



Application Note

Application Note Number	A-SIH34-2020E-TR
Version	1
Function	Tail Rotor Balance
Airframe	Sikorsky H-34/S-58/S-58T
Engine	N/A
E-Setup Number	A-SIH34-2020E-TR.asf
ACES Systems Analyzer	Model 2020 ProBalancer Analyzer
Firmware Version	2.00 or > with T/R Enhanced Performance Software
Procedure	N/A

Introduction

This outline covers the required equipment, installation, analyzer setup, and data acquisition process for using the ACES Systems' Model 2020 ProBalancer Analyzer with Tail Rotor Enhanced Software for performing a tail rotor balance on the Sikorsky H-34, S-58, and S-58T helicopters. General instructions for the use of the Model 2020 can be found in user manual #2020OM-01.

A. Required Equipment

The following ACES Systems' equipment is required.

Item	Quantity	Description	Part Number
1.	1	Model 2020 Analyzer with Tail Rotor Enhanced Firmware	10-100-2020
2.	1	Vibration Sensor, 991D-1	69-100-0075
3.	1	Cable, 991D Sensor, 50 ft.	10-320-0163
4.	1	Phototach	10-100-1773
5.	1	Cable, Tachometer, 50 ft.	10-320-0126
6.	1	Mount, Sensor, ¼	22-430-0035
7.	1	Mount, Tach	22-430-0066
8.	1	Reflective Tape	10-400-0176

Optional Equipment

No optional equipment required.

Miscellaneous Equipment

Tape or adel clamps.

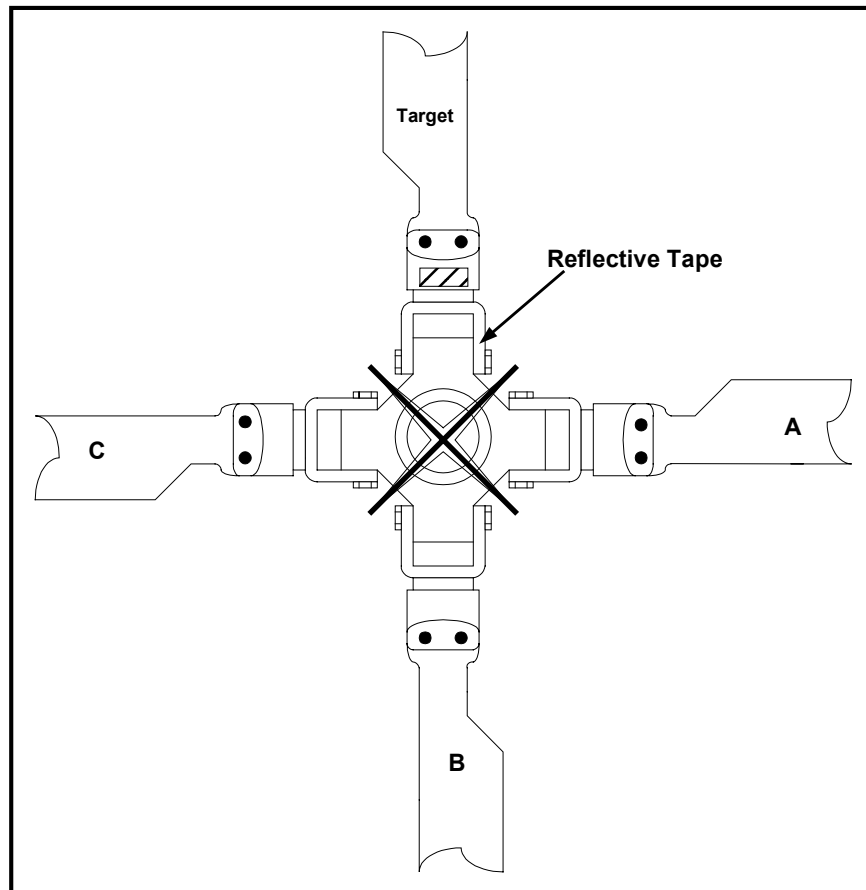
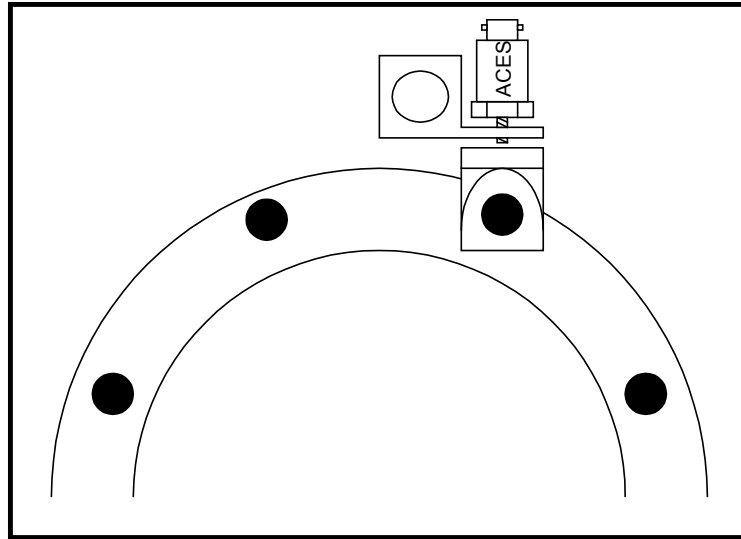
B. Equipment Installation

