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DYNAMIC RESPONSE OF TWO COMPOSITE PROP-FAN MODELS ON A NACELLE/WING/FUSELAGE HALF MODEL

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National Aeronautics and Space Administration
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16. Abstract

Results are presented for blade response wind tunnel tests of two 62.2 cm (24.5 in) diameter Prop-Fan (advanced turboprop) models with swept and unswept graphite/epoxy composite blades. Measurements of dynamic response were made with the rotors mounted on a simulated nacelle/wing/fuselage model, with varying tilt, at flow speeds up to 0.85 Mach number.

The presence of the wing, downstream of the rotor, induced 1-P responses that were about twice those previously measured for an isolated nacelle installation, as expected.

The swept blade had less 1-P response than the unswept (straight) blade. The 2-P response was significant for both blades, and was closely correlated to wing lift. Higher order response was not important for the straight blade, but possibly important for the swept blade near critical speeds, due to the proximity of the blade tips to the wing leading edge.

Measurements are compared with theoretically based predictions. Correlations between calculated and measured 1-P response were good for the straight blade, and fair for the swept blade.

Improvements to the calculation method were identified and implemented.

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FOREWORD

All of the testing reported herein was performed in the 4.27 m (14 foot) transonic wind tunnel at the NASA-Ames Research Center by NASA-Ames personnel, under the direction of Mr. Ronald C. Smith. Calculations of the flow field induced by the model installation in the vicinity of the Prop-Fan were performed by Dr. Joel P. Mendoza. These efforts are accomplished with the assistance and direction of Mr. Oral Mehmed of the NASA-Lewis Research Center, who was the NASA Technical Monitor for this project.

The test was supported and the test data were reduced, analyzed and reported by personnel from Hamilton Standard, a division of the United Technologies Corporation. Test support was provided by Mr. Richard C. Valentine and Mr. Arthur F. Smith. Mr. Donald J. Marshall performed the data reduction and Mr. Arthur F. Smith conducted the test data analysis and comparison to predictions. Mr. Peter J. Arseneaux performed the study to modify and improve the existing finite element analysis models. Ms. Mary E. Coyne and Ms. Carol M. Vaczy performed the blade response prediction calculations. The Project Manager was Mr. Bennett M. Brooks.

This work was accomplished under contract NAS3-24088 for the NASA Lewis Research Center in Cleveland, Ohio.

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SUMMARY

High speed blade dynamic response tests were conducted on two Prop-Fan models, one with swept and the other with unswept composite blades. These were mounted on a simulated fuselage/wing/nacelle half model.

TEST

The tests were conducted, in the NASA-Ames Research Center 4.27 meter (14 foot) wind tunnel, on the SR-2C and SR-3C-3 model Prop-Fans, operating on a simulated aircraft installation. The SR-2C and SR-3C-3 advanced turboprop models are nominally 62.2 cm (24.5 in.) in diameter, and have eight blades constructed of graphite/epoxy composite material. The SR-3C-3 model has swept blades and the SR-2C model has unswept (straight) blades. They were operated at tunnel velocities up to 0.85 Mach number. Also, the fuselage orientation was varied from -1 to 4 degrees from the freestream flow direction.

DATA ANALYSIS AND CORRELATION TO CALCULATIONS

Blade vibratory strain gage test data were reduced and analyzed to determine modal and forced response. Response trends with variations of operating parameters were studied. Non-dimensionalized blade strain sensitivities are presented as a function of rotor power coefficient.

Calculations of blade response were made using lifting line aerodynamic and finite element structural methodologies. The calculations are compared to test data. Also, fuselage installed data for the SR-3C-3 model are compared to data for that model from isolated nacelle tests.

CONCLUSIONS

1) The presence of the wing, downstream of the rotor, induced 1P responses about twice those previously measured for an isolated nacelle installation, as would be expected.

2) The swept composite blade showed less response than the unswept composite blade.

3) Measured 2P blade strain varied linearly with wing lift.

4) Higher order response for the SR-2C model was not important.

5) Higher order response for the SR-3C-3 model can be important near critical speeds due to the proximity of the blade tips to the wing leading edge.

6) Correlations between 1P dynamic response calculations and measured data for the SR-2C model were good (underprediction averaged 10 percent). For the SR-3C-3 model, 1P correlations were fair (overprediction averaged 33 percent).

7) The 2P dynamic response of both blade models was overpredicted.

8) Improvements to the calculation method were identified and implemented.

RECOMMENDATIONS

1) The improved finite element prediction method should be confirmed by additional modal and forced response calculations.

2) Existing test data for other Prop-Fan models should be reviewed to determine the extent of nonlinear effects on blade response. These nonlinear effects should be included in future improvements to the blade response calculation method.

3) The effects of unsteady aerodynamics, aerodynamic damping and stiffness, and structural damping should be investigated.

SYMBOLS

AF	Blade Activity Factor $= \frac{100,000}{16} \int_{0.2}^{1.0} \frac{b}{D} x^3\, dx$
b	Blade Section Chord Width, m
Cl	Blade Section Design Lift Coefficient
CN	Aircraft normal force coefficient
CP	Power coefficient $= 2\pi Q/\rho n^2 D^5$
D	Rotor Diameter, m
e_{total}	Total strain (statistically based) $= x_{bar} + 2\sigma$
EF	Excitation Factor $= \psi (V_{eq}/348)^2$
EF_{eq}	Equivalent Excitation Factor $= \alpha_{eq} (V_{eq}/348)^2$
N	Rotor Speed, RPM
n	Rotor Speed, revolutions/sec
Q	Rotor Torque, N-m
SHP	Shaft Horsepower
Veq	Equivalent Airspeed, knots $= V_T \sqrt{\rho/\rho_0}$
V_T	True Airspeed, knots
V_{tip}	Blade Tip Rotational Speed, m/s $= n\pi D$
x	Non-Dimensional Blade Radius
x_{bar}	Mean Strain (Statistically Based)
α_f	Aircraft Attitude (Angle of Attack) degrees
α_o	Aircraft Attitude for Minimum 1P Excitation, degrees
α_{eq}	Equivalent Inflow Angle $= \alpha_f - \alpha_o$, degrees
β_{ref}	Reference Blade Angle (at 0.78 radius), degrees
$\beta_{.75}$	Blade Angle at 3/4 Radius $= \beta_{ref} + 0.9$, degrees
ϵ	Micro-Strain
ρ	Air density, kg/m^3
ρ_0	Air Density, Standard Sea Level = 1.225 kg/m^3

SYMBOLS
(continued)

∇	Strain Standard Deviation (statistically based)
Ψ	Prop-Fan Shaft Tilt (isolated nacelle), degrees
1P	Frequency = one cycle per propeller revolution, Hz
nP	Frequency = n cycles per propeller revolution, Hz

SI units of measurement used throughout unless specified otherwise.

1.0 INTRODUCTION

Prop-Fan aircraft propulsion technology has been developing for over a decade in a joint venture between the NASA-Lewis Research Center and Hamilton Standard, a division of United Technologies Corporation. The technical and economic benefits of the Prop-Fan concept, shown during this development, are discussed in Reference 1.

Of key importance, for successful development of the Prop-Fan, is the structural integrity of the rotor hardware. This concern has been addressed by programs of both theoretical analysis and test of scale Prop-Fan models. The results of some recently completed programs studying the structural integrity of Prop-Fan models are reported in References 2, 3 and 4. These reports discuss rotors with solid metal blades, tested on an isolated nacelle, and a model with straight composite blades, tested on an isolated nacelle as well as on a nacelle/wing/fuselage half model.

Ultimately, knowledge of the integrated effect of the aircraft flow field on the Prop-Fan is essential, since the wings, pylons and/or other empennages alter the airflow in the vicinity of the Prop-Fan and may drastically affect its efficiency and dynamic structural response. As an example, much of the lost swirl due to Prop-Fan rotation can be recovered by properly shaping the wing behind the Prop-Fan (see Reference 5). In a like manner, the flow field encountered by the rotor can be tailored to either improve or worsen the vibratory response of the blade.

As part of the continuing studies of Prop-Fan structural stability and blade dynamic response, two single-rotation tractor, composite blade configurations, the SR-2C and the SR-3C-3, were tested. The SR-2C model was designed by NASA-AMES and the SR-3C-3 model was designed by NASA-Lewis with Hamilton Standard support. The models were fabricated by NASA-Ames.

Forced response tests were conducted by NASA-Ames in the 4.27 meter (14 foot) transonic tunnel, over a Mach number range of 0.6 to 0.85. The Prop-Fan models were mounted on a nacelle/wing/fuselage half model The SR-2C was tested as an eight-bladed configuration and the SR-3C-3 was tested as a four-bladed configuration. The wing on this model contained a leading edge extension (LEX), which was contoured over the wing nacelle as discussed in Reference 6. These tests were conducted during July and August of 1984. Hamilton Standard, under contract, supported the test effort, and then reduced and analyzed the structural response data acquired during these tests.

This report summarizes the results of the dynamic blade response investigation. Included are trends of measured vibratory blade strain with operating conditions for the two configurations tested. The test results are presented in the form of total vibratory strain, modal vibratory strain, P-order strain and frequency spectra. Comparisons are made between measured blade strain and calculated analytical predictions for selected test cases. Improvements to the calculation method were identified and implemented. Data trends were analyzed and recommendations are made for future Prop-Fan design and application.

2.0 DESCRIPTION OF THE EXPERIMENTAL PROGRAM

The tests described in this report were conducted on the SR-2C 8-bladed, and SR-3C-3 4-bladed Prop-Fan models mounted over the wing on a contoured nacelle/wing/fuselage half model configuration. The tests were run in the NASA-Ames 4.27 meter (14 foot) transonic wind tunnel. The primary purpose of these tests was to determine the effects of the aircraft flow field and attitude on the vibratory response of Prop-Fans at high speed, up to 0.85 tunnel Mach number.

2.1 Test Models

The SR-2C and SR-3C-3 Prop-Fan models are nominally 62.2 cm (24.5 in.) in diameter and incorporate thin airfoils (2 percent thick at the tip). The SR-2C has a straight (unswept) planform while the SR-3C-3 incorporates swept blades to achieve high aerodynamic efficiency with low noise generation. Table I is a summary of the overall design parameters for these Prop-Fans. The blades and hubs were built at NASA-Ames and the geometric shapes (aerodynamic shapes) are Hamilton Standard designs. The blades are made of unidirectional carbon fiber cloth layers in an epoxy matrix. The cloth plies are oriented in such a manner as to provide similar vibratory response frequencies as the metal SR-2 and SR-3 models, and to allow the models to be free of unstalled flutter instabilities. Further discussion of composite blade stability is found in Reference 7.

Figure 1 shows the SR-2C and SR-3C-3 models installed in the wind tunnel. Reference 3 contains a description of the geometric characteristics of these blades. The characteristics include blade twist, blade section chord, and sweep distribution, plotted as a function of radius.

Each of the blades is fitted with a gear sector at the end of the shank which meshes with a ring gear in the hub to synchronize blade pitch. The pitch angle of all blades (collective pitch) is ground adjustable. It may be readily changed by relocation of a pin which locks the ring gear to the hub.

The wind tunnel facility used for these tests was the 4.27 meter (14 foot) transonic wind tunnel at the NASA-Ames Research Center, in California. This is a closed-circuit tunnel equipped with an adjustable, flexible-wall nozzle and a test section with four slotted walls. The air circuit is closed except for the air exchanger, which is located in the low speed plenum section. The exchanger is controlled in order to maintain suitable air temperature. Airflow is produced by a three-stage, axial-flow compressor powered by three variable-speed, electric motors mounted in tandem and rated at 82,000 kw (110,000 horsepower) total power.

The SR-2C model was tested in the full 8-bladed configuration. Test rig limitations dictated that the SR-3C-3 model be tested in a 4-bladed configuration.

The SR-2C and SR-3C-3 models were mounted in an over-the-wing contoured nacelle on a wing/fuselage half-model. This half-model was fastened to a balance in the tunnel floor. The balance was used to measure the aerodynamic forces on the model installation. The aircraft attitude could be changed remotely in pitch during the testing. References 6 and 8 discuss this installation. The model Prop-Fan was powered by an air turbine mounted within the nacelle which was supplied by air routed up through the wing. The turbine supplied up to 545 kilowatts (730 horsepower) of power to the rotor.

2.2 Model Instrumentation

Foil strain gages mounted on the cambered (suction) surface of selected blades were used to measure vibratory surface strain due to blade dynamic response. The strain gages were mounted by NASA-Ames personnel, at locations recommended by Hamilton Standard.

The strain gages were located at points along the blade mid-chord where the vibratory strains were calculated to be high. Figure 2 shows the locations of the strain gages as they were applied to the blades. The blades of each rotor were numbered for identification of strain gage instrumentation. Looking upstream, the SR-2C blades were assigned the numbers 1 through 8 consecutively in the clockwise direction. The SR-3C-3 blades were assigned the numbers 2, 4, 6, and 8, in the clockwise direction. The blade strain gages are identified by BGx-y, where x is the blade number and y is the gage number, as shown in Figure 2.

On the SR-2C model the gages were used to measure inboard bending, inboard shear (torsion), and mid-blade bending on blade number 3, and inboard bending on blade number 1. On the SR-3C-3 model, inboard and mid-blade bending were measured on blade number 4, and inboard bending and shear were measured on blade number 8. A description of the gages and their locations is found in Table II.

The strain gage signals were routed through a slip ring assembly located within the nacelle. The output was ultimately directed to magnetic tape recording equipment.

2.3 Test Procedures

The tunnel airflow was brought up to speed with the Prop-Fan wind-milling (zero power). Its rotational speed was dependent on the blade pitch angle setting. The model rotational speed, at this fixed blade angle and fixed tunnel Mach number, was incrementally increased by increasing the power to the rotor. This was done until an operating limit, such as a blade stress limit, rig power limit or rotational speed limit was reached. The maximum allowable rotational speed was 8500 RPM for the SR-2C and 7000 RPM for the SR-3C-3, determined by safety limits for rig unbalance in case of blade loss. This procedure was repeated for various aircraft attitudes and tunnel Mach numbers, which were varied from the control room.

The tunnel was shut down in order to change blade pitch angle (ground adjustable). An inclinometer was used to set the blade pitch angle at the reference location (reference blade angle) prior to tunnel start up. The reference location for the SR-3C-3 and the SR-2C models is the 0.78 radius. The blade/hub collective pitch mechanical arrangement allowed the measurement of blade angle for a single blade to be used for this adjustment. However, the blade angle of each blade was measured, and the average of those values was used for reporting.

2.4 Test Conditions

The operating parameters that were varied during the test were Mach number, aircraft attitude, blade angle and rotor RPM. All of these parameters, except blade angle, were remotely controllable from the control room. The Mach numbers, blade angles, and rotor shaft tilt angles which were tested are summarized in Table III. The rotational speeds which were tested range from 3740 RPM to 7000 RPM for the SR-3C-3, and 5677 RPM to 8532 RPM for the SR-2C. The RPM was increased in 500 RPM increments, from the windmilling RPM to the RPM limit. The operating conditions for each test run, may be found in Appendix II.

