GLIDING NEW ZEALAND INCORPORATED

ADVISORY CIRCULAR AC 3-08

GEL-COAT REFINISHING

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1 Introduction

This Advisory Circular provides basic quality control guidance on the process of removal and replacement of the external finish on Fibre Reinforced Plastic (FRP) gliders and powered gliders.

On a number of occasions, it has been necessary to redo an unsatisfactory refinishing job because not enough old gel-coat was removed, or the chosen new finishing system was inappropriate or poorly applied. In one case the glider aileron control system froze in flight because residual water from the wet sanding process had not been dried out before release of the glider to service.

2 Inspection and Conformity Certification

Refinishing is classed as major maintenance and requires completion of a form CAA 337 with the related inspection and conformity certification by the holder of an Inspection Authorisation-Glider (IA-G). The IA-G should:

- Inspect the glider before any refinishing work is commenced and determine if the data intended to be used is acceptable.
- Inspect the glider after completion of any repairs found necessary during removal of the old finish, ie before repainting.
- After painting, determine that the guidance given by this Advisory Circular has been followed, in particular that control surface mass balancing and glider reweighing has been carried out properly.
- Determine that a proper logbook entry has been made, that weight & balance forms have been properly completed, and the cockpit weight placard has been updated as necessary.
- Certify conformity on the form CAA 337.

3 Removal of Old Finish and Repair of Cracks

Typically, the old finish will be a polyester gel-coat, which will be prone to cracking. Cracks allow the ingress of moisture and, if left for long enough, will result in migration of the cracking into the FRP laminate beneath. All such cracks must be found and repaired before refinishing.

In general, it will be necessary to remove about 90% of the old gel-coat, and use of a dye trace and magnifying glass is recommended to ensure adequate tracking and repair of any cracks.

It is particularly important to ensure that no chord-wise surface cracks are left in the area of the wing spar caps.

Extra care may be needed if the glider has been refinished previously without sufficient gel-coat being removed. In such cases, cracks in the original gel-coat may have continued to migrate into the FRP laminate while not being visible in the external finish before work is started.

Any damage to laminates incurred by general sanding as well as the crack removal must be repaired using standard techniques.

4 Repainting and Finish Sanding

This Advisory Circular is not intended to provide advice on the choice and application of any particular finishing system, other than to note that polyurethane systems tend to be far more durable than polyester gel-coats. The aim should be to add as little weight to the airframe as possible, while ensuring that no laminate weave shows in the surface prior to finish sanding.

When wet sanding, great care must be taken to prevent, as much as possible, the entry of water into the internal spaces of the structure. On completion of wet sanding, all internal spaces must be completely dry. Failure to observe this precaution may compromise reweighing and may cause a hazard to flight above freezing level.

To avoid instrument malfunction, it is also very important to ensure that pitot, static and total energy ports are suitably protected against ingress of undesirable contaminants during the entire refinishing process.

5 Control Surface Mass Balancing

All repairs to and/or refinishing of a control surface require a check of both the weight and residual moment of that surface in accordance with the glider manufacturer's specifications. Any adjustments necessary to bring the mass balance within tolerance must also be done in accordance with the glider manufacturer's instructions.

In cases where no manufacturer's data exists, each undamaged control surface residual moment must be determined before refinishing work commences, and returned to that residual moment within ± 5% on completion of refinishing.

6 Reweighing

On completion of all work, the glider must be rigged and reweighed, new forms CAA 2102 and 2173 completed, and the cockpit weight placard data updated as necessary.

7 Work Records

A glider logbook entry must be made that records all work done, including details of any repairs made and the paint system used, and include reference to the form CAA 337. The completed form CAA 2102 is to be affixed in the logbook and the form CAA 2173 replaced in the Flight Manual. The original of the completed form CAA 337 is to be kept with the glider maintenance records and a copy sent to the CAA within 7 days of signing by the IA-G.