,000 ft MSL between the Middle Teton Peak (12,809 ft MSL) and the South Teton peak (12,519 ft MSL).   *NTSB CEN18FA217*

The pilot of a Standard Cirus was fatally injured and the glider was substantially damaged after it impacted terrain after entering a spin at 400 ft AGL. The driver of the ground launch vehicle (auto-tow launch) reported that the pilot had a 3 minute flight in the glider prior to the accident flight. On the accident flight the glider towed to approximately 1,000 ft AGL. After release the pilot appeared to enter a right downwind. About 3 minutes later the tow vehicle operator reported that the glider appeared to be attempting to thermal at 400 ft AGL near the approach end of the runway. While in a 30 deg bank turn the glider abruptly pitched 60 deg nose down and completed a 2 turn spin before the witness lost sight of the glider. The glider impacted the driveway of a home and the homeowner notified the local fire department. *NTSB WPR18FA178*

The private pilot in a Ventus 3F was fatally injured and the motorglider was substantially damanged after it impacted terrain about ½ mile southeast of Moriarty Municipal airport. The GPS flight log (FLARM) extract shows that about 11 seconds prior to the impact the glider entered a left hand descending spiral at an airspeed of 48 knots which continued until the ground impact occurred. There were no witnesses to the accident.   *NTSB CEN18FA262*

The commercial pilot and 2 ride passenger in a SGS 2-32 were fatally injured and the glider was substantially damaged after it impacted terrain during a sightseeing flight. The tow-pilot reported that during the tow the formation flight had to ‘weave around cloud’ but they maintained VFR cloud clearance minimums. He also indicated that ‘some of the mountain tops were partially obscured’. The glider released about 4.500 ft (not stated if AGL or MSL) and according to a witness on the ground the glider flew away and ‘disappeared’ into the clouds. When the glider failed to return numerous attempts were made via radio and cell phone to contact the pilot without success. Airport personnel then contact the local 911 center and an Alert Notice was issued by the FAA. The tow-pilot then began an aerial search and spotted the wreckage about 7 miles northwest of the airport. Search and rescue personnel reported the glider impacted the terrain about 40 ft below the summit in a near vertical nose down attitude. *NTSB ERA18FA238*

The private pilot and private pilot rated passenger in a Duo Discus T were fatally injured and the glider was destroyed after it experienced an in-flight breakup while maneuvering. The pilots were conducting a cross-country flight as part of a local informal contest. The tow-pilot reported a normal 3,000 ft AGL tow and several other FLARM equipped gliders recorded traces of the accident motorglider as it flew east eventually reaching 14.500 ft MSL at a distance of 12 miles from the airport and 1 mile west of Slide mountain. Several paraglider pilots then reported observing the accident glider somewhere between 9,200 ft and 11,000 ft MSL near their launch platform on Slide mountain. These pilots reported the Duo performing a series of loops which continued until the left wing failed due to stress overload. This was followed shortly later by the right wing failing and the glider impacting the mountain terrain. *NTSB WPR18FA247*

For the five-year period 2014 – 2018, 21 pilots and 6 passengers received fatal injuries while soaring. This equates to a five-year average of 5.4 fatalities per year, a significant increase in the number of pilots and passengers lost from the previous 5-year period. The data shows the long term average of 5.8 fatal accidents per year since the SSF began collecting fatal accident data in 1987. While the current 5-year average is down from the initial rate of 7.2 fatal accidents per year recorded in 1991 (1987-1991), 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 glider/tow-plane accidents. From 2002 – 2018 there were 89 fatal glider/tow-plane accidents in the US involving 95 pilots and 9 passengers in 95 aircraft (mid-air collisions account for the additional aircraft). The NTSB database contains a probable cause (PC) for 78 of these accidents leaving11 still under investigation.

Figure 9 shows the number of fatal accidents per year and averaged over 2 different time periods. The green bar shows the number of fatal accidents that occurred during that reporting period (Nov 1 – Oct 31). The red bar shows a 5 year moving average and the yellow bar shows the average number of fatal accidents since the SSF began keeping statistics in 1987.

