Lockheed

VOL. 16, NO. 3, JULY-SEPTEMBER 1989

service news

A SERVICE PUBLICATION OF LOCKHEED AERONAUTICAL SYSTEMS COMPANY–GEORGIA

Teflon Hoses

Previous Page Table of Contents Next Page

Lockheed
service news

A SERVICE PUBLICATION OF LOCKHEED AERONAUTICAL SYSTEMS COMPANY-GEORGIA

Editor
Charles I. Gale

Editorial Liaison
Richard D. Latendresse

Art Director
Anne G. Anderson

Vol. 16, No. 3, July-September 1989

CONTENTS

Photographic Support: John Rossino

Front Cover: An Algerian Air Force C-130H on a training flight over north Georgia.
Back Cover: The U.S. Coast Guard patrols the Florida shoreline.

Focal Point

R. E. McAndrew

Setting the Standard

Standards are very important to all of us in the modern world. There are international standards for our number system, for weight, measure, and even for electronic data transfer. Pi is an example of a famous standard in mathematics, and GMT is the world-renowned standard for timekeeping.

In many ways, the Hercules aircraft enjoys a similar distinction as a kind of universal standard. It is the acclaimed world "standard" for airlifters. Standards are established and endure for one simple reason: they work. And what description could be more fitting for the Hercules? More than 60 nations have already chosen the Hercules to accomplish an immense variety of tasks. They include general cargo transportation, disaster relief, search and rescue, aerial spraying; plus many unique and specialized country-building missions. Almost every nation in the world has seen the Hercules within its boundaries, and all have benefitted from the support it has provided.

Although the Hercules has been in service for over 30 years, we are pleased that many nations are now supplementing or replacing their present Hercules fleets with the latest "standard" of the Hercules aircraft. Lockheed has continued to update and improve the Hercules, so that the C-13011-100 of today is significantly improved and more versatile than earlier versions. We are seeing a unique event in the airplane business, in which an aircraft is actually replacing itself in the marketplace. This is a convincing testimonial to the Hercules, and its ability to continue to offer the unmatched combination of capabilities that have made it such a world standard.

Lockheed will be delivering the 1900th Hercules this September. Of all that have been built, more than 750 are owned and operated by organizations or entities other than the U.S. Government. We foresee continued strong international sales for the Hercules. In the past year alone, three more nations have become first-time Hercules operators. We at LASC welcome them aboard, and we renew our standing commitment to our customers new and old: to provide each and every Hercules with the kind of support worthy of a world standard in excellence.

Sincerely,

Robert McAndrew

R. E. **McAndrew, Director**
International Sales
Lockheed Aeronautical Systems Company

PRODUCT SUPPORT

LOCKHEED AERONAUTICAL SYSTEMS COMPANY-GEORGIA

J. D. ADAMS (ACTING) DIRECTOR

FIELD SUPPORT	SUPPLY SUPPORT	TECHNICAL PUBLICATIONS	RELIABILITY MAINTAINABILITY SUPPORTABILITY &TRAINING
J.D. ADAMS	D.R. STEELE	C.E. ADAMS	H.M. SOHN

TEFLON HOSES—AN APPLICATIONS GUIDE

by **W. H. Mitchell,** *Specialist Engineer*
Propulsion and Equipment Design Group

M. R. Starz, *Design Engineer*
Hydraulic, Oxygen and Pitot-Static Design Group

Teflon hoses are replacing elastomeric hoses in many applications on the Hercules aircraft.

Hercules aircraft systems are gradually making the transition from elastomeric (rubber) hoses to Teflon hoses, with the Teflon type generally serving as the preferred spare. During this changeover period, some confusion may exist as to which hose may be appropriate for a particular location.

The list of Teflon hoses approved for specific applications is constantly being enlarged and updated, and it is important to refer to a reliable source of current information before attempting to replace a hose with the same or a different hose type. The use of Teflon hoses has been approved for only certain locations in the airplane. When replacing a hose, be sure to check that you are replacing a hose with the approved type and part number.

C-130 maintenance or supply organizations should consult the latest edition of the Qualified Products List (QPL) for approved part numbers and vendor names and addresses. Commercial (L-100) operators can contact the LAX-Georgia Customer Supply Department for information, and for the hoses themselves. When a Teflon hose is available for a particular application, it will be identified as the preferred spare. As such, it will automatically be substituted when you place your order.

Where do you use Teflon hoses instead of elastomeric hoses in the Hercules aircraft? This question has been raised many times recently in the field, and has been a source of numerous inquiries to Lockheed Customer Supply, Field Service, and Engineering organizations. The following listings should offer some guidance as to the locations in the power plant and fuselage where Teflon hoses may be used.

A total of seven Teflon hoses are approved for the power plant section on L-100 (commercial) Hercules

TEFLON HOSES IN THE QEC (L-100)

LAC No.	Item	Mfg.	Mfg. Part No	Qty Item per A/O
	Drain, fuel recycle	Stratoflex	124002-4CR-0183	4
	Vent, fuel recycle	Stratoflex	124001-4CR-0142	4
	Drain, fuel recycle	Stratoflex	124001-4CR-0240	4
–	Fuel, recycle	Stratoflex	'124D002-6CR-0150	4
	Fuel, recycle	Stratoflex	'124DO1 2D020DCOO	4
755200-3	Starter, pressure sensing	Titeflex	106852-3	8

TEFLON HOSES IN THE AFT NACELLE (L-100)

–	Hydraulic pump pressure	Resistoflex	'TR395800CC-10-0282	4
	(alternate)	Resistoflex	'OOOAE9010T-0282	
	(alternate)	Titeflex	*66060610-0282S	
	(alternate)	Aeroquip	'AE1000429-JO282	
	(alternate)	Aeroquip	'AE246001 i-JO282	

'Has a full-length fire sleeve.

Previous Page Table of Contents Next Page

There are two Teflon hoses approved for the C-130 (military) power plant section.

TEFLON HOSES IN THE QEC (C-130)

LAC No.	Item	Mfg.	Mfg. Part No.	Qty Item Per A/C
755200-3	Starter, pressure sensing	Titeflex	106852-3	6

TEFLON HOSES IN THE AFT NACELLE (C-130)

	Hydraulic pump pressure	Stratoflex	AS621-10-0282	4

Note that most hoses used in the power plant section require additional fire protection because of their location. Fire protection is provided in the form of cuff-type or full-length sleeves; hoses of this kind are indicated by asterisks in the listings above.

