SOARING SAFETY FOUNDATION

1999 SAFETY REPORT

SOARING SAFETY FOUNDATION
ANNUAL SAFETY REPORT
1999

In 1980, the Soaring Society of America (SSA) mandated the Flight Training and Safety Board to conduct a review of soaring safety in the United States and to use the information obtained to develop methods and techniques to promote safety in soaring through pilot education, program development, information dissemination, and participation in areas of general aviation safety pertinent to soaring. A Safety Task Force was formed to collect all available information and to report those findings to the SSA Board of Directors and the soaring community. In 1985, the newly created Soaring Safety Foundation (SSF) assumed this mandate. The 1999 SSF Safety Report is a product of that mandate.

The compilation and dissemination of accident data have become one of the Soaring Safety Foundation's most important functions. Analysis of this information is crucial because it allows the SSF to identify and evaluate emerging accident trends within the soaring community and to focus accident prevention resources on specific problem areas having a negative impact on the safety of our sport.

Accident data included in this report was obtained from two primary sources: National Transportation Safety Board (NTSB) Accident Reports and the Federal Aviation Administration (FAA) Daily Reporting System. These sources were selected because of the specific reporting requirements of NTSB Part 830 of the Code of Federal Regulations. 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 database of soaring accident information. This database 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, **Sailplane Safety** newsletter, the SSF web page, Flight Instructor Refresher Clinics, and pilot safety seminars.

The Trustees of the Soaring Safety Foundation sincerely hope that this report and the publication of accident data are beneficial is 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 by accessing the Soaring Safety Foundation web page @ ssa.org and selecting SAFETY.

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THE SOARING SAFETY FOUNDATION

The Soaring Safety Foundation (SSF) was founded in 1986 for the purpose of promoting soaring safety through pilot education, program development, information dissemination, and participation in areas of general aviation safety pertinent to soaring. The stated goals of the SSF are to reduce the accident rate in soaring and to make soaring as safe as a sport can be.

The scope of the SSF includes all activities of the Soaring Society of America relating to the subjects of flight training and safety. The SSF is responsible for the development and maintenance of the ABC Training Program, appointment of SSA Instructors, review of manuals, development of procedures, accomplishment of specific programs, data compilation and review, and dissemination of information relating to flight training and the promotion of soaring safety.

One of the most important functions of the SSF is the dissemination of safety information to the soaring community. To meet this responsibility, the SSF obtains accident data from the National Transportation Safety Board and the Federal Aviation Administration and distributes that information through various mediums including Sailplane Safety and the SSF Web Page. Information of a time critical nature may be disseminated through the issuance of a *Safety Alert* to inform pilots of potential aircraft or operational safety issues.

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 Page, and the newsletter of the SSF, *Sailplane Safety*.

SOARING SAFETY FOUNDATION TRUSTEES

GENE HAMMOND

TOM KNAUFF

JOHN SHARP

BILLY SINGLETON – CHAIRMAN

BERNALD SMITH

CHAIRMAN'S REPORT

The 1999 Soaring Safety Foundation Safety Report is the result of an extensive review of glider related accidents that occurred from January 1st – December 31st of the 1999 reporting period. Compiling accident data is important for two reasons. First, this data allows the Soaring Safety Foundation to establish a history of glider accidents to use in determining the effectiveness of our accident prevention efforts. From a statistical perspective, we are doing much better than we were almost twenty years ago when the Soaring Safety Foundation assumed the responsibility of maintaining accident records. In 1987, for example, the soaring community averaged approximately ten fatalities each year in glider accidents. Although 1999 was a difficult year in terms of the number of fatalities, the five-year average of 6.2 fatalities per year is still a significant improvement from that of fifteen years ago.

While we have made considerable progress over the years in reducing the frequency of accidents, much remains to be accomplished. Consequently, accident data obtained from the National Transportation Safety Board serves a second important function by indicating important trends in soaring safety. The Trustees of the Soaring Safety Foundation review accident data to establish themes for SSF accident prevention programs.

Based on the accident history for the 1999 reporting period, I have identified three distinct areas of soaring operations as requiring immediate attention. Frankly, the first area, landing accidents, has been a problem for a number of years. Unfortunately, while accident prevention efforts have been successful in reducing other types of occurrences, the percentage of landing accidents has increased to fill the void. In 1999, landing accidents accounted for approximately 80% of all reported glider accidents. Although landing accidents involve various contributing factors, the most common include landing short of the intended landing area after the pilot has flown a normal landing pattern and inadequate altitude to return to the departure runway after a local flight, resulting in the glider being damaged during an off-airport landing.

The second operational area requiring attention is operation of tow aircraft. For the year, four pilots conducting glider tow operations were involved in accidents. Two of the accidents resulted in fatalities. For the first seven months of 2000, seven accidents involving aircraft towing gliders have been reported. Primarily, causal factors of these accidents include fuel starvation, loss of directional control on landing, and abnormal occurrences involving the glider being towed.

The third, and most challenging, area is the threat of mid-air collisions. The most serious accident reported during 1999 involved the in-flight collision of a Grob G103 and a Cessna aircraft that was towing another glider. This accident alone claimed the lives of three of our fellow soaring pilots. This was not the only mid-air collision that occurred during the year and the first mid-air collision of the current year has already been reported.

Most alarming is the fact that an increasing number of collisions involve gliders and powered aircraft that are not participating in soaring operations. As the national airspace system continues to become increasingly complex and saturated with aircraft, the threat for collisions between aircraft will continue to increase. Additionally, the potential for a collision between a glider and a transport category aircraft remains an area of extreme concern.