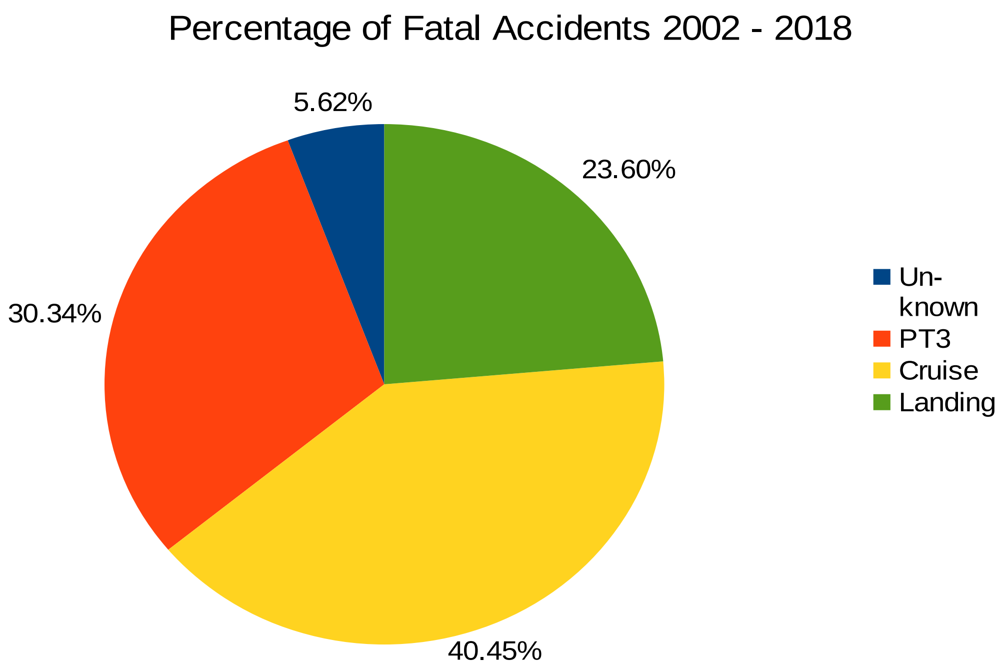

Figure 10: Percentage of Fatal Accidents in various phases of flight

Figure 10 shows the percentage of fatal accidents in the 3 major phases of flight (launch, cruise, and landing) from 2012 thru 2018. 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 show a complete different trend. In this case fatal accidents occur most often in the cruise phase of flight with the fewest number of fatal accidents occurring in the landing phase of flight.

As shown in Figure 11, the NTSB has determined the probable cause of the accident in 78 of the 89 fatal glider/tow-plane accidents that occurred between 2002 and 2018. These causes break down into 9 major areas, with a 10th (no P.C. - Probable Cause) 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.

The SSF Trustees will continue to work with the soaring community to find ways to eliminate fatal glider/tow-plane accidents.