Notice also that elastomeric hoses continue to be specified for most of the applications in the power plant section. A change to Teflon for the hoses in this area does not appear to be cost-effective at the present time.

Be sure to make careful note of the part number when ordering replacement hoses. Use of the proper part number will ensure that you will get the correct material hose, complete with the fire protection sleeve where required.

Teflon hoses offer many advantages over the older elastomeric types. Hose assemblies made of Teflon have practically unlimited shelf life and greatly enhanced service life. They also expand much less under pressure, which means the response efficiency of the entire system is increased.

But there are also a few disadvantages that must be considered. One is the greater initial cost. In the case of a number of hoses in the power plant section, the cost of a material change is currently prohibitive. The most significant disadvantage of Teflon hoses when compared to synthetic rubber, however, lies in the tendency of the Teflon liner to kink if bent in an arc less than the rated minimum bend radius, or if subjected to severe twisting.

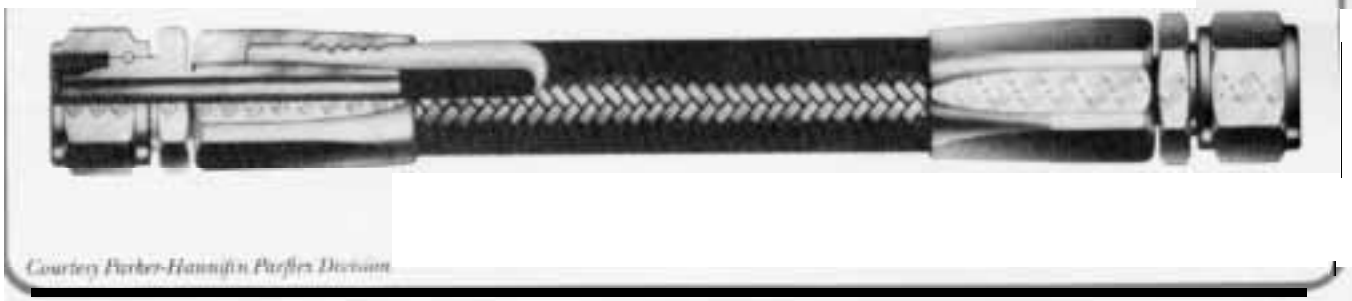
Teflon hoses have a bright stainless steel reinforcing braid pattern that is aligned with the centerline of the inner liner (note that in hoses with full fire sleeves. the braid is covered). It is important that the braid pattern not be twisted during installation. Take special care not to alter the “set” (shape) that the hose has taken when removing and reinstalling a Teflon hose that has been in service for a time.

Note also that hoses made of Teflon are generally thinner. lighter, and more flexible than the elastomeric hoses they replace. They may therefore have a greater tendency to sag into the path of movable mechanical assemblies in such

Cutaway views **of a typical** Teflon hose **and an elastomeric hose reveal** construction **differences.**

Teflon Hose

Elastomeric Hose



Courtesy Parker-Hannifin Parflex Division

Previous Page Table of Contents Next Page