Based on this information, I will be submitting to the Trustees of the Soaring Safety Foundation the following goals to be adopted immediately:

1. Focus additional accident prevention resources on the prevention of landing accidents. These resources will receive widespread dissemination through the SSF web site, Flight Instructor Refresher Clinics, SSA Instructor Forums, and articles in Sailplane Safety.

2. Increase the awareness of clubs and commercial operators of the prevalent causal factors of accidents involving tow aircraft. Additionally, produce more safety related information for those pilots involved in glider tow operations.

3. Continue to emphasize the importance of proper collision avoidance procedures for glider operations. This is especially important for those operations that share airport facilities with other general aviation activities.

Of course the Soaring Safety Foundation, in addition to these stated goals, will continue develop accident prevention programs for all areas of soaring operations to achieve our mandate of *making soaring as safe as a sport can be*.

The Soaring Safety Foundation will continue to take advantage of electronic media to create a learning environment for both the new and experienced soaring pilot, tow pilot and ground crewmember. We also intend to continue to take advantage of opportunities in the field of video production. The Trustees of the Soaring Safety Foundation recognize the changing dynamics of pilot safety education and intend to position our organization to take full advantage of the opportunities on this new environment.

Billy J. Singleton, Chairman
Soaring Safety Foundation

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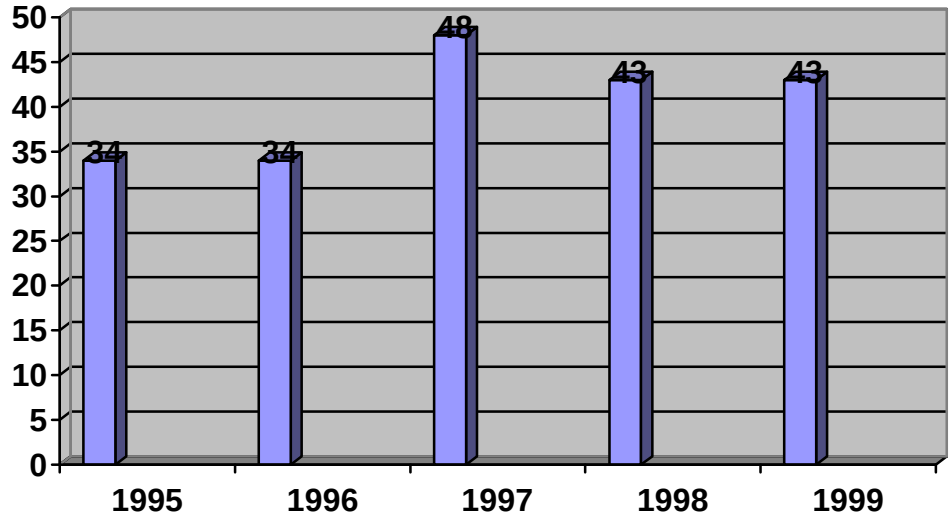
1999 ACCIDENT SUMMARY

I. OVERVIEW

For the twelve-month period ending December 31, 1999 43 glider accidents meeting the reporting requirements of Part 830 of the Code of Federal Regulations were reported to the National Transportation Safety Board. The number of accidents reported during the period is unchanged from the number reported for the previous year. The five-year average for the 1995-99 reporting period is 40.4 accidents per year. This represents an increase from the 39.2 accidents reported for the previous five-year period.