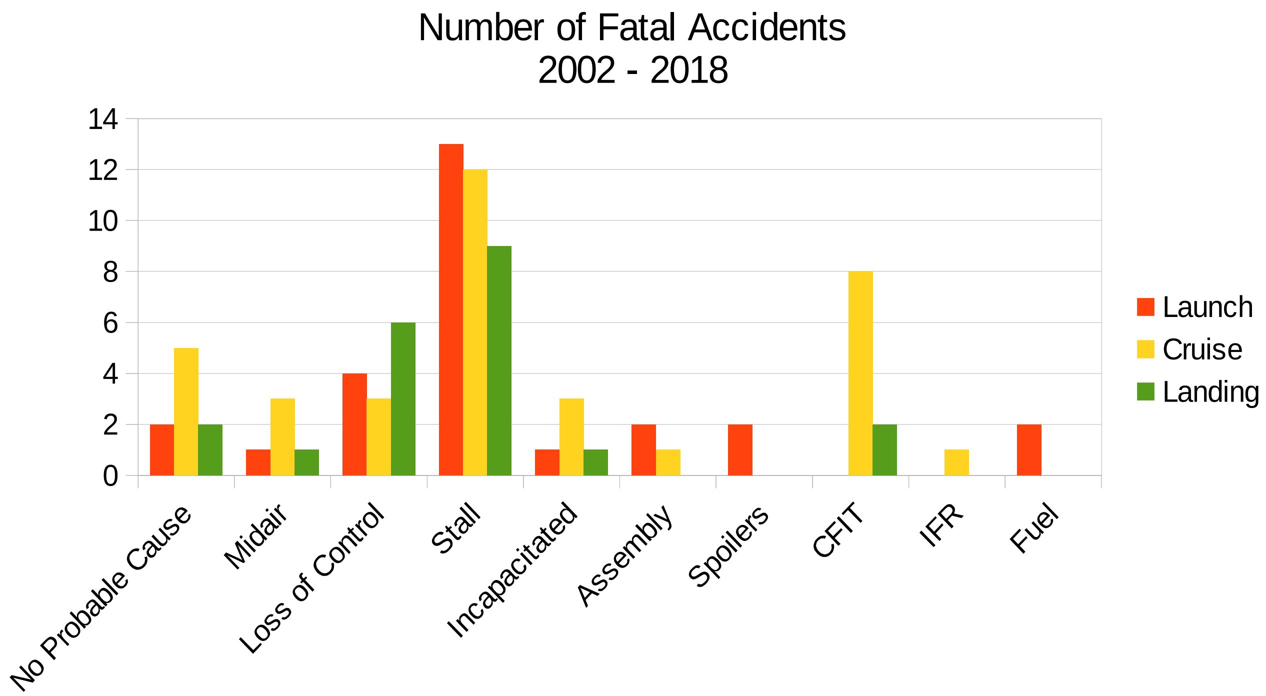

Figure 11: Number of fatal accidents by NSTB defined Probable Cause

During the FY18 reporting period 2 of the fatal accidents occurred while commercial glider schools were conducting sightseeing ride flights. This resulted in fatal injuries to 2 pilots and 3 passengers. Both of these occurred in mountainous terrain where the commercial ride pilot had flow for many years. It is unclear why commercial glider operators would be encountering this significant jump in fatal accidents.

Damage to Aircraft

A total of twelve (12) gliders, five (5) motorgliders, and three (3) tow-planes received structural or substantial damage during this reporting period. Two (2) gliders and two (2) motorgliders were destroyed during accidents in the FY17 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 and makes it harder for members/customers to obtain and maintain both currency and proficiency.

Auxiliary-Powered Sailplanes

Seven (7) gliders equipped with some kind of internal powerplant (gas or electric) were involved in accidents during this reporting period. In this report a glider that can self-launch, or simply sustain flight after a conventional glider launch has been completed is referred to as a motorglider. Details of those accidents are reported in the appropriate section (launch, cruise, landing or fatal) above.

Accidents Involving Tow-Aircraft

During the FY18 reporting period three (3) accident involving tow-planes occurred. .

Details for this tow-plane accident are described in the Cruise, Landing, and Fatal accident sections of this report.

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].

