

Soaring Safety Foundation (SSF): Safety Advisory 00-1, Glider Critical Assembly Procedures

Introduction

The Soaring Society of America (SSA) and the Soaring Safety Foundation (SSF) issued Safety Advisory 00-1 concerning glider assembly procedures to aid the pilot by providing some critical information to consider when assembling a glider. Due to a number of recent accidents involving improper assembly of the glider as a causal factor, the SSF is issuing this Safety Advisory to address the critical components of glider assembly. Improper glider assembly has been identified as having caused injuries to pilots and destruction of aircraft.

This safety advisory presents suggested procedures for ensuring proper assembly without specific detail that is available in Pilot Operating Handbooks (POHs) and other checklists developed by the manufacturer. Other knowledgeable individuals have also presented methods to confirm proper assembly, as well as emergency procedures for flying the aircraft should any control function improperly due to improper assembly. The latter may or may not be approved by the manufacturer of the glider or sailplane, and will not be discussed herein.

History

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. An improperly assembled glider would not pass a simple control check. For example, the horizontal tail assembly (including elevator) may not have been detached during disassembly; the control cables for the rudder and elevator were never disconnected nor did they require assembly later.

Later, manufacturers developed quicker and easier methods for assembling gliders and sailplanes. This made it possible to install both wings by simply 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 simple attach bolt or pin. The SSA and the SSF encouraged all manufacturers to go to the next level and provide “automatic hook-ups” for ailerons, flaps, glidepath 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.

Although the annual numbers of reported incidents and accidents resulting from failure to attach controls have decreased, disturbing numbers of recent incidents and accidents indicate a need for further investigation of the causes. Subsequent structural improvements and/or revisions of assembly and/or disassembly procedures could help prevent many future incidents and accidents.

The SSF recognized four factors that frequently appeared when investigation of such accidents were made:

1. Distractions from other people while assembling the glider,
2. Failure to follow manufacturer-recommended assembly procedures,
3. Failure to do a positive control check, and
4. Rushing the procedure to get into the air.

Ensuring Airworthiness

The pilot in command (PIC) is directly responsible and the final authority for operation of the aircraft in accordance with Title 14 of the Code of Federal Regulations (14 CFR) part 91, section 91.3. It is also the responsibility of the PIC to determine if the aircraft is in condition for safe flight (14 CFR part 91, section 91.7). During assembly of the glider or sailplane, the PIC assumes that responsibility.

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 the cause of incomplete and/or inaccurate assembly. The crew person or assistant can be of great assistance by immediately deflecting this unintentional interference.

To ensure the glider is properly assembled, the manufacturer's checklist should be followed and positive control check performed. The assembly should proceed in a relaxed and thorough manner and never be hurried. Rushing to squeeze in between landings or to be number one on the grid has resulted in improperly assembled sailplanes and subsequent accidents. To enhance the checking of the assembly process, it is suggested that the PIC ask 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 how to assemble a glider or sailplane. If such a person is not available, the PIC may benefit from explaining to an assistant how each part is installed and attached; in effect, checking the pilot's own work.

Critical Items

The following list, although 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. With the help of an assistant, and usually performed by simply walking around the aircraft, starting and ending at the cockpit area, check each of the following items as appropriate to the aircraft being flown for proper installation and security. After a thorough check of the following items is complete, a positive control check should be conducted.

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

The SSA and the SSF agree that adherence to this safety advisory will prevent accidents that occur as a result of improper assembly of gliders. The SSF strongly encourages each PIC 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.

After the assembly is completed, the pilot should conduct a preflight as recommended by the manufacturer. This preflight ensures that all assembly has been conducted properly, and the pilot can determine if the glider is airworthy for flight. During the preflight, it is essential that the pilot completes a positive control check. This check ensures that the glider has been assembled correctly and that all controls are connected and secured as per the manufacturer recommendations.

