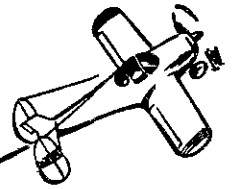


Ercoupe MEMORANDUM

ERCOUPE
SERVICE
MEMORANDUM

No. **44**

**SUBJECT: Electrical System
Care and Maintenance of**



This Memorandum is prepared to provide instructions on the care and proper maintenance of the Ercoupe electrical system, the installation of which was covered in Service Memorandum No. 23. The proper maintenance of the electrical system is very important because its malfunctioning can cause considerable structural damage. This Memorandum affects Ercoupes Serial Nos. 113 and subsequent. The system should be checked within the next 60 days and at each 100 hour inspection thereafter.

1. **Battery:** (Reading R-24-7) (415-54044-20).

Reference—Storage Battery Technical Service Manual, distributed by Reading Batteries, Inc., Reading, Penna.

- a. Check battery externally for loose terminals, bad cable connections, cracked case, cracks in top sealing compound, damaged filler hole and vent plug.
- b. Check charge of battery with hydrometer. (Readings taken at standard temperature of 80°F.) A fully charged battery hydrometer reading is 1.275 to 1.300. If the reading is below 1.225, the battery should be bench recharged. Instructions for bench recharging will be found on the side of the battery case. If there is more than 25 points of specific gravity difference between any cells, this is an indication that the battery is probably on the verge of failure.
- c. Check electrolyte level in battery. (This must be done at 25 hour intervals or 30 days whichever occurs sooner.) Batteries both with and without horizontal level plates have been used in Ercoupes. The electrolyte level in batteries having a horizontal level plate (with a single hole in each cell) shall be no higher than flush with the plate. The electrolyte level in batteries without horizontal plates should not be more than 1/4" above separators. Too high an electrolyte level may result in battery acid overflowing or spilling. Capillary action of acid in vent tube, motion in rough air, or boil-

ing of electrolyte due to overcharging, will cause spilling of acid in batteries with too high an electrolyte level. An electrolyte level allowed to drop below the separators may result in the following: plates and separators damaged due to sulphation caused by exposure to air, sulphuric acid becomes too concentrated causing damage to both separators and plates, and low battery output.

2. **Battery Box Assembly:** (415-54035). Leaking of battery acid from the battery box assembly, after spilling from battery will cause corrosion of structural members around battery box and deterioration of the baggage compartment. A modification is being prepared to improve the battery box assembly. The Bulletin on this modification will be issued as soon as prepared, to facilitate field modification of the battery box.

- a. Check Battery Box for leakage, loose attachment to support, chipped acid proof paint, excessive corrosion, bent or loose brackets, or loose or deteriorated drain tube.
- b. Check length of battery box drain tube as per instructions in Service Bulletin No. 8. (At least 1/2" extension below skin.)
- c. Check battery box cover (415-54040) for chipped acid proof paint, excessive corrosion, or damaged wing bolts (415-54037), bumper pads and elastic grommets (415-54040-2).
- d. Check for new decal (415-54062) with battery maintenance instructions in lieu of one with instructions for weight and balance only. (See Bulletin No. 22, part A.)

3. **Voltage Regulator:** (Delco-Remy No. 1118-259) (415-53016-15).

Reference—Operators Manual for Delco-Remy Aircraft Electrical Equipment published by the Delco-Remy Division, General Motors Corp., Anderson, Indiana. (Supplied with all new Ercoupes since August 1946.)

- a. Check operation of generator and voltage regulator by running engine and observing ammeter readings. See Service Memorandum No. 23 for proper readings and if faulty, refer regulator to authorized Delco-Remy Repair Station.

4. Miscellaneous Electrical Equipment:

- α. Check remaining electrical equipment for proper operation, electrical wiring for proper tapping of connectors and terminals. Continuity tests should be made on any doubtful wiring and worn wires should be replaced. Inspect 30 amp. fuse in the generator circuit. Check switch and circuit breaker in navigation light circuit. A schematic electrical circuit diagram is included with Memorandum No. 23.

5. Baggage Compartment:

- α. The baggage compartment shall be inspected each time electrolyte level is checked for deterioration that may occur from spilled battery acid. Damaged areas may be mended by hand or machine sewn patches.

6. Airplane Structure:

- α. The aluminum alloy structure, especially adjacent to and aft of the battery box, shall be carefully examined for corrosion due to spilled acid. When corrosion is discovered it is of utmost importance that immediate steps be taken to neutralize active acid and salt crystals. This may be accomplished by washing the affected area with a saturated solution of Bicarbonate of Soda or a solution of Ammonia water (1 part household Ammonia, 4 parts water). Neither of these solutions are dangerous to handle, however, they must be diluted to an inactive state by thoroughly flushing with water followed by drying. When using either of these solutions it is imperative that ferrous metals be immediately treated with a protective coating to prevent oxidizing (rusting). The above should be followed immediately upon the discovery of any corrosion, to prevent further damage.
- b. The determination of the extent of the damage to the base metal in the affected area will require complete removal of all of the products of corrosion (scale, loose metal flakes, powder and salt crystals). When removing the products of corrosion caution must be taken to remove only enough of the base metal to obtain a clean surface. Chemical treatments are definitely preferred but polishing is permissible for small areas. Chromic acid solution or an Alcohol-Phosphoric Acid solution

may be used for chemical cleaning. It is imperative, however, that neither of these materials be allowed to come into contact with organic materials or be permitted to penetrate between frayed surfaces or into blind openings. They are not especially dangerous to personnel.

- c. The Chromic Acid Solution consists of 5% Chromic Acid dissolved in tap water and heated to 120°F. to 140°F. The wash may be applied with either a brush or a soft cloth. The solution should be allowed to remain on the corroded area for five to ten minutes. Remove the solution by rinsing with hot water while scrubbing lightly with a bristle brush. The area cleaned may then be polished with 180 mesh emery sand paper or abrasive cloth, or wet or dry sand paper using water solvent as lubricant.
- d. The Alcoholic Phosphoric Acid solution consists of a mixture as follows:

| <i>Material</i> | <i>Quantity by Volume</i> |
|--------------------------------|-------------------------------|
| Butyl Alcohol | 40% |
| Isopropyl Alcohol | 30% |
| Phosphoric Acid (85% solution) | 10% |
| Water | 20% |

This solution is used in the manner described for chromic acid except that the solution should not be allowed to remain on the aluminum for more than 1 to 2 minutes.

- e. After the above operations the affected areas should be protected from normal deterioration by painting with zinc chromate before reassembly. Exterior surfaces may be given a coat of clear lacquer for protection.
- f. If at any time battery acid has spilled in control cables or bearings, they should be removed and replaced. We do not recommend any neutralizing steps for the above.
- g. Affected steel parts should be removed from the airplane. The oxidization and corrosion removed with 180 mesh emery sandpaper, abrasive cloth or wet or dry sandpaper using water solvent as lubricant. Steel parts should then be coated with zinc chromate primer and re-installed.