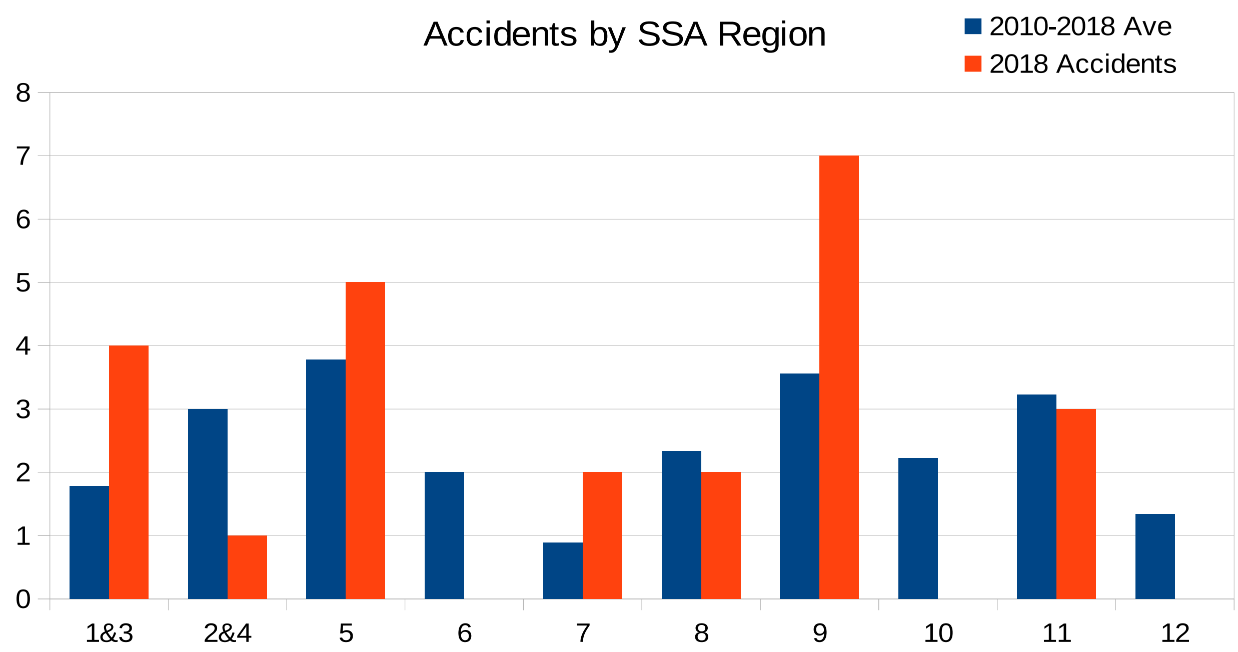

Figure 12: FY17 and average Number of accident per SSA Region

Figure 12 shows the number of accidents in each SSA region along with the average number of accidents in that region during the previous 6 years (FY10-FY16). Figure 13 shows the same information for fatal accidents during the same periods.

As can be seen, accidents occur in all regions. Due to the different geography in the US, it is difficult to compare one region against the other. However, it is possible to see how each region compares to its

[2] See Appendix A for more details

historical trend. The intent of these graphs is to show how the current reporting period compares to the historical trend for each region.

A strong 'safety culture' is a large part of the solution to reducing the number and severity of glider/tow-plane 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.

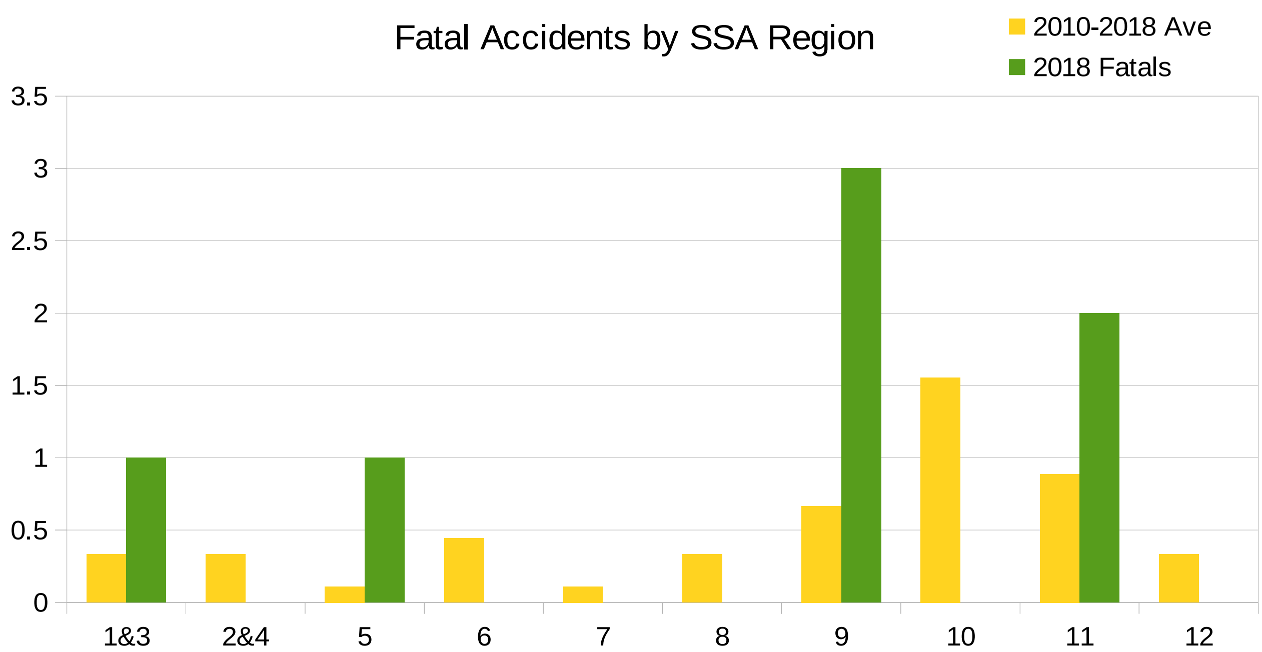

Figure 13: FY17 and Average number of Fatal Accidents per SSA Region

Flight Training and Safety Report

The SSF generates this safety report based on data extracted from the NTSB aviation accident database. We also receive summary and trend information from the SSA's group insurance program. Slow, long term progress continues to be made. While the number of claims is up last year (4% higher over 2017) it is still lower than the number of claims in 2012. However, it is obvious that 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 glider/tow-plane accidents is the Human Error factor. 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[3] 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.