Figure 3 shows the operating envelopes for this test. These boundaries include the RPM limits encountered, defined by windmilling, the maximum drive power available, or a pre-determined limit of 7000 RPM for the SR-3C-3 and 8500 RPM for the SR-2C. The upper bounds on tilt angle and blade angle were generally limited by blade strain limits. A set of operating boundaries is shown for each Mach number tested.

It should be noted that the aerodynamic conditions for these wind tunnel tests differ from the Prop-Fan design cruise operating condition at 10668 meters (35000 feet) altitude because of a large air density difference. The near sea level density of the wind tunnel results in a higher dynamic pressure for blade tip relative Mach number similarity.

2.5 Data Reduction

Two types of magnetic tape data were provided to Hamilton Standard by NASA-Ames. One contained the operating condition data in digital form, and the other contained the strain data, in analog form. The first type (condition data) was used during the data reduction process to formulate the operating condition tables and data trend summary curves.

The second type (strain data) was also processed at Hamilton Standard using a computer based instrumentation data tape playback system. The time varying strain gage signals were passed through a scaling amplifier and then through vibratory peak detectors. Positive and negative amplitudes were averaged over specific time intervals. The peak detector output was then sampled by an analog to digital converter and calibrated in engineering units for subsequent storage in computer memory. The data were then processed by a computer based analysis system.

Once the sampled data resided in computer memory, a statistical, total treatment of the data was used to define the "total strain". For the present work. Total strain is defined by the mean value of the time-varying strain half amplitude (zero to peak), plus 2 times the standard deviation of the strain amplitude, as measured during the sample record period. That is:

$$\epsilon_{total} = x_{bar} + 2\nabla$$

The instantaneous strain amplitude will be below this level 97.72 percent of the time during the data sampling period. That is, only 2.28 percent of the measured vibratory strains will be above this value. Note that "total strain" levels determined by this method will generally be higher than levels determined by a data sample average process, such as spectral analysis.

The core of the data analysis system is a high speed mini-computer. This computer was used to process and store the total strain data on a dual rigid disk drive. These data were later used to create trend summary plots of total strain vs. RPM and other test operating variables.

The data analysis system also performed a spectral analysis of the analog blade strain data. The spectral data (in digital form) were then stored on a disk for every steady state run analyzed. An algorithm for the computer, developed at Hamilton Standard, determined the peaks of the spectral data above a specified threshold level. Tables of P-order values and trend summary plots were made from these data and will be discussed later in the report.

3.0 DATA ANALYSIS

The test data for the SR-2C straight blade and the SR-3C swept blade were analyzed. The trends of vibratory blade response with variations of operating parameters were determined. Results for the SR-2C straight blade and the SR-3C-3 swept blade were compared. The test results are presented in the form of blade vibratory strain amplitudes and spectra. Also, measured and calculated blade natural frequencies are compared and test data trends in terms of non-dimensional parameters are presented. In addition comparisons are made between isolated nacelle and nacelle/wing/fuselage test data.

3.1 Total Vibratory Strain Measurements

Blade vibratory strain measurements were made, as described in the report instrumentation section (2.2), during wind tunnel testing of each Prop-Fan operating on the simulated nacelle/wing and fuselage combination. The angle of attack of this simulated aircraft was varied to change the inflow angle into the propeller, for a variety of operating conditions (blade angle, RPM, tunnel Mach number). As previously discussed, the total strain amplitude was defined, using a statistical approach, as the mean of the vibratory amplitude (zero to peak) plus twice the amplitude standard deviation (represented by $x_{bar} + 2\nabla$, see section 2.5).

Total strain measurements were obtained for all of the steady state runs made during the testing, and a table of these values is found in Appendix I. The table includes total strain values for all of the gages (listed by run number). A run number identifies a data sample taken at a single operating condition. The operating conditions that these runs represent are found in Appendix II.

For this study, trend plots of total vibratory strain were made for variations of operating condition, for all of the steady state runs. Total strain was plotted as a function of rotational speed (RPM) for various fuselage attitudes, combinations of blade angle, and Mach number. These trends are shown in Figures 4 through 8 and are discussed below.

RPM Trends. Figure 4 contains plots of inboard bending total vibratory strain as a function of rotational speed, at a constant Mach number of 0.6, for both the SR-2C and SR-3C-3 models at various fuselage attitudes (fuselage angles of attack).

The high stress regions shown in Figure 4 are indications of critical speeds for the blades. The SR-2C has strain peaks near 6000 RPM and just above 8000 RPM, while the SR-3C-3 has strain peaks near 4000 and 7000 RPM. These critical speeds are discussed in further detail in Section 3.3.

Similar plots of measured total blade strain, but at a tunnel Mach number of 0.8 and for three blade strain gages, and shown in Figures 5 and 6.

Figure 5 shows SR-2C model response data. The highest strain for the bending gages again occurs near 6000 RPM, indicating a blade critical speed. However, the shear strain is almost constant with RPM. The critical speed appears to be due to excitement of one or more bending modes, to which the shear gage does not respond (Section 3.3).

Figure 6 shows response data for the SR-3C-3 model. The high strain regions for each gage indicate response to critical speed excitations. Further analysis of critical speeds is discussed below (Section 3.3).

Fuselage Attitude Trends. Some of the total strain data have been crossplotted in Figures 7 and 8 in the form of total stress vs. fuselage attitude. Also shown in these figures are once per revolution (1P) vibratory strain components, which are discussed below.

Figure 7 shows the SR-2C total inboard bending strain (BG3-1) at a rotational speed of 8000 RPM and Mach numbers from 0.6 to 0.85, and blade angles from 50.8 degrees to 56.6 degrees.

Figure 8 shows the SR-3C-3 total inboard bending strain (BG4-1) at a rotational speed of 6000 RPM and Mach numbers from 0.60 to 0.8, and blade angles from 58.8 degrees to 62.7 degrees.

The total strain data all show variations with fuselage attitude that are approximately hyperbolic in shape. Note that the fuselage attitude yielding the minimum total strain increases somewhat with increasing Mach number. This minimum does not appear to be affected by rotor power (blade angle). The minimum total strain values for these data are about 500 micro-strain.

It will be shown below, that the total strain contains significant contributions by two and three per revolution (2P and 3P) strain components, in addition to the 1P components.

3.2 Spectral Analysis

Spectral analysis of the strain gage signals was used to identify the harmonic P-order and non P-order (modal) responses of the blade. P-order responses are blade strain responses at frequencies which are integer multiples of the Prop-Fan rotational speed. Modal responses occur at the natural frequencies of the blade vibratory modes. Computer spectral analyses were conducted for all of the steady state runs. A table of the P-order harmonic values, derived from these data, is given in Appendix II. Also, spectral plots were made from these data for selected test runs as discussed in this section.

SR-2C Response. Figures 9 and 10 show typical samples of the spectral plots for the SR-2C blade response to angular inflow at several Mach numbers. Each figure shows the strain response spectrum of the inboard bending gage, the outboard bending gage and the outboard shear gage. The test operating conditions for the data in these figures are as follows:

	Mach No.	Fuselage Angle of Attack	RPM
Figure 9	0.6	4.0 degrees	7000
Figure 10	0.8	-0.0 degrees	6900

Both curves show substantial amounts of 60 Hertz noise and multiples thereof, probably due to contamination of the signal with power line interference the exact source of this noise is unknown, but the amplitudes of the spikes were small in comparison to the strain amplitudes. For this reason, this noise was ignored.

Blade strain data for both operating conditions show significant amounts of 4P and higher P-order response. Figure 10 shows a higher 1P vibratory strain value than that of Figure 9. This is because the angular flow effects are more severe for the higher Mach number even though the fuselage angle-of-attack is smaller. All of the bending gages show response to the first mode at around 220 Hz, while the outboard bending shows some higher mode response at around 530 Hz. The shear gage also shows higher mode response at 650 Hz.

SR-3C-3 Response. Figures 11 and 12 are spectral plots showing the blade vibratory strain response of the SR-3C-3 blade operating at a Mach number of 0.6, a fuselage angle of attack of -1.0 degree, and a blade angle of 62.7 degrees. Figure 11 data were measured during operation at 3800 RPM. Figure 12 data were measured during 6000 RPM operation.

Figure 11 for 3800 RPM operation, shows a large 1P and 3P response. Figure 12, for 6000 RPM operation, shows a large 1P and 2P response for the inboard bending and outboard bending strains. At angular inflow conditions, the 1P response generally dominates. Response magnification due to the presence of the first mode critical speed, causes the high 3P response at 3800 RPM, and the high 2P response at 6000 RPM. This is discussed further in the next section. The shear gage does not show this effect, because there is little first mode response in shear.

3.3 Campbell Diagrams

The critical speeds for the SR-2C and SR-3C-3 models are shown in the Campbell diagrams in Figure 13. Critical speeds are defined as the rotational speed at which a blade natural mode frequency crosses a p-order excitation frequency. This is sometimes known as a critical speed "crossover".

Measured and calculated blade natural frequencies are shown in Campbell diagrams in Figure 13, for several modes for each blade from spectral data. Measured frequencies were determined from spectral data. The calculated mode frequencies are discussed later in this report (Section 4.2). Of primary interest is the first mode/2P crossover critical speed, since it generally is a major source of blade response. As such, it is to be avoided during operation if possible. It is noted that during this test critical speeds were encountered, which resulted in high measured strains at about 3800 and 6000 RPM for the SR-3C-3, and about 6000 and 8100 RPM for the SR-2C.

3.4 P-Order Analysis

A digital computer program was used to search the spectral data previously stored on disk (see section 2.5), and to pick out the values of strain amplitudes at the spectral peaks. These "peak values" were separately stored on disk for subsequent tabulating and plotting. Only peaks above an arbitrarily chosen threshold level were saved. In the present study, the cut-off strain value was 0.5 micro strain.

A table of the P-order harmonic values of vibratory strain (up to 6P), tabulated according to reading number, is given in Appendix II. The values were tabulated for the following gages on the SR-2C; inboard bending on blades 1 and 3, BG1-1 and BG3-1, mid-blade shear on blade number 3, BG3-2, and outboard bending on blade number 3, BG3-4.

Values were also tabulated for the following gages on the SR-3C-3; inboard bending on blades number 4 and 8, BG4-1 and BG8-1, outboard bending on blade number four, BG4-2, and outboard shear on blade number 8, BG8-3. Also tabulated were run number, Mach number, fuselage attitude, blade angle, Prop-Fan rotational speed, shaft power, and power coefficient.

If the rotational speed of the rotor drifts during a test run, the frequency of a harmonic peak will also drift. Then, the value of the harmonic peak will be reduced due to frequency smearing. This error can be as great as 10 percent, although it is typically less.

For a number of selected test cases, a harmonic order analysis was performed on the strain data. This is a spectral analysis which is triggered by the rotor once-per-revolution signal. The purpose of this special procedure, called data speed correction, was to refine the tested P-order strain values for comparison to calculations. These results are discussed further in section 4.3.

3.5 Effect of Fuselage Attitude on 1P Strain

Total and 1P vibratory strains were plotted in Figures 7 and 8 as a function of fuselage attitude for different combinations of blade angles and Mach numbers, for the SR-2C at 8000 RPM and for the SR-3C-3 at 6000 RPM.

The curves in Figures 7 and 8 show variations of 1P strain with fuselage attitude. The 1P strain decreases linearly with increasing fuselage attitude, with the minimum strain value dropping very close to zero. At higher attitudes the 1P strain then increases linearly with increasing attitude.

Since the 1P response has a minimum near zero, this indicates that there is very little 1P distortion to the inflow at that operating condition. 1P inflow distortion can be due to a combination of both pitch and yaw effects. Pitch related effects include fuselage attitude, nacelle downtilt and wing upwash. Yaw related effects include streamline divergence due to the presence of the fuselage and nacelle. They are fairly independent of pitch. To counteract yaw inflow effects, nacelle toe-in (see Figure 1) is usually applied. Since the minimum measured 1P responses are nearly zero, this is an indication that the Prop-Fan toe-in angle is properly adjusted for this aircraft configuration.

It is seen that the total vibratory strain is substantially higher than the 1P vibratory strain. This is due to two factors.

1) The total strain consists of many vibratory components and the 1P vibratory strain is only part of the total signal.

2) The 1P vibratory strains are data sample averages (RMS values) taken over 30 second intervals, as needed to produce the spectral analyses. The total strain is the statistically highest strain over about 97% of the data sample. The total vibratory strain and 1P strain measured by these methods, will have the same magnitude only if the signal was comprised of 1P, and had a constant amplitude for the data sample period.

From Figures 7 and 8, it is observed that the minimum 1P vibratory strain occurs at a fuselage attitude between 2.3 and 3.4 degrees, depending on the Mach number. Figure 14 contains curves showing the average fuselage attitude giving 1P minimum vibratory strain, plotted as a function of Mach number. Data are shown for each model tested.

There is a small difference of about 0.14 degrees between the two curves of Figure 14. A possible explanation for this slight difference may be that there were only four blades in the SR-3C-3 configuration tested, while there was a full complement of eight blades in the SR-2C configuration. The SR-2C produced more thrust and absorbed higher power and hence blew more air over the wing, causing greater circulation (upwash). Thus, a slightly smaller fuselage attitude (wing angle-of-attack) would be required to offset the nacelle droop, to achieve minimum vibratory strain for the SR-2C model.

This effect is also seen in the scatter of data for each blade model, which is due to testing at different Prop-Fan blade angles (power). It can be concluded from the small magnitude of these variations, that the effect of rotor power and thrust on wing lift, and thus flowfield, is small. This confirms the validity of neglecting thrust in the flowfield calculations. This calculation is discussed in section 4.1.

3.6 Higher Order Vibratory Strain

For realistic Prop-Fan installations, higher order vibratory blade strain can be significant. As an example, the presence of a swept wing behind the Prop-Fan generates 2P vibratory blade loads, from wing induced flow variations in the plane of the Prop-Fan. For this test, measured blade strain had significant 2P and 3P components.

2P Response. Figures 15 and 16 show 2P micro-strain amplitudes for the SR-2C and the SR-3C-3 models, respectively. These data are given for the same operating conditions as in Figures 7 and 8 where the 1P strain components are shown. Here, the 2P micro-strain is plotted as a function of fuselage attitude, for various blade angles and Mach numbers.

Both the SR-2C and the SR-3C-3 data indicate large amounts of 2P vibratory blade strain. The 2P contribution is highest when operating at or near a critical speed. The rotational speeds for the data shown were chosen so as to avoid the effects of critical speed. Mach number and blade angle show little effect on 2P amplitude. However, fuselage attitude has a substantial effect.

