

## **Europa Over Gross or Hard Landing Inspection**

### **Amplified data to supplement the Operators Handbook**

### **Include Ground Loop Inspections**

The structural stress induced by an over gross, a hard landing or ground loop depends not only upon the gross weight at the time, but also upon the severity of impact. However, because of the difficulty in estimating vertical velocity at the time of contact, it is hard to judge whether or not a landing has been sufficiently severe to cause structural damage. For this reason, a special inspection should be performed after a landing which is made at a weight known to exceed the design landing weight of 1370 lbs. or after a rough, damaging, or hard landing, even though the latter may have occurred when the aircraft did not exceed the design landing weight.

Wrinkled fuselage skin and bent gear or gear frames are the most easily detected sign of an excessive load having been imposed during a landing. The Europa has both the nose gear for the Trigear and the Main Gear for the Monowheel arm attached to a welded steel landing gear frame attached at two or more points. These are critical areas for inspection. Other possible locations of damage are the gear attachment bearings/sleeves and pivot points. Another indication which can be detected easily is fuel leakage along the bottom of the tank, due to fuselage flex or tank flex and subsequent failure due to excessive tank flexure. Be especially aware of skin deformations such as wrinkles or cracks in the exterior fiberglass skin and the interior skin. A small wrinkle on the outside with a small white line on the inside glass indicates the skin has been over deflected and is compromised. Those areas of major concern are the center tunnel for deformations, broken glue joints or tape joints in the cockpit or wheel well. Pay attention to the area from the stick attach point on the front of the seat to the bulkhead of the rudder pedal platform as a buckle here indicates severe impact on the forward section (such as in a nose wheel first impact). An acceptable technique for inspection of the glass areas is to remove the interior, and tap with a coin or small drift on the glue joints. Any hollow sounds are an indication of an unseen glue joint failure. The trigear main gear is quite robust, and hopefully the interior wood and glass truss work has not been painted, which makes inspections and de-lamination checks easier to inspect. If painted in this gear truss area, get rid of the paint. If damage is detected a more extensive inspection and alignment check of the gear and structure may be necessary. On the mono wheel, a thorough of the tail cone, and tail wheel spring area must be checked. The following is a detailed inspection procedure to compliment the Europa Operators Handbook.

*Note: Remove and replace any defective component with genuine Europa parts or have them repaired properly.*

#### **Forward Fuselage Area:**

1. Fuselage gear frame through bolt attachments of the into the cockpit module sides of this welded frame must be inspected for elongation/ deformation or de-lamination. Pay particular attention to the frame. Any deformation or crack in the frame must be corrected or the assembly replaced. It is fairly simple task to remove the gear frame to replace it. This makes the attachment points much easier to inspect.
2. Cockpit module wheel well fiberglass for deformations, punctures or de-laminations. Inspect all Redux/Araldite 420A/B joints via tap method for hollow sound indicating de-lamination or failed joints. Any white lines visible in the footwell are signs of flex damage.
3. Check the belly sides and top for wrinkles or deformations in the exterior fuselage.

## **Monowheel Specifics:**

*Note: The best inspection of the mono is to completely remove it and inspect. Everyone is reluctant to do this but the over center for gear lock down is affected by a bent frame as are the bearings and swing arms. Thoughtfully consider simply removing the entire gear and do a very thorough inspection if there is any evidence of deformation/stiffness or strain.*

1. Mono Wheel gear retraction, extension, or stiffness is a sign of damage. Bearings in the swing arm can be damaged, and the frame twisted.
2. Mono gear handle attachment and shape must be inspected for distortion or looseness. A rebuild of the gear lever is often needed.
3. On mono aircraft check the LG04 pin for straightness as if this is bent there is likely damage. and all the mounting and swing hardware for deformations, looseness or cracks. Pay particular attention to the up and down lock mechanisms and the over center.
4. Inspect the spring for straightness and cracks as well as security. Inspect the tail spring attachment bolt and mount for straightness, deformations or elongations. Also check the glass and wood pylon the bolt sits in and its metal cap. If bent, or the wood and glass have any damage, grind it out and replace. Add a 5/16 ID tube from the lower fuselage up to the metal base cap for the spring. This will greatly improve the tail wheel spring attachment without compromising the tail cone.
5. Inspect the wheel fork and bearings for deformations or abnormalities. Inspect the wheel and tire.

## **Trigear Landing Gear:**

Jack the aircraft for the inspection with weight off all gear including the nose.

1. Inspect the aircraft for wheel toe in and alignment. There should be zero toe with weight off the wheels. There should be very little looseness of the main gear in the support tubes.
2. Fully disassemble the main wheels inspecting the gear for cracks, the bolts and holes for elongation or deformation, as well as the spindle and wheels for damage.
3. Pull the bolts securing the gear legs in the tubes and check for deformation. It is not uncommon that the tube wall cuts the bolt slightly. Check the bolt holes are still round and tight.
4. Inspect the bend in the main gear area and check for cracks. This is common as the gear is heat treated.
5. Inspect the nose gear leg bolts and welds for deformations, cracks or misalignment. Check the pivot bushings for wear and soundness that attach to the gear frame. Bending here is common. Check the bump stop and leg for any deformation. Check the tire(s) for wear, cuts and flat spots.
6. Inspect the wheels for cracks and damage.
7. Inspect the bearings for smoothness and the races are undamaged.

## **Inspections of other areas:**

1. Engine mount and bushings can be deformed and the ring mount on the engine must be carefully inspected.
2. Check the wheel pants and brackets for cracks and deformations.
3. Outriggers and outrigger mechanism must be checked for any deformation, cracks, or mounting tab damage. Any deformation or bending is cause to remove the flap and rebuild the outrigger.
4. Examine the outrigger wing flap attachments for deformations and cracks.
5. Final inspection must include a complete retraction and flap rig check if the outriggers are damaged.