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 low or flew to slow). While it might be comforting to accept that this single pilot was at fault, in reality this is not the case.

If a pilot fails to clear his turns, then how many times did he successfully make turns without looking? It could be thousands. Thus the problem is not simply that the pilot failed to clear his turns, the problem is that the flight instructor(s) he trained with failed to emphasize the importance of this task. The operations training syllabus may not have emphasizes 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 flight instructor(s) 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 need 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 can be easily accomplished through the use of scenario based training (SBT) which allows the instructor to evaluate a pilot's response to different scenarios as presented.

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.

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

SSF Trustee Action: Glider flight Data

As noted earlier in this report, the SSF accident reports have historically reported on the number of accidents that are reported to the National Transportation Safety Board. The SSF Trustees search the NTSB aviation accident database several times a year to collect accident reports and identify accident trends and probable causes. The SSF trustees started capturing NTSB data in 1981 and have continued to do so annually for the past 35 years.

However, while this data can show trends, it does not show the accident rates that are commonly shown in General Aviation publications or Commercial publications. To have statistically meaningful data you need to have both the number of accidents and the number of flights or flight hours. Without that flight/time component you can't tell if the number is decreasing because pilots are making better decisions or because pilots are flying less.

Getting flight hour data has stymied the SSF since it was formed in 1981. Try as we might, the community has been unable/unwilling to reliably submit flight hours to the SSF. However, getting this data is crucial to understanding if the decline in accident numbers is due to a lower accident rate or just fewer pilots flying fewer hours.

At the 2018 Soaring Convention the SSF Chairman gave a presentation on the U.S. glider accident rate, using several proxies and assumptions. The presentation, available on the http://www.soaringsafety.org/presentations/presssa.html web page, shows how these proxies and assumptions were generated and what they say about accident rates. The absolute number given by these proxies and assumptions is suspect, or flat out wrong, but all of them show the same trend. The Accident Rate for gliders has been declining for the past few years. Here's a summary of that talk.

OLC Data:
The international On-Line Contest (OLC) web site has downloadable files that can be filtered to show the number of flights and miles flown by U.S. pilots. There is also a file that contains the best flight for each contestant, which includes the task speed and distance for that flight. This allows us to calculate the number of hours the contestant flew. Using that data, and making an assumption that the rest of the flights made by each pilot are 80% shorter, then it is possible to estimate the average number of hours OLC pilots flew per year from 2007 to 2016. Using this number, approximately 30,000 hours/year, as a proxy we see a glider accident rate as shown in figure 13 (accident rate per 100,000 hours vs year).

FAA Survey Data:
Every year the FAA sends a random subset of glider pilots, clubs, and commercial operators, a post card requesting that they go on-line and fill out a usage survey. This survey data is then placed on the FAA web site and the files can be downloaded for review. Using this data, approximately 90,000 hours/year are flown by U.S. glider pilots. As a 2nd proxy we can again we can plot the glider accident rates for the U.S. glider population. This accident rate is shown in figure 14 (accident rate per 100,000 hours vs year).