The 2P vibratory strain increases linearly with fuselage attitude. The minimum or zero value is at some negative fuselage attitude. Extrapolating the 2P curves of vibratory strain for the SR-2C model, gives a zero strain value close to -3.0 degrees of fuselage attitude. The SR-3C-3 and SR-2C models show equivalent 2P vibratory strains at similar blade angles.

The above results are consistent with the propeller aerodynamic theory that predicts 2P blade airload excitation due to wing sweep (see Reference 9). If the 2P response is primarily due to excitation caused by wing sweep (differences in upwash at the upgoing and downgoing blades), then it should be expected that the 2P response should be minimum at a fuselage attitude for zero lift.

Figure 17 is a curve of lift coefficient (for the entire half-span aircraft model) plotted as a function of fuselage attitude, for the model aircraft with the SR-2C Prop-Fan installed. This curve displays data for 0.80 Mach number operation, at several Prop-Fan rotational speeds. All RPM curves converge on the zero lift crossover point at approximately -2.5 degrees fuselage attitude. Other Mach numbers show zero lift occurring at the same fuselage attitude. This is close to the fuselage attitude for minimum 2P strain response (-3.0 degrees) that was extrapolated from measured data. It is recommended that negative fuselage attitudes be included in future testing to more closely determine the attitude for zero 2P response.

3P Response. The 3P response for the SR-2C is small, so it will not be discussed here. However, the 3P response for the SR-3C-3 has a significant amplitude. This can be verified by the data in Appendix II. The 3P vibratory strain response of the SR-3C-3 was plotted as a function of fuselage attitude for various rotational speeds in Figure 18. Here, the 3P vibratory strain is a strong function of rotational speed, where the strain decreases for increasing rotational speed. From the Campbell diagram in Figure 13, it may be concluded that there is a 3P critical speed crossover at 4000 RPM, which would explain the high strain values at the lower rotational speeds.

The observation that the SR-3C-3 has higher 3P vibratory strain than the SR-2C can be partially explained by the location of the critical speeds. Also, some of the 3P aerodynamic excitation may be due to the sweep of the SR-3C-3 model blades. In addition, the tip of the SR-3C-3 blades were located within one inch (~ 1/2 tip chord) of the leading-edge of the inboard side of the wing. This small tip clearance will cause significant higher order excitation due to the effect of a local wing blockage. This effect will be smaller for the SR-2C straight blade model, which had a larger tip clearance.

3.7 Strain Sensitivity

Strain sensitivity is a term used in the analysis of blade dynamic response. It is defined as the vibratory strain (usually 1P vibratory strain) divided by another term, know as the excitation factor (EF). The excitation factor is defined for a rotor in pure angular inflow (isolated nacelle) by the following relationship:

$$EF = \Psi (V_{eq}/348)^2$$

where Ψ is the nacelle tilt angle in degrees, and V_{eq} is the equivalent airspeed in knots. The excitation factor is proportional to rotor shaft tilt angle and to free stream dynamic pressure. It can also be thought of as being proportional to blade aerodynamic unsteady loading. Normalization of strain by EF has been demonstrated to be a valid way to account for the effects of shaft tilt and dynamic pressure, see References 2, 4 and 10.

Since this discussion is about an aircraft configuration, consider the aircraft angle of attack (fuselage attitude, α_f). Recall that the 1P vibratory strain does not go to zero when the fuselage attitude is zero, see Figures 7, 8, and 14, as would be the case for an isolated nacelle installation. The attitude for which the vibratory strain is minimum can be defined as α_o. An equivalent excitation factor can be defined for the aircraft configuration based on the difference between the actual fuselage attitude and the attitude of minimum vibratory strain. This is shown graphically in Figure 19.

Equivalent inflow angle is defined as:

$$\alpha_{eq} = \alpha_f - \alpha_o$$

The equivalent excitation factor is:

$$EF_{eq} = \alpha_{eq}(V_{eq}/348)^2$$

The strain sensitivity can now be defined for an aircraft by dividing the blade strain by the equivalent excitation factor, having the units of strain per degree. Noting, as before, that the strain is linear with variations in attitude, the strain sensitivity is the slope of the curve. This slope is the same value at all fuselage attitudes, for any particular operating condition. Therefore, strain sensitivity is independent of fuselage attitude.

3.8 Power Coefficient

The effect of rotor power variation on blade strain can be studied through the use of the term "power coefficient". This term has been in use for many years, in application to propeller data analysis. The power coefficient is a non-dimensional function of the dynamic pressure, due to rotational speed at the blade tip, rotor torque and diameter cubed. That is, everything else held constant, the power the rotor absorbs is proportional to the tip dynamic pressure and diameter cubed. Power coefficient is defined as:

$$C_p = \frac{2\pi Q}{\rho n^2 D^5} = \frac{\pi^3 Q}{1/2 \rho V^2_{tip} D^3}$$

where ρ = air density in kg/m^3, Q = rotor torque in N-m, n = rotational speed in revolutions per second, V_{tip} = blade tip rotational speed in m/s, and D = rotor diameter in m. Use of the power coefficient normalizes the effect of rotor size and speed in the data. In the range of linear aerodynamics, the power coefficient includes the effect of blade angle.

3.9 Strain Sensitivity vs. Power Coefficient

Strain sensitivity is plotted against power coefficient for the SR-2C and SR-3C-3 model Prop-Fans mounted on the simulated model aircraft, in Figures 20 and 21, respectively. Curves are shown for Mach numbers of 0.6, 0.7, 0.8, and 0.85 for each configuration. Points are plotted for each steady state condition. These data encompass variations in blade angle, rotational speed, and fuselage attitude.

Note that there is some scatter present in the data. This may be due to several factors, involving data for which the equivalent inflow angle was small (less than one degree). At small equivalent inflow angles, the blade strain is small and normal experimental variations are large percentages of the mean strain. Also, the equivalent inflow angle itself is calculated using an angle for minimum strain which is an approximation of data at several operating conditions (see Figure 14). Although these variations are small, they can cause larger variations in the strain sensitivity for small strain.

Note that the SR-3C-3 model Prop-Fan was run in a four-way configuration. The values of power coefficient for these data were doubled for comparison to eight-way Prop-Fan data, to account for the effects of rotor solidity. Therefore, the data points in Figure 21 represent test cases for which the power coefficient value has been multiplied by two.

Both model Prop-Fans show a trend of strain sensitivity increasing with increasing power coefficient. The unswept SR-2C model generally shows higher strain sensitivity than the swept SR-3C-3 model. This reduction of blade response with sweep was also seen in tests of the solid metal blade Prop-Fan models (Reference 4). Thus, the benefits of sweep in reducing blade vibratory response apply also to blades of composite material construction.

3.10 Data Comparison with the Isolated Nacelle Tests

In addition to the data observed during this test at NASA-Ames, data are shown in Figure 21 that represent the results of structural dynamic response tests for the SR-3C-3 on an isolated nacelle, tested at NASA-Lewis in an eight-way configuration (see Reference 9).

Figure 21 shows that the 1P vibratory strain sensitivities for the SR-3C-3 Prop-Fan installed on the aircraft model, are almost twice the values measured during the isolated nacelle test conducted at NASA-Lewis. This indicates that the 1P vibratory strain response for a Prop-Fan installed on an aircraft increases at twice the rate as the response for an isolated nacelle configuration with a change in attitude, or angle-of-attack. This is consistent with the fact that the inflow angle at the Prop-Fan on an aircraft has both a component due to a change in rotor attitude, and a component due to a change in wing circulation or lift.

4.0 THEORETICAL PREDICTIONS AND COMPARISONS TO TEST DATA

Comparisons are presented between measured blade strain and calculated analytical predictions for selected test cases. These comparisons are useful to validate and improve the prediction methods. An accurate analytical model for blade response is a key element in the development of an optimum blade design.

4.1 Analytical Techniques

Extensive use was made of the MSC/NASTRAN finite element analysis computer program, described in Reference 11, for the n-P structural dynamic analysis of the SR-2C and SR-3C-3 model blades. Careful modeling techniques are required in order to create a finite element model that gives accurate results for a Prop-Fan blade.

Initially, a finite element model for the SR-3C-3 blade provided by NASA-Lewis was used. This model was composed of CTRIA3 elements, and a schematic representation of the model is shown in Figure 22. Later an improved finite element model was generated by Hamilton Standard using CQUAD4 elements. It is also shown in Figure 22. The calculations made for comparison to measured SR-3C-3 blade response for the fuselage/wing installation were performed using this model. The study on which the improved model was based in described in Appendix III.

A CTRIA3 finite element model of the SR-2C blade was also evaluated in this study. It was determined that with minor modifications, this model was satisfactory. The modifications included altering the element stiffnesses so that the calculated first mode non-rotating frequency better matched measurements. This modified finite element model was used for calculations made for comparison to measured SR-2C blade response, and is shown in Figure 23.

Figure 24 shows a block diagram of the prediction methods used in this analysis. The computer codes used in this analysis are listed in Table IV, where they are matched to their numerical designation.

Referring to Figure 24, the model finite element description and flow field definitions were initial inputs for the calculation procedure. The flow field velocity components at the rotor disk location were calculated by NASA-Ames for a particular operating condition of the wing/body model using the method of References 12 and 13. Rotor thrust was ignored in these calculations, as discussed in Section 3.5. The wing angle-of-attack for which the flow field was calculated was corrected to match the measured lift at the chosen operating condition.

Using the calculated flow field as input, the blade steady airloads, were computed by the HS/H045 code. These airloads, as well as centrifugal load effects, were input into MSC/NASTRAN to determine a steady displaced blade position. The nP airloads were then computed using the HS/H337 skewed wake analysis. These airloads were distributed over the finite element model using the HS/F194 code, and input into the MSC/NASTRAN structural dynamics analysis. A post-processor code was used to determine the blade strain at the gage locations.

4.2 Blade Natural Modes and Frequencies

Blade mode shapes and natural frequencies were calculated by Hamilton Standard for the non-rotating SR-3C-3 and SR-2C model blades. These calculations were performed using the improved finite element models, described above. The mode shapes and frequencies calculated, using the improved CTRIA3 SR-2C model and the CQUAD4 SR-3C-3 model, compare well with holographic measurements (non-rotating) made at NASA-Lewis. These comparisons are shown in Figures 25 and 26.

Mode shapes and frequencies for rotating operating conditions were calculated at NASA-Lewis using the unimproved SR-3C-3 and SR-2C finite element models. Some discrepancies were noted between these calculations and measured blade modal data (see section 3.3, and Campbell diagrams, Figure 13). It is recommended that blade modal data be calculated, using the improved finite element models, at rotating conditions, in addition to the non-rotating condition described above, to further validate the blade models. A more detailed discussion of these issues is found in Reference 10.

4.3 P-Order Response Calculations and Comparisons to Measurements

The dynamic response of the model blades operating in the nacelle/wing/fuselage environment was calculated using the method described in section 4.1 above, for selected test operating conditions. Twelve cases were studied for the SR-2C and SR-3C-3 models, six each. The operating conditions for these cases are listed in Table V, and correspond to test points for which measured strain data are available. These points were chosen to provide variations in operating condition which would be useful in identifying data trends, and to determine the ability of the calculation procedure to model those trends.

SR-2C Responses. The measured and calculated values of 1P, 2P and 3P vibratory strains are given for the SR-2C model in Table VI. The strain values are given for the selected test operating conditions for the inboarding bending, mid-blade bending and mid-blade shear gage locations. The measured strain data given in Table VI were "speed corrected", using the method described in section 3.4. This technique eliminates any frequency smearing of harmonic peaks, yielding the most accurate test values. Note that these levels are data sample averages, and are generally lower than "total strain" levels, as discussed earlier.

Comparison of the calculated to the measured values, for the 1P inboard bending strain, is very good for most of the test condition cases. Inboard bending strain is an important factor in determining blade and hub structural design. Inboard bending strain is an important factor in determining blade and hub structural design. The measured values are slightly underpredicted. The exception is case 5, for which the strain is overpredicted. For this case, however, the measured strain is very low and therefore not significant. At the less important mid-blade location, the bending and shear strains are also underpredicted, with the exception of case 5.

A comparison of tested and calculated values of 2P strain, in Table VI, shows these values to be overpredicted. The important inboard bending strain values are overpredicted by an average of about 60 percent. Note that the 2P strain magnitudes are generally much lower than the 1P strain values, and thus will make a smaller contribution to the total strain level.

The reason for the overprediction of 2P strain could be an overprediction of the dynamic magnification due to the 2P critical speed. Referring to the Campbell diagram for the SR-2C model in Figure 13, it is seen that the rotational speeds for the comparison cases (~8000 RPM and up) are well above the first mode 2P critical speed of 6000 RPM. However, the variation of first mode frequency with RPM is predicted to be larger than is indicated by the test data. Thus, at 8000 RPM, the first mode frequency is predicted to be closer to the 2P excitation, producing greater dynamic magnification, than is indicated by the measured data. Note also, that the dynamic magnification would be reduced by the addition of structural or aerodynamic damping, which were not included in this analysis.

As discussed earlier, the 3P response of the SR-2C model blade is insignificant.

SR-2C Trends. The trends of the important inboard bending strain with RPM, fuselage attitude, rotor blade angle and Mach number are shown in Figures 27 and 28. Both 1P and 2P responses are shown. The measured values shown on these charts were not speed corrected during data reduction (section 3.4), which accounts for any difference between the chart strain values and those given in Table VI.

The variation of blade response with RPM for constant Mach number, blade angle and fuselage attitude is shown at the top of Figure 27. Measured 1P response increases with increasing RPM. This trend is followed by the calculations, although not as strongly. Measured 2P response drops with increasing RPM, above the critical speed and levels off about 7500 RPM. The calculated response drops more than measured, due to the overprediction of dynamic magnification effects, discussed above.

The variation of blade response with fuselage attitude is shown at the bottom of Figure 27. Measured 1P response decreases linearly with increasing attitude angle to a minimum, and then increases (see Section 3.5). This trend is matched by the calculations, although the amplitude of the minimum point is overpredicted. This may be due to a discrepancy between the actual and predicted 1P flow fields at these low excitation conditions. The 2P calculated response slope matches the test data well, although the amplitude is overpredicted.

The variation of blade response with blade angle (power) for constant Mach number, RPM and fuselage attitude is shown at the top of Figure 28. Both 1P and 2P calculations generally match the measured data trends. Response trends with Mach number for constant RPM, blade angle and fuselage attitude are shown at the bottom of Figure 28. Again, measured data trends are generally well predicted.

SR-3C-3 Responses - The tested and calculated values of 1P, 2P, and 3P vibratory strains are given for the SR-3C-3 model in Table VII. The strain values are given for the inboard bending, mid-blade bending and mid-blade shear gage locations, for selected operating conditions. The measured values were "speed corrected" during data reduction (Section 3.4) to obtain the true test values.

