



Application Note

Bell 206A/B

Tail Rotor Balance

Part Number: 11-200-0192

AppNote Number: A-BE206B-4040-TR (Rev. 1.1, May 2005)

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Application Note

Application Note Number	A-BE206B-4040-TR
Revision	1.1 (From Airframe Manual obtained 6/2004)
Function	Tail Rotor Balance
Airframe	Bell 206A/B
Engine	N/A
E-Setup Number	a-be206b-4040-tr.asf
ACES Systems Analyzer	Model 4040
Boot/App Version	1.04/1.05p3 or later
Procedure	N/A

Introduction

This Application Note covers the required equipment, equipment installation, analyzer setup, data acquisition and solution process for using the ACES Systems Model 4040 with the Tail Rotor Enhanced Performance Option to perform a tail rotor balance on the airframe listed above. General instructions for the use of the Model 4040 can be found in the Model 4040 User Manual #4040-OM-01 (P/N 75-900-4040) and Optical Tracker Operational Supplement #540-OM-1 (P/N 75-900-2021). All procedures for track and balance and all adjustments should be made in accordance with the Airframe Maintenance Manual.

A. Equipment Setup

Required Equipment: The following equipment is required to perform a Tail Rotor Balance:

Item	Quantity	Description	Part Number
1.	1	Analyzer, Model 4040	10-100-4040
2.	1	Option, 4040 Main and Tail Rotor	11-900-0005
3.	1	Tachometer, Optical, Phototach (New)	10-100-1773*
4.	1	Cable, Tach, Generic, 50'	10-320-0126*
5.	1	Sensor, Vibe, Accel, 991D-1	69-100-0075
6.	1	Cable, Sensor 991D-1, 50'	10-320-0163
7.	2	Mount, 1/4X28 Sensor, Vibe 1/4" Hole, S/Stl	22-430-0035
8.	1	Mount, Phototach, B-206	10-100-0486

9.	1	Tape, Reflective, Roll, 10'	10-400-0176
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*This listing shows the latest design parts. It is acceptable to perform this task using previous designs with the appropriate accessories. For compatibility issues, contact ACES Systems.

Miscellaneous Equipment

Tape or tie wraps to secure cables to airframe.

If adjustments are to be made to the tail rotor balance, use only hardware or balance weights that are specified in the applicable airframe maintenance manual.

B. Equipment Installation

1. Place the Model 4040 Analyzer (Item 1) in the flight compartment.
2. Install the 991D-1 Vibration Sensor (Item 5) into the 1/4 x 28 Sensor Mount (Item 7) and attach to the left hand side of the tail boom with the connector pointed down. **The connector must point down.** (Figure 1)

NOTE

Secure and route cables as not to interfere with hot or rotating components.

3. Install the Phototach (Item 3) into the Phototach Mount (Item 8) and attach to center gearbox fairing bolt under the tail boom where the lower fairing meets the vertical stabilizer. (Figure 2)

NOTE

See Paragraph D. 2 for additional installation instructions of Phototach and Tape.

4. Connect the end of the 50' Tachometer Cable (Item 4) to the Phototach. Wrap the Cable forward around the tail-boom away from rotating components to the cabin. Connect the opposite end of the Cable to the analyzer to "Tach 1".
5. Connect the 50' Vibration Sensor Cable (Item 6) to the Vibration Sensor. Wrap the cable forward around the tail-boom away from rotating components to the cabin. Connect the opposite end of the Cable to vibration "Channel A" on the analyzer.
6. (Optional) Number the holes on tail rotor balance wheel (Figure 3), this will aid in the application of balance weights. If this step is omitted, be sure to refer to the diagram shown in Figure 3 for the proper hole assignments when placing weight on the tail rotor balance wheel in accordance with the analyzer supplied solutions.
7. Secure all cables to the airframe to prevent them from becoming involved with any rotating components or aircraft controls.