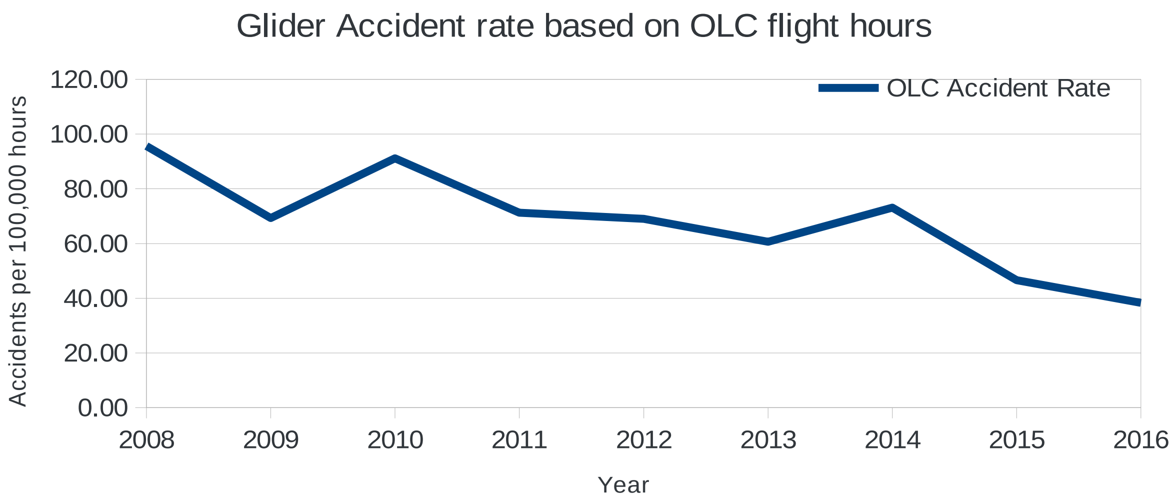

Figure 14: Estimated accident rate using OLC flight hours

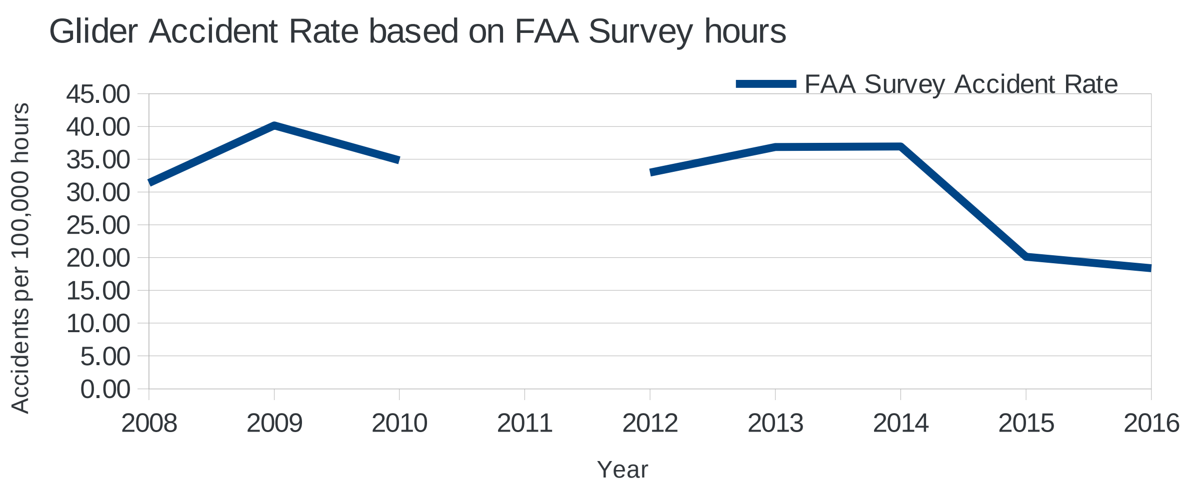

Figure 15: Estimated accident rate based on FAA survey data (2011 data missing)

Finally, the FAA has 2 downloadable databases that can be used as a 3rd proxy. The first database contains the number of gliders registered in the U.S. The second database contains the pilot certificate information for individuals with U.S. pilot certificates. Knowing the number of gliders and the number of glider pilots is a good starting point. What we need are a couple of estimates as to how many hours these gliders and pilots can fly each year.

To find an upper bound I assumed that every glider would fly 8 hours a day for 78 days. That would be every weekend day for 9 months. That number is approximately 2 million hours per year. Clearly nobody believes that we actually fly 2 million hours per year, it is simply meant to be an upper limit that will never be reached.

Next I took the pilot population and assumed that 45% of the licensed glider pilots flew each year. I also assumed that 1% flew 200 hours/year, the majority (22%) flew 3 hours/year, and the reminder flew different numbers of hours between these two extremes. I then estimated the number of student pilots who start training each year and further estimated they flew 39 hours each year (1 hour/week for 9 months). This gave me a total of approximately 410,000 hours of flight time per year. Figure 3 show the glider accident rate (accident rate per 100,000 hours vs year) and compares that to the General Aviation accident rate and to the non-airline Commercial aviation accident rate.