TEFLON HOSES IN THE FUSELAGE (ALL AIRCRAFT)

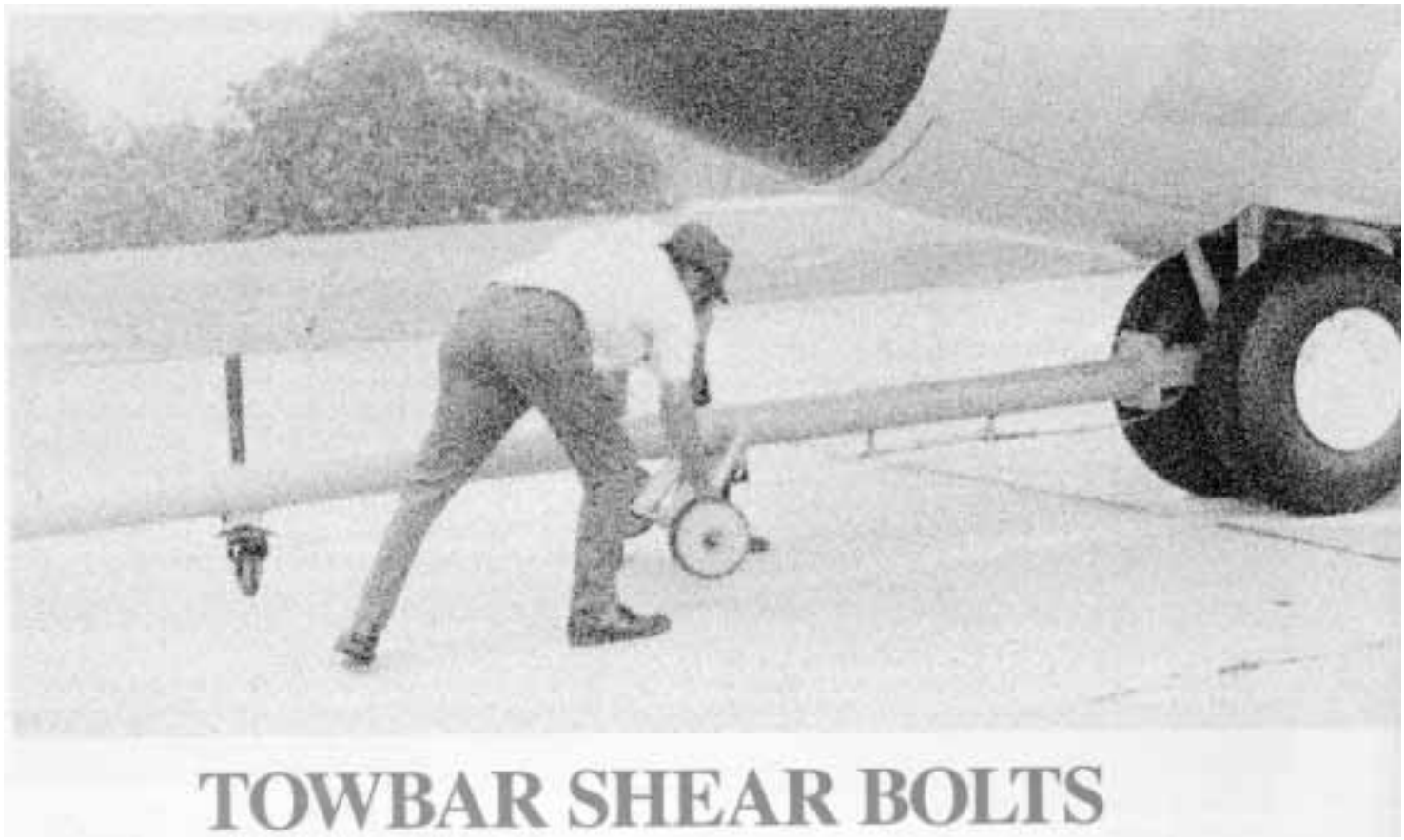
Elastomeric Hose	Item	Mfg. Part No. Teflon Replacement	Qty. Per A/C
(Already Teflon)	Brakes-main wheel well	AE1004638GO1 55	1
(Already Teflon)	Brakes-main wheel well	AE1004638G0210	2
(Already Teflon)	Brakes-main wheel well	AE1004638G0240	1
(Already Teflon)	Brakes-main wheel well	AE1004638G0260	1
MS28762-4-0092	Booster system pressure transmitter	AS1 15-04-0092	1
MS28762-4-0102	Rudder boost-booster system transmitter	AS1 15-04-0102	1
MS28762-4-0120	Wing flap gearbox	AS1 15-04-0120	1
MS28762-4-0120	Rudder boost-utility system transmitter	AS1 15-04-0120	1
MS28762-4-0130	Ramp lock plumbing	AS1 15-04-0130	2
MS28762-4-0130	Wing flap gearbox	AS1 15-04-0130	1
MS28762-4-0130	Cargo door uplock	AS1 15-04-0130	1
MS28762-4-0130	NLG uplock cylinder-nose gear wheel well	AS1 15-04-0130	1
MS28762-4-0134	Ramp uplock cylinder	AS1 15-04-0134	1
MS28762-4-0134	AUX system pressure transmitter	AS1 15-04-0134	1
MS28762-4-0147	NLG uplock cylinder	AS1 15-04-0147	1
MS28762-4-0156	Ramp uplock cylinder	AS1 15-04-0156	1
MS28762-4-0160	NLG uplock cylinder	AS1 15-04-0160	1
MS28762-4-0230	Utility system pressure transmitter	AS1 15-04-0230	1
MS28762-4-0250	Emergency brake pressure transmitter	AS1 15-04-0250	1
MS28762-4-0360	Normal brake pressure transmitter	AS1 15-04-0360	1
MS28762-6-0100	Aft cargo door actuator	AS1 15-06-0100	1
MS28762-6-0130	Rudder boost-utility system	AS1 15-06-0130	1
MS28762-6-0155	Aft cargo door actuator system	AS1 15-06-0155	1
MS28762-6-0170	Aft cargo door actuator	AS1 15-06-0170	1
MS29762-6-0180	Ramp actuator	AS1 15-06-0180	2
MS28762-6-0290	NLG actuator	AS621 -06-0290	1
MS28762-6-0304	NLG actuator	AS621 -06-0304	2
MS28762-8-0160	Aileron boost pressure-utility system	AS1 15-08-0160	1
MS28762-8-0200	Ramp actuators	AS1 15-08-0200	2
MS28762-8-0200	Auxiliary pump, system pressure	AS1 15-08-0200	1
MS28762-8-0222	Aileron boost pressure- booster system	AS1 15-08-0222	1
MS28762-8-0282	Emergency brake-main wheel well	AS621-08-0282	2
MS28762-8-0282	Normal brake-main wheel well	AS621 -08-0282	4