1. Place the Model 2020 in the cabin.
2. Remove the nut at the 1:00 o'clock position of the tail gear box as viewed from the tail rotor side of the tail pylon. Insert threaded end of sensor through mount (P/N 22-430-0066) and thread into sensor mount (P/N 22-430-0035). Tighten the sensor. Install the assembly on the tail gearbox and secure with nut. Sensor should point up.
3. Install phototach (P/N 10-100-1773) into tach bracket (P/N 22-430-0066) and secure with plastic nut.
4. Connect the end marked "991D-1" of a vibration cable (P/N 10-320-0163) to the sensor. Route the cable forward to the cabin. Connect the opposite end of the cable marked "2020" to vibration channel "A" on the Model 2020.
5. Connect tachometer cable (P/N 10-320-0126) to the phototach. Route the cable forward to the cabin. Connect the opposite end of the cable marked "analyzer" to tachometer channel "1" on the Model 2020.
6. Place a one inch piece of reflective tape (P/N10-400-0176) to the back side of the rotor. Rotate the tail rotor to verify proper alignment of the phototach and the reflective tape.

Note

When routing cables, use caution to avoid rotating components, engine exhaust system, or aircraft controls.

Equipment Installation Diagram



C. Analyzer Set Up

This section provides instruction on how to define and store an enhanced tail rotor balance setup for the Sikorsky H-34/S-58/S-58T helicopters. These steps will only have to be performed the first time you use the analyzer for this purpose, the information will be stored in the database for future use.

1. Turn the analyzer [ON].
2. From the “Main Menu”, select “Tail Rotor Balance” and press [Enter].
3. From the “Tail Rotor Balance” menu, select “Manage Setups” and press [Enter].
4. From the “Manage Setups” menu, select “New” and press [Enter].

Warning

It is important that the following setup information be entered exactly as shown, any errors may lead to low performance of jobs during use.

5. The “Tail Rotor Setup” screen appears, enter the job setup information as shown in the appropriate fields. Enter tail rotor RPM of 1300 for the H-34 and S-58. Enter 1430 RPM for the S-58T. When completed, press [Enter].

Model 2020 ProBalancer	
Tail Rotor Setup	
Name:	SIKORSKY S-58 T/R
Sensor Chan:	(A)
Sensor:	SS1D-1
Tach Chan:	(1)
Tach Type:	Optical
Tach Pos:	(1)
Balancing RPM:	1430
Rotor Direction:	(CW)
Number of Blades:	4
Max Baln. Wts:	50

6. The “Tail Rotor Chart Setup” screen now appears. Enter the setup chart influence information exactly as shown.

Model 2020 ProBalancer			
Tail Rotor Chart Setup			
Name:	SIKORSKY S-58 T/R		
Chart Type:	(Regular)		
No. of WtPos:	4		
Grams/IPS:	25.00		
WtPos	Add @	WtPos	WtPos
TARGET	6	:	15
A	3	:	15
B		:	
C		:	
WtPos MUST be in CW or CCW order			

7. When completed, press [Enter] to save the setup and return to the “Manage Setups” screen. Press [Main Menu] to return to the “Main Menu” screen.

