



US Department of Transportation  
Federal Aviation Administration

**MAJOR REPAIR AND ALTERATION**  
**(Airframe, Powerplant, Propeller, or Appliance)**

Form Approved  
OMB No. 2120-0020

For FAA Use Only

Office Identification

INSTRUCTIONS: Print or type all entries. See FAR 43.9, FAR 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. 1421). Failure to report can result in civil penalty not to exceed \$1,000 for each such violation (Section 901 Federal Aviation Act of 1958).

|             |   |  |
|-------------|---|--|
| 1. Aircraft | Make<br><b>Cessna</b>   | Model<br><b>T-50</b>   |
|             | Serial No.<br><b>6487</b>   | Nationality and Registration Mark<br><b>N66671</b>   |
| 2. Owner    | Name (As shown on registration certificate)<br><b>T.M. Sullivan</b> | Address (As shown on registration certificate)<br><b>454 Linden Street<br/>Shreveport, Louisiana 71104</b> |

**3. For FAA Use Only**

The (data/airframe) identified herein complied with applicable airworthiness requirements and is approved only for the above described aircraft subject to conformity inspection by a person authorized in Section 43.7 of the FAR.

*5/19/08*  
Date  
FAA Inspector *[Signature]*

**4. Unit Identification**  
SW-RTR-FSDO

**5. Type**

| Unit       | Make                           | Model | Serial No. | Repair | Alteration |
|------------|--------------------------------|-------|------------|--------|------------|
| AIRFRAME   | (As described in Item 1 above) |       |            |        | X          |
| POWERPLANT |                                |       |            |        |            |
| PROPELLER  |                                |       |            |        |            |
| APPLIANCE  | Type                           |       |            |        |            |
|            | Manufacturer                   |       |            |        |            |

**6. Conformity Statement**

|  |  |  |
|--|--|--|
| A. Agency's Name and Address<br><b>T.M. Sullivan<br/>454 Linden Street<br/>Shreveport, Louisiana 71104</b> | B. Kind of Agency<br><input checked="" type="checkbox"/> U.S. Certificated Mechanic<br><input type="checkbox"/> Foreign Certificated Mechanic<br><input type="checkbox"/> Certificated Repair Station<br><input type="checkbox"/> Manufacturer | C. Certificate No.<br><b>516585866</b> |
|--|--|--|

D. I certify that the repair and/or alteration made to the unit(s) identified in item 4 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

|                            |  |
|----------------------------|--|
| Date<br><b>1 June 2008</b> | Signature of Authorized Individual<br><i>[Signature]</i> |
|----------------------------|--|

**7. Approval for Return To Service**

Pursuant to the authority given persons specified below, the unit identified in item 4 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is  APPROVED  REJECTED

|    |                              |                |                                     |   |                 |
|----|------------------------------|----------------|-------------------------------------|---|-----------------|
| BY | FAA Fit. Standards Inspector | Manufacturer   | <input checked="" type="checkbox"/> | Inspection Authorization                                | Other (Specify) |
|    | FAA Designee                 | Repair Station |                                     | Person Approved by Transport Canada Airworthiness Group |                 |

|   |   |  |
|---|---|--|
| Date of Approval or Rejection<br><b>1 June 2008</b> | Certificate or Designation No.<br><b>AP 77A<br/>369627621</b> | Signature of Authorized Individual<br><i>[Signature]</i> |
|---|---|--|

**NOTICE**

*Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.*

**8. Description of Work Accomplished**

*(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)*

- 1.) Removed original Hayes wheels and brakes and master cylinders in accordance with manufactures erection and maintenance manual and Redline Drawing H119 (1), Installation Instructions.
- 2.) Installed Cleveland Wheel and Brake Kit No. 199-167 as follows:
  - a) Install Cleveland Wheel Assembly P/N 40-256 on existing axel. No modification to the existing axel was necessary.
  - b) Bolt Cleveland Brake Assembly P/N 30-195 to existing flange. No modification to the existing flange was necessary.
  - c) Remove existing master cylinders and replace with Cleveland Master Cylinder Assembly P/N 10-30A using existing mount and hardware.
  - d) All work done in accordance with Cleveland Wheel and Brake Drawing 20-278 and Redline Drawing H119.
- 3.) Serviced brake system in accordance with manufacturer's maintenance manual and Parker Hannifin Corporation instructions 199-167, NC 05-23-88 (289-96), 10-3-88, REV. A, (292-89) using MIL-H-5606 (Red Oil) Hydraulic Fluid.
- 4.) Operationally checked in accordance with manufacturer's maintenance manual and conditioned using Cleveland Product Reference Memo, "Conditioning Procedure For Non Asbestos Organic Brake Lining" PRM13A, Initial Release November 4, 1987, Rev A July 1, 1995.
- 5.) Weight and balance revised and entered into airframe logbook.
- 6.) System is to be maintained in accordance with Instructions For Continued Airworthiness (ICA) dated April 22, 2008. See attachment.

**BRAKE ANALYSIS AS PER 14CFR PART 23, SECTION 23.735, Cessna T-50**

Kinetic Energy of P/N 40-256/30-195 wheel and brake assembly: 500,000 ft lbs/wheel

$KE = 0.0443 \times W \times V^2$  divided by 2

KE = Kinetic Energy per wheel

W = Cessna T-50 designed landing weight = 5,700 lbs

V = Cessna T-50 power off stall speed in knots = 57.35 knots,  $V^2 = 3289$

N = Number of main wheels on aircraft = 2

Solution:  $KE = 0.0443 \times 5,700 \times 3289$  divided by 2

KE = 415,252.69 ft lbs

The braking capacity of the above assembly (500,000 ft lbs) is above the calculated required capacity of 415,252.69 ft lbs. Assembly is adequate to handle the required load.

END

■ Additional Sheets Are Attached

## INSTRUCTIONS FOR CONTINUED AIRWORTHINESS (ICA)

A/C Make: Cessna  
Revision: Original  
System: Wheels & Brakes

Model: T50 S/N: 6487 Reg. #: N66671  
Effective Date: April 22, 2008

### INTRODUCTION:

Remove original Hayes wheels and brakes. These units are no longer supported by a manufacturer and are of marginal performance. Lack of parts to maintain airworthiness was also a factor in the removal decision in that any parts still available are at least 60 years old.

Install Cleveland Wheel & Brake Kit No. 199-167. This kit provides for a modern style brake system to be used on these types of aircraft to replace the brake units available at the time of original manufacture. Several similar units have been installed on Cessna T-50 type aircraft under FAA Form 337's and have provided reliable braking and ease of maintenance. Continued airworthiness of these units is assured by using the manufacturer's instructions provided in the kit. Safety is also greatly enhanced by the installation of these brake units. Braking action is much improved over the original units and parts are available.

### DESCRIPTION:

Remove existing wheel and brake assembly and install Cleveland Wheel Assembly P/N 40-256 on existing axel. No modification to the OEM axel is necessary. Bolt Cleveland Brake Assembly P/N 30-195 to existing flange. No modification to the OEM flange is necessary. Remove existing OEM master cylinders and replace with Cleveland Master Cylinder Assembly P/N 10-30A using existing mount and hardware.

### CONTROL, OPERATION INFORMATION:

- 1) New brakes are to be conditioned using Cleveland Product Reference Memo, "Conditioning Procedure For Non Asbestos Organic Brake Lining" PRM13A, Initial Release November 4, 1987, Rev A July 1, 1995:
  - a) Taxi aircraft for 1500 feet with engine at 1700 rpm applying brake pedal force as need to develop a 5-10 mph taxi speed.
  - b) Allow brakes to cool for 10-15 minutes.
  - c) Apply brakes and check to see if a high throttle static run up may be held with normal pedal force. If so, conditioning is completed.
  - d) If static run up cannot be held, repeat steps 1 through 3 as needed to successfully hold.
- 2) For normal operation information, refer to Pilot Operating Handbook located in the aircraft.

## **SERVICING INFORMATION:**

- 1) Check level of hydraulic fluid at regular intervals by removing Brake Reservoir Inspection Plate Assembly, Cessna P/N 52581, located on nose of aircraft and unscrewing top on fluid reservoir. Replace fluid as necessary with MIL-H-5606 (Red Oil) Hydraulic Fluid only.
- 2) Measure lining thickness at each annual inspection. Linings worn to a minimum thickness of 0.100 inch (2.54 mm) must be replaced.
- 3) Check entire system for leaks prior to each flight as per Pilot Operating Handbook located in the aircraft.
- 4) Check torque of wheel assembly mounting bolts at each annual inspection to 135-145 D (in-lbs).
- 5) Check torque of back plate assembly mounting bolts at each annual inspection to 80-90 D (in-lbs).
- 6) Repack wheel bearings every 100-120 hours with MIL-PRF-81322, Grade 2 or DOD-G-24508A (Aeroshell Grease 22).

## **MAINTENANCE INSTRUCTIONS:**

On-aircraft maintenance of brake assemblies is limited to inspection of the assembly and replacement of the linings. It is not necessary to remove the wheel and brake assemblies or raise the aircraft to replace the linings.

- 1.) Block aircraft and insure that parking brake is in the OFF position.
- 2.) Remove back plate attaching bolts and washers and remove back plates, shims and insulators (if applicable).
- 3.) Slide brake caliper out of torque plate bushing.
- 4.) Carefully clean entire assembly of dirt, grease, etc. and install new linings.
- 5.) Install back plate attachment bolts and washers in brake caliper along with shims as necessary.
- 6.) Slide back plates between brake disc and wheel/tire and install back plate attachment bolts and washers into back plates.
- 7.) Torque brake assembly back plate bolts to 80-90 D (in-lbs).

## **TROUBLESHOOTING INFORMATION:**

If brake effectiveness is lost, probable cause is lack of proper amount of hydraulic fluid and/or worn lining(s). Replace fluid as necessary with MIL-H-5606 (Red Oil) Hydraulic Fluid. Consult the Cleveland Wheel & Brakes Component Maintenance Manual, Publication No. AWBCMM0001-7/USA, Issue 7, Dated April 1, 2007, Section 100 for corrective action.

Recondition brakes using conditioning procedure as set out in Cleveland Product Reference Memo, "Conditioning Procedure For Non Asbestos Organic Brake Lining" PRM13A, Initial Release November 4, 1987, Rev A July 1, 1995.

## **REMOVAL AND REPLACEMENT INFORMATION:**

Wheel Removal is not necessary unless brake torque plate is to be removed. Refer to Cleveland Wheel & Brakes Component Maintenance Manual, Publication No. AWBCMM0001-7/USA, Issue 7, Dated April 1, 2007, Section 300 (2)(a) for removal instructions.

Minimum replacement thickness on metallic and organic linings is 0.100 inch (2.54 mm). Brake disc thickness beyond 0.015 inch (0.381 mm) in either direction is cause for replacement. Refer to Cleveland Wheel & Brakes Component Maintenance Manual, Publication No. AWBCMM0001-7/USA, Issue 7, Dated April 1, 2007, Appendix A1 and A2.

## **DIAGRAMS:**

- 1) Cleveland Wheel & Brake Assembly Drawing 20-278
- 2) Redline Drawing H119.

**SPECIAL INSPECTION REQUIREMENTS:** Not Required.

## **APPLICATION OF PROTECTIVE TREATMENTS:**

Refer to Cleveland Wheel & Brakes Component Maintenance Manual, Publication No. AWBCMM0001-7/USA, Issue 7, Dated April 1, 2007, Section 300 (4)(d) for repainting; Appendix B5 and B6 for priming and stripping materials:

- 1) Conversion Coating per MIL-C-5541, Class 1A, (Alodine)
- 2) Sherwin Williams P60G2 (Primer)

- 3) Sherwin Williams F63W13 (White)
- 4) Sherwin Williams F63BXS58-4337 (Silver)

Substitution of products is permissible, provided an equivalent level of protection is produced.

**DATA:**

Cleveland Wheel & Brakes Component Maintenance Manual, Publication No. AWBCMM0001-7/USA, Issue 7, Dated April 1, 2007.

Cleveland Wheel & Brakes Technician's Service Guide, Publication No. AWBCMM0001-1/USA, Issue 1, Dated May 15, 2006.

**LIST OF SPECIAL TOOLS:**

Consult Cleveland Wheel & Brakes Component Maintenance Manual, Publication No. AWBCMM0001-7/USA, Issue 7, Dated April 1, 2007, Appendix B – Special Tools/Lubricants/Repair Materials:

- 1) Rivet Set Kit, P/N 199-1
- 2) Parker O-Ring Extractor Kit, P/N 199-18
- 3) Brake Line Bleeder, P/N 087-00500
- 4) Brake Lining Rivet Tool Kit, P/N 199-579
- 5) Antiseize Compound, SAE AMS2518 (MIL-T5544) or MIL-PRF-83482 (MIL-T-83483).

**FOR COMMUTER CATEGORY AIRCRAFT:** Not Applicable

**RECOMMENDED OVERHAUL PERIODS:** No additional overhaul time limitations.

**AIRWORTHINESS LIMITATIONS:** No additional airworthiness limitations.

**REVISION:**

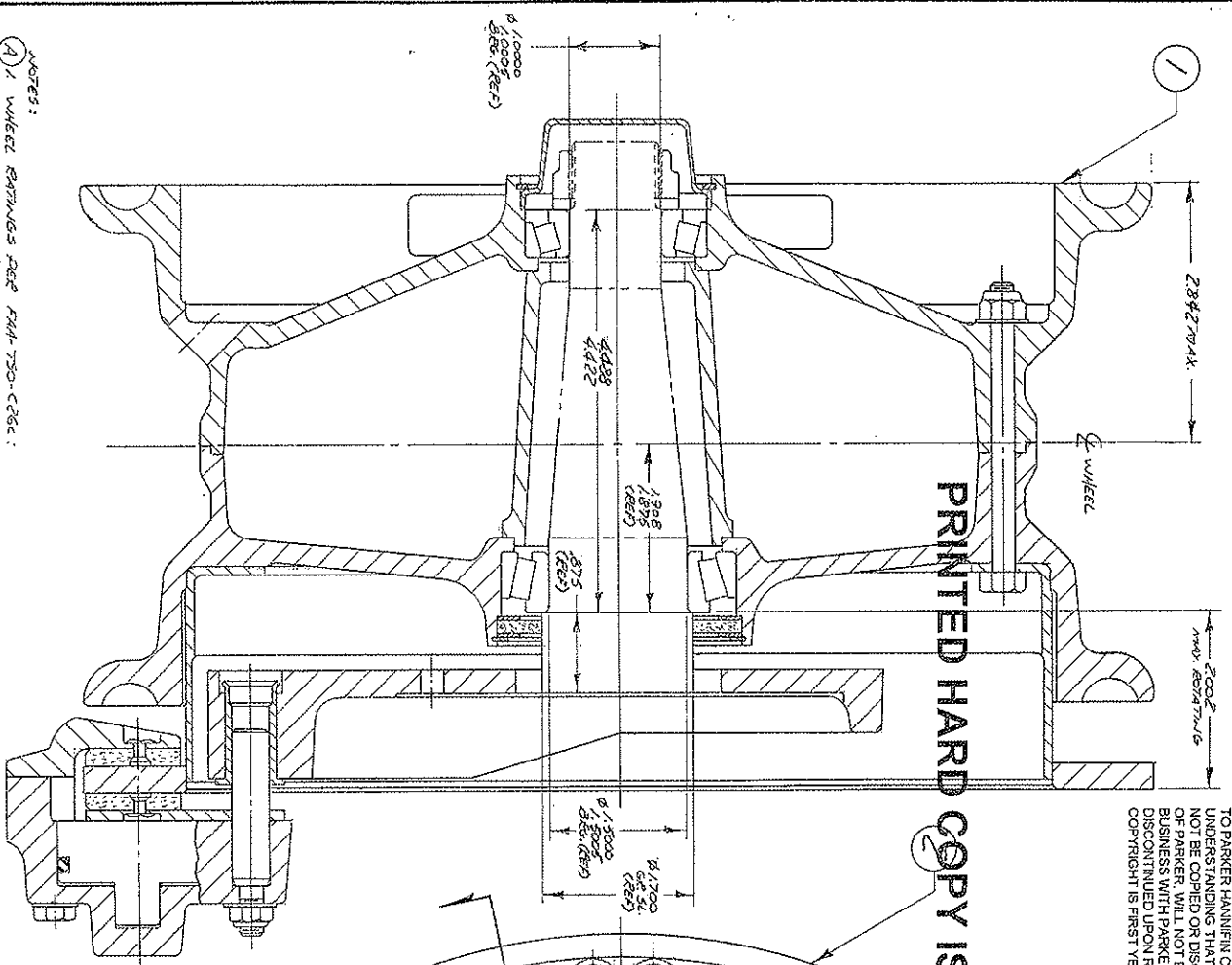
This ICA can be revised by the submission of a letter to the local FSDO along with a copy of a revised FAA Form 337 and revised ICA. Once accepted by the FSDO inspector, a maintenance record entry will be made in the aircraft logs identifying the revision, location and date of the FAA Form 337.

END



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- NOTES:
1. WHEEL RANGES PER FHM-750-C86:
  2. WHEEL LOAD = 3600 LBS.
  3. WHEEL ENERGY CAPACITY PER FHM-750-C86: 500,000 FT-LBS. 100 STOPS FROM 75 MPH AT 10 FT/SEC. DECCELERATION WITHOUT DIST. OR CRUISE CHANGE.
  4. BRAKE RATED DISAPPEARANCE: 1.60 CU. IN. MAX. WHEEL TO FULLY WEAR = 1.60 CU. IN. NOMINAL CLEARANCE TO 400 PSI = .09 CU. IN.

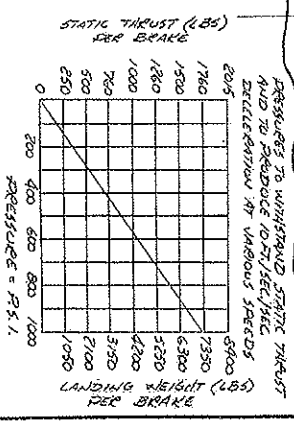
WEIGHTS:

|              |            |
|--------------|------------|
| WHEEL        | 200 LBS.   |
| DISC         | 4.97 LBS.  |
| BRAKE CYL.   | 4.00 LBS.  |
| TORQUE FLUTE | 1.60 LBS.  |
| WHEEL        | 79.77 LBS. |

| REV. | DATE     | DESCRIPTION   | MATERIAL & SPEC.  | FINISH & SPEC. | WGT. |
|------|----------|---------------|-------------------|----------------|------|
| 1    | 06-25-80 | WHEEL ASSY    | 6.5D-10 TRADE III |                |      |
| 2    | 08-19-80 | BRAKE ASSY    |                   |                |      |
| 3    | 08-27-80 | WHL/BRAK ASSY |                   |                |      |

REVISIONS TO WHIRLWIND STATIC THRUST AND TO REBRAKE TO 10 FT/SEC. VARIOUS SPEEDS DECELERATION AT VARIOUS SPEEDS

RESUBMITTED BY: Cleveland Wheels & Brakes, 1180 Center Road, Avon, Ohio 44011



|                       |            |
|-----------------------|------------|
| CHANGE NO.            | 20-278     |
| DATE                  | 08/27/80   |
| DESCRIPTION OF CHANGE | WHEEL ASSY |
| BY                    | JL         |
| CHECKED BY            | JL         |
| DATE                  | 8/27/80    |