Comparison of calculations to test values for the important 1P inboard bending strain shows the test data to be overpredicted. For most cases, this overprediction is by about one third of the test value. The exception is, as for the SR-2C model, a low strain case at higher fuselage attitude (case 11).

This level of overprediction (~33 percent) for 1P inboard bending strain is consistent with that obtained using the improved SR-3C-3 CQUAD4 model for the isolated nacelle tests, as described in Reference 10. Also similar to the 1P isolated nacelle results, are the comparisons of calculated to test strain values for the mid-blade bending and shear gages. The mid-blade bending strain is substantially underpredicted, while the shear calculation varies with each case. Note that mid-blade 1P strains are consistently lower in level than inboard 1P strains.

Comparison of measured and calculated 2P strains, for the SR-3C-3 model, are shown in Table VII. Almost all strains are significantly overpredicted. Similarly to the SR-2C 2P strain situation, this may be due to overprediction of dynamic magnification associated with the 2P/first mode critical speed. Referring to the Campbell diagram in Figure 13, the comparison case rotational speeds (6000 - 6500 RPM) are very close to the predicted critical speed. The measured first mode frequencies are slightly higher than predicted. The measured first mode critical speed is about 7000 RPM, while the predicted critical speed is about 6500 RPM. Therefore, the influence of the critical speed on 2P response is not as great in test as was predicted. Also, the addition of damping to the calculation procedure would redo the 2P overpredictions.

Comparison of measured and calculated 3P strains are shown in Table VII. Even though the 3P strain are generally much less than the lower order strains, they are still significant. This may be caused by additional excitation due to the proximity of the swept SR-3C-3 blade tip to the wing leading edge. Also, the 3P/first mode critical speed (~4000 RPM) may have an influence on the response (see section 3.6). The 3P blade bending strains are generally underpredicted somewhat while shear strain is overpredicted. The cause of this is not known.

SR-3C-3 Trends. The trends of the important inboarding bending strain with RPM, fuselage attitude, rotor blade angle and Mach number are shown in Figures 29 and 30. Both 1P and 2P responses are shown. The measured strain values shown on these charts were not speed corrected during data reduction. This accounts for any small differences between the chart strain values and those given in Table VII.

The variation of blade response with RPM for constant Mach number, blade angle and fuselage attitude is shown at the top of Figure 29. The measured increase of 1P strain with increasing RPM is well matched by the calculations, although at a higher absolute level, as discussed above. The 2P response is overpredicted, with the degree of overprediction increasing with proximity to the critical speed, also discussed above.

The variation of SR-3C-3 blade response with fuselage attitude is shown at the bottom of Figure 29. As for the SR-2C trend (Figure 27), the SR-3C-3 1P response trend is well matched by the prediction, except for the difference in absolute level. The 2P responses are greatly overpredicted, due to the difference between the calculated and measured critical speed and the neglect of damping in the analysis, as discussed above.

The variation of blade response with blade angle (power) for constant RPM, Mach number and fuselage attitude is shown at the top of Figure 30. The 1P response trend is well matched by the calculations. The 2P response is overpredicted. Response trends with Mach number for constant RPM, blade angle and fuselage attitude are shown at the bottom of Figure 30. Except for the overprediction in absolute level, both 1P and 2P strain trends are well predicted.

Correlation Evaluation. The usefulness of the blade structural dynamics prediction method as a Prop-Fan design tool can be assessed by evaluating the correlation between measured and calculated response data. For the important 1-P responses, the SR-2C straight blade calculations were generally good, underpredicting test data by about 10 percent. The SR-3C-3 swept blade calculations were fair, overpredicting test data by about 33 percent.

For both the SR-2C and SR-3C blades, 2P responses were substantially overpredicted. This is due to the proximity of the rotational speeds for these comparison cases to the 2P/first mode critical speed, for each blade. Response calculations near critical speeds are quite sensitive and not generally reliable. Away from critical speeds, it is presumed that 2P correlations would improve, as was found in previous Prop-Fan model studies (Reference 14).

The causes of differences between measured and predicted 1P response are more complex. The composite SR-2C straight blade response is underpredicted, which was also found in studies of metal Prop-Fan blades at high speed (References 2, 14). By contrast, the composite SR-3C-3 swept blade response was overpredicted. Blade sweep and flexibility effects, not accounted for in the theory, may be responsible.

The correlation between measured and predicted 1-P blade strain for the SR-3C-3 wing/fuselage test repeats the results found for the isolated nacelle SR-3C-3 test, which was reported in Reference 10. This indicates that the predicted flow field definition at the rotor, for this fuselage/wing test, is probably valid. Also, the steady and P-order vibratory blade airloads, calculated to arise from the flow field, are probably correct. The structural finite element model was validated by the good correlation between measured and predicted mode shapes and frequencies. Therefore, it must be concluded that the overprediction of 1-P strain is due to phenomena not accounted for in the calculation method.

Possible effects not included in current predictions were described in Reference 10. These include dynamic twist magnification, structural damping, aerodynamic damping and stiffness, and other aeroelastic and nonlinear effects.

Twist magnification is important since blade airloads are calculated assuming the blade is rigid. The blade angle of attack is not calculated to increase with loading. Thus, airloads may be underpredicted. This effect is more prominent for straight blades than swept blades, and may explain the small underprediction of SR-2C 1P strain. Other offsetting aeroelastic or nonlinear factors due to blade sweep and flexibility may be responsible for the SR-3C-3 overprediction. This warrants further study.

5.0 CONCLUSIONS

As a result of this study of SR-2C and SR-3C-3 model Prop-Fan blade dynamic response, the following conclusions are made:

1) The pressure of the wing, downstream of the rotor, induced 1P responses about twice those previously measured for an isolated nacelle installation, as would be expected.

2) The swept composite blade showed less response than the unswept composite blade.

3) Measured 2P blade strain varied linearly with the wing lift.

4) Higher order response for the SR-2C model was small.

5) Higher order response for the SR-3C-3 model was significant near critical speeds due to the proximity of the blade tips to the wing leading edge.

6) Correlations between 1P dynamic response calculations and measured data for the SR-2C model were good (underpredictions averaged 10 percent). For the SR-3C-3 model, correlations were fair (overprediction 33 percent).

7) The 2P dynamic response of both blade models was overpredicted.

8) Improvements to the finite element models of the blades resulted in better correlation between predicted and measured blade strains.

6.0 RECOMMENDATIONS

Based on the conclusions of this study, the following recommendations are made:

1) The improved finite element model should be confirmed by additional modal and forced response calculations.

2) Existing test data for these and other Prop-Fan models should be reviewed to determine the extent of nonlinear effects on blade response. These nonlinear effects should be included in future improvements to the blade response calculation method.

3) The effects of unsteady aerodynamic, aerodynamic damping and stiffness, and structure damping should be investigated.

4) To better determine the influence of wing lift effects on blade strain, future testing should include additional negative fuselage angles.

7.0 REFERENCES

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TABLE I

DESIGN CHARACTERISTICS FOR THE SR-2C AND THE SR-3C MODEL PROP FAN

PARAMETER	SR-2C	SR-3C
Number of blades	8	8
Activity factor/blade AF	203	235
Activity factor, total	1624	1880
Integrated design lift coefficient, Cl	0.081	0.214
Blade aerodynamic tip sweep, degrees	0	34.5
Power loading, kw/m^2 (shp/ft^2)	300(37.5)	300(37.5)
Tip speed, m/sec (FPS)	244(800)	244(800)
Power coefficient, Cp	1.695	1.695
Advance ratio, J	3.056	3.056
Material	carbon fiber composite	
Diameter, cm (in.)	62.2(24.5)	62.2(24.5)
3/4 chord cm (in.)	8.79(3.53)	11.51(4.53)
Airfoil outboard (NACA)	16 series	16 series

Table II SR-2C AND SR-3C-3 MODEL PROP-FAN STRAIN GAGE DESIGNATIONS, NASA-Ames Wing/Body/Nacelle Response Tests

Gage Description	Radial Stat. cm/cm	Blade Number 1	2	3	4	5	6	7	8
SR-2C, Eight Way									
Inboard Bending	0.522	BG1-1	-	BG3-1	-	-	-	-	-
Mid-Bld Bending	0.816	-	-	BG3-4	-	-	-	-	-
Shear	0.612	-	-	BG3-2	-	-	-	-	-
SR-3C-3, Four Way									
Inboard Bending	0.381	-	-	-	BG4-1	-	-	-	BG8-1
Mid-Bld Bending	0.789	-	-	-	BG4-2	-	-	-	-
Shear	0.837	-	-	-	-	-	-	-	BG8-3

Table III OPERATING CONDITIONS FOR THE SR-2C AND SR-3C-3 PROP-FAN MODELS, Wing/body/nacelle response tests NASA-Ames.

	Variable	Range of variable
SR-2C	MACH NO.	0.6, 0.7, 0.75, 0.8, 0.85
	Rotational Speed	5677 to 8532 in 500 RPM increments
	Blade Angle	50.8, 52.5, 55.0, & 56.6 deg.
SR-3C-3	MACH NO.	0.6, 0.7, 0.8, 0.85
	Rotational Speed	3740 to 7000 in 500 RPM increments
	Blade Angle	58.8, 60.7, 61.9, & 62.7 deg.

TABLE IV

HAMILTON STANDARD COMPUTER CODES USED FOR

BLADE DYNAMIC RESPONSE ANALYSIS

Code Designation	Description
HS/H045	Lifting line, quasi-static performance strip analysis, 2-D airfoil section data, Goldstein wake induction, azimuthal variations.
HS/H337	Lifting line, quasi-static performance strip analysis, 2-D airfoil section data, skewed wake induction, azimuthal variations.
HS/F194	Distributes airloads over finite element grid.
MSC/NASTRAN	Finite element analysis used for calculating vibratory mode shapes and frequencies, and dynamic responses of Prop-Fan model blades.
STRAINNP	Converts element stresses from MSC/NASTRAN to strains at the strain gage locations.

TABLE V

OPERATING CONDITIONS FOR TEST POINTS USED FOR COMPARISON WITH CALCULATIONS

Prop-Fan Config.	Case No.	Run No.	Rotational Speed RPM	Mach No.	Fuselage Attitude deg.	Blade Angle 3/4 R deg.	Shaft Power kw
SR-2C	1	3556	8025	0.6	0.0	52.5	371
	2	3726	8417	0.6	0.0	50.8	372
	3	3725	7996	0.6	0.0	50.8	273
	4	3546	8003	0.6	1.0	52.5	366
	5	3536	7981	0.6	2.0	52.5	363
	6	3652	8007	0.8	0.0	52.5	34
SR-3C-3	7	4415	6000	0.6	0.0	61.9	137
	8	3904	6000	0.6	0.0	58.8	122
	9	3903	6500	0.6	0.0	58.8	80
	10	3894	6500	0.6	1.0	58.8	121
	11	3864	6500	0.6	2.0	58.8	120
	12	4532	6050	0.85	0.0	61.9	15.5

TABLE VI - SR-2C VIBRATORY MICRO-STRAIN

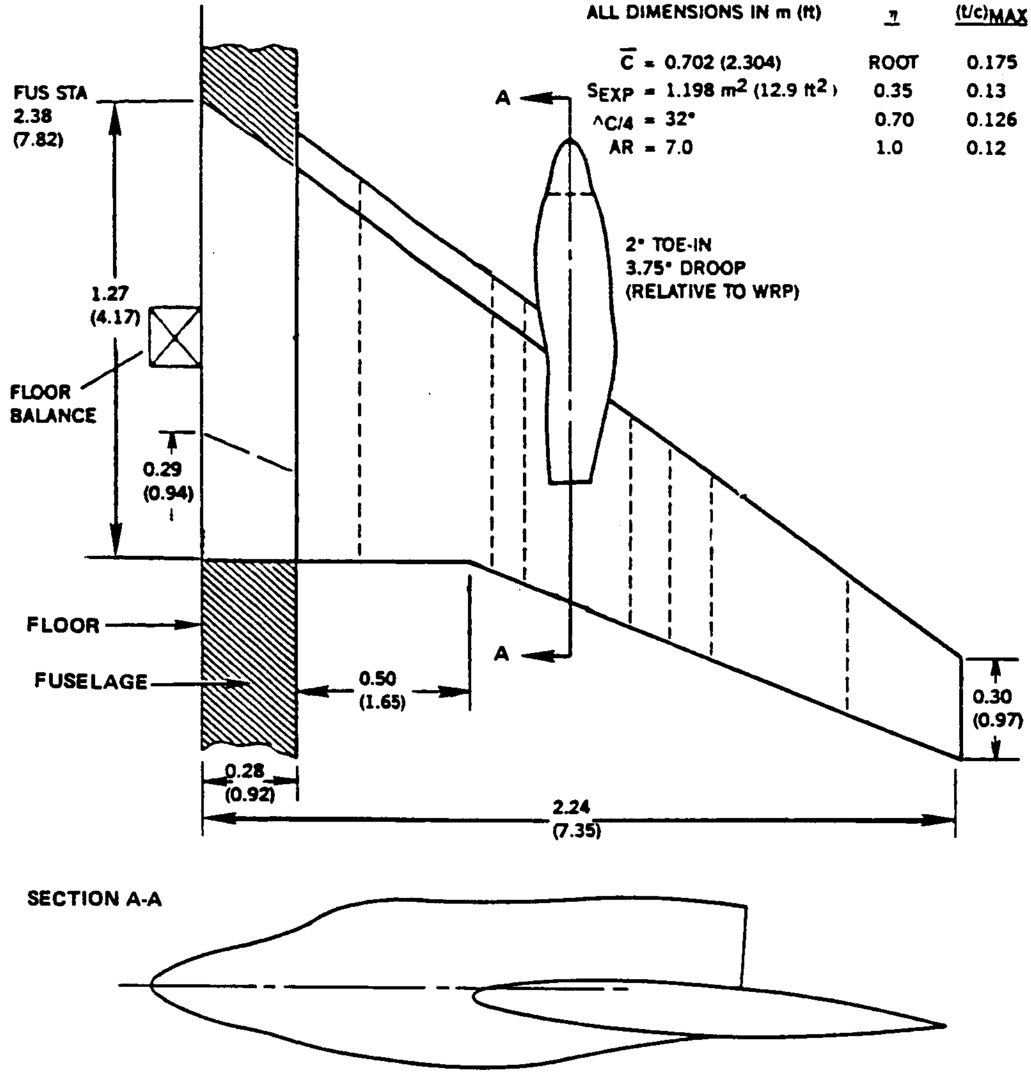
Case No.	Gage* No.	1P Test	1P Calc	1P Calc/Test	2P Test	2P Calc	2P Calc/Test	3P Test	3P Calc	3P Calc/Test
1	1	576	485	.84	189	316	1.67	39.1	44	1.13
	2	427	344	.81	59	83	1.41	15.7	26	1.66
	4	297	153	.52	105	181	1.72	12.2	36	2.95
2	1	532.5	461	.87	164.5	247	1.50	29.2	37	1.27
	2	382.3	302	.79	54.0	57	1.06	12.8	22	1.72
	4	268.5	134	.50	81.7	140	1.71	9.4	33	3.51
3	1	507.9	456	.90	168.3	307	1.82	35.7	43	1.20
	2	388.7	320	.82	44.8	77	1.72	18.6	25	1.34
	4	223.7	146	.65	93.7	175	1.87	10.1	35	3.46
4	1	315.4	296	.94	240.1	354	1.47	41.4	48	1.16
	2	245.2	212	.86	67.7	90	1.33	18.4	30	1.63
	4	176.5	97	.55	130.4	201	1.54	10.3	37	3.59
5	1	78.4	196	2.50	299.3	405	1.35	48.9	54	1.10
	2	80.8	147	1.82	80.7	94	1.16	31.5	39	1.24
	4	63.9	73	1.14	164.1	227	1.38	9.1	38	4.18
6	1	641.8	614	.96	158.3	302	1.91	28.1	39	1.39
	2	378.3	289	.76	12.2	50	4.10	9.9	15	1.52
	4	186.8	144	.77	96.5	158	1.64	46.4	36	.78

* a. Gage 1 measures inboard bending strain and is the average between blades no. 1 and no. 3.
b. Gage 2 measures mid-blade shear strain on blade no. 3.
c. Gage 4 measures mid-blade bending strain on blade no. 3.