places as the wheel wells. Wherever Teflon hoses are used as replacements for hoses of an older type, appropriate clamps and restraints should be provided as necessary to prevent any possibility of the new hoses fouling nearby mechanical components.

On balance, the advantages of this new type of aircraft hose significantly outweigh the disadvantages, except in the case of the special requirements of certain hoses in the power plant section. The benefits of reduced weight, unlimited shelf life, and resistance to leaks make the Teflon hoses a welcome addition to the Hercules aircraft.

The use of Teflon hoses has been approved for only certain locations. Be sure to check the part number.

Previous Page Table of Contents Next Page



TOWBAR SHEAR BOLTS

Two types of towbars widely used with the Hercules aircraft depend in part upon the AN6 bolts that attach the towhead to the towtube to protect the nose landing gear assembly during towing operations. Under a condition of extreme load, such as an excessively sharp turn radius, or a sudden start or stop, the 3/8-inch diameter AN6 bolts in the towbar will shear and thereby prevent damage to the nose landing gear strut or the supporting structure. These alloy-steel bolts are therefore very important, and should be checked periodically to ensure that they are correctly installed or they have not been replaced with unauthorized bolts.

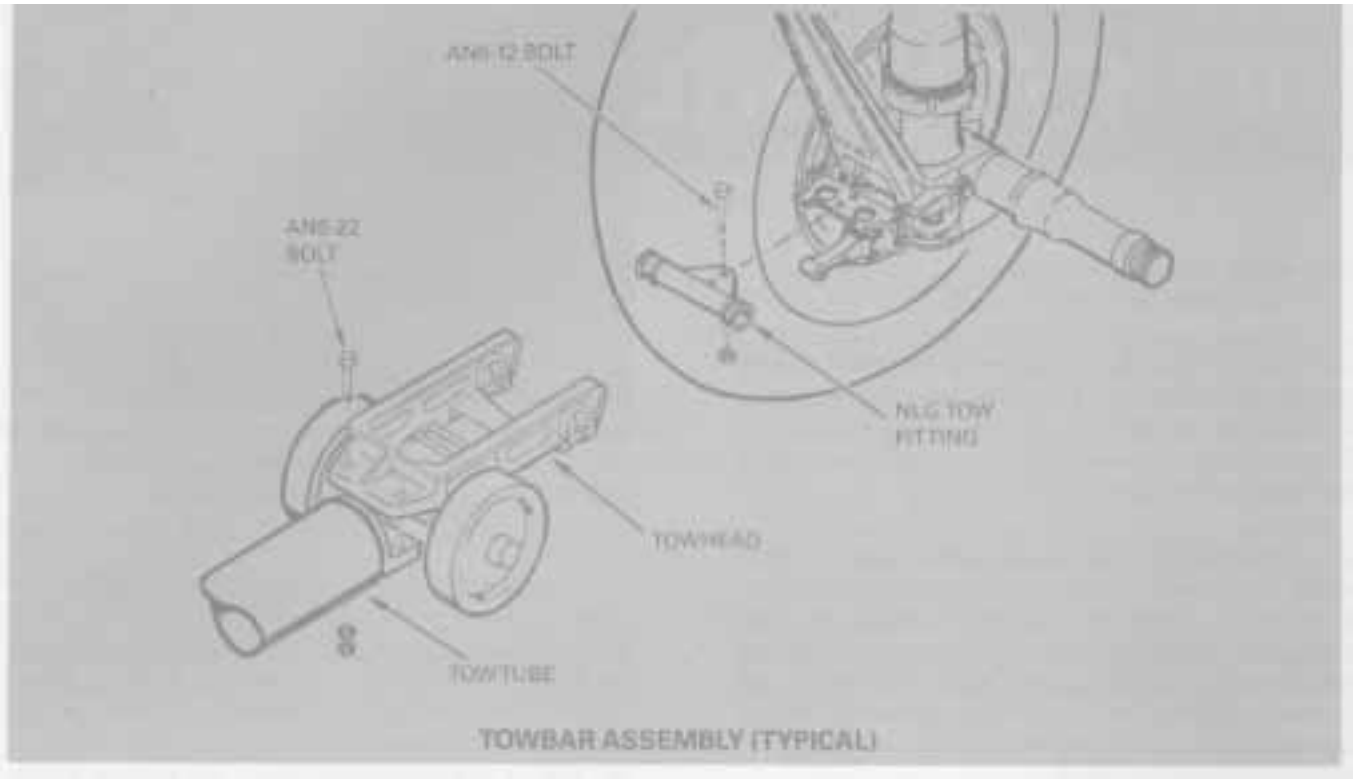
Safety Shear Function

It should be remembered that the AN6 safety shear bolt installed in the aircraft nose landing gear crossbar and tow fitting (see illustration) is designed to shear only with a pulling force. If the Hercules aircraft is being pushed backward, the nose landing gear tow fitting will bottom out against the crossbar and the crossbar bolt will not shear, leaving only the AN6 bolts in the towbar to provide the safety shear function.

Reports from the field indicate that the two AN6 bolts in the towbar shear more frequently than does the AN6 bolt in the nose gear tow fitting. One reason for this is that the bolt in the nose gear tow fitting must shear in two places while

This safety shear bolt is designed to shear only when excessive pulling force is applied.

Previous Page Table of Contents Next Page



TOWBAR ASSEMBLY (TYPICAL)

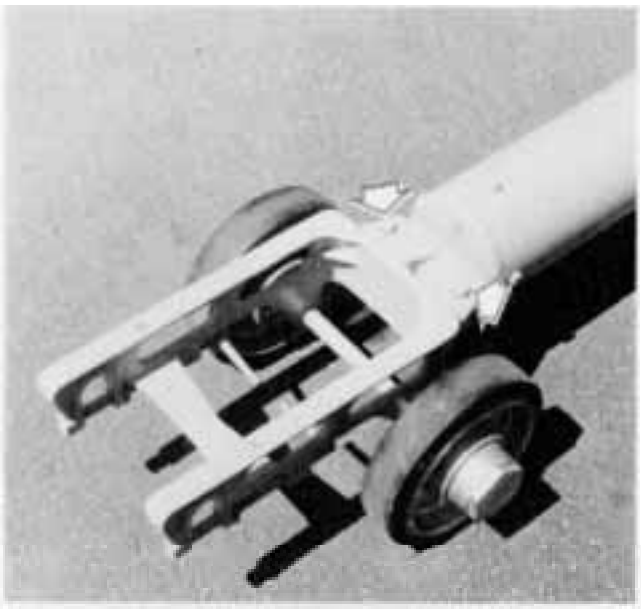
the bolts in the towbar have only one shear point. Also, leverage may be exerted on only one of the two bolts in the towbar, causing the towbar to overload and shear.

Towbar Differences

The original towbar was made by Lockheed (PN 403980) and since the towhead and towtube end connections were made of high-strength steel, the two AN6 safety shear bolts were installed without bushings.

A newer towbar made by Ventura (PN 126-000-101) has a towhead and towtube end connector made from general purpose structural steel. Although the steel used is of good quality, proper shearing of the AN6 bolts is ensured by using high-strength steel bushings in the towtube-to-towhead attachment holes. These bushings must be flush at the towtube and towhead mating surfaces. Also, large washers should be used to prevent the bolt head and nut from pulling into the bushing holes.

These shear bolts will shear in response to high lateral and "pushing" loads.



Preventing Nose Gear Damage

Under no circumstances should the bushings be removed and **5/8-inch** bolts installed, since a considerably higher shear load would be required for separation of bolts that are larger than standard. Note also that the specified bolts must not be replaced with higher-strength bolts of the same size.

If there is a problem with the AN6 bolts shearing in the towhead attachment, it is likely that the towing instructions and limitations detailed in the Hercules maintenance manuals are not being followed. The ground handling, towing, and taxiing sections of the applicable maintenance documents should be reviewed to ensure that the correct procedures are being used.

Previous Page Table of Contents Next Page

ELIMINATING BATTERY BOX NOISE

[redacted]alyst

C-13OlHercules Service Department

From time to time, flight crews have reported hearing popping noises coming from the vicinity of the battery compartment during flight in certain Hercules aircraft. These reports prompted an investigation which has resulted in a solution for this nuisance item.

The problem in question had been observed during ascent to cruising altitude and was repetitive in nature. After extensive troubleshooting, it was found that the upper panel of the battery box (at the FS 165 pressure bulkhead) was separating from the aft upper attach angle between the fasteners whenever the aircraft was pressurized. Deflections of the battery box panel were causing oil-canning and the resulting popping sounds.

Engineering analysis has determined that the problem does not present a safety of flight concern, but a change has been proposed that will eliminate the possibility of unwanted noises from this source in future production aircraft. The change replaces the rigid fasteners at the battery box attaching flange with spring washers and NAS 1298 shoulder screws. The new arrangement will allow a small amount of movement between the components during pressurization without the accompanying sound effects.

