

BGA Airworthiness and Maintenance Procedure	AMP 1-5
SEAT HARNESSSES AND BELTS	

Version 2	5th January 2024
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General

Seat harnesses (or straps) are one of the most used parts of an aircraft. Pilots often take them for granted. They are often subject to body sweat, Ultraviolet (UV) exposure, freezing in Winter, fungal contamination in unventilated trailers, occasional spillage of drinks, food, vomit, constant adjustment and variable loads in flight. Yet are required to perform perfectly. Various types of seat harnesses are fitted to gliders ranging from simple 4-point harnesses to more complex 5-point harnesses. Each harness must be capable of restraining the occupant in his/her initial position during all phases of flight and in emergency situations, releasing when required and never prematurely.

With the higher crashworthiness loads required by recent amendments to EASA design code CS22, the improved crashworthiness of gliders has made the role of harness is even more important in keeping the pilot in the cockpit during extreme, but more survivable accidents.

Part 21 aircraft

Part 21 aircraft may only be fitted with approved harnesses. Note: during transition to Part 21, several gliders were transitioned with non-approved harnesses only for use on that airframe. Some aircraft maintenance manuals specify exactly which harness can be fitted. CS-STAN permits different types of approved harness to be fitted if the mounting points do not need modification.

Common harness types

In non-Part 21 aircraft the RAF style Z harness is popular. In Part 21 aircraft there are currently two very popular harness manufacturers, Gadringer and Schroth. There are a few other less popular manufactures like Speckon in Germany and Autoflug also in Germany. Harness manufactures sell multiple types of harness with different types of mounting systems and webbing to suit their application. The airframes TCDS holder chooses the one they think suits their airframe best.

Harnesses are equipment and not part of the airframe. They have their own approvals (RAF and car harnesses do not hold civil aviation approvals as such and cannot be used in Part 21 aircraft) and are subject to EU/UK regulation and occasional Airworthiness Directives in the case of Schroth. Useful links below.

Link to EASA Airworthiness Directive on Scroth Harness <https://ad.easa.europa.eu/ad/2017-0225>
Schroth website <https://www.schroth.com/en/segments/aviation/service/service-information-letters-sil.html>
Gadringer Gurte <https://gadringer-gurte.de/info-material/>
Speckon <https://www.spekon.de/en/products/aviation-textiles.html>

Harness life

Harnesses were originally made of Cotton that had a very short life due to aging and U/V damage. Then nylon was used instead, and now most modern harnesses are made from polyester. Gadringer and Schroth recommend a maximum life of 12 years from manufacture. They have a date on each strap showing when they were built. A harness that is unused for years in a store is still using its recommended life.

Some aerobic Schroth harnesses used at time of writing have an applicable Airworthiness Directive that shortens their life to a legally mandated 5 years. This directive applies to the buckles as well as webbing. Unfortunately, a lot of new gliders were fitted with these harnesses when built or refitted with them as they were cheaper than Gadringer harnesses.

Aerobatic harnesses

Most gliders are cleared for basic aerobatics. But not all harnesses are cleared for aerobatics. In the case of Schroth harness this is a common issue. The problem is more to do with the buckles rather than the actual webbing and in Schroth's case, mandated by an EASA Airworthiness Directive. If you have a non-aerobatic harness in gliders that can perform aerobatics.

The glider must be restricted to non-aerobatic flight and it must be placarded as such. Read the service information the manufacture has published.

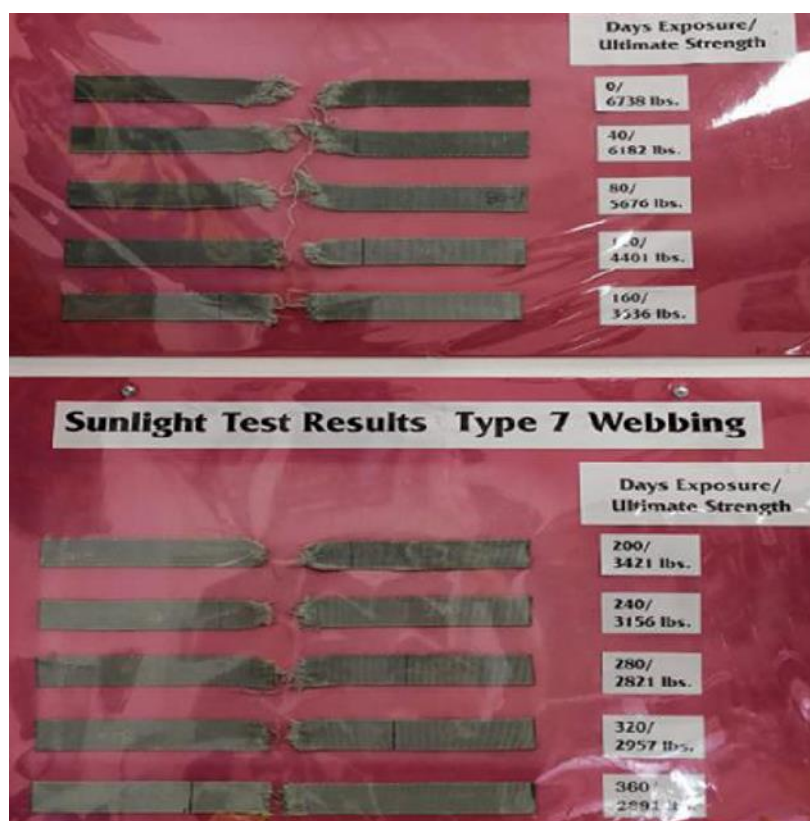
Link to EASA Airworthiness Directive on Schroth Harness <https://ad.easa.europa.eu/ad/2017-0225>

Continuing airworthiness and maintenance

The harness and anchor points should be thoroughly inspected annually or if there is any reason to doubt the harness condition or serviceability. Just because a harness is within its recommended life, there is still a requirement to ensure that it is serviceable. Note: high utilisation 2-seaters often wear out the shoulder straps in half the recommended life.