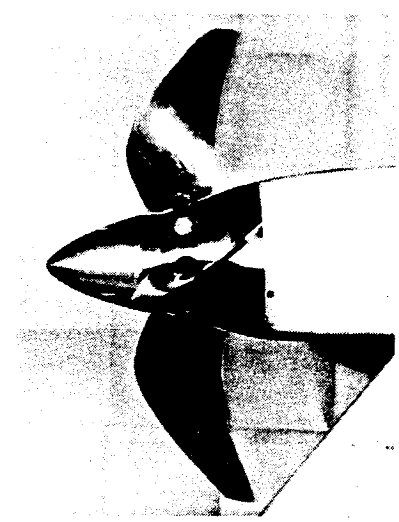
TABLE VII - SR-3C-3 VIBRATORY MICRO-STRAIN

Case No.	Gage* No.	1P Test	1P Calc	1P Calc/Test	2P Test	2P Calc	2P Calc/Test	3P Test	3P Calc	3P Calc/Test
7	1	278.9	390	1.40	183.8	633	3.44	77.1	63	.82
	2	182.5	103	.56	205.7	363	1.76	119.1	91	.76
	3	69.5	196	2.82	54.4	112	2.06	59.9	146	2.44
8	1	305.6	389	1.27	277	1223	4.42	63.5	49	.77
	2	197.8	94	.48	276.8	703	2.54	95.1	84	.88
	3	179.7	198	1.10	62.5	310	4.96	90.7	143	1.58
9	1	277.5	366	1.32	180.5	521	2.89	75.6	68	.90
	2	169.7	91	.54	182.0	267	1.46	111.3	80	.72
	3	206.0	193	.94	28.2	32	1.13	102	121	1.19
10	1	183.8	232	1.26	341.9	1365	4.0	65.9	51	.77
	2	115.0	60	.52	358.9	786	2.19	104.1	87	.84
	3	112.0	125	1.12	71.3	344	4.82	112.5	149	1.32
11	1	59.5	145	2.50	385.6	1524	3.95	70.7	55	.78
	2	39.6	42	1.06	407.6	864	2.12	98.3	92	.94
	3	31.3	91	2.91	68.1	353	5.18	123.8	160	1.29
12	1	460.8	642	1.39	273.8	786	2.87	83.0	115	1.39
	2	302.9	134	.44	284.2	352	1.24	106.2	95	.89
	3	292.0	223	.76	53.5	8	.15	78.4	123	1.57

* a. Gage 1 measures inboard bending strain and is the average between blades no. 4 and no. 8.
b. Gage 2 measures mid-blade bending strain on blade no. 8.
c. Gage 3 measures mid-blade shear strain on blade no. 8.



SR-2C 8-WAY



SR-3C-3 4-WAY

FIGURE 1. AIRCRAFT GEOMETRY AND PROP-FAN INSTALLATION

SR-2C Eight Blades

	Gage Description	Limits Micro-Strain
-1	Inboard Bending	1000
-4	Mid-blade Bending	800
-2	Shear	600

SR-3C-3 Four Blades

	Gage Description	Limits Micro-Strain
-1	Inboard Bending	700
-2	Mid-blade Bending	700
-3	Shear	800

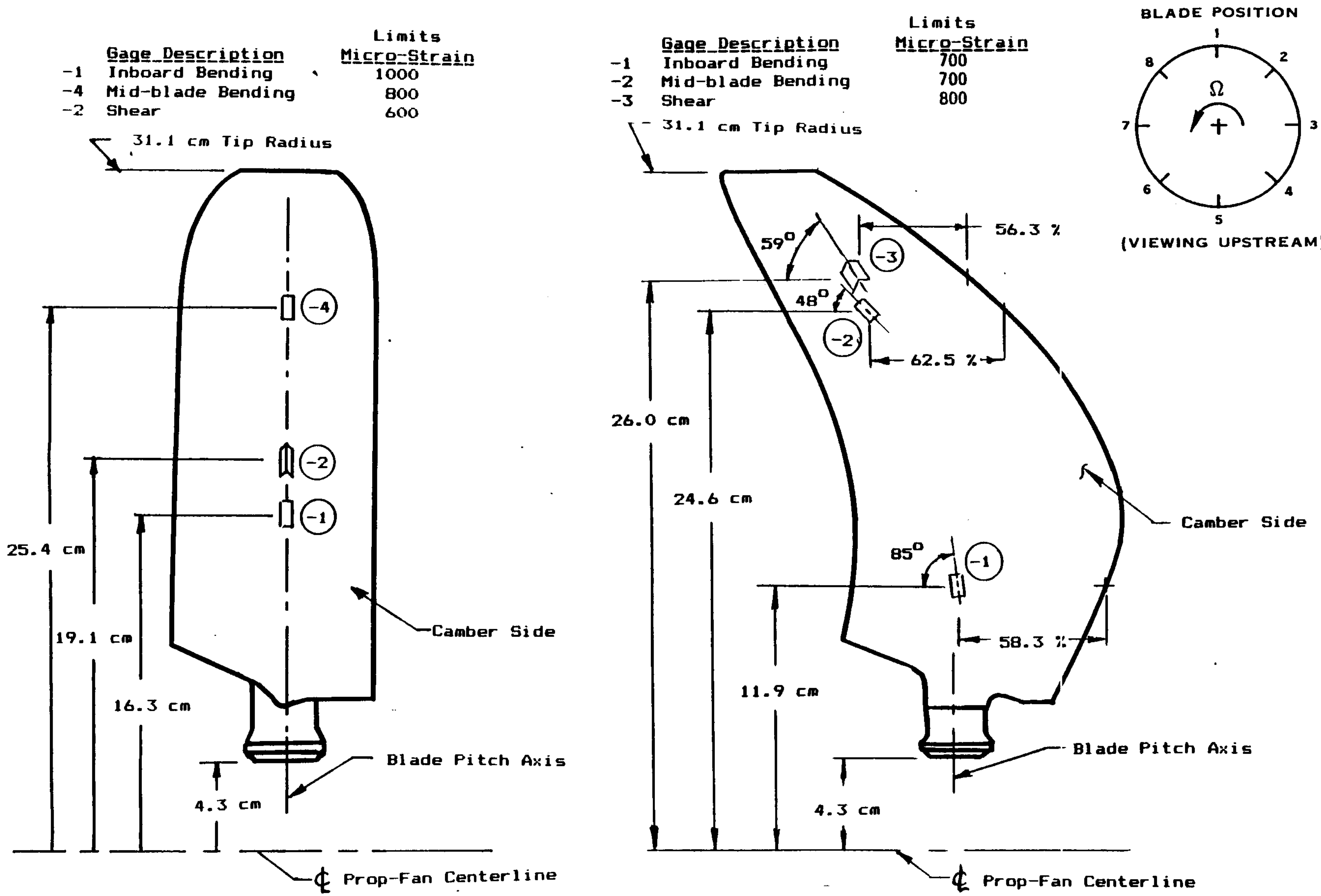


Figure 2 SR-2C and SR-3C-3 Prop-Fan Schematics showing the strain gage locations, NASA-Ames Wing/Body/Nacelle response tests.

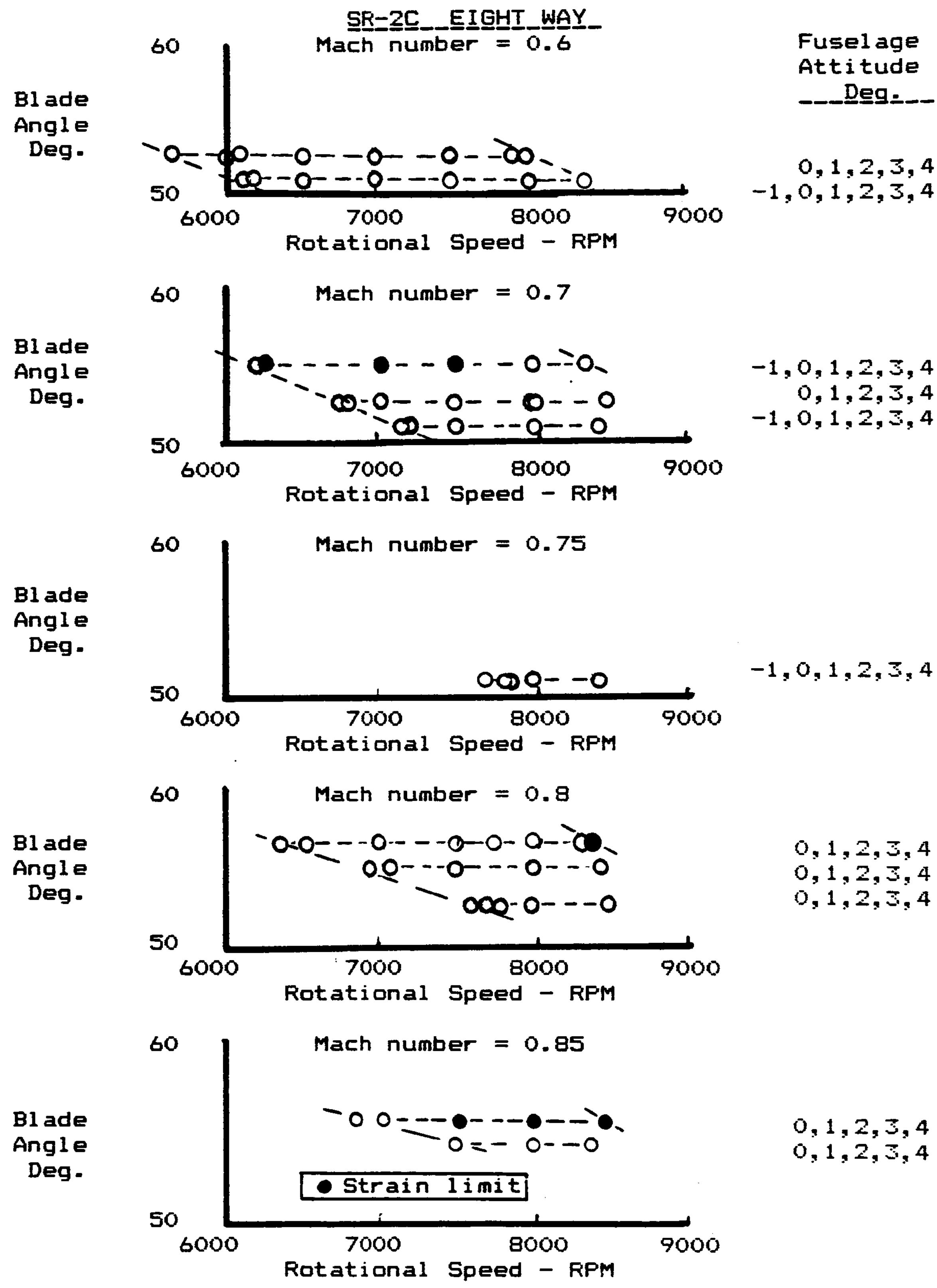


Figure 3 Test envelopes for the SR-2C model Prop-Fan wing/body/nacelle tests in the 14 foot transonic tunnel, NASA-Ames.

SR-3C-3 FOUR WAY

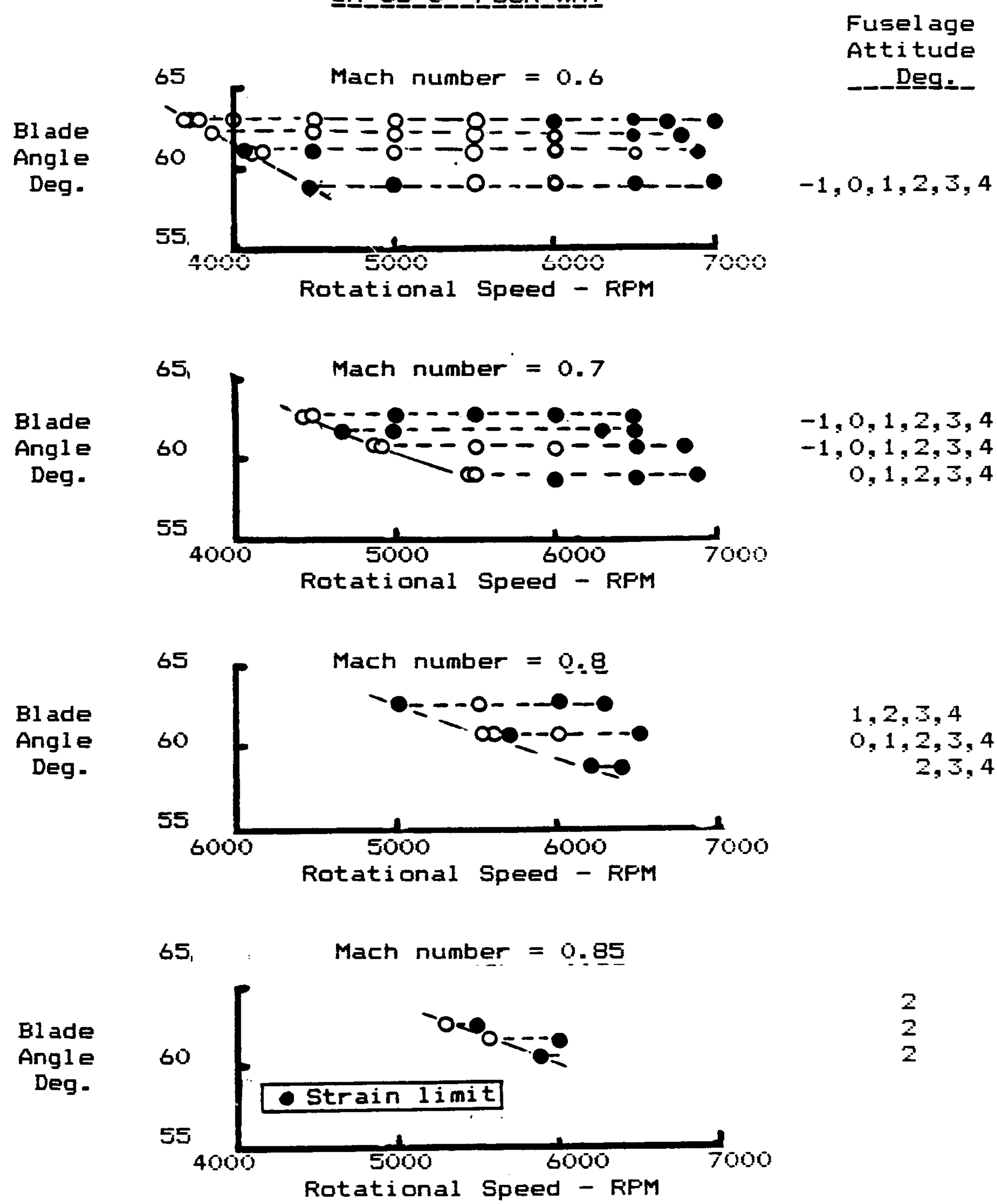


Figure 3 (Continued)

Test envelopes for the SR-3C-3 model Prop-Fan wing/body/nacelle tests in the 14 foot transonic tunnel, NASA-Ames.