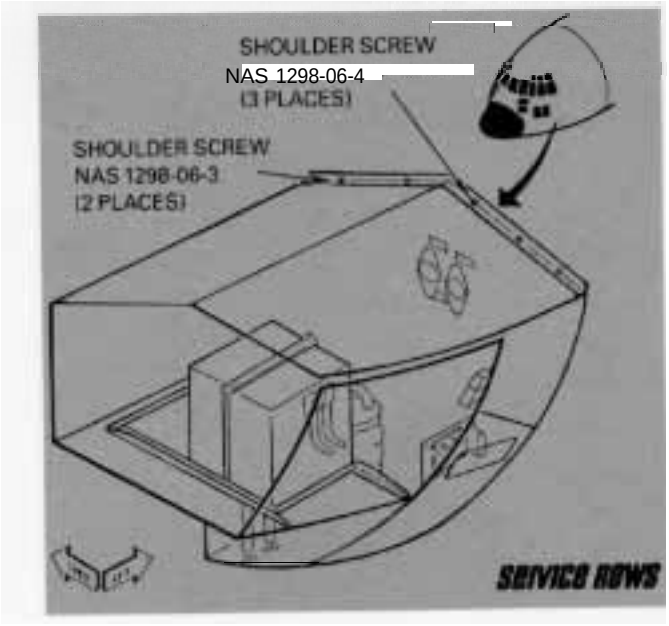
The following is a summary of the hardware requirements that would be involved in the proposed change:

Item	Application
NAS 1298-06-3 shoulder screw	2 places inboard
NAS 1298-06-4 shoulder screw	3 places outboard
M 12133/5-4P spring washer	All 5 places (under screw head)
AN 970-3 washer	All 5 places (trimmed to fit bulkhead)
LS 35 176CCO6L washer	All 5 places (under nut)
AN 960-9L washer	All 5 places (under nut)
MS 21042-06 nut	All 5 places

Two of the five rigid fasteners that can be replaced with NAS 1298 shoulders screws and spring washers are visible in this photograph.

This same modification could also be accomplished on in-service aircraft subject to battery box noises. If any of your organization's Hercules aircraft have recorded this complaint and you wish to correct the problem, please contact the C-130/Hercules Service Department at the address below and request full information, including print No. 339275, Box Installation-Battery and External Recep. (note in particular reference 9).

Cl30/Hercules Service Dept.
R. H. Brandt, Supervisor
Lockheed Aeronautical Systems Company-Georgia
Dept. 64-21, Zone 365
86 South Cobb Drive
Marietta, Georgia 3006 3
or
Telephone (404) 494-1313
Telex 542642
Fax (404) 494-1353



Previous Page Table of Contents Next Page

SKE and Battery Abuse

by Ron **Curty,** *Service Analyst*
C-130lHercules Service Department

On aircraft equipped with the station-keeping equipment (SKE) intra-formation positioning system, 24v battery power is applied through a 5.0-amp circuit breaker on the pilot's side circuit breaker panel to the coder-decoder. The DC power is taken from the battery bus, and its purpose is to power the heater for the clock oscillator in the SKE coder-decoder.

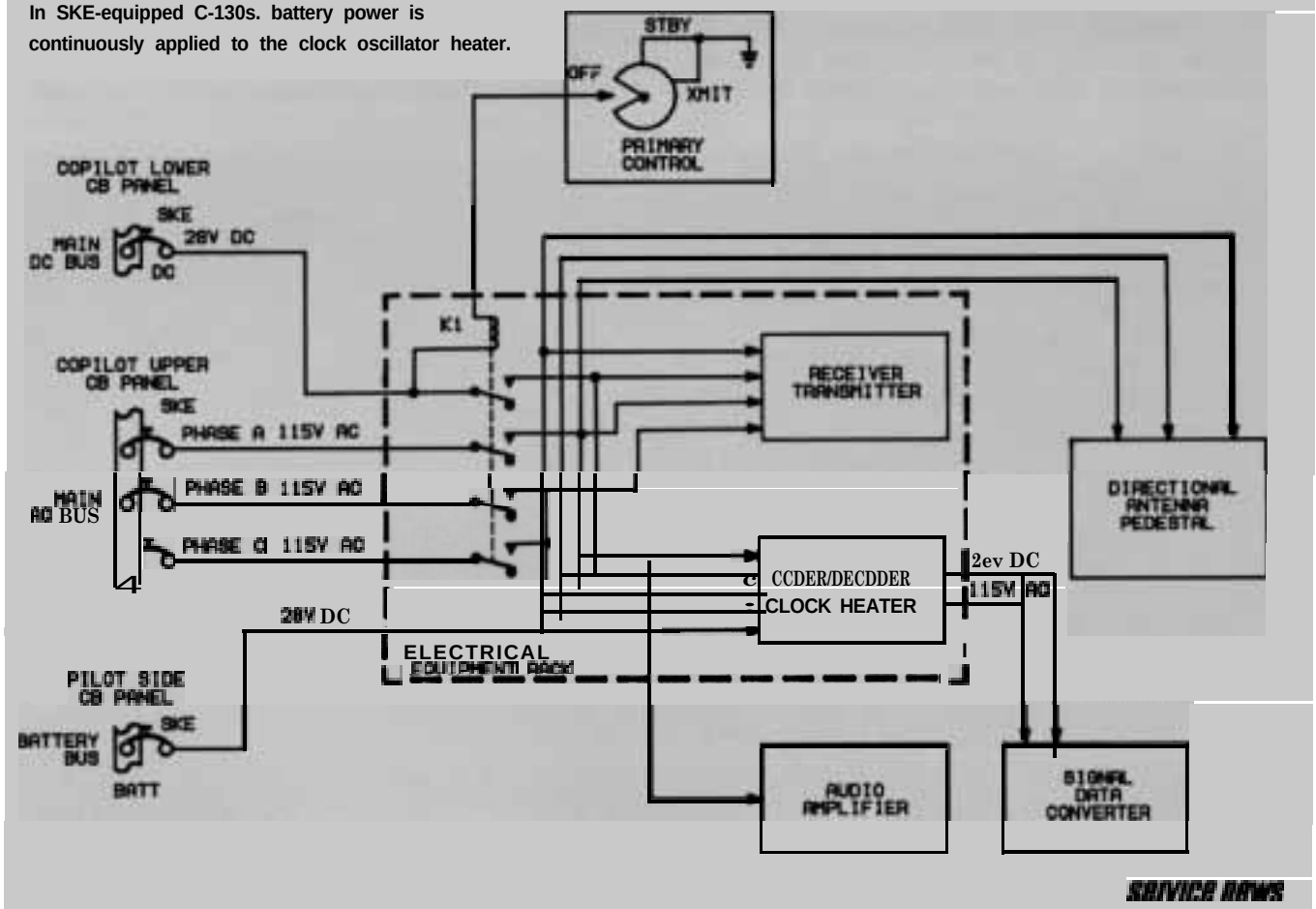
Since power is applied to the clock heater whenever the SKE BATT circuit breaker is closed, there is a steady drain on the aircraft battery. If the aircraft doesn't fly for 48 hours, the battery will be discharged to less than 50 percent of its capacity.

