BRITISH MICROLIGHT AIRCRAFT ASSOCIATION

TECHNICAL INFORMATION LEAFLET
NO: 015 ISSUE: 1 NOVEMBER 1998

GUIDELINES FOR THE REPAIR OF MICROLIGHT AEROPLANE SAILS

Introduction

The UK Permit to fly for a microlight aeroplane requires repairs to be carried out to the satisfaction of the Type Approval Holder or another CAA approved organisation. The BMAA is the normal route by which Microlight Sail Repairs are carried out and this Technical Information Leaflet describes the BMAA's procedures for this.

Procedure

a) Determine, using the procedures normally applied for permit renewals, whether the sail has enough life left to make the repair viable.

b) If the repair is minor, the owner or their nominee may carry out the repair. An entry must be made in the airframe logbook, countersigned by a BMAA Inspector at next Permit renewal.

c) If the repair is Major, an application must be made to the manufacturer or BMAA headquarters in Deddington for approval of the repair scheme. This should be done (for BMAA purposes) using a form BMAA/AW/002 (modification application) but no payment is required.

d) If the repair is considered by the BMAA to be minor, revert to b).

e) Approval for the repair will be given on the appropriate form of BMAA Paperwork.

f) A BMAA Inspector will, if satisfied, sign the airframe logbook, and any other paperwork provided by the BMAA to verify that the repair has been satisfactorily carried out.

g) The aircraft is to be check flown by a BMAA Check Pilot to the requirements of the BMAA, normally to schedule BMAA/AW/011. They will make an appropriate entry into the airframe logbook.

Repair Guide

Viability of Repairs

Before considering any repair scheme, the rest of the sail must be inspected and meet current BMAA Inspection Standards. If the sail would not pass a re-permit anyway, or would cost more than the price of a new sail to repair, there is little point in wasting time and money repairing it! In such a case, if a supplier for a new sail is not available and it will be necessary to replace the whole sail, consult the BMAA Technical Office for advice.

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Definition of Repairs

Repairs are designated Major or Minor, although for sails the definitions do not follow the procedures given in the *BMAA Guide to Airworthiness Procedures*. Replacement of Sails, if this is required, is not covered by this Leaflet.

In the absence of other advice from the aircraft manufacturer, the owner may consider that a repair is minor if tears are less than 30mm long (20mm for Mainair wings), provided that no free edges (such as the wing trailing edge) are broken and that the tear is isolated and not within 50mm of an existing seam line or 100mm of the trailing edge. Also, abraded holes no more than 15mm in diameter. Such damage may be replaced with self adhesive patch material (often called "sail tape") such as is used for registration letters, if possible to both sides of the fabric. Minor repairs must be drawn to the attention of a BMAA Inspector at Permit renewal and considered satisfactory. Coloured sail tape may be bought from marine chandlers, permitting a colour match to be maintained for most wings.

If a major repair is required for a type approved microlight, consult the manufacturer and follow their repair procedures. If the manufacturer is unable to assist or no longer exists, or the aircraft is Type Accepted, follow the procedures below:-

Details of the proposed repair scheme must be submitted to the BMAA office for assessment using a form BMAA/AW/002 (mod application). The following information should be included:-

1. Who will carry out the repair, and (if appropriate) their experience.
2. Materials to be used, with specifications.
3. Repair technique(s) to be followed.
4. Sketch(es) or photograph(s) of the area(s) (to be) repaired.
5. Material orientation in both the repair and untouched wing.

Major repairs should, if possible, use the original pattern. If this is not available, a pattern produced from the opposite wing should be used to maintain geometry - maintaining a tolerance of no more than ±1mm from the original. Any repair must be constructed and sewn so as to preserve original structural integrity and stiffness. As a guide, repair seams must have at least as much overlap and similar stitching density to other joints in the original construction taking a similar load (i.e. on the opposite side). Where possible the same type of sail thread should be used.

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Repair Agency

Sail repairs are to be carried out by a recognised sail loft (generally one owned by an A1 manufacturer or a BHPA approved Hang-glider manufacturer / repairer), or by a person known by the BMAA Technical Office to have appropriate and current experience, expertise and equipment. The latter will be verified by the BMAA Technical Office prior to any particular repair. The BMAA does not issue open-ended "sail-repairer" approvals.

Material Specifications

Where available, all materials should be to the original specifications, including the thread. If these specifications are not available, strength and stiffness tests must be conducted on samples of the original and replacement sail materials to confirm that they are equivalent and the results of these tests submitted with the repair scheme details.

Warning: Over-stiffening parts of a wing can adversely alter the handling.

Processes

Stitching used in the repair must be to a similar pitch and pattern to that used in the rest of the sail. Cut edges must be protected from fraying (e.g. by hot-knife cutting).

The sewing machine, if used, must be capable of lockstitching; CHAINSTITCHING IS UNACCEPTABLE BECAUSE IT CAN UNRAVEL. Needle diameter must be the minimum consistent with the thread used.

The sewing machine tension must be set so that it is balanced top and bottom, so that ideally the stitch interlock is in the middle of the material thickness. The tension must be set so that there is no obvious slack in the stitches, nor broken fibres due to over-tension. Stitched seams must be neatly finished so as to prevent fraying in service.

The warp / weft orientation of the repair materials must match (within $\pm 2°$) the orientation of the surrounding material (or the panel being replaced in the case of a panel replacement).

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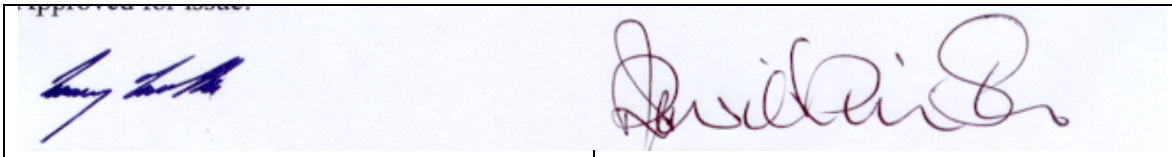
Final Inspection and Test

Inspection and test of the repaired aeroplane must be by an independent BMAA Inspector and BMAA Check Pilot respectively.

The completed repaired aeroplane must be inspected as fit for flight by a BMAA Inspector before it is check flown. The flight test report is to be submitted for retention by the BMAA Office in the main aircraft file, where it will be retained with the repair scheme details.



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