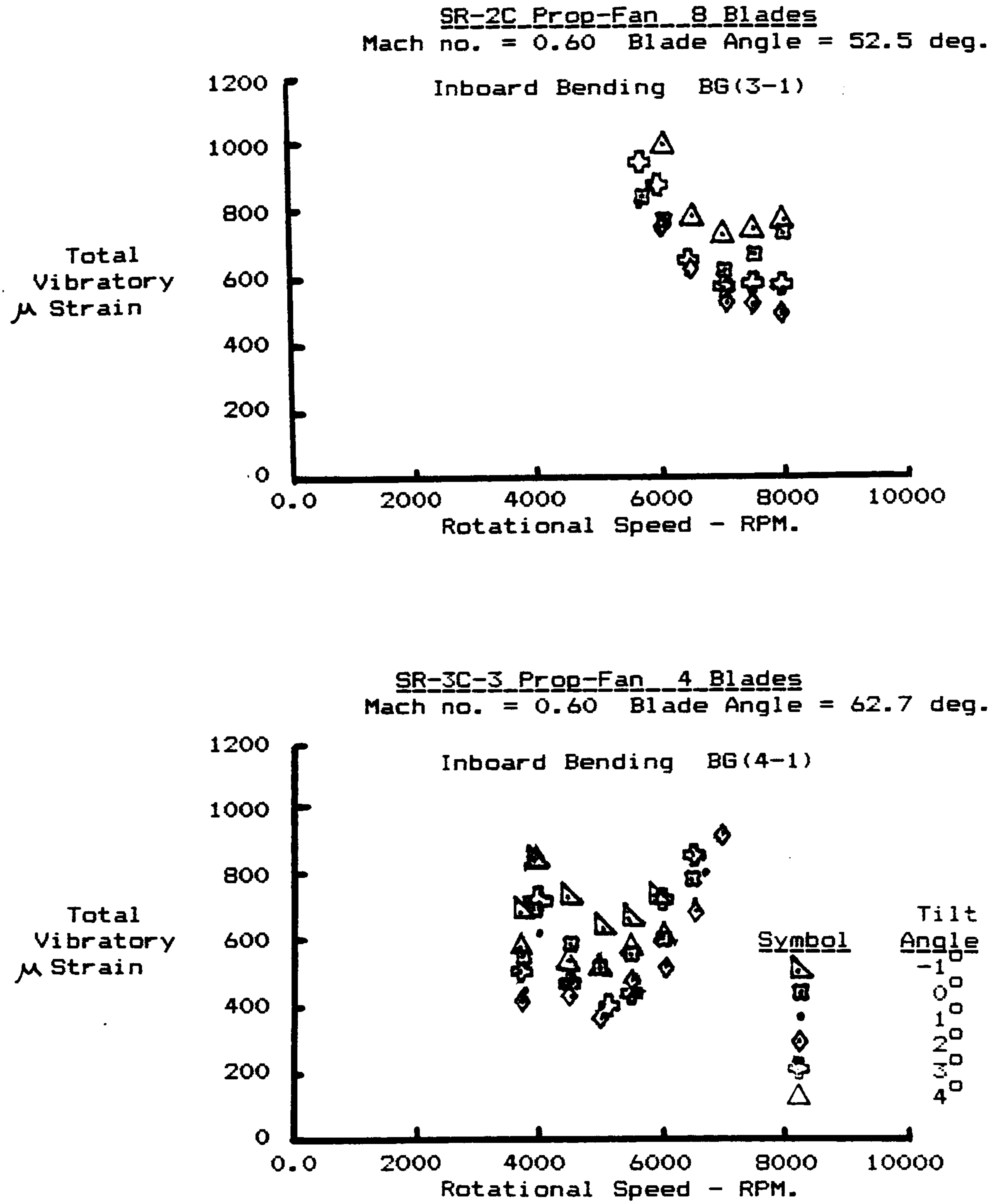


Figure 4. Measured total inboard bending vibratory strain as a function of rotational speed for the SR-2C and SR-3C-3 model Prop-Fans, Mach No. = 0.6.

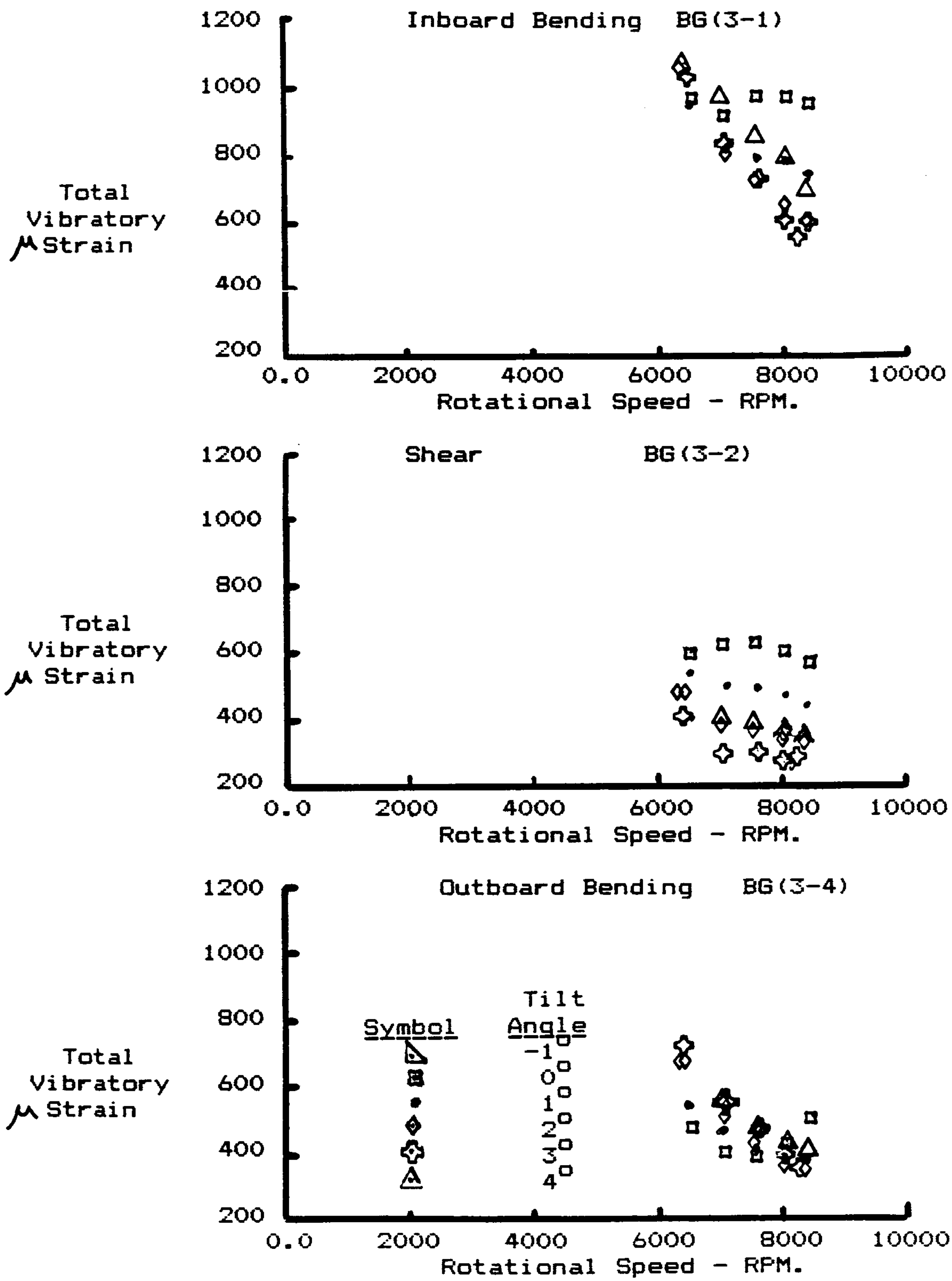


Figure 5. Measured total vibratory strain for the SR-2C model Prop-Fan. Blade angle = 56.6 deg., Mach No. = 0.8.

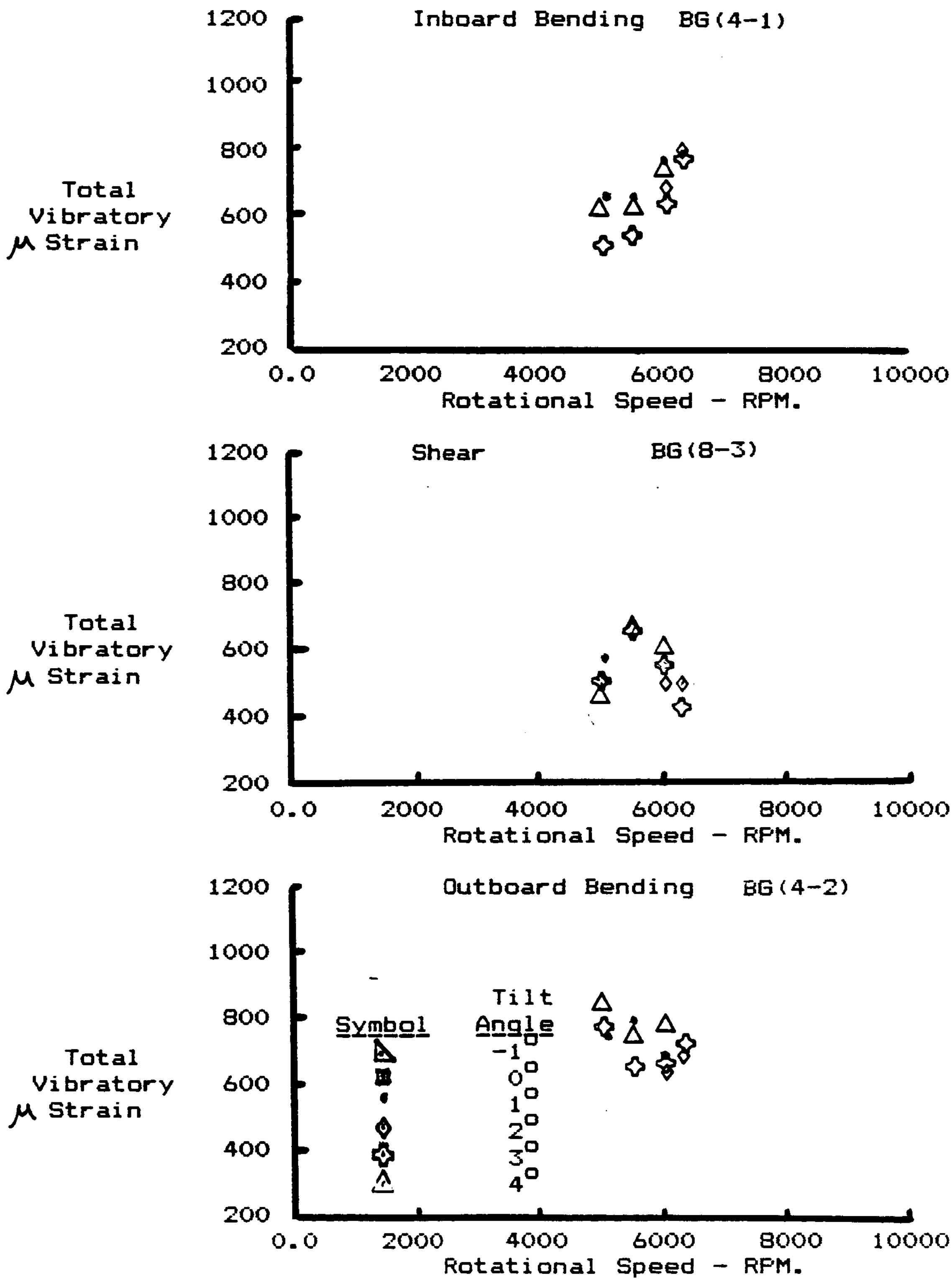


Figure 6. Measured total vibratory strain for the SR-3C-3 model Prop-Fan. Blade angle = 62.7 deg., Mach No. = 0.8.