This depletion is detrimental to the battery, and the current flow could be stopped by pulling the battery bus SKE BATT circuit breaker to the open position. This practice is **not** recommended, however. Circuit breakers are not designed to be switches, and should never **be used as such.**

Lockheed engineering will resolve the battery discharge problem in the near future by making changes in the clock oscillator heater wiring. In the meantime, operators should be aware of the potential for battery depletion from this source, and take appropriate steps to recharge the aircraft battery periodically when an airplane containing SKE is idle.

SKE POWER DISTRIBUTION

In SKE-equipped C-130s. battery power is continuously applied to the clock oscillator heater.



BLEED AIR PRESSURE REGULATING VALVE NOTES

by **Darell A. Traylor,** *Service Analyst Coordinator*
C-130lHercules Service Department

The function of bleed air pressure regulating and shutoff valves is to maintain constant pressure at a preset value in the bleed air manifold which connects the four engines of the Hercules aircraft, and to do so while allowing the engines to share the bleed air load (flow) equally.

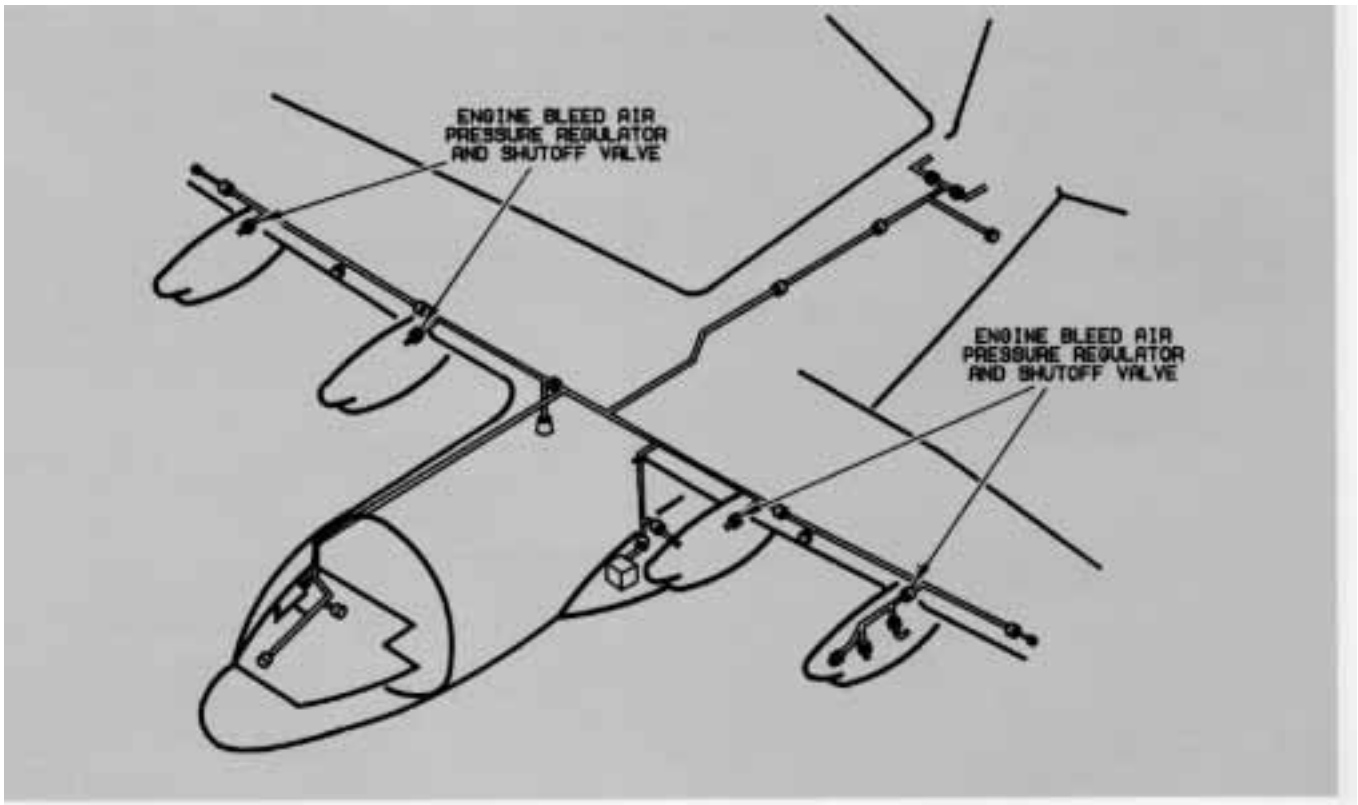
A number of systems utilize bleed air as the energy source for accomplishing work in the Hercules aircraft, and the bleed air system must be equipped to respond automatically to changes in demand when these systems are operated.

When, for example, the air conditioning system is turned on or off, the pressure in the bleed air manifold is affected. It tends to drop in response to the increased load when the air conditioning system is activated, and surge when it is turned off. The bleed air regulating and shutoff valves limit these effects by acting to increase the airflow when more air is required, and reduce it again when the demand decreases. This ensures that a constant pressure level will be maintained in the bleed air manifold.

Flow Sharing

In addition to keeping the manifold pressure constant, the regulators are also designed to maintain an equal flow of bleed air from each of the engines. This flow sharing prevents any particular engine from "hogging" the bleed air load, which would result in that engine developing less than normal torque. Carried to the extreme, an engine hogging the load could fall below the minimum torque required for takeoff, or cause handling problems when reverse thrust is needed during landings.

The maintenance manuals require that each bleed air pressure regulating and shutoff valve maintain a pressure reading of 50 +/- 7 psi in the aircraft bleed air manifold. In addition, all the valves in a given aircraft must be able to



Previous Page Table of Contents Next Page

maintain pressure values that are within 3 psi of each other. This helps ensure that the bleed air load will be shared evenly among the **engines.**

Valve Calibration

The calibration procedures for making the necessary adjustments to the valve for the 50 +/-7-psi and 3-psi limits are called out in T.O. 15 A2-l-143, and the component overhaul manual SMP 850, chapter 36-6a, page 7-6, section 7-11. These procedures require specific pressures, temperatures, and flow conditions that are only available on a test bench such as the Lockheed Pneumatic Test Stand Assembly, PN 3402890-I or the equivalent. Recalibration of the valves should not be attempted in the field.

Since adjustment of the valves is not a practical field repair, operators of Hercules aircraft have often asked what they should do in the event a bleed air regulating valve fails the 3-psi flow-sharing check in a remote location where replacement valves or proper facilities for adjustment are not available.

A bleed air pressure regulating valve in its installed position in the nacelle.