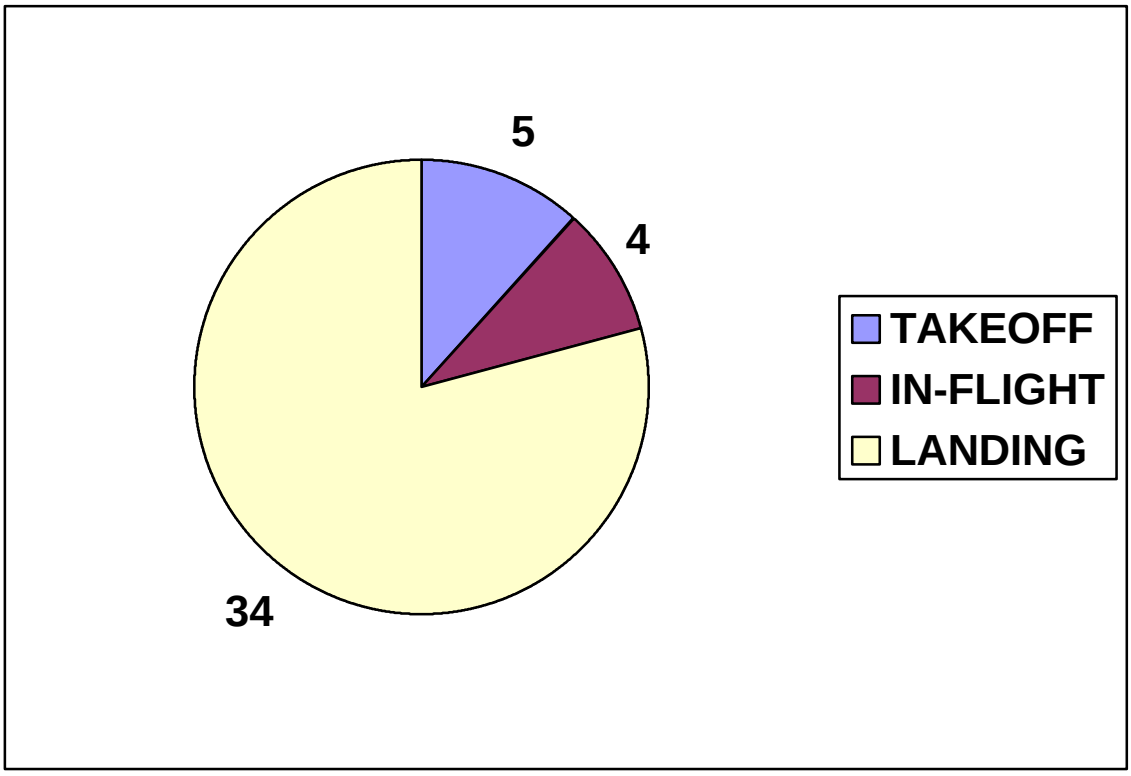


SOARING ACCIDENTS
1995 – 1999

The number of pilots fatally injured in glider operations increased during the 1999 reporting period. For the year, eight pilots were fatally injured while participating in glider operations. Two of these pilots were involved in accidents related to glider tow while the remaining six fatalities were the result of glider accidents. It is important to note that one additional fatality occurred when a pilot was fatally injured in a ground accident that took place as the pilot was hooking up a glider trailer to an automobile. Since the accident did not meet the criteria established by the National Transportation Safety Board to define an aircraft accident, the airman's death was not included in the 1999 total.

In addition to the glider accidents reported during 1999, four powered aircraft being used in glider tow operations were involved in accidents. In two of these accidents, the pilots of the tow aircraft were fatally injured. During 1998, three tow aircraft were involved in accidents, one of which resulted in fatal injuries to the pilot.

II. PHASE OF FLIGHT



PHASE OF FLIGHT
1999

The number of accidents occurring during approach and landing again far surpassed those recorded during any other phase of flight. For 1999, the number of landing accidents was more than three times the combined number of accidents that occurred during the takeoff and in-flight phases. For the year, approximately seventy-nine percent (79%) of the reported accidents occurred during landing. These represents an increase from the sixty-seven percent (67%) reported for the previous year. As has been the case in previous years, takeoff and landing accidents accounted for over ninety percent (90%) of the total number of accidents for the year.

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 sixty percent (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 sixteen percent (16%) of actual flight time.

III. IN-FLIGHT ACCIDENTS

During 1999, three accidents occurred during the in-flight phase. For the first time in a number of years, accidents occurring during the in-flight phase accounted for more fatal injuries to pilots than any other phase of flight. During the year, two very notable in-flight accidents were reported.

The first involved a mid-air collision between a Grob 103 being operated on an instructional flight and a Cessna 305A that was being used to tow another glider. After departure with a single seat glider in tow, the Cessna 305 made a left turn to a northerly heading. While turning through a southeasterly heading, the pilot of the single seat glider reported seeing the Grob at his eleven o'clock position, approximately 1,500 feet away and 100 feet above his altitude. The pilot further stated that it became apparent that the flight path of the Grob and that of the tow aircraft would result in a collision if no evasive action was taken. The pilot of the single seat glider released from tow at approximately 1,200 feet above ground level and made a turn to the right at a bank angle of approximately forty-five degrees. The pilot then observed the Grob and the Cessna tow aircraft approach and collide. It did not appear that either aircraft took evasive action. The pilots of both aircraft received fatal injuries in the accident. *NTSB IAD99FA041A.*

A second fatal accident resulted from the in-flight break-up of a Nimbus 4DM. An airborne witness observed the motorized glider in a high-speed spiral with a steep nose down attitude. After two complete spirals, the rotation stopped and the aircraft stabilized on a northeasterly heading but the nose then pitched further down to a near vertical attitude. The glider was observed to return to a level attitude with the wings bending upward. The outboard wing tip panels were then observed to depart from the glider. The wings of the glider soon began to disintegrate and the fuselage dove into the ground. Other witnesses subsequently stated that the glider was in a tight turn, as if climbing in a thermal when it entered the spiral. Reconstruction of the glider revealed that all primary and secondary flight control surfaces, including mass balance weights, were within the wreckage distribution path. Flight control system continuity was established. Both pilots of the Nimbus were fatally injured. *NTSB LAX99MA251.*

A second accident involving in-flight structural failure occurred as the pilot of a DG-400 operated the glider at an indicated airspeed of sixty knots during cruising flight. The pilot stated that the glider was assembled using a one-person rig and that no problems were encountered during the procedure. The pilot conducted a preflight check, including security of the spar pin handles. He also reported that the natural wing frequency was determined to be within limits. Flying straight and level, the pilot heard a “sharp bang” that sounded as though the glider had struck an object. Both wings of the glider were observed to be intact. The pilot began a turn of approximately 360 degrees to look for other traffic in the vicinity. As the glider rolled out of the turn, the pilot heard another loud noise and observed the left wing of the glider displaced up approximately twenty degrees from its normal position. The glider began to descend and control inputs from the pilot were not responsive. In the descent, the speed of the glider began to increase. As the glider was approaching a near vertical attitude, the pilot elected to parachute from the glider. The pilot received minor injuries upon landing. *NTSB NYC99LA102.*

IV. TAKEOFF ACCIDENTS

The number of accidents occurring during the takeoff phase of flight decreased significantly during the most recent reporting period. For 1999, five takeoff accidents were reported to the National Transportation Safety Board. For 1998, eleven takeoff accidents were reported.

Causal factors for takeoff accidents were evenly divided between loss of directional control, collision with obstructions during takeoff, mechanical factors, and a premature termination of the tow. It is significant to note that no accidents involving gliders attempting takeoff with divebrakes / spoilers inadvertently extended were reported during the year. The Soaring Safety Foundation devoted considerable effort to address this issue during the past two years through publication of safety literature and presentations.