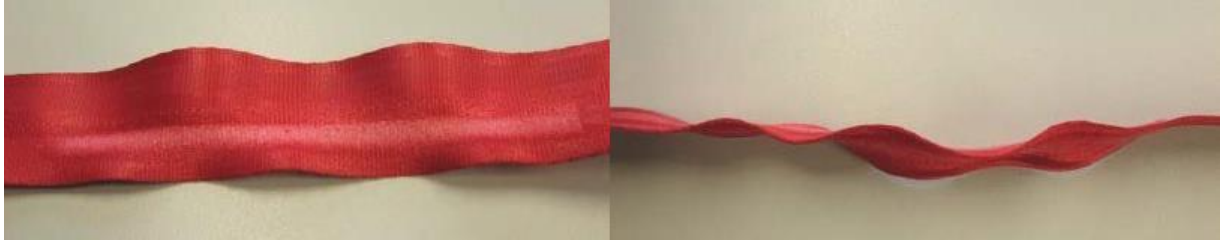
Inspecting harnesses for UV damage

See image below. These webs started life with a breaking strength of 6738lbs and after 1 years of UV exposure this had reduced to 2891lbs. A reduction in strength of 3847lbs or 57%. Annual strength testing is not practical. But as you can see from the image the higher the UV exposure the more faded the colour and the weaker the webbing is. Significant fading of colour is a good reason to reject a strap when inspecting.



Webbing wear inspection

The webbing should be checked for Fungus growth, abrasions, wear, damage, pulled or loose stitching. Some very minor abrasion is acceptable where the belt is regularly adjusted. Pay attention to the edges of the straps where they pass through slots or guides. Any edge wear, cuts or abrasions in these areas are cause for rejection. The straps below are



Quick release units

Referring to manufacturer's guidance, QR units should be checked for correct operation, positive locking when a seat harness is inserted, smoothness of operation, ability of springs to return the control knob to the closed position. QR units should be checked for loose items internally by shaking or examination through fitting slots. If loose items are suspected the QR unit must be removed for inspection. A function test must be carried out with a person sitting in the seat to ensure the QR unit functions correctly in fastening and unfastening modes. Attachments of webbing should have no frays, there should be no corrosion.

Quick release units may require some lubrication from time to time. This should be done sparingly, and only light oil should be used. If available, always follow the manufacturer's recommendations. Too much lubricant will attract dirt, fluff, possibly affect nylon parts and will leak onto clothes or the webbing. The image below shows a corroded and frayed Quick Release Unit that is many years past the point at which it should have been replaced.



Adjustable buckles

Buckles should be checked for wear, especially on the Gadringer knurled locking bar held in place with a spring, cracks and corrosion. Adjustment buckles must be checked to ensure that they do not slip under load. Ensure they have not been installed upside down or the left and right sides have been mixed up.

Harness aduster springs

Details to follow including images.

Attachments

The harness should be checked at each attachment point to ensure that the webbing is correctly fitted and doubled back through the attachment buckle. The aircraft attachment points should be checked for damage, security and condition. The aircraft structure should be inspected in the vicinity of the harness attachment points. On wooden airframes have very careful inspection of the glue joints holding the strap mountings. Some gliders like Vegas have some sharp edges that can slice into the straps near the mounting points.

Some tugs have like Pawnees have a "Transit" type unit is fitted that loosens the shoulder straps in flight and you lock it again before landing. Check the upper restraint release is operational and locks correctly, the operational lever must be checked for operation. It **must not** release on a hair trigger but be positive in operation. Additionally, the "Transit" release must not release the lap straps on disengagement or when the upper straps are refitted.

Mix and match

The unauthorised mixing of different harness components is not permitted as even with the same manufacturer's items, there could be a specification change, and this may not be readily visible to the installer. It is recommended that complete harness assemblies be changed as a unit unless the manufacturer supplies a specific item compatible with the existing assembly. Old or unserviceable harnesses should be destroyed to prevent inappropriate use.

Cleaning

Seat harnesses should only be cleaned using mild soap and warm water and rinsed in clean water, then allowed to dry. Never use excessive heat to speed up drying and avoid getting a Quick Release unit wet. Solvents and harsh detergents must not be used.

Harness life beyond 12 years

Using a Self-Declared Maintenance Program (SDMP), if the certifying engineer agrees the harness is serviceable, the owner can declare a deviation and take responsibility for extending the life of the harness subject to annual inspection. Note: this can never overrule an Airworthiness Directive.