

GLASTAR SERVICE BULLETIN 49

MANDATORY

Subject: Inspection of welded cage and seat assemblies for cracking.

Applicability: All Flying GlaStar Aircraft

Compliance Time: Visual inspection **prior to further flight**, full inspection at next **annual**.

Discussion:

Item 1: We have recently been informed that, while performing an inspection of a GlaStar taildragger, cracking was noted on two welded tubes in the steel cage. Specifically, the affected tubes are the ones where the lower 3/4" diameter tube on the truss above the doors intersects with the 1" diameter tube on the vertical truss just aft of the main door. The vertical tube has a 1-1/8" sleeve welded over it at this intersection. The cracking was evident on both sides of the aircraft, limited to the forward side of the 1-1/8" sleeve. The crack was visible through the powder-coat finish. Reference Figure 1.

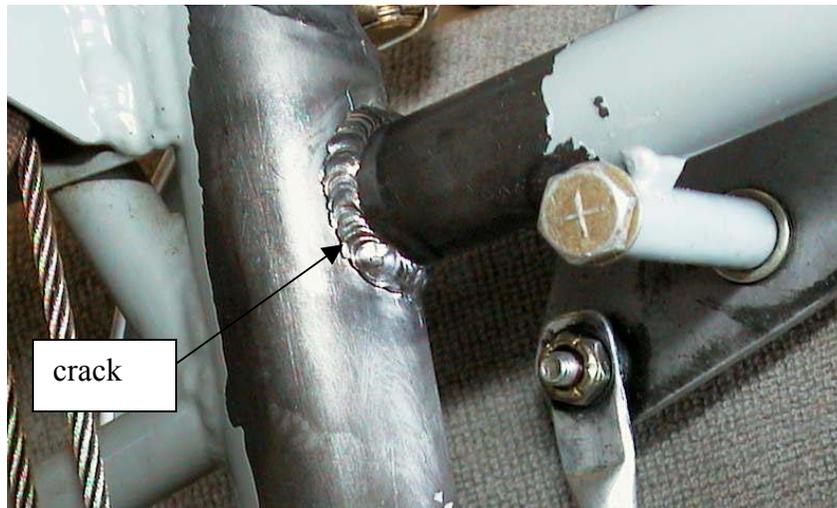


Figure 1. Cracking of weld at tube intersection.

At the time of discovery, the aircraft involved had a total of 476 hours on the cage/airframe. The involved cage bears serial number 147.

Note: There are many GlaStar aircraft with flight hours well in excess of 476, all of which have had no known related issues of tube cracking. Also, the original GlaStar prototype had

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approximately 1200 hours and had no signs of cracking. To our knowledge, the subject cage is the first known instance of cracking being observed on primary structural tubes in the GlaStar.

Based upon inspection of this weld from the photo and our conversations with the repair facility, it appears to us that the welds are separating from the tubes right at the weld line. Often, fatigue cracking of tubular structure, will occur in the heat affected zone and the cracking will occur slightly away from the weld bead itself. The failure of the weld right at the weld bead (as in this case) is usually evidence of a cold weld.

Based upon our review of the photo and information gathered, we believe that the weld in question is that of a MIG process. In general, the MIG weld will be rougher and will tend to have a convex weld bead, whereas the TIG weld will be smoother and generally have concave weld beads. When done properly, MIG and TIG are equally sufficient welds. However, operators performing MIG welds must be extra careful not to cold weld or cold lap a joint.

Stoddard-Hamilton Inc. only MIG welded for a short period of time and eventually went back to TIG welding all the welded structures at their premises. (All cages welded by New Glastar LLC are TIG welded.) Based upon the in service date of the aircraft in question, we believe that this cage (# 147) was one of Stoddard Hamilton's early MIG welded cage assemblies.

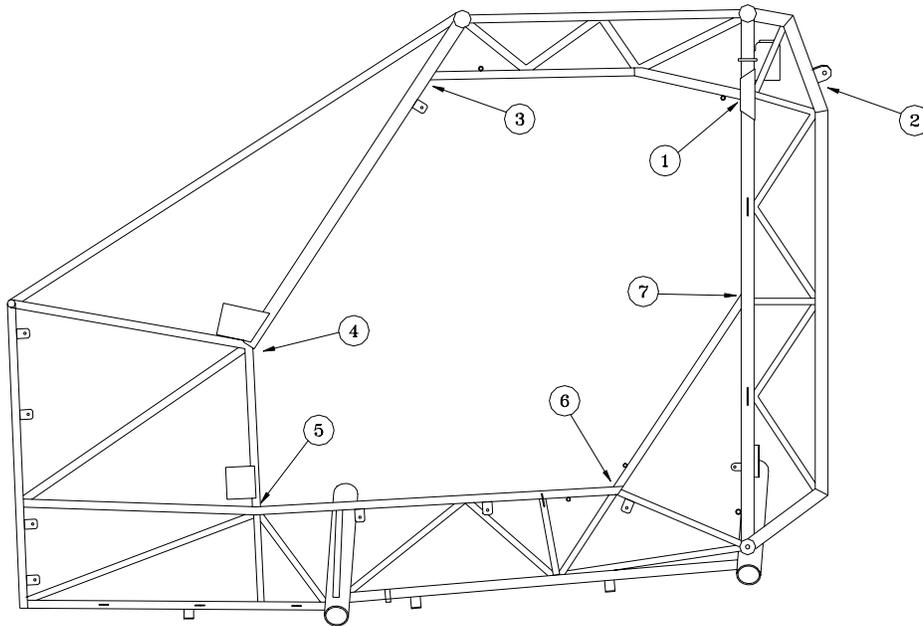
Item 2: We have also been informed, that cracking of a seat base tube has been discovered on more than one occasion where the owner (or 3rd party build centers) have modified the seat back to a "high back" configuration. To date, we are unaware of any cracking of the "stock" seat base tubes; thus, it is possible that extending the height of the seat back has overstressed the seat base from that originally designed. Note: The specific part number of the "stock" base is the 802-03000-03. This part (currently in production) is known as the "second run" seat base in the assembly manuals and can be seen in Figure 28, page 68 of the Section X Final Assembly. Cracks were discovered where the seat back pivot tab is welded to the tube as can be seen in Figure 3.