It is also encouraging to note that the number of accidents resulting from collision with obstructions during takeoff also decreased dramatically. It has been the position of the Soaring Safety Foundation that this type of accident is one of the most preventable. Typically this type of accident involves a glider hitting an aircraft or surface vehicle that has been parked in close proximity to the runway. Establishing staging areas for parked aircraft that are well clear of the departure / arrival runway can virtually eliminate this type of hazard.

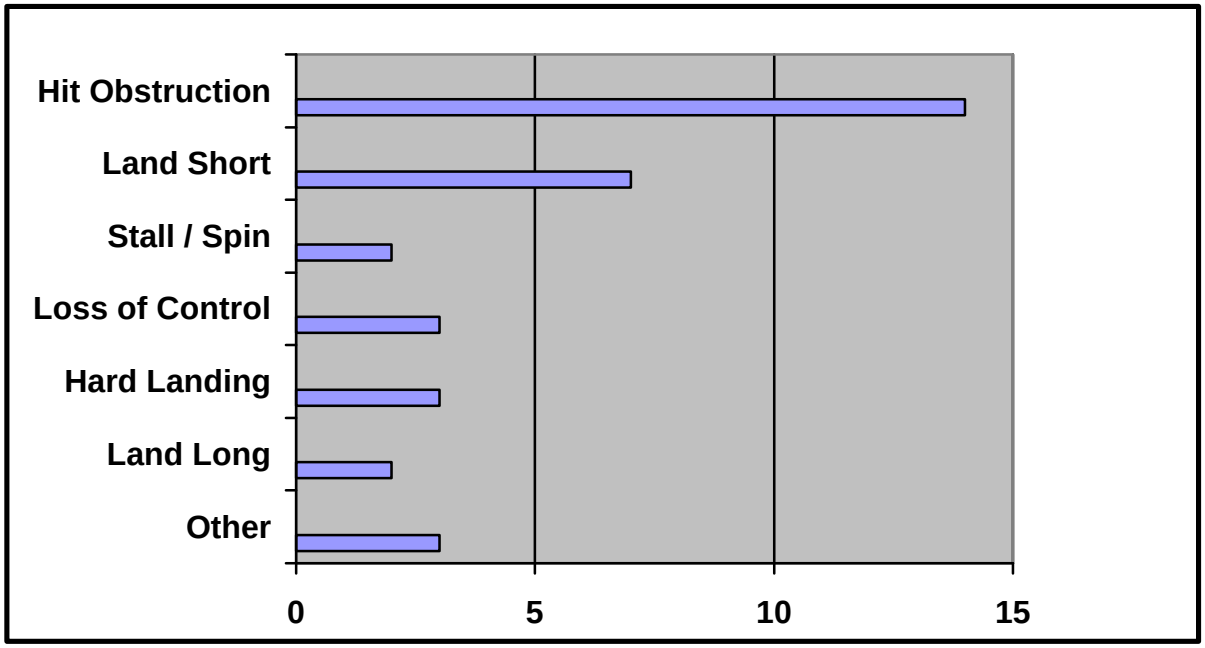
The pilot of a Genesis 2 was fatally injured in a takeoff accident that involved incomplete assembly of the glider as a causal factor. The aircraft collided with terrain following an uncontrolled descent immediately after takeoff. According to witnesses, as the glider began the takeoff, the horizontal stabilizer fell off the aircraft. At approximately 100 feet above ground level, the pilot of the tow aircraft reportedly released the towline and the glider dove into the ground. The pin that secures the horizontal stabilizer to the structure was found on the runway near the point where the glider began the takeoff.
NTSB LAX99LA215.

Although this accident was the only assembly related event reported to the National Transportation Safety Board during the year, it generated a significant response in terms of accident prevention efforts. The consensus held that this type of problem was more widespread than accident data indicated. Consequently, in conjunction with the Chairman's Task Force on Glider Assembly Accidents and the Board of Directors of the Soaring Society of America, the Soaring Safety Foundation assisted in developing a recommended procedure to be used at soaring contests and operations nationwide.

Additionally, the Soaring Safety Foundation developed a Safety Recommendation addressing assembly-related accidents (Appendix D). Furthermore, the Soaring Safety Foundation developed and distributed over one hundred copies of an accident prevention video that focused on assembly related accidents to SSA Instructors and commercial operators. This issue was also the focal point of articles in Sailplane Safety and the SSF Web Page.

V. LANDING ACCIDENTS

Accidents occurring during the landing phase of flight consistently account for an overwhelming majority of injury to pilots and damage to aircraft. This has proven to be especially true during the past year when approximately eighty percent (80%) of all glider accidents occurred during the landing phase of flight.



LANDING ACCIDENTS
1999

During 1998, the most common causal factor of landing accidents was gliders being landed short of the intended landing area. Progress was made during 1999 to reduce the number of occurrences of this type of accident. However, this reduction in accidents was offset by an increase in the number of gliders being damaged by collision with obstructions in the landing area. For the year, fourteen (14) gliders were damaged as a result of accidents involving collision with obstructions during landing. This represents an increase of approximately fifty-percent (50%) above the 1998 total. It is important to consider that eleven (11) of the obstruction related accidents occurred during off-airport landings. Somewhat disturbing, however, is the fact that only four (4) of these off-airport landing accidents occurred during cross-country flights. The majority of these accidents were the result of gliders having insufficient altitude to return to the departure airport during local flights.