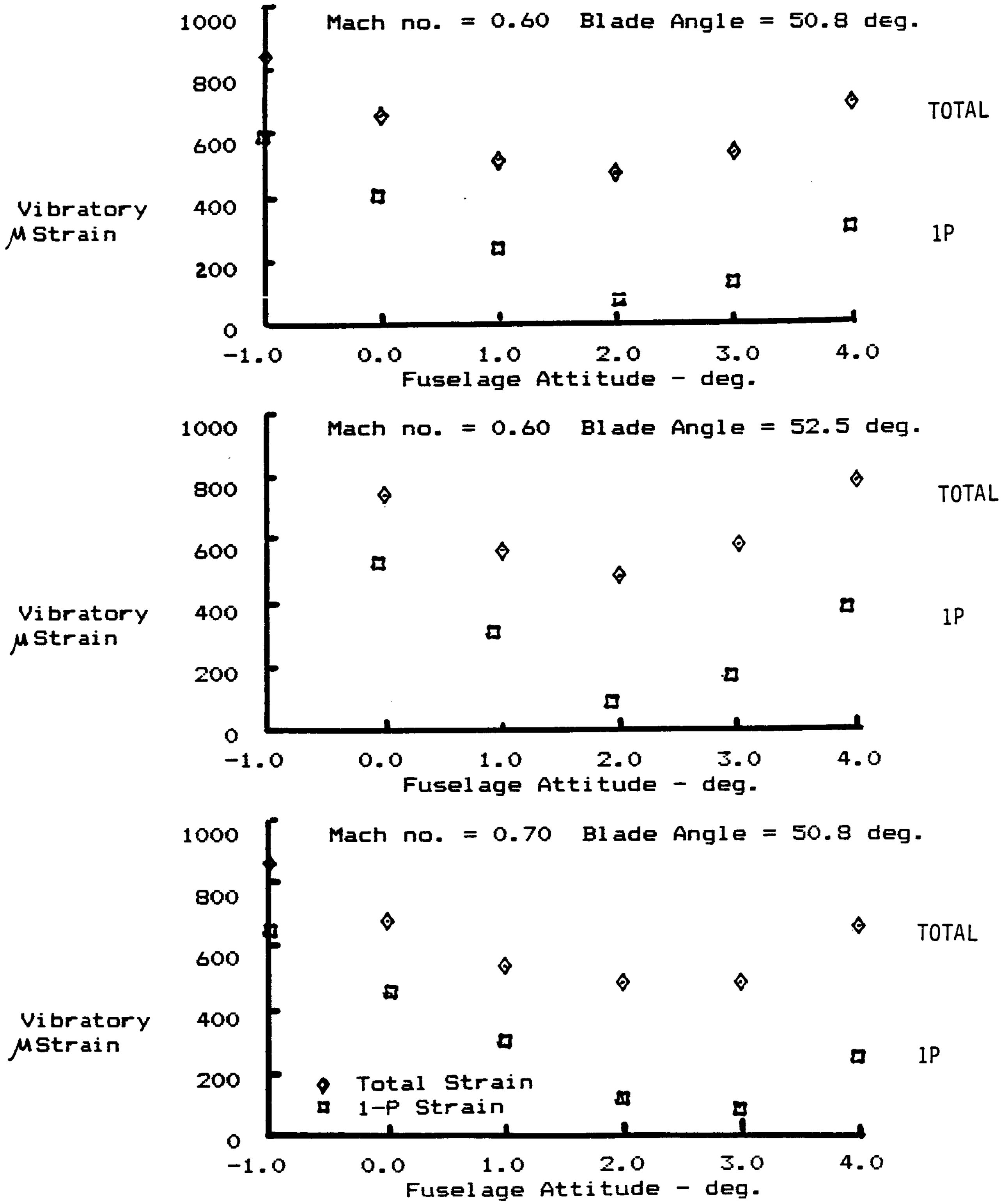


Figure 7. SR-2C 8-way Measured total and 1P inboard bending vibratory strain (BG3-1) as a function of fuselage attitude, Prop-Fan Nacelle/Wing/Fuselage tests. 8000 RPM. NASA-Ames 14 ft. transonic tunnel.

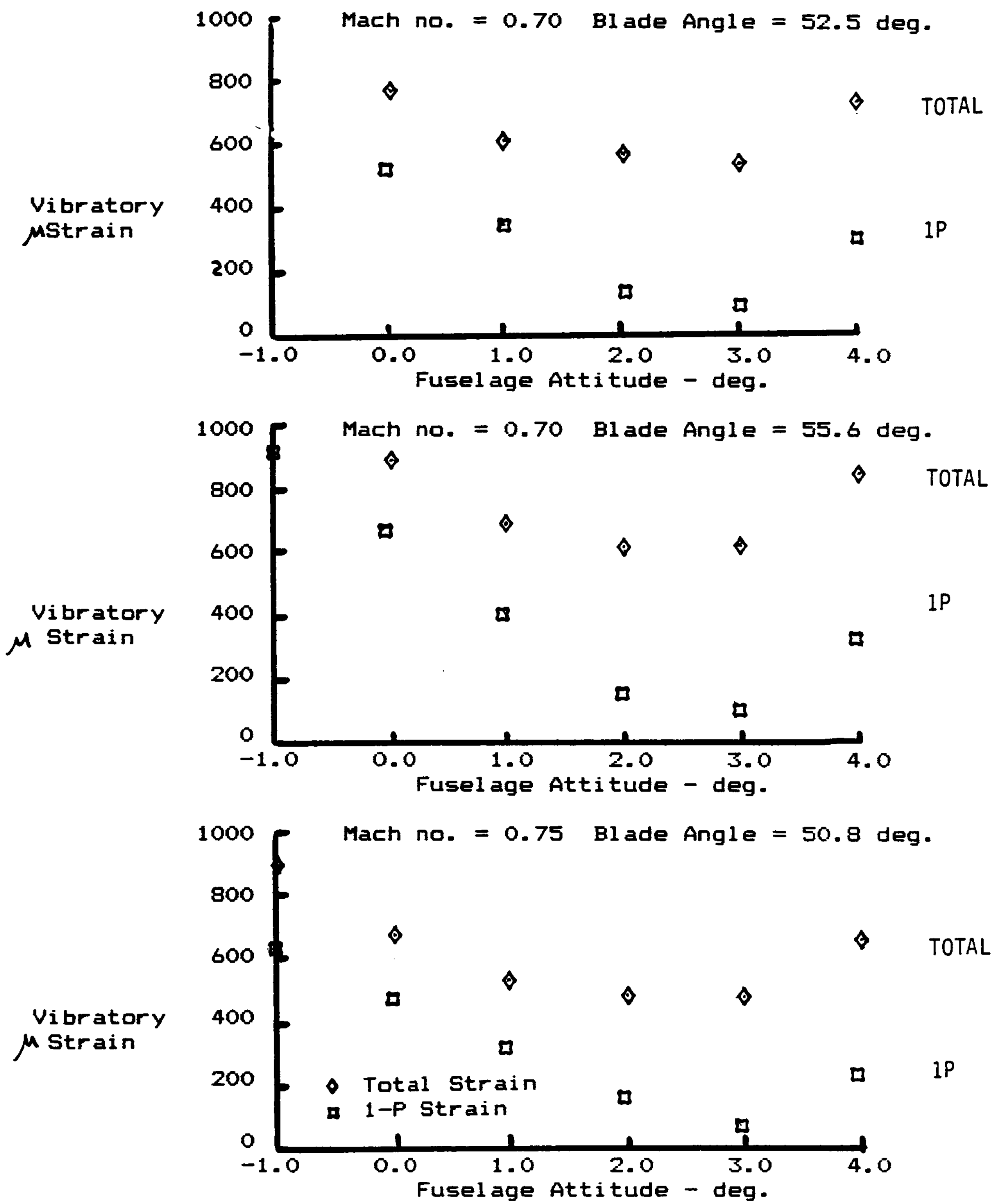


Figure 7. (Continued)

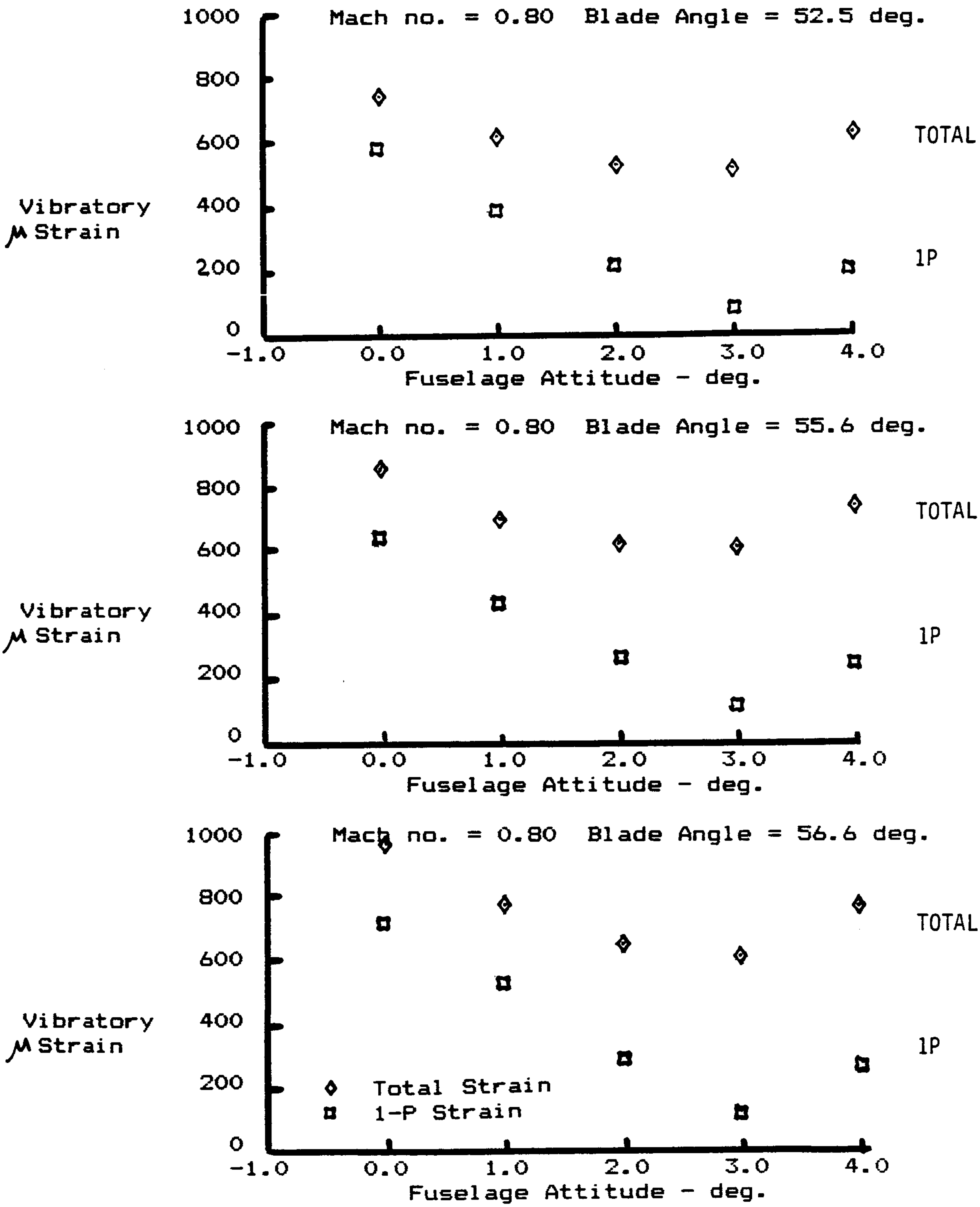
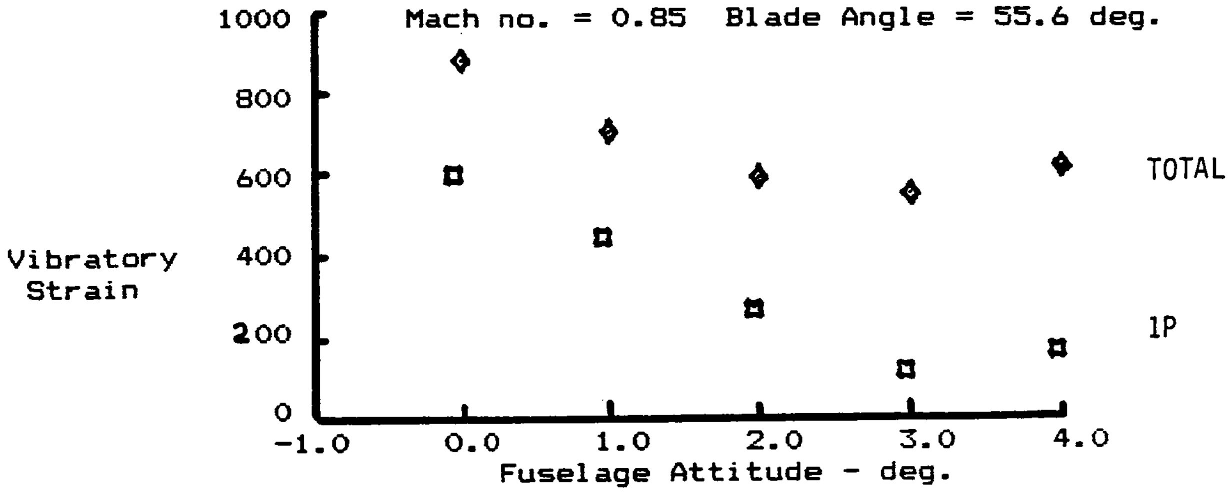


Figure 7. (Continued)



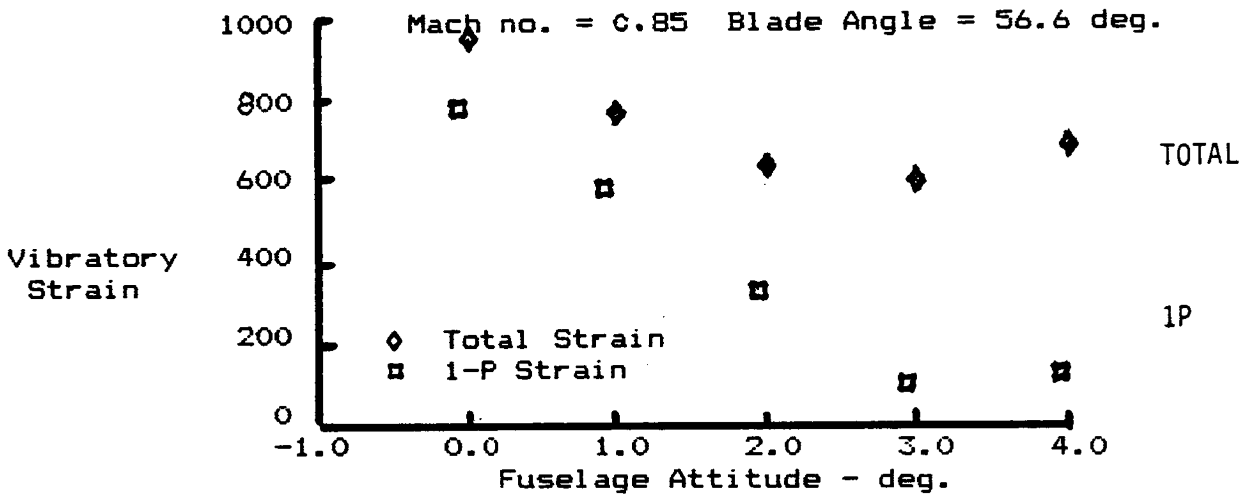


Figure 7. (Continued)