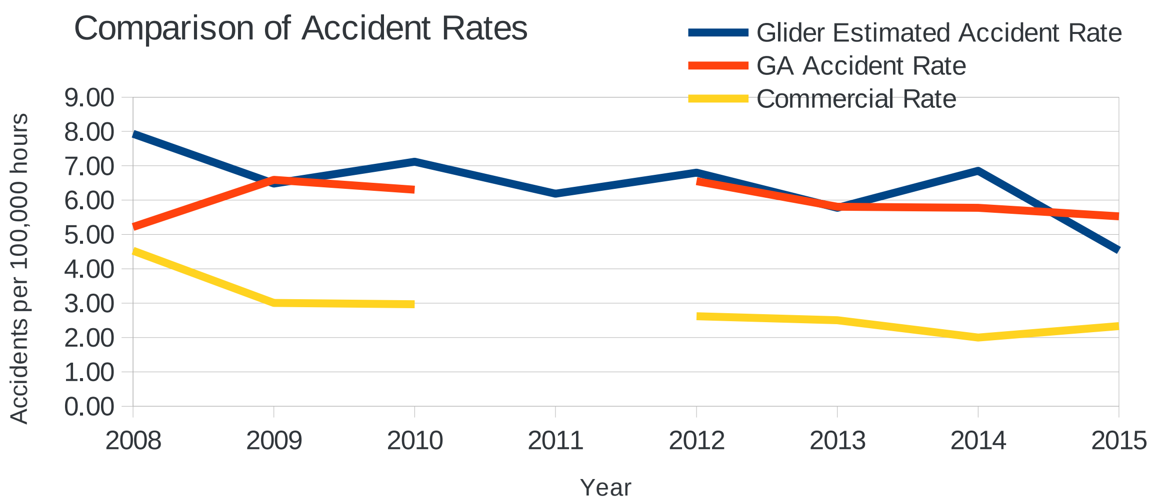

Figure 16: Estimated Glider accident rate compared to GA and non airline commercial rate (2011 data missing)

As can be seen from the above graphs, the number of hours shown in the OLC, FAA Survey, and Pilot estimation varies dramatically. To repeat ourselves, the accident rate/100,000 hours values shown in each of the graphs are suspect or flat out wrong. However, it is noteworthy that each graph shows a decline in the accident rate over the past 10 years. While this is encouraging, we still want to know what the real number is!

Now it is time for every club, chapter, and commercial operator to step up and help the SSF obtain this missing data. What is the real glider accident rate in the U.S.? The SSF Board of Trustees has decided to take 2 approaches to get this data.

1) We have asked the soaring contest community to provide us with the number of launches and number of flight hours from each sanctioned glider contest. The contest committee will look for ways to easily extract this information and submit it to the SSF.

2) The SSF will contact every club, chapter, and commercial operator, via email and US postal mail, in the U.S. asking that they annually submit, on a voluntary basis, the following 6 pieces of information:

A) The number of gliders located at your field
B) The number of club/commercial gliders located at your field
C) The number of tow-planes and/or winches at your field
D) The number of launches (broken down by type) you gave
E) The number of club/commercial glider launches you gave
F) The number of hours your club gliders flew

You will notice that we are not asking for the number of hours the privately owned gliders fly. We realize that the club/commercial operator probably doesn’t have that information. The SSF will attempt to obtain those hours in other ways.

Getting real data from the SSA membership will go a long way towards giving us realistic accident rates. We can then compare these rates to our European colleagues to see how we fair. We can compare the data to General Aviation and Sport Aviation communities to see if there are common elements that we can all work to solve. Most importantly, we can demonstrate to ourselves and our community that Soaring pilots really are developing the Risk Management (RM) and Aeronautical Decision Making (ADM) skills needed to fly safely while having fun doing so.

So, step up and submit your data. The SSF letter/email will provide details on how to submit your club, chapter, commercial operate data.