The number of landing accidents that occurred during flight training activities also increased during the most recent reporting period. During 1999, four accidents were reported to have occurred during landing with a student and certificated flight instructor onboard the aircraft. Two of these accidents were attributable to the pilot(s) of the glider being unable to stop the aircraft prior to reaching the end of the runway (Land Long). In one case, the flight instructor reported that the student was demonstrating a landing approach without the use of the spoilers. The instructor stated that during the landing roll, it became evident that the aircraft would not stop before the end of the runway. The instructor reported that she took control of the aircraft, deployed the spoilers, and turned the aircraft towards an open field. The aircraft impacted between two trees on the right side of the runway. *NTSB CHI99LA220.*

National Transportation Safety Board reports also indicates two additional landing accidents that occurred as student pilots were operating gliders in solo flight operations. The pilot of an SGU 2-22 stated that he was established on the final approach for landing when he lost consciousness. When he regained consciousness, the glider was in ground effect and approaching power lines. He avoided the power lines by flying under them, but was unable to avoid striking a stop sign and a steel pole on the ground. A physician who examined the pilot determined that the pilot was dehydrated.
NTSB DEN99LA102.

The second accident involved a student pilot who departed on a local unsupervised solo flight. The pilot stated that the surface winds were blustery at approximately 15-20 knots. He was maintaining 75-80 miles per hour as he approached the airport for landing. The pilot reported encountering wind shear while on the final approach. He stated that he was eight feet from the ground and the airspeed was dropping below 60 miles per hour. The aircraft stalled and bounced twice, sustaining substantial damage.
NTSB LAX99LA232

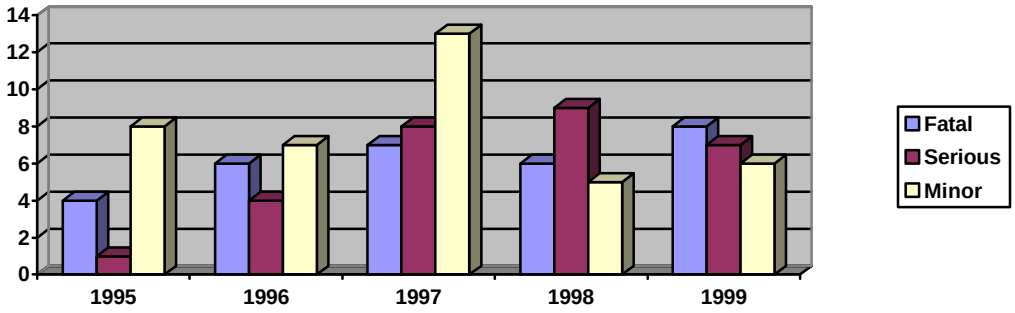
In a communication to Soaring Society of America Instructors, the SSF has emphasized the importance of flight instructor supervision of student pilots conducting solo flight operations. In many cases, insurance requirements specify that an appropriately rated flight instructor be physically present during the periods in which student pilots are conducting solo flight operations.

National Transportation Safety Board reports indicate one mid-air collision that occurred in the traffic pattern of a tower-controlled airport. The pilot of an HK 36R Super Dimona reported that he had just departed and intended to remain in the traffic pattern to practice touch and go landings. While receiving Air Traffic Control services from control tower personnel and established on the downwind leg of the traffic pattern, the aircraft collided with a Cessna 172. Both pilots were able to land their aircraft and no injuries were reported. The Cessna aircraft was being operated as an instructional flight.
NTSB LAX99LA204B.

A Grob 109 motorglider was substantially damaged in an off-airport landing accident. The Grob was flying at an altitude of approximately 500 feet above the ground when the propeller synchronization system failed. The aircraft lost altitude and struck the ground, resulting in minor damage to the motorglider. Neither occupant was injured *(FAA Report)*.

VI. INJURIES TO OCCUPANTS

During 1999, eight pilots were fatally injured during glider operations. This represents an increase from the six reported fatalities from the previous year. Of this total, six fatalities Was the result of glider accidents. The remaining fatalities resulted from accidents involving tow aircraft.



INJURIES TO OCCUPANTS
1995-1999

One additional fatality did occur during the 1999 reporting period. The pilot of a glider was fatally injured as he attempted to secure a glider trailer to an automobile. Because the fatality was not the result of an aircraft accident as defined by the National Transportation Safety Board, it is not reflected in the 1999 data.

It is important to note that five of the fatalities reported during 1999 were the result of only two accidents. The accidents (*NTSB IAD99FA041A/B & LAX99MA251)* resulted from a mid-air collision between a tow aircraft and a glider and the in-flight break-up of a Nimbus 4DM. Both of these accidents have been previously reviewed in Section III of this report.

The sixth fatality was the result of a pilot attempting flight in a glider that had not been properly assembled *(NTSB LAX99LA215).* A brief summation of this event is included in section IV of this report.

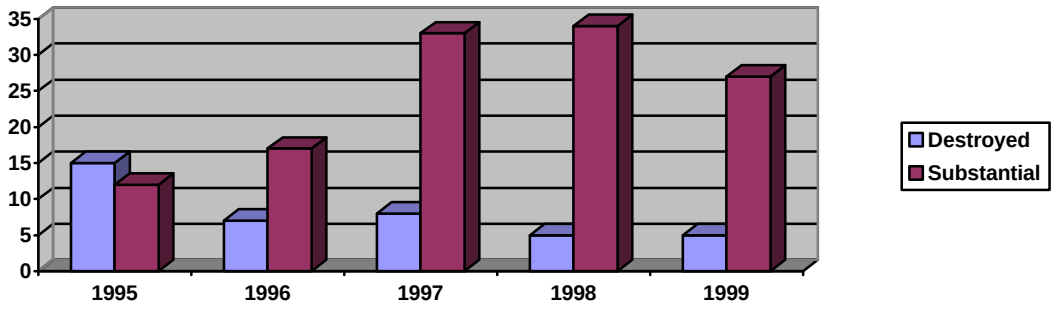
The pilot of a Piper PA-18 was fatally injured as a result of an accident that occurred during glider tow operations. The pilot of the glider on tow reported that at approximately fifty feet above the ground after takeoff, the glider's spoilers began to extend. The pilot of the glider retracted the spoilers and the glider began a rapid climb during which he lost sight of the tow aircraft. The glider pilot then felt his aircraft release from the towline. He then executed a course reversal and landed. Witnesses reported seeing the tow aircraft's tail pitch up immediately followed by the towline breaking at a point forward of the glider. The engine of the tow aircraft was reported to be operating smoothly at a high power setting throughout the descent to impact. *NTSB SEA99FA080.*

