

Subject: Paint cracks on fiber composite gliders.

Types affected: ASW 12, ASW 15, ASW 17, ASW 19, ASW 20, ASK 21, ASW 22, ASK 23, ASW 24, ASH 25; ALL variants and all serial no.s.

Compliance:

1. If deep cracks which go down to the fiber composite structure, are found on the glider, the glider must be presented each year to the manufacturer or any other licensed aviation station, who upon examination of the glider decides whether the glider can be continued in service for 1 year more or whether the repair must be done at once (see point "Action A.").
2. If hairline cracks which run only in the paint surface, are found on the glider, the glider shall be presented at the latest after three years annually to the manufacturer or any other licensed aviation station, who upon examination of the glider decides whether the glider can be continued in service for 1 year more or whether the repair must be done at once (see point "Action B."). The 3 years extension applies only on the condition that the maintenance and care of the aircraft is no longer neglected during this period of time and that the gliders are no longer stored outside;

Reason: The Flight and Maintenance Manuals for SCHLEICHER-glidern contain insistent notes concerning the detrimental influence of moisture and sun radiation on the aerodynamic paint surface quality standard. Herewith we point out emphatically once again that every owner is obliged to observe the flight and maintenance or operations manuals of his glider in all points, and this refers also to the relevant notes on the care and maintenance of the glider.

If these notes are contravened, the result will be sooner or later - depending on the climate - damage to the paint surface quality.

Influence of the two factors
moisture and UV-radiation:

To begin with, generally an enlargement of the waviness of the finish develops - mainly on the wing and tail unit skins - caused by penetration of moisture. On the occasion of performance measurements (accomplished by P.Bickle, R.Johnson and the German DFVLR/Idaflieg) it has been demonstrated repeatedly that the larger waviness leads already to considerable performance loss which is all distinctly noticed in competitions.

A competition pilot will always be anxious to preserve or restore the performance of his glider to its full extent, but unfortunately owners of training and instruction gliders are generally of the opinion that they may accept such a performance loss with those gliders. This is regrettable in the view of the manufacturer because he makes all efforts to build and supply also these gliders with a clean aerodynamic surface. The valuable production time used to this end is then possibly uselessly provided.

Owing to the UV-radiation the gel coat of the paint surfaces grows brittle and shrinks; at the same time the UV-light destroys paint ingredients. So moisture (rain, dew) working in on long term will wash the decomposed paint ingredients out off the paint. The paint starts chalking and gets hairline cracks owing to the concurrence of embrittlement and shrinkage. Furthermore, these hairline cracks gather dirt which through its aggressive effect and its stronger heating-up from sun radiation further precipitates the degradation of the paint. Owing to this the intended protective effect for the fiber composite structure against moisture and UV-radiation is no longer granted.

Certainly a good care with hard wax can slow down the above process distinctly, but it cannot be stopped completely. For this reason a repainting of the aircraft will always become necessary at some point of time.

However, we point out explicitly that paint cracks - even deep cracks - do not represent damages to the aircraft structure if as of their first appearance immediate correct maintenance and care is given furthermore to the aircraft.

As all the outside skin of the aircraft is dimensioned for stiffness, there are no critical mechanical strength problems, even if some cracks have gone down into the fiber composite structure and have already attacked the resin matrix base.

The unknown ageing effects caused by the influence of moisture and UV on the unprotected fiber composite structure are more dangerous.

Those paint cracks as reported from customers in USA and Australia do not appear here in Europe or they develop so much more slowly that a paint crack repair has never yet been carried out here at our works. Accordingly we have no experience of our own with such repairs.

In this connection we point out expressly that for the mentioned cases in the USA or Australia an absolute "zero" care of the gliders in question added to the "climate" factor; besides these gliders were exposed to the weather almost continuously and without any particular protection - very often day and night.

Action:

To repair the paint cracks, these have to be removed generally by sanding them down to their ground. But in doing so, the fiber composite structure lying under the gel coat should not be sanded on. Thus the sanding job is difficult and, therefore, relatively expensive.

A. If deep cracks are concerned which go down to or into the fiber composite structure (it is assumed that they result from large and rapid temperature changes as found e.g. with wave flights !), and if a repair is decided to be necessary, the paint material has to be sanded down to the fiber composite structure carefully and the area affected must be repaired.

In case that the resin matrix base of the fiber composite structure is already damaged, one should consider peeling off and replacing the damaged fiber composite layer. This work is possibly easier than the careful sanding job.

B. If hairline cracks are concerned which run only in the paint surface (and which presumably result from bad maintenance together with continuous UV-radiation - i.e. gliders left outside without any protection for a long period of time), we recommend to remove the paint material from all areas attacked by sanding on them down their end and to repaint these areas. The sooner this measure is taken, the less the work expenditure.

On the subject of rebuilding the paint system with materials available in the USA as well as on the subject of how to rebuild the profile (which is a must for high performance gliders which are to be flown in competitions) R.H.Johnson, Dallas Soaring Association, has written several articles published in SOARING magazine. We advise to consider in any case the repair experience accumulated in the USA.

For Europe we suggest to spray the sanded surfaces first with polyester fillers, to sand them again, and to re-spray them finally thinly with a white paint system on a Polyurethane basis which should be aircraft-approved.

Material and drawings:

See chapter „Action“.

Weight (Mass) and Balance:

It is necessary to redetermine the mass and C.G. data after repaintings.

After repainting of control surfaces and flaps special attention must be paid to their tailheavy balance moments; these data are given in the respective Maintenance (or Operations) Manuals of the gliders.

If in the case of older glider models such data are not contained in the manuals, then the mass of the control surfaces and their tailheavy static balance moment must be determined prior to the paint job and must be readjusted after the repainting by $\pm 5\%$.

Notes:

1. The action as per this Maintenance Instruction must only be accomplished by the manufacturer or by a technical aviation service station holding an appropriate license.
2. The present Maintenance Instruction PAINT CRACKS dated June 26, 1989, supersedes the previous Maintenance Instruction dated 15.07.87.

Poppenhausen, June 26, 1989

Alexander Schleicher
GmbH & Co.

Gerhard Waibel

The translation into English has been done by best knowledge and judgement; in any case of doubt the German original is controlling.