D. Data Acquisition

This section presents the steps necessary to start a balance job, acquire vibration data, and record corrections performed prior to the next run.

1. Turn the analyzer **[ON]**.
2. From the “Main Menu”, select “Tail Rotor Balance” and press **[Enter]**.
3. From the “Tail Rotor Balance” menu, select “Start a Job” and press **[Enter]**.
4. Next, if the S-58 setup is already stored in the analyzer’s setup list, select it and press **[Enter]**. If it is not present, press **[F-1]** for a “New” setup. Define a new setup as described in the section titled “Analyzer Setup” of this application note.

Select Setup List		
1	>	SIKORSKY S-58 T/R
2	>	HILLER
3	>	BELL 47 NEW STYLE
4	>	BELL 47 OLD STYLE
5	>	SCHWEIZER 269/300
6	>	EC-120 TAIL ROTOR
7	>	S-76
8	>	BELL 407
9	>	AS355 270 NR
10	>	AS355 T/R NOMINAL
11	>	AS365
12	>	BELL 206B
New		

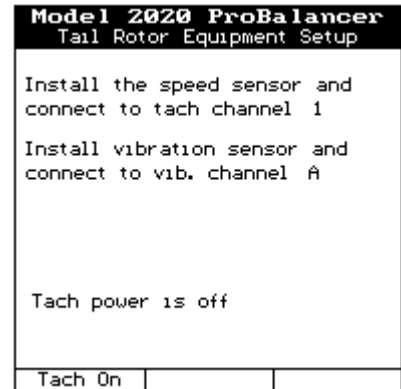
5. The “Customer Information” screen appears. You may enter this optional customer information and press **[Enter]** or skip this step by simply pressing **[Enter]**. If you have used the analyzer prior to this job, you will be able to recall a list of names to select from by pressing the **[F-1]** “Names” key. It is recommended that you enter at least a customer name, as it will aid in recalling the data at a later date.

Model 2020 ProBalancer Customer Information		
Enter the following optional Customer Information.		
Name:	YOUR COMPANY	
A/C Registrations:	N1234	
A/C Total Time:	1350	
Press ENTER to continue.		

- An equipment setup screen will appear next, directing you to install and connect the vibration sensor and tachometer sensor to the channels assigned in the job setup.

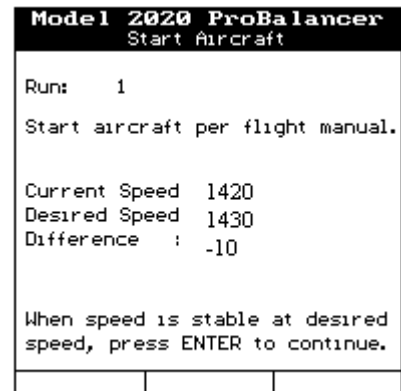
If you wish to verify proper phototach to tape alignment, press the **[F-1]** “Tach On” key. Rotate the fan until the reflective tape is in front of the phototach and verify the red LED at the rear of the phototach is illuminated. If the LED is not illuminated, refer to Chapter 15, Equipment and Accessory Setup and Troubleshooting.

Press **[Enter]** to continue.



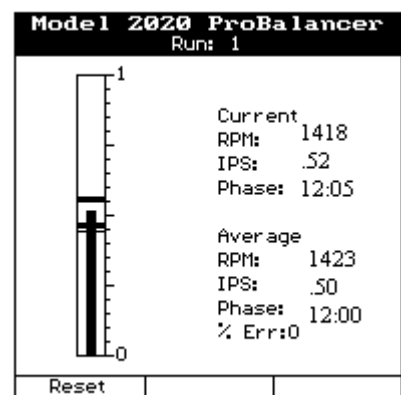
- The “Start Aircraft” screen, is presented next. This screen has an rpm monitor to allow verification of the tail rotor speed prior to acquiring vibration data.