The final fatality of 1999 occurred when the pilot of an ASW-19 apparently suffered a massive stroke during the final moments of a local flight. The aircraft over-flew a significant portion of the landing runway before crashing. *NTSB IAD99LA061.*

For the most recent five-year period, 1995-1999, thirty-one (31) fatalities have been reported. This equates into a five-year average of 6.2 fatalities per year. This is up slightly from the 5.6 fatalities per year average from the previous five-year period that ended last year. The current five-year average still represents significant improvement from the yearly average of 10.71 fatalities per year recorded in 1987.

VII. DAMAGE TO AIRCRAFT

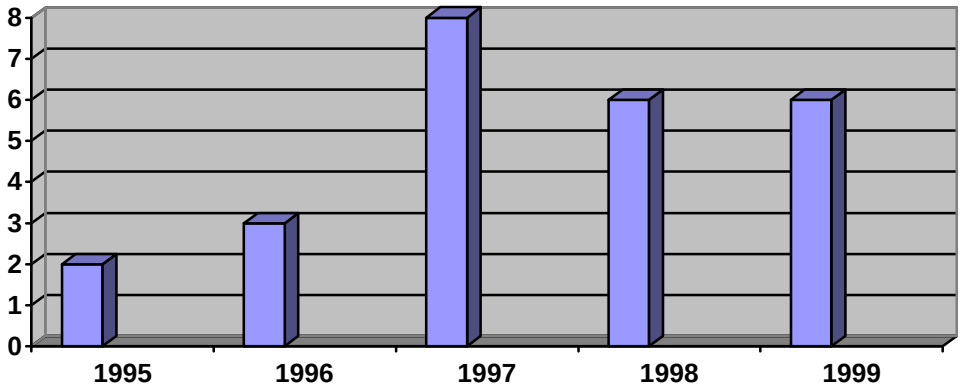
Damage to aircraft reported to the National Transportation Safety Board declined slightly during the 1999 reporting period. Five (5) gliders were destroyed and twenty-seven (27) aircraft were substantially damaged during the year. Additionally, seven (7) gliders were reported to have received minor damage as a result of accidents. As expected, landing accidents accounted for the majority of aircraft destroyed or substantially damaged.



DAMAGE TO AIRCRAFT
1995-1999

VIII. AUXILIARY POWERED SAILPLANES

For the twelve-month period ending December 31, 1999,six (6) accidents involving auxiliary powered sailplanes were reported to the National Transportation Safety Board. This represents no change from the number of accidents reported for the previous year.



AUXILIARY-POWERED SAILPLANE ACCIDENTS 1995-1999

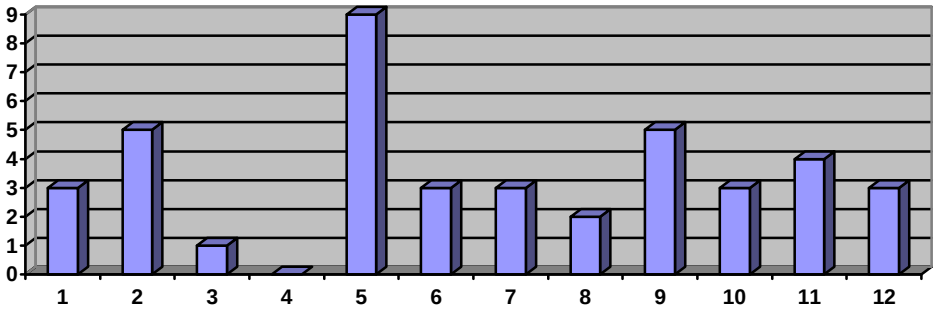
As a result of these accidents, two pilots were fatally injured and three aircraft destroyed. For the five-year period 1995-1999, auxiliary-powered sailplanes have averaged five (5) accidents per year. This is up slightly from the 4.6 per year average of one year ago.

The two fatalities occurred when a Nimbus 4DM suffered an in-flight structural failure while maneuvering *(NTSB LAX99MA251).* A second aircraft was damaged as a result of a mid-air collision with a powered aircraft in the traffic pattern of a tower-controlled airport *(NTSB LAX99LA204B).* No injuries were reported as a result of this accident.

The pilot of a DG-400 received minor injuries when he was forced to bail out of the aircraft following an in-flight structural failure (*NTSB NYC99LA102).* The remaining accidents were caused by various mechanical failures resulting in forced landings.

IX. 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 largest populations of SSA members and a higher frequency of soaring activity tend to record the highest number of accidents.



ACCIDENTS BY SSA REGION
1999

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).

X. 1999 NON-FLIGHT INSURANCE LOSSES

From information supplied to the Soaring Safety Foundation, we take note of Non-Flight claims (losses) in the SSA Hull & Liability Insurance program for 1999. These losses have been put into categories to define the area in which they occur. This data allows the SSF to focus efforts to address the safety factors involved, which could concomitantly reduce losses.

