AEROSPACE INFORMATION REPORT

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GROUND EQUIPMENT REBUILD PROGRAM

1. PURPOSE

This Aerospace Information Report (AIR) provides information for airline consideration in forming in-house or outside vendor rebuild programs for motorized and non-motorized ground support equipment (GSE).

2. SCOPE

This AIR is intended to be concerned with fleet programs rather than programs for individual units. Technical and administrative considerations in developing an approach to a program will be suggested. Organization of material possibly wanted in the form of a detailed specification for airline rebuilder communication is reviewed.

3. DEFINITION

Rebuild - reworking of equipment to include all corrective action normally done during an overhaul, correction of known mechanical, electrical, hydraulic, as well as operational deficiencies, reinforcement of known structural deficiencies, replacement of obsolete parts and components, and necessary modifications to eliminate operational and maintenance deficiencies. The intent of rebuild is to return the equipment to a servicable condition having an expected or greater service life than when it was new. Latest American National Standards Institute (ANSI) and Occupational Safety and Health Administration (OSHA) requirements should be observed. High cost components probably should be evaluated by using available technology. For example, a gasoline engine's condition can be determined by a compression check and an oil analysis. Hydraulic test stands and electrical test equipment can be employed on a good percentage of other high cost components.

4. DISCUSSION

4.1 Basic Philosophy: Automobiles are generally of light construction with emphasis on thin gauge sheet metal paneling needed for high speed over the road transportation. In contrast, ground support equipment tends to be beefy; emphasis is on heavy structure. Their designs incorporate components of adequate capacity to insure sustained performance under severe operational and environmental demands.

There is good evidence to believe that the most economical way to provide long term support equipment needs is to accomplish major rebuilding of the present equipment when the useful life has been expended. The frames and structures of GSE are costly to build. By required disassembly, structural repairs, replacement or renewing of components, refinishing and assembly, it is expected a unit very close to new quality can be achieved.

4.2 Methods: To insure that parts which have a finite life, i.e., hoses, wiring, components, switches, cable, chains, etc., are renewed, an understanding between the customer and the vendor must be established. High volume, relatively inexpensive parts such as wheel bearings, head lights, toggle switches, bushings, rollers, etc., might best be replaced on all units to facilitate planned quantity purchases, eliminate inspection and servicing, and permit a standard production sequence.

4.3 Defining the Approach: Airlines have often found that the best method of procurement is by competitive bids. To insure that no surprises arise, either to the customer or the rebuilder, the work task and the expected results need to be clearly understood. How the unit has been operated and maintained, damage, corrosion, and abuse will be reflected in the equipment's condition, largely dependent on the station from where it came. Several approaches are possible. The rebuilder can offer a fixed price by guessing at the scope of the work. The customer and the rebuilder can inspect each unit together and agree on the job. Or a rebuilt criterion can be agreed upon as to how to determine when to rebuild/replace with pricing accordingly. Manufacturer's manuals and part supports should be utilized to the best advantage.

4.4 Economics:

4.4.1 Service Life: The time in service when a unit is ear-marked for rebuild will be helpful for planning programs. Hours of operation can be determined on motorized equipment directly from the hour meter (if installed) or by estimating annual utilization. Maintenance records often show many units within a fleet reach a time when costs escalate unreasonably rapidly. Non-motorized equipment might best lend itself to a rebuild program by an on-condition approach.

4.4.2 Inception: The decision to undertake a rebuild program will be governed by availability and pricing of new equipment, freight costs for new equipment vs. that of freight to the rebuild facility, and delivery times. A rule of thumb is that if the total unit cost (price, freight, support) of rebuild can be done for up to 70% of a new unit, the program is viable. However, in some cases, availability of new or replacement units due to delivery time, freight costs, product support, etc., will justify over 100% of the new unit cost.

4.4.3 Scheduling: A planned scheduling of units through the rebuild facility will insure best utilization of manpower and resources.

4.4.4 Standardization: The firmer the definition of work to be accomplished on each unit in the program, the more efficient the overall operation will be.

4.4.5 Modular Replacement Packages: Control consoles, electrical panels, wiring harnesses, some mechanical assemblies, hydraulic components, etc., that have suffered from weathering, abuse or severe use should be considered to be completely replaced rather than custom troubleshooting and repair.

5. METHODS

5.1 Steam clean and disassemble unit. (Remove assy., hydraulic/electrical components, gauges, lights, etc., but not axles, springs, welded panels and other heavy components.) Accomplish fair wear and tear structural/body repairs as required. Remove loose paint, rust and feather rough edges. Prime all bare metal. (If sandblasting is done, protect sensitive locations and parts - bearings, fluids, components, etc., must not be contaminated.) Reassemble per requirements following and paint per spec.

5.2 Various aspects of a rebuild specification may not be applicable to each unit. Therefore, some items may be requested to be bid individually and can be so marked with an asterisk (*) in the specification. An agreement can be arranged between the customer and the vendor as to how these replacements will be determined.

5.3 Replacement parts and methods used in a program should comply to documentation supplied by the customer in his original request for bids. These shall include schematics, operational characteristics, etc. Deviations can be mutually agreed upon by the customer and the vendor.

5.4 All removed components can be retained at the vendor's facility for possible salvage if desired by the customer. Disposition of parts not retained by the customer will be at the re-manufacturer's expense.

6. (SUGGESTED) COMPONENTS TO BE NEW OR REBUILT/RECONDITIONED

*6.1 Engine

6.2 Starter

6.3 Carburetor

6.4 Fuel Pump

6.5 Alternator

6.6 Regulator

6.7 Water pump

6.8 Hydraulic cylinders

6.9 Hydraulic pump

6.10 Hydraulic valves

*6.11 Radiator

6.12 Brake Drums, Shoes, Cylinders

6.13 Hydraulic Motor

7. (SUGGESTED) COMPONENTS TO BE REPLACED NEW

7.1 Hydraulic hoses

7.2 Battery

7.3 Tires

7.4 Muffler & Tail Pipe

7.5 Bushings & Bearings (except conveyor bearings)

7.6 Engine Belts

7.7 Wheel Bearings

7.8 Hydraulic Fluid

7.9 Radiator Hoses

7.10 Wiring & Cables

7.11 Radiator Pressure Cap

7.12 Fuel Filter Element

7.13 Air Filter Element

7.14 Oil Filter Element

7.15 Refrigerant

7.16 Brake fluid

7.17 Transmission filter (screen)

8. (SUGGESTED) CHECK & RECONDITIONED/REPLACE AS NECESSARY

8.1 Lights

8.2 Reflectors

8.3 Bearings

8.4 Transmission

8.5 Differential

8.6 Exhaust Pipe

8.7 Instruments

8.8 "U" Joints

8.9 Horn

8.10 Morse Control

8.11 Rubber Bumpers

8.12 Parking Brake

8.13 Seat & Seat Back

8.14 Placards/Stencils

8.15 Fasteners

8.16 Gas/Oil Caps

9. DECONTAMINATION

9.1 Drain, clean and flush hydraulic reservoir and lines

9.2 Drain and clean fuel tank

9.3 Drain and clean refrigerant systems when applicable

9.4 Drain and clean hydraulic brake circuit

10. OPTIONS - AS MAY BE DESIRED

11. IMPROVEMENTS - LIST UPGRADE PROJECTS