SSF Recommendation: Scenario Based Training

From October 2015 to February 2016 the SSF published a series of articles in SOARING dealing with Scenario Based Training (SBT). Reprints of those articles can be found on the SSF's web site at http://www.soaringsafety.org/publications/soaring-articles.html These articles were followed by a special SBT training session during the 2016 Convention in Greenville SC. Copies of the presentation slides can also be found on the SSF's web site at http://www.soaringsafety.org/presentations/presssa.html

As these articles describe, SBT is the training method the airlines and military use to train their pilots, flight crews, and other personnel involved in flight/ground operations. The idea is to provide a realistic situation that either has occurred in the past, or might occur in the future and discuss the potential threats this situation presents to the pilot and/or aircraft. The pilots/instructors then determine potential mitigation strategies that can range from not taking the flight, to deviating to an alternate destination, to ensuring that an emergency plan is developed and practiced in case this situation occurred. The flight instructor should use a guided discussion technique to ask questions that lead the pilot to consider all the factors that must be considered to safely mitigate this situation.

The question you may be asking now is, “How do I create a scenario”? The answer to that is “it’s easy”. The SSF has created an on-line database http://www.soaringsafety.org/forms/sbt.html with dozens of scenarios that were created for flight instructor training. You can use these as is, or modify them slightly to fit your local situation. Another good method is to look at the NTSB data base, or review the accidents listed in this report. These are real life examples that you can use to talk about how your students and pilots can learn from the mistakes of others. You can look at the SSF's on-line

Incident Reporting Database http://www.soaringsafety.org/forms/incident.html to find out what problems and issues other clubs are having.

Finally, 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. You might just capture an incident or issue that would make a great scenario. The point is, scenarios aren't hard to create, they happen all around us. You just need to look for them and you will have plenty of canned versions and plenty more occurring in real life.

In addition to finding issues and problems at your soaring site, the SSF also suggests that you recognize students and rated pilots when they make a good decision. 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 value this skill? 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

SBT is an excellent way to provide the RM/ADM skills CFIs are required to teach. It is well recognized that RM/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 RM/ADM skills.

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

Imagine that during the assembly process you are installing the horizontal stabilizer and after putting it in place you realize you forgot the assembly tool in the cockpit side pocket. No problem you think, I'll just walk around the wing and get it. While digging in the cockpit a fellow pilot comes up and asks you a question about the day's task. You interrupt your assembly process and begin to answer his question when you notice the weather is changing so you decide to go into the clubhouse and check the radar returns. The check reveals that things will be OK, but the day will be shorter than you expected so you need to hurry if you are to get a short X-C flight in. You go back out and rush 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.   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 actions 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.

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

SSF Recommendation: Stall Recognition Proficiency

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

See a more complete set of recommendations in the SSF 2013 Annual Report.

SSF Goal Orientated Approach

As the FY17 statistics show, the majority of glider/tow-plane 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 "enter the pattern over the white silo and turn base over the red barn" method is not a good teaching practice and can lead a pilot to making critical errors during the approach.   Instructors need to understand the Goal Orientated Approach method and teach this method of approach to a landing to all pilots

See a more complete set of recommendations in the SSF 2013 Annual Report.

Flight Instructor Roles

Flight instructors play an important safety role during every day 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 and RM/ADM in the flight training process. Examiners will check for this training during the practical test. The regulations require that all flight instructors provide some kind of aeronautical judgment training as well as RM/ADM training during pilot training flights (student, private, commercial, and flight instructor). 14 CFR 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/tow-plane accident rate.

The SSF offers Flight Instructor Refresher Courses throughout the country each year. The SSF Trustees strongly recommend that ALL instructors (experienced and inexperienced alike) avail themselves of these courses to keep updated of the latest safety trends in training including RM/ADM skills and Scenario Based Training skills as well as Stick and Rudder skills. This kind of continuing education course allows for meaningful interaction between fellow CFI’s and will help to keep the training we offer “standardized” throughout the country.

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 78^{th} 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

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/tow-plane accidents meeting the NTSB reporting criteria are investigated by representatives of the FAA.

All aircraft accidents involving injury to passengers or crew-members 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 B

Phase of Operation

Ground Movement - Re-positioning of the glider while on the ground. To meet the definition of an accident, occupants must be on-board 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 aerotow, 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 aerotow and ground launches or the pilot shuts down the engine when self launching 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 C

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 re-positioned 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, aerotow, 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 over-stress 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.