Non-flight is defined as any activity in which flight is not directly involved. Non-flight can be moving, e.g. taxiing, trailering and moving the ship by hand or towing by car/tractor from one spot to another, whether or not in preparation for flight. Non-flight does not include the takeoff or landing roll. It mostly is non-moving, such as running into a glider with a golf cart or theft/vandalism or when a windstorm causes movement by picking up or moving a canopy or aircraft at rest, whether tied down or not.

Over the previous seven years, non-flight claims averaged 41% of the total claims. In 1999, they were only 24% of total claims and a 37% reduction in number of claims from the average of the previous three years' number of claims. Hopefully this reflects the considerable effort involved in the SSF calling attention to such losses and asking for members to take special effort to reduce them. That's a significant reduction in dollar loss, too, from 1998's 18% of 1998's dollar losses to only 9% of dollar losses for 1999.

So, in contrast to the earlier statement that we aren't making any headway yet in reducing the incidence of non-flight losses, we obviously did in 1999. The question remains, of course, can that be sustained? However, 1999 again saw very heavy non-flight losses (59% of the non-flight claims) in my east area that includes all states east of the Mississippi River, including MS, TN, KY, IL, WI and east.

These are the non-flight categories I use; the word minor is only relative, (referring to the total number of non-flight losses), because just two of the ground losses were settled for a total of $36K:

assembly/disassembly	-	significant number of claims
trailering	-	minor number of claims
canopy	-	major number of claims
vandalism	-	significant number of claims
ground handling	-	major number of claims
towplane	-	minor number of claims
wind	-	significant number of claims
run into by vehicle	-	significant number of claims
fatal	-	minor number of claims
repair process	-	minor number of claims

One claim was for four ships!

Note: The word state in the following comments includes DC and VI, but no Territories.

Figures given below are only for one year; real trends require several years of accumulation and analysis to draw meaningful conclusions.

1999
Eleven states with more than 50% of the total non-flight losses in 1998 had no losses in 1999. Five states with no losses in 1998 had less than 25% of the non-flight losses in 1999. No doubt those contributed mightily to the reduction in 1999 non-flight losses. Thirty-five states had no 1999 non-flight losses.

Four states had significant increases year-over-year in their 1999 non-flight losses.

One state with a continuing record of a significant number of non-flight losses has the type of losses that would seem to respond well to a loss-reduction effort.

The state that in 1998 had the worst record had no 1999 non-flight claims.

XI. ACCIDENTS INVOLVING TOW AIRCRAFT

During 1999, four accidents involving tow aircraft were reported to the National Transportation Safety Board. Two of these accidents occurred in-flight while the remaining events were divided between the takeoff and landing phases of flight. As a result of these accidents, two pilots were fatally injured and two aircraft were destroyed.

During a glider tow, the pilot of the glider failed to ensure that the aircraft's spoilers were retracted. During the initial climb, the pilot of the glider retracted the aircraft spoilers but the glider entered a nose-high, pitch-up attitude. Before the pilot of the glider was able to release, the towline broke due to overload. A witness observed seeing the towplane climb to approximately 150 feet above ground level and then pitch down, descending in a forty-five degree nose down attitude. The aircraft impacted terrain in a wings level attitude with the engine developing power. Examination of the aircraft's tow hook release mechanism revealed the potential for binding of the release latch when the aircraft being towed moved significantly above the normal horizontal position *NTSB SEA99FA080*.

A Piper PA-18-150 was substantially damaged when the aircraft nosed over during landing. The pilot, the sole occupant of the aircraft was not injured *NTSB DEN99LA111*.

The pilot of a Maule MX-7 was not injured in an accident that occurred during climb while conducting glider tow operations. The flight originated approximately fourteen minutes before the accident. Details of the accident were not reported *NTSB MIA00LA038*.

The final accident relating to glider tow operations was the mid-air collision of a Cessna 305 and a Grob 103 that occurred shortly after takeoff. The details of this accident are included in the accident summary of this document *NTSB IAD99FA041B*.

A review of National Transportation Safety Board accident reports involving tow aircraft for the period 1983-1999 indicates that the most common causal factors include:

1. Fuel Exhaustion
2. Loss of Directional Control (Landing)
3. Abnormal Occurrences Related to Operation of the Glider on Tow

The Soaring Safety Foundation strongly encourages soaring clubs and commercial operators to emphasize these problem areas when qualifying new tow pilots and during regular proficiency training for pilots involved in glider tow operations. Additionally, it should be emphasized that pilots of tow aircraft develop an emergency plan prior to each tow operation. The Soaring Safety Foundation has stressed the importance of pilots developing an emergency plan prior to takeoff in a glider but this same procedure is equally beneficial for towing operations.

A number of accidents in which loss of directional control was a contributing factor occurred as the pilot of the tow aircraft attempted a downwind landing to expedite launch operations. It is imperative that pilots of tow aircraft recognize meteorological conditions that increase the potential for an accident and to develop an alternate course of action to conduct tow operations safely.

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, representatives of the FAA investigate many glider accidents meeting the NTSB reporting criteria.

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, which 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 - 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 proceeding or subsequent to a flight operation that demonstrates the intention of flight. 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 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 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. Inflight 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 that 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 that 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.

APPENDIX D

SOARING SAFETY FOUNDATION SAFETY ADVISORY

CRITICAL GLIDER ASSEMBLY PROCEDURES

I. Introduction:

Due to a number of recent accidents involving improper assembly of the glider as a causal factor, the Soaring Safety Foundation is issuing this Safety Advisory to address the critical components of glider assembly. These issues have been identified as having caused injuries to pilots and destruction of aircraft.