Out-of-Limits Operation

The procedures for operating an aircraft in which individual bleed air regulating pressures are not within the 3-psi limit are called out in the flight manuals. These involve placing the engine bleed air switches for symmetrical engines to the OVRD or (preferably) OFF position during takeoff to ensure balanced torque.

There is no particular risk involved in keeping a bleed air pressure regulating and shutoff valve in service temporarily when the 3-psi limit is exceeded by a small amount, provided the engine torque differential is not excessive. A valve that exceeds the 3-psi limit should be replaced with a new one as soon as practicable, however, and the old one sent to component overhaul.

Preventing Wind-Induced Rudder System Damage

by Dave Holcomb, Service Analyst
C-130lHercules Service Department

Recently a C-130H aircraft was found to have sustained a broken output lever on the rudder boost assembly. The damage was discovered after the aircraft had been parked for several days during a period of sustained winds in excess of 25 knots.

Similar occurrences have been reported from time to time in the past. Although there is some guidance on the subject in the aircraft manuals, not all operators realize that the snubbing action of the rudder and elevator boost assemblies which acts to prevent uncommanded control surface movements can be lost after an undetermined period of time. This is because the hydraulic fluid is gradually pumped back through the return lines by the wind-induced movement of the flight control surfaces.

Under normal circumstances. the snubbers installed at each end of the booster cylinders reduce the velocity of the piston load before the rod contacts the internal stops. However, when hydraulic pressure is fully depleted, such as is the case when hydraulic connections are loosened or when the aircraft sits for extended periods, the snubbing action is lost.

T.O. IC-l30H-2-9 and the equivalent flight control manuals for commercial Hercules aircraft and other military models give clear information regarding flight control wind precautions to be taken. For example, page l-6A, Paragraph l-19, provides the following:

> Do not use mechanical restraining devices on flight control surfaces, unless both the utility and booster hydraulic systems have been depleted or a booster unit has been removed (aileron. rudder, or elevator). Built-in snubbers in a fully serviced system will prevent slamming of the controls into their stops.

The same T.O. goes on to point out:

> To prevent damage to the hydraulic booster assemblies, rig pins shall not be installed in any flight control system nor the rudder pedal, control column, or control wheel as a means of locking control surfaces against wind gusts. If the utility and booster hydraulic systems are properly serviced, normal wind gusts will not damage the controls.

It should always be borne in mind, however. that the rudder control booster assembly may lose this snubbing

Previous Page Table of Contents Next Page

capability if the hydraulic systems have not been pressurized for an extended period of time.

As a general rule of thumb, whenever the aircraft remains idle for 3 days or more, the hydraulic systems should be pressurized to reestablish the snubbing capability of the flight controls. This is especially true if there have been windy conditions during the period.

Furthermore, it is always a good idea to check the aircraft for damage before the next Right after high winds have occurred. There is a potential flight hazard if a part of the flight control linkage is damaged on the ground and subsequently breaks under the stress of air loads in flight. The -2-9 also offers guidance in this area:

> Whenever control surfaces are caught by wind and moved violently against their stops, or to the limit of their travel under any condition, make a special check before the aircraft is flown. In this case, check all control surfaces, controlling parts, and mechanisms for cracks or signs of failure. such as hinges. hinge brackets, and attachment of surfaces to torque tubes, paying particular attention to the possibility that rivets and bolts might have been sheared.

Remember that only in certain maintenance situations is it permissible to use external locks on the control surfaces. T.O. IC-l30H-2-9 notes (para. 1-27 and l-28) that an external contour clamp should be installed to lock the control surface to adjacent structure to prevent damage to the flight control system when any of the following maintenance actions is performed:

- Removing a booster assembly.
- Disconnecting a flight control surface.
- Draining the hydraulic systems.

It is also important to note that removal or installation of flight control surfaces is not permitted when wind velocities are 20 knots or higher.

The flight control system of the Hercules aircraft offers effective, built-in protection against the kinds of damage that can result from wind-induced movements of the control surfaces. A little attention paid to ensuring that these protective features continue to do their job during periods of aircraft inactivity can pay big dividends in terms of aircraft safety and reduced maintenance costs.

SERVICE NEWS

PROTECTING MULTICONTACT ELECTRICAL CONNECTORS

by **H.** J. **Singletary,** *Staff Engineer*
Materials and Producibility Technology Department

Corrosion of pins and sockets is a common cause of electrical failure in multicontact electrical connectors.

Since connectors of this type are not ordinarily hermetically sealed, they tend to “breathe” when the aircraft goes through pressure and temperature changes. Outside air is drawn into the connectors by this pumping action, and when moisture from the humidity in this air condenses inside, electrical leakage paths are established and corrosive action begins.

It has been estimated that only I5 percent of the surface area on the outside of a pin and the inside of a socket conduct the current through a connector. It consequently takes very little corrosion on these surfaces to cause signal degradation at the interface.

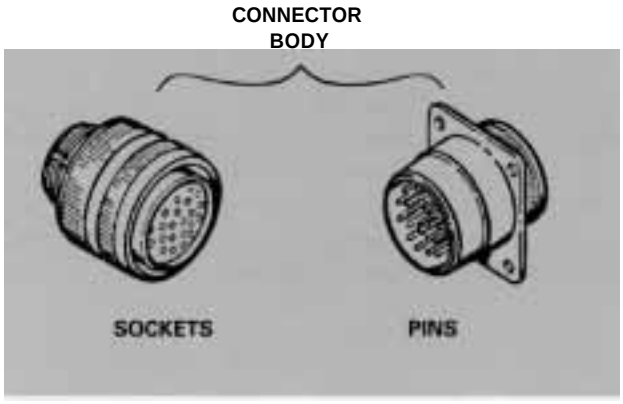
Corrosion has penetrated all the way through the metal structure of this connector bodv.

Previous Page Table of Contents Next Page

When corroded pins and sockets are found and the connectors are considered salvageable. the following process is recommended to restore conductivity, and provide protection for the conducting surfaces in the future.

It should be noted that in most connectors. the socket (female) contacts are quite difficult to clean. If significant corrosion is found in these, the most practical solution is simply to replace the sockets. If the sockets are not replaceable, then replace the affected connector half.

Connector components-typical.



The Process

1. With an acid brush, apply and scrub trichlorotrifluoroethane solvent over all mating conducting surfaces of the connector. For female contacts with openings that are large enough, use a pipe cleaner to scrub and clean the surfaces with solvent.