Equipment Installation Diagram

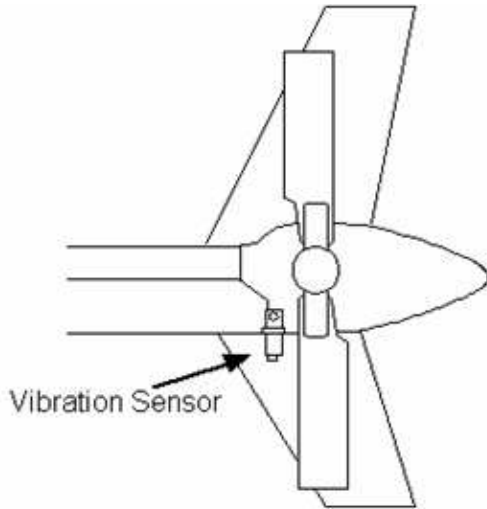


Figure 1

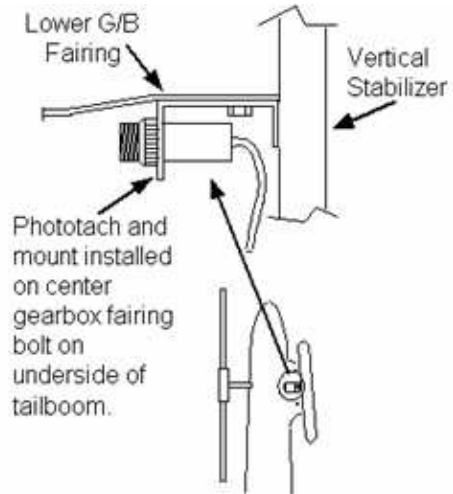


Figure 2

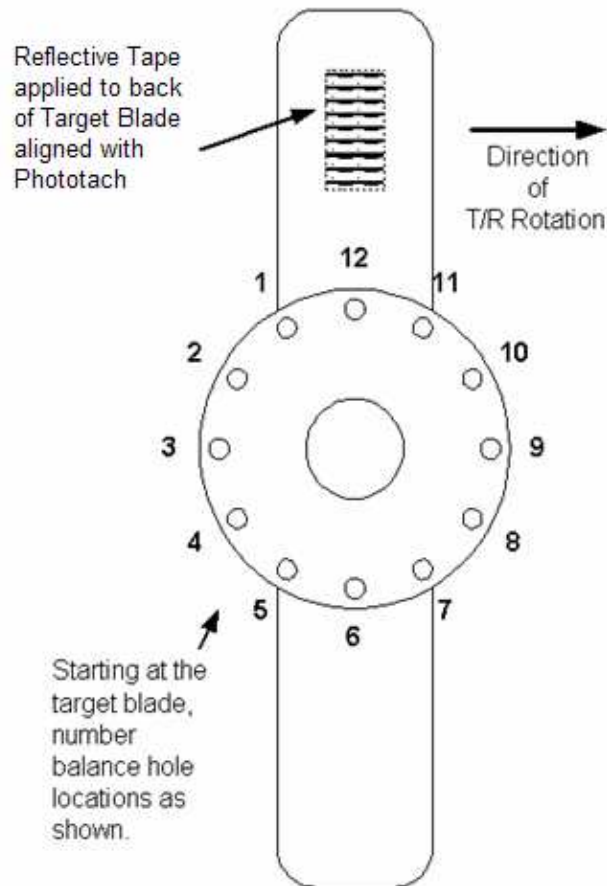
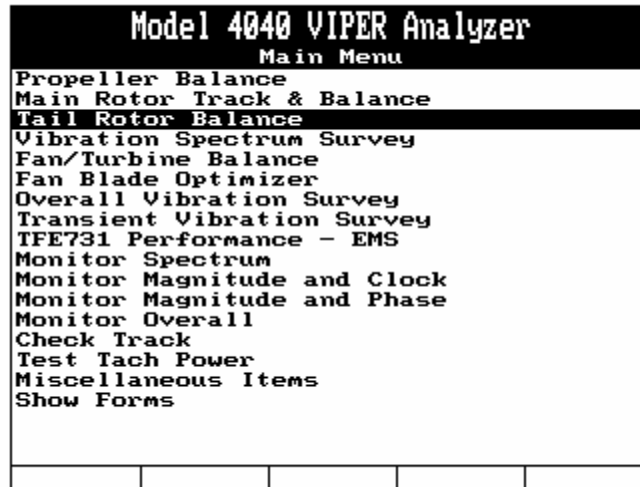