This **Safety Advisory** includes recommended procedures for ensuring proper assembly without specific that is available in Pilot Operating Handbooks and other checklists developed by individual manufacturers. Other knowledgeable individuals have also presented methods to confirm proper assembly as well as emergency procedures for flying the aircraft should any control not function properly due to improper assembly of the aircraft. The latter may or may not be approved by the manufacturer of the glider or sailplane, and thus will not be discussed in this advisory.

II. History:

During the period prior to 1960, most gliders required significant effort to assemble. Many had containers of bicycle chains, bolts, nuts, washers, retaining pins, and other pieces that had to be assembled in sequence. A glider not properly assembled would not pass a simple flight control check. The horizontal tail assembly (including elevator) may not have been detached during disassembly, thus the control cables for the rudder and elevator were never disconnected nor did they require assembly later.

Later, manufacturers began to develop quicker and easier methods for assembling gliders and sailplanes. This made it possible to install both wings by inserting the wing root into the fuselage and using a pin to secure the attachment. Horizontal stabilizers and elevators were removed during disassembly and reassembled with as little as one attach bolt or pin.

The Soaring Society of America (SSA) and the Soaring Safety Foundation (SSF) encouraged all manufacturers to go even further and provide "automatic hook-ups" for ailerons, flaps, glide path control devices, and elevators, anticipating a reduction in the potential to attempt flight without the controls properly attached. Many of the gliders and sailplanes today have these automatic attachments.

Though the number of reported incidents and accidents resulting from failure to attach these controls decreased, a continuing number of incidents and accidents required further investigation into the cause of this type failure and the development of procedures that would further reduce such incidents and accidents.

The SSF has identified four causal factors that are prevalent in assembly related accidents:

1) Distractions during the assembly process,
2) Failure to follow manufacturer's recommended assembly procedure,
3) Failure to conduct a positive control check,
4) Rushing the procedure to get into the air.

III. Ensuring airworthiness:

The pilot in command (PIC) is directly responsible and the final authority for operation of the aircraft in accordance with Federal Aviation Regulation (FAR) 91.3. Furthermore, it is the responsibility of the PIC to determine that the aircraft is in an airworthy condition (FAR 91.7).

During the assembly procedure, NO outside interference should be allowed. It is difficult to keep observers from attempting to converse or ask questions, but such action has frequently been a contributing factor in accidents that result from improperly assembled aircraft. The individual assisting in the assembly process can help prevent this type of distraction by preventing this type of interference.

To ensure the glider is properly assembled, the manufacturer's checklist should be followed, and positive control check performed. The assembly should be conducted in a relaxed and thorough manner and never hurried. Rushing the procedure to first in line for launch or number one on the grid has resulted in improperly assembled gliders and subsequent accidents.

To enhance the assembly process, it is recommended that the PIC recruit another person to assist by examining critical items to ensure proper installation. This person does not necessarily need to be familiar with a specific aircraft or manufacturer, but should have a basic understanding of the factors involved in a properly assembled glider. If such a person is not available, the PIC may obtain similar benefits by explaining to an assistant how each part is installed and attached, in effect, checking his/her own work.

IV. Critical items:

The following list, though not totally inclusive, offers items that should be checked prior to flight. Failure to have these items correctly assembled may result in difficult or impossible flight characteristics. The check by the PIC and an assistant can usually be performed by simply walking around the aircraft, starting and ending at the cockpit area.

CRITICAL ASSEMBLY PROCEDURE

With the help of an assistant, check each of the following items for correct installation and safety method.

After check of these items is complete, a ***Positive Control Check*** should be performed.

Main wing pin(s)
Drag spar pin(s)
Control rods attached
Hotellier connectors
Spring-loaded connectors
Locking collars
Safety pins installed
Safety collars installed
Outer wing panels installed
Control rods attached and properly secured
Horizontal stabilizer properly installed
Elevator control rod attached
Safety pin installed
Rudder cables attached

V. The SSA and the Soaring Safety Foundation (SSF) feel that adherence to this **Safety Advisory** will prevent accidents that occur as a result of improperly assembled gliders. The SSF strongly encourages each Pilot In Command to develop a list of Critical Items for each glider being flown to assist in ensuring that critical items are properly installed and secured during the assembly process.

APPENDIX E

SOARING SAFETY FOUNDATION

SAFETY ADVISORY

TO: Owners / Operators of PZL-Bielsko SZD-50-3 PUCHACZ Gliders

SUBJECT: Issuance of PZL-Bielsko Mandatory Bulletin

The Soaring Safety Foundation has received information regarding the issuance of two separate bulletins, a Mandatory Bulletin, distributed by PZL-Bielsko and one being distributed by the Polish Civil Aviation Authority, relating to cracks discovered in the front bracket console mounted on the front fuselage bulkhead of the SZD-50-3 Puchacz glider. This bulkhead is the point at which the wings attach to the fuselage and the bulletins require inspection of both sides of the bulkhead. The Mandatory Bulletin calls for the grounding of any Puchacz glider in which cracks longer than 3mm are discovered.

It is our understanding that this problem was discovered as a result of a discrepancy associated with a glider of this type in Germany. This led to an inspection of other PUCHACZ gliders, some of which exhibited similar problems. Some of the gliders identified as having these cracks had been used extensively in aerobatic flights.

It is important to note that the Federal Aviation Administration has not yet issued an Airworthiness Directive relating to this problem.

The intent of this Safety Advisory is to inform owners / operators of PUCHACZ gliders of the safety issues related to this problem and the impact this Mandatory Bulletin may ultimately have on the operation of this aircraft.

The Soaring Safety Foundation will continue to monitor this situation and report the issuance of any Airworthiness Directive or other inspection requirements distributed by the Federal Aviation Administration. The Soaring Safety Foundation will post additional information on the SSF Web Page as it becomes available.