Required Action:

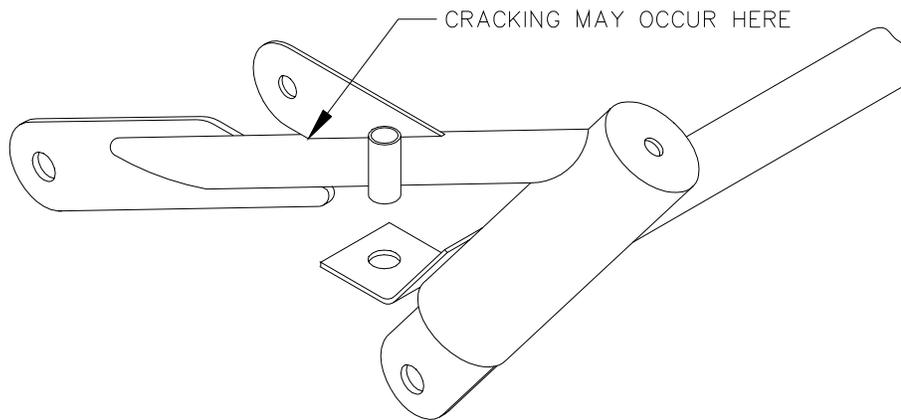
Item 1: Before next flight, the owner shall perform a visual inspection of the tubes and welds indicated in Figure 2 below. Although the GlaStar cage is a highly redundant tubular structure, these specific joints are identified as critical to inspect for the purposes of this service bulletin.

Visual inspection should be done with a mirror and flashlight. You will need to remove any interior covers that might be installed which impede complete access to the desired joints. Carefully look for any signs of cracking in the vicinity of the weld bead or right under the weld bead. The powder coating used on the cages and other structure is brittle enough, that should any cracking occur or be severe enough under the coating, the crack will transfer through to the surface and be visible to the eye. You may want to pick at or press the powder coat with the edge of a wooden tongue depressor to see if the coating has bridged any initial crack.

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Although cracking was only discovered at point 1 in Figure 2, it is recommended that you inspect the other points as well. These points make up the structural ring of the door, which must transfer the shear loads and bending moment through the fuselage.



SECOND-RUN SEAT BASE (P/N 802-03000-03)

Figure 3. Seat base where cracks have occurred.

Item 2: The seat base should also be inspected for signs of cracking. Builders who have modified their seat backs to the "high back" configuration should pay particular attention to the area noted in the figure above.

If you feel you have identified an area in item 1 or 2 above that is showing signs of cracking, it is recommended that you inspect the area further with a penetrant inspection. These kits are available through most aircraft supply companies. Penetrant inspection works by having a dye penetrate into a flaw such as a crack and then after the application of a developer, the highly visible dye shows up on the contrasting surface of the developer. It is a very cost effective way to inspect for weld integrity or on older aircraft for fatigue cracks.

The area to be inspected should be cleaned thoroughly by brushing the weld area clean of all powder coat. Follow the instructions on your particular inspection kit. The surrounding area within the cabin should be covered to eliminate the accidental spillage of the dye.

If you note any cracking in the above structures, contact New GlaStar LLC for additional information and a repair procedure for your particular case. We will request that you provide us with your cage number, which is stamped in one of two areas: either on the taildragger gear truss on the right side, or above the right rear spar hinge on the rear spar carry-through end cap.

After you have complied with the visual inspection described herein, it is recommend that you fully inspect the points identified in Figures 2 and 3 above at your next and all subsequent annual inspections. Additionally it is recommended that you inspect the following areas on a routine (annual) basis:

1. Lower cage wing strut lug. This is the steel lug that the wing strut attaches to. Inspect the welds near the 1" diameter vertical tube.
2. Aileron and elevator control yoke assembly. Inspect all the welds on the horn, the pivot brackets and the mounting brackets.
3. Control cable pulley bushings. Inspect the welds on all the pulley bushings, specifically on the tension side of the welds. This would be the same side as the pulley itself.
4. Rudder pedal assemblies and rudder yoke. Inspect the welds at the base of the pedal arms and the cable arm. Also inspect the steel yoke riveted to the rudder itself.

The more you become familiar with these areas, the easier it will be for you in the future to identify any changes to the structure as you maintain and inspect your aircraft.

Based upon the number of field reports and the number of GlaStar aircraft sold, completed and flying to date, we believe that these reports are isolated incidents. However, as a matter of prudence, we are issuing this service bulletin in an abundance of caution.

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