When the rotor speed reaches the desired setting, press **[Enter]** to continue.

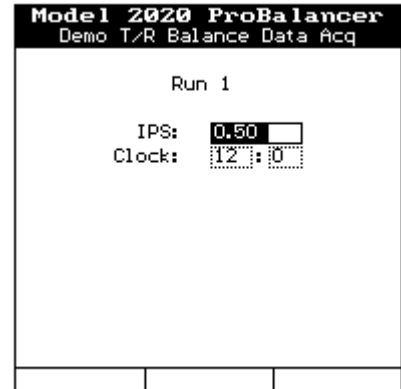


- The analyzer will now present the data acquisition screen. This screen allows you to monitor both the current and averaged vibration readings. While monitoring the measurement, you may press the **[F-1]** “Reset” key to restart the averaging process. Use this feature as a way to validate the quality of the measurement, if the averaged readings return to a value similar to that prior to being “Reset”, the measurement can be considered good. If the measurement is not similar, you may choose to reset the average again.

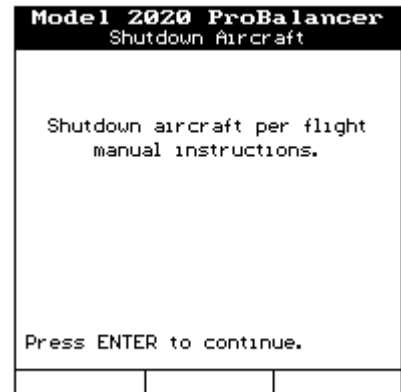
When the % error shown has reached its lowest point, press **[Enter]** to stop the acquisition process.



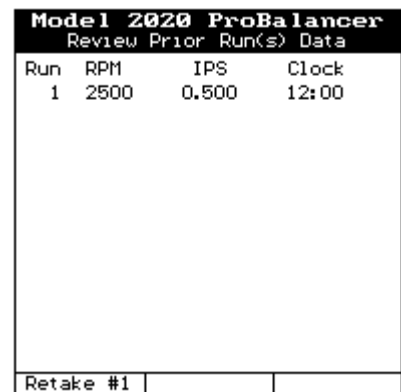
- 9. The analyzer will now display the imbalance reading. Press **[Enter]** to continue.



- 10. Shut down the aircraft and press **[Enter]** to continue.



- 11. The analyzer will now present the “Review Prior Run(s) Data” screen as shown. If you wish to re-measure the data just acquired, you may press **[F-1]** “Retake”, otherwise, press **[Enter]** to continue.



12. The solution screen will now present the recommended corrections for the current run.

The example shows a solution of adding 12.4 grams to B blade and 1.7 grams to C blade.

Using the keypad, record the actual weight(s) installed between runs and their location, 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 to produce a negative symbol (-), then enter the value of the adjustment. You must then erase the default solution as presented by the analyzer or both values will be used to calculate the new influence.

The important point to remember when installing weights and recording their positions, is that the influence for the next correction will be updated by the vibration results from the first solution, therefore you should be as accurate as possible when recording adjustments made.

If you have changed the values in the installed fields and wish to return reset the original solution, press the [F-1] “Install = Suggested” key.

If you wish to start the next run and not record any adjustments performed, press the [F-2] “Install = None” key. This will delete all data entered in the installed fields.

If you wish to terminate this job, press the [F-3] “Quit Job” key, and the job will be stored as completed.

Model 2020 ProBalancer			
T/R Sugg. & Inst. Wts			
Run 1	Suggestion:		
B	12.4	C	1.7
----- Enter Installed Wts -----			
TARGET	0.0		
A	0.0		
B	12.4		
C	1.7		
Inst=Sugg	Inst=None	Quit Job	

Note

Using the [F-3] “quit job” option will terminate the ability to resume or restart the job at a later date. 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 7 of this section, to start the next run.



Application Note

Sikorsky H-34/S-58/S-58T

Tail Rotor Balance

Part Number: 11-200-0097

AppNote Number: a-sih34-2020e-tr

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