   Note that trichlorotrifluoroethane belongs to a family of polyhalogenated hydrocarbons commonly known as Freon. In some locations, Freon-type solvents may not be available or not permitted.

   Isopropyl alcohol may be used as a substitute solvent in such cases, but remember that isopropyl alcohol is flammable and appropriate safety precautions must be employed.

2. Remove any excess solvent with clean, lint-free cloths. and clean. dry pipe cleaners, as required.

3. Spray the separated surfaces of the connectors with a water-displacing, ultra-thin film, avionics grade corrosion-preventive compound (see the materials list following this article).

4. Reconnect the connector halves after spraying.

5. In locations outside the aircraft's pressurized area (except in areas subject to fluid drainage or collection) apply a coating of corrosion-preventive compound conforming to MIL-C-16173, Grade 4. to the exterior surface of the connectors. This produces a transparent, non-tacky film over the joint and other potential openings to the inside of the connector pair.

Whenever the connector is separated in the future, the water-displacing, corrosion-preventive compound should be reapplied to the interior mating surfaces prior to rejoining the connector halves. This practice will reduce. if not eliminate. the corrosion problems experienced inside [redacted]nectors.

Materials and Specifications

The materials below are listed in the order in which they are mentioned in the text.

Acid brush-Specification H-B-643, Type II. Class I:

- NSN 907920-00-514-2417

Solvent trichlorotrifluoroethane-Specification MIL-C-81302, type II or Type IIA:

- NSN 9G6850-OO-319-0834-one-gallon container.
- NSN 9G6850-OO-l42-9247-Type IIA, 16-0z. aerosol can.

Isopropyl alcohol-Specification TT-I-735:

- NSN 9G6810-00-983-8551, one-quart container.

Water-displacing corrosion-preventive compound; ultra-thin film, avionics grade-Specification MIL-C-81309, Type III, Class 2:

- NSN 9Q8030-00-546-8637, 16-0z. aerosol can.

Corrosion-preventive compound-Specification MIL-C-16173. Grade4:

- NSN 9Q8030-00-142-9281, 16-0z. aerosol can.

ENGINE STARTER SHAFT SEAL REPAIR

by **Darell A. Traylor** *Service Analyst Coordinator*
C130lHercules Service Department

A number of years ago Allison began equipping 501/ T56 engines with magnetic starter shaft seals. The new seals offer a significant improvement in performance over the older design, and provide a better seal with longer service life.

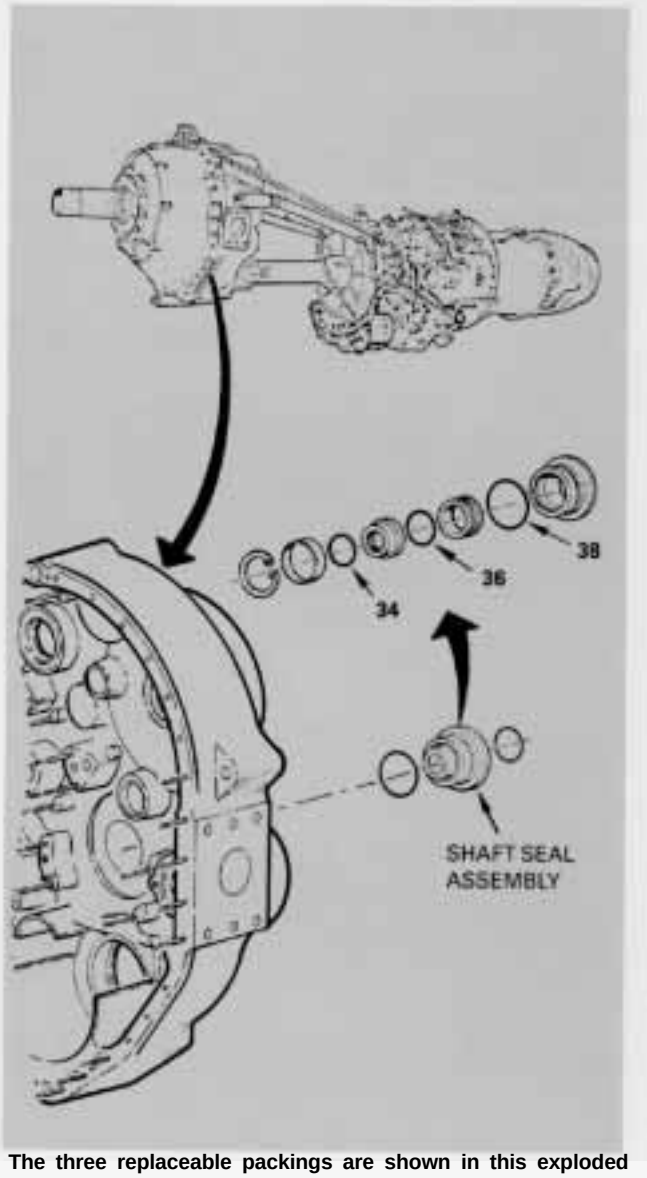
All mechanical components are subject to wear and tear, however, and eventually even starter shaft seals of the newer type may show evidence of leakage and need attention. But sometimes worn seals get more attention than they actually require. When a starter shaft seal is found to be leaking, some operators have been replacing the entire seal assembly instead of just the packings.

The seal assembly incorporates three packings. In most cases where starter shaft seal leakage has been noted, the problem can be corrected by replacing the packings instead of the relatively expensive complete seal assembly.

Overhaul kit PN 77006 is listed in T.O. 2J-T56-44 for overhaul of seals PN 6894191 and PN 6898246 for the military version of the Hercules. This kit contains the cure-date items necessary for repair of the seal assembly on the commercial Hercules also.

Unfortunately, neither the Allison l5RC4 manual nor its commercial equivalent (4RC4) list the overhaul kit, but both do list the detail cure-date items required. The necessary packings, called out in Figure 58 of Allison 15RC4 manual, are shown in the table below.

All operators of Hercules aircraft should be aware that these seal assemblies can be repaired, and take appropriate steps to obtain a supply of the necessary packings for future use.



The three replaceable packings are shown in this exploded view of the starter shaft seal assembly.

ENGINE STARTER SHAFT SEAL REQUIRED PACKINGS

PART NO.	NSN	DESCRIPTION	ITEM
6894197	5530-01-085-2034	Packing	34
6894198	5330-01-085-2033	Packing	36
6894168	5330-01-085-2785	Packing	38

Previous Page Table of Contents Next Page

Lockheed Aeronautical Systems Company
Training Systems Department
LASC-Georgia
Marietta, GA 30063