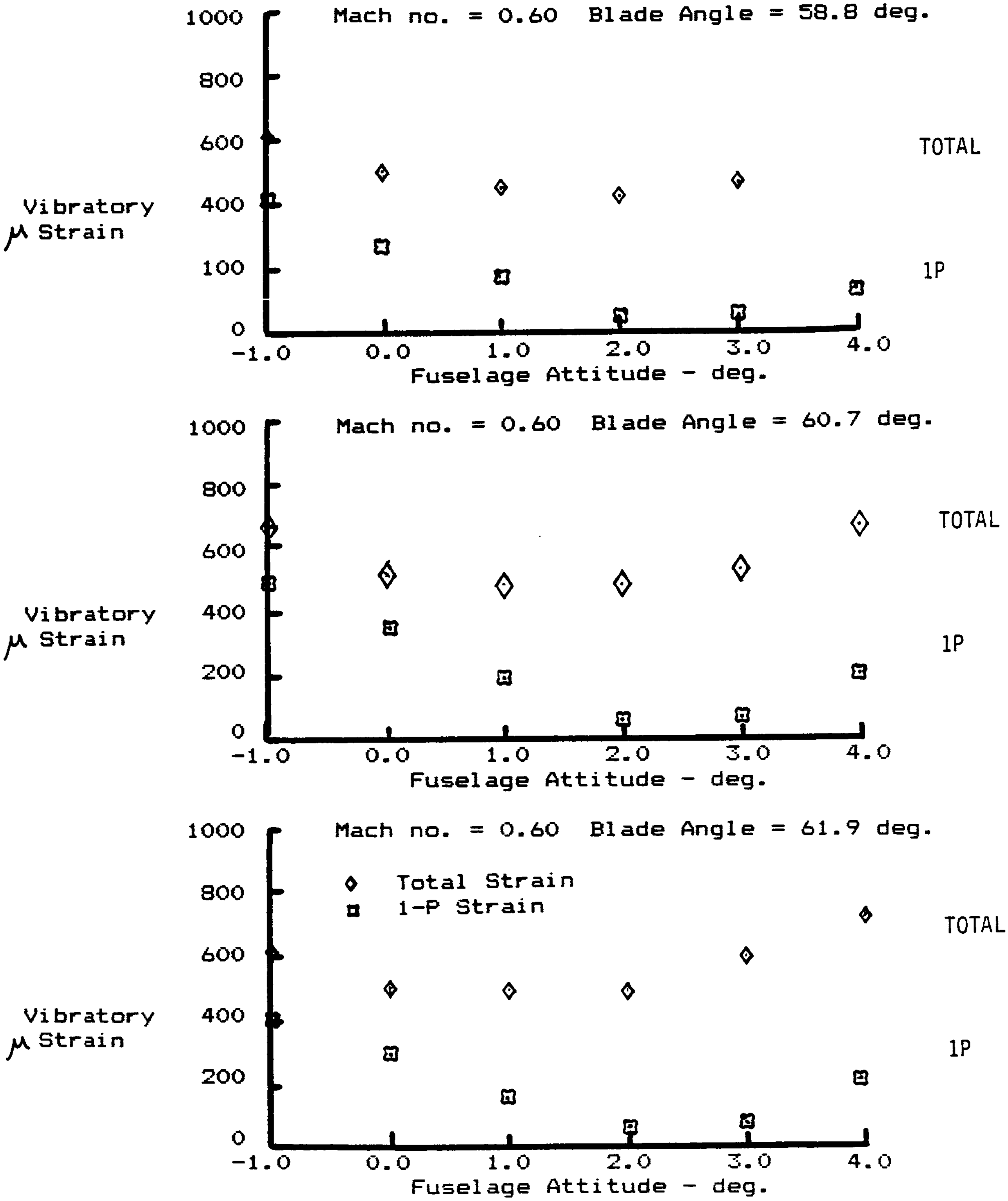


Figure 8. SR-3C-3 4-way measured total and 1P inboard bending vibratory strain (BG4-1) as a function of fuselage attitude, Prop-Fan Nacelle/Wing/Fuselage tests at NASA-Ames 14 ft. transonic tunnel. 6000 RPM.

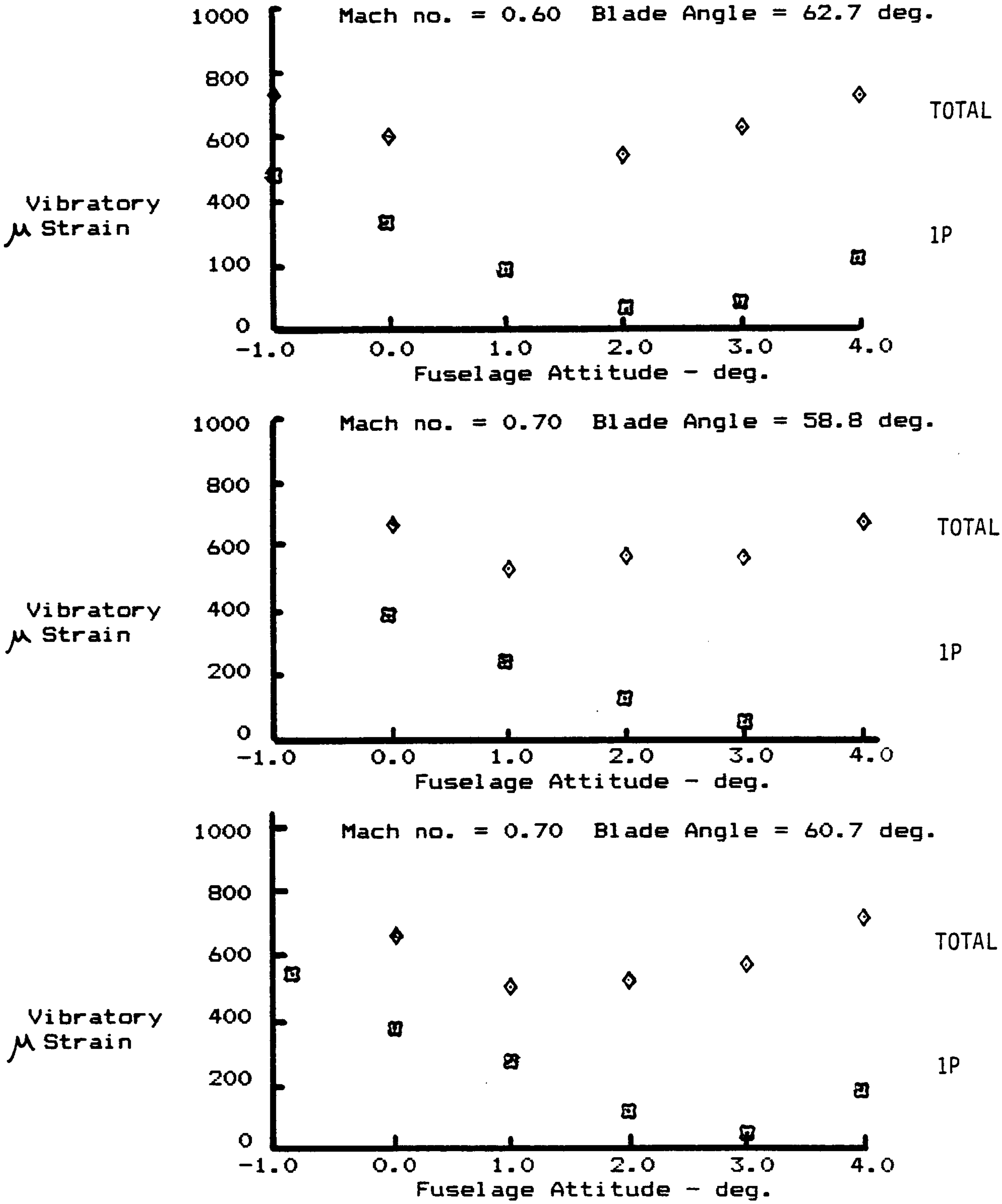


Figure 8. (Continued)

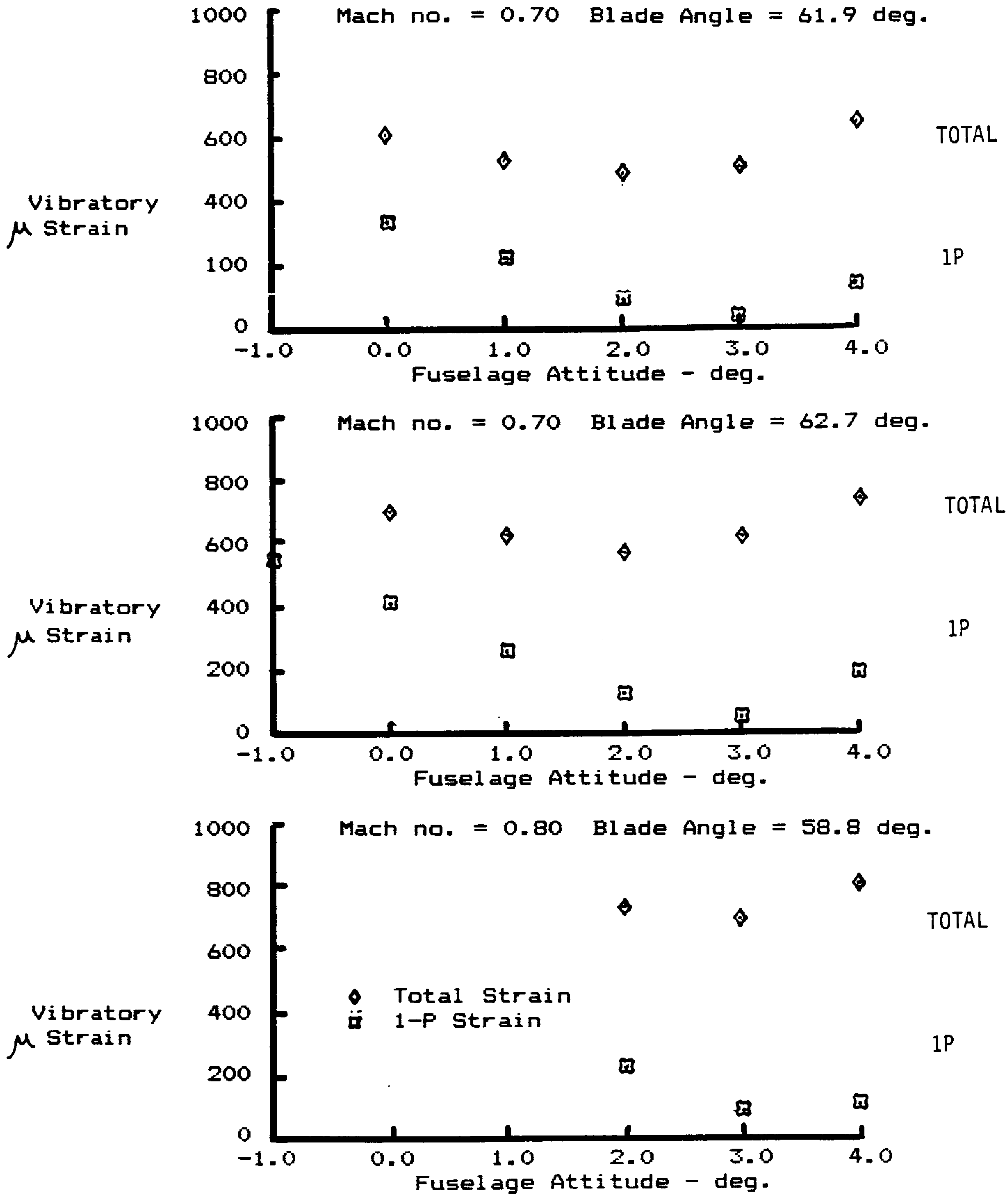
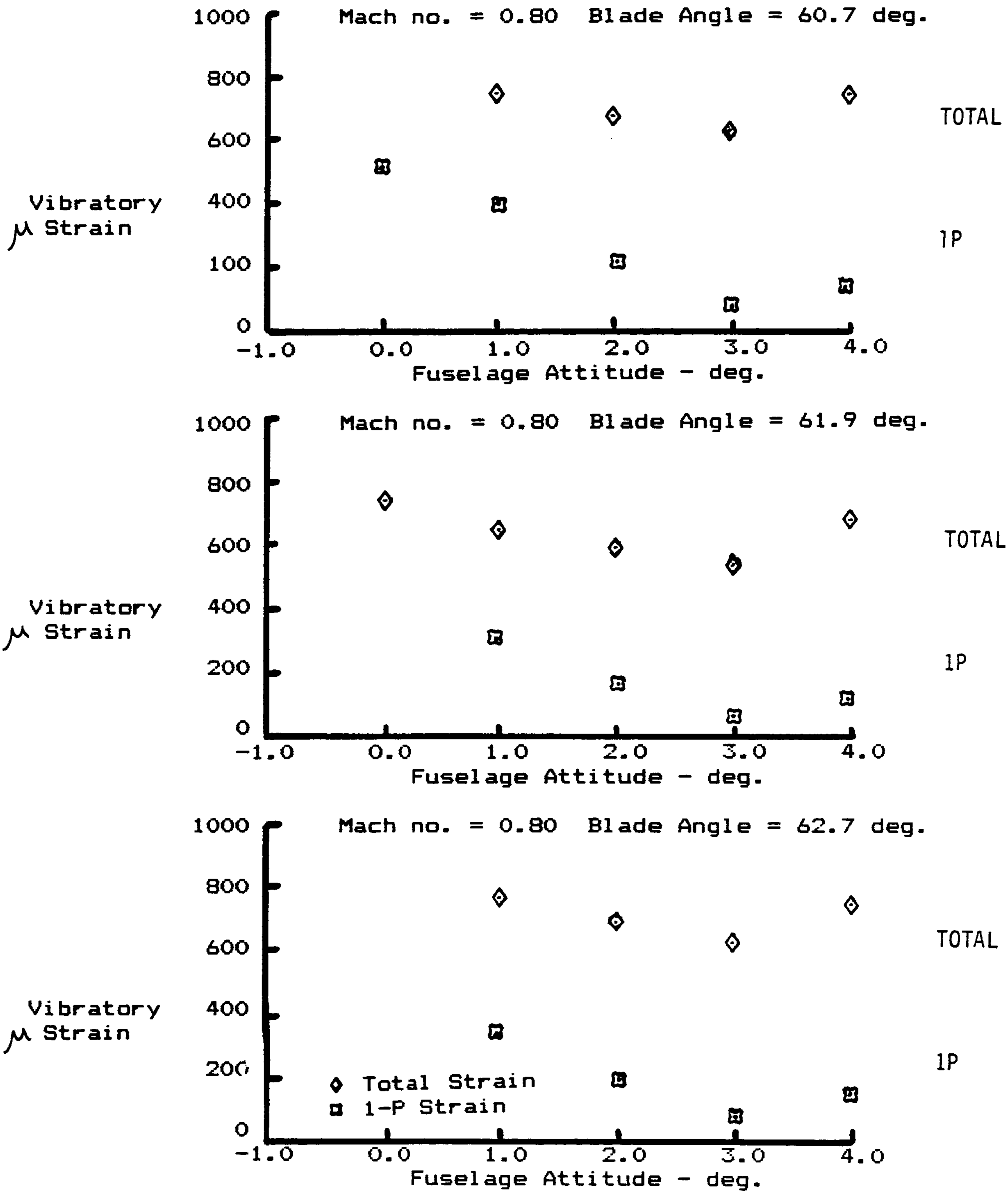


Figure 8. (Continued)



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