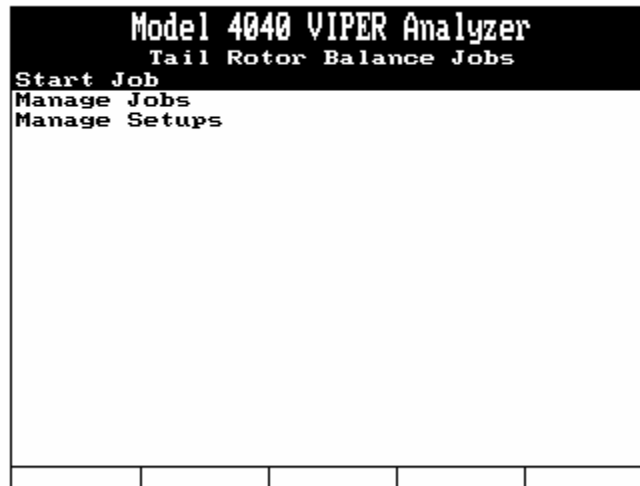
Figure 3

C. Analyzer Set Up

1. Insure the analyzer battery is charged prior to starting the job.
2. Turn the analyzer ON by pressing the [ON/OFF] key.
3. From the Main Menu shown below, select “Tail Rotor Balance” and press the [ENTER] key.



4. From the Tail Rotor Balance Menu shown below, select “Start Job” and press the [ENTER] key.



5. If the Bell 206A/B is listed in the Setup List, select it using the [↓] key, press [ENTER] and go to Section D below. If the Bell 206A/B is not in the Setup List, press the [F1], “New” key and go to step 6 below.

```

Select
Setup List
1) BELL 206A/B
2) BRAND X HELICOPTER
3) BRAND Y HELICOPTER
4) BRAND Z HELICOPTER
    
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New			Copy
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6. The “Tail Rotor Setup” screen now appears. Enter the Tail Rotor Setup as shown below. When completed press [ENTER].

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Model 4040 VIPER Analyzer
Tail Rotor Setup
Name: BELL 206A/B
Sensor Chan: A
Sensor: 991D-1

Tach Chan: 1
Tach Type: Optical
Tach Pos: 6

Balancing RPM: 2550
Rotor Direction: CW
Number of Blades: 2
Conditions: 1
Max Baln. Wts: 15.0
    
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7. The “Tail Rotor Chart Setup” screen will appear next as displayed below. Enter the information as indicated in the illustration below. Press [ENTER] to continue.

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Model 4040 VIPER Analyzer
Tail Rotor Chart Setup
Name: BELL 206A/B
Chart Type: Regular Num WtPos: 12
Grams/IPS: 10.000
WtPos  Add @  WtPos  WtPos
1      1 : 00   8
2      2 : 00   9
3                               10
4                               11
5                               12
6
7

WtPos MUST be in CW or CCW order
    
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D. Data Acquisition

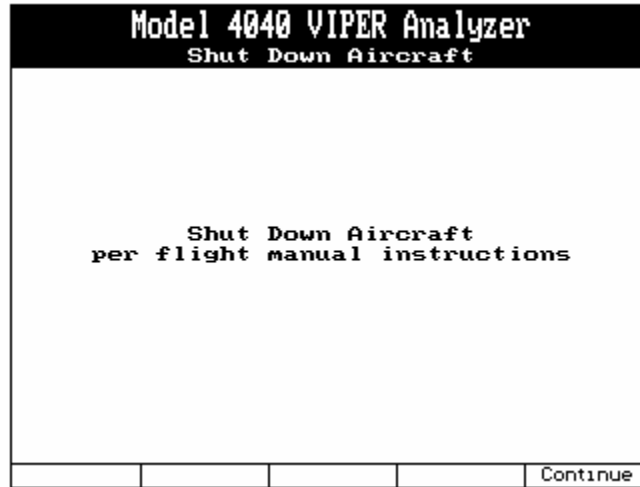
1. The “Customer Information” Screen will be displayed, as shown below. Use the analyzer keypad to enter a customer name in the “Name:” field. The analyzer will maintain a list of customer names as new names are entered. If names have been previously entered into this analyzer, you may press the [F1] “Names” key and select a customers name from the provided list. Press the [↓] key to move to the next field and use the analyzer keypad to enter the optional aircraft registration and aircraft total time as required. When all fields are complete, press the [ENTER] key to accept and continue.

Model 4040 VIPER Analyzer				
Job Identification				
Name : CUSTOMER NAME				
A/C Registration: N1234				
A/C Total Time: 123.4				
Press ENTER to continue				
Names				

2. The next screen to be displayed will be the “Tail Rotor Equipment Setup” screen as illustrated below. This screen gives instructions on installing sensors and cables. You may also check the Phototach alignment by pressing the [F1] “Tach On” key which supplies power to the optical tachometer for checking alignment with the reflective tape.

Model 4040 VIPER Analyzer				
Tail Rotor Equipment Setup				
Install the speed sensor and connect to tach channel 1				
Install vibration sensor and connect to vib. channel A				
Tach power is Off				
Tach On				

See the Model 4040 User Manual #4040-OM-01 (P/N 75-900-4040) Chapter 20 for detailed instructions on how to read the “Converging Vibration Indicator and Scale.”



5. You will be prompted to “Shut Down Aircraft” as shown above. Press [F5] to proceed. The “Review Prior Run(s) Data” screen will appear as shown below. This screen allows you to view the vibration readings that were acquired during the condition. Press [F1] to “Retake” the data or [ENTER] to continue.

Model 4040 VIPER Analyzer				
Review Prior Run(s) Data				
Run	RPM	IPS	Clock	
1	2500	0.380	1:34	
Retake #1				

6. The “T/R Sugg. & Inst. Wts” screen will present a suggested solution based on the chart created in the original setup and the vibration IPS and clock reading. You have the opportunity to install the suggested weight corrections or decide on a different corrective action. It is important that the entry under the “Enter Installed Wts” reflect the actual weight amounts and locations used.

Model 4040 VIPER Analyzer			
T/R Suggested/Installed Weights			
Run 1 Suggestion:			
Chart: BELL 206A/B			
1	2.6	2	3.3
Enter Installed Weights:			
1	2.5	11	0.0
2	3.0	12	0.0
3	0.0		
4	0.0		
5	0.0		
6	0.0		
7	0.0		
8	0.0		
9	0.0		
10	0.0		
Inst=Sugg	Inst=None		Quit Job

Using the keypad, record the actual weight(s) installed between runs and their location. In the example above, the closest available weight to the suggestion was to install 2.5 grams in hole #1 and 3.0 grams in hole #2. If you choose to remove weight from an opposite or alternate position, enter the negative adjustment. Do this by moving the highlight to the appropriate field, press the [SPACE+/-] key once to produce a (-).

To remove all values in the suggested column use the [F2] "Inst=None" key. If you decide you would like to revert back to the suggested weights use [F1] "Inst=Sugg" key.

The [F5] "Quit Job" exits the balance job with no provisions to resume the job at a later point in time. If you wish to leave the job and be able to resume it later, press the [MAIN MENU] key.

- When you have finished with the solution process, press [ENTER] and you will be taken to the "Start Aircraft" screen as shown in Paragraph 3 of this section to continue the balance process.

F. Quit Job

- Repeat steps D.3 through D.7 applying the solutions as necessary. When you are satisfied with the results, from the screen shown in Paragraph D.6 above, pressing [F5] "Quit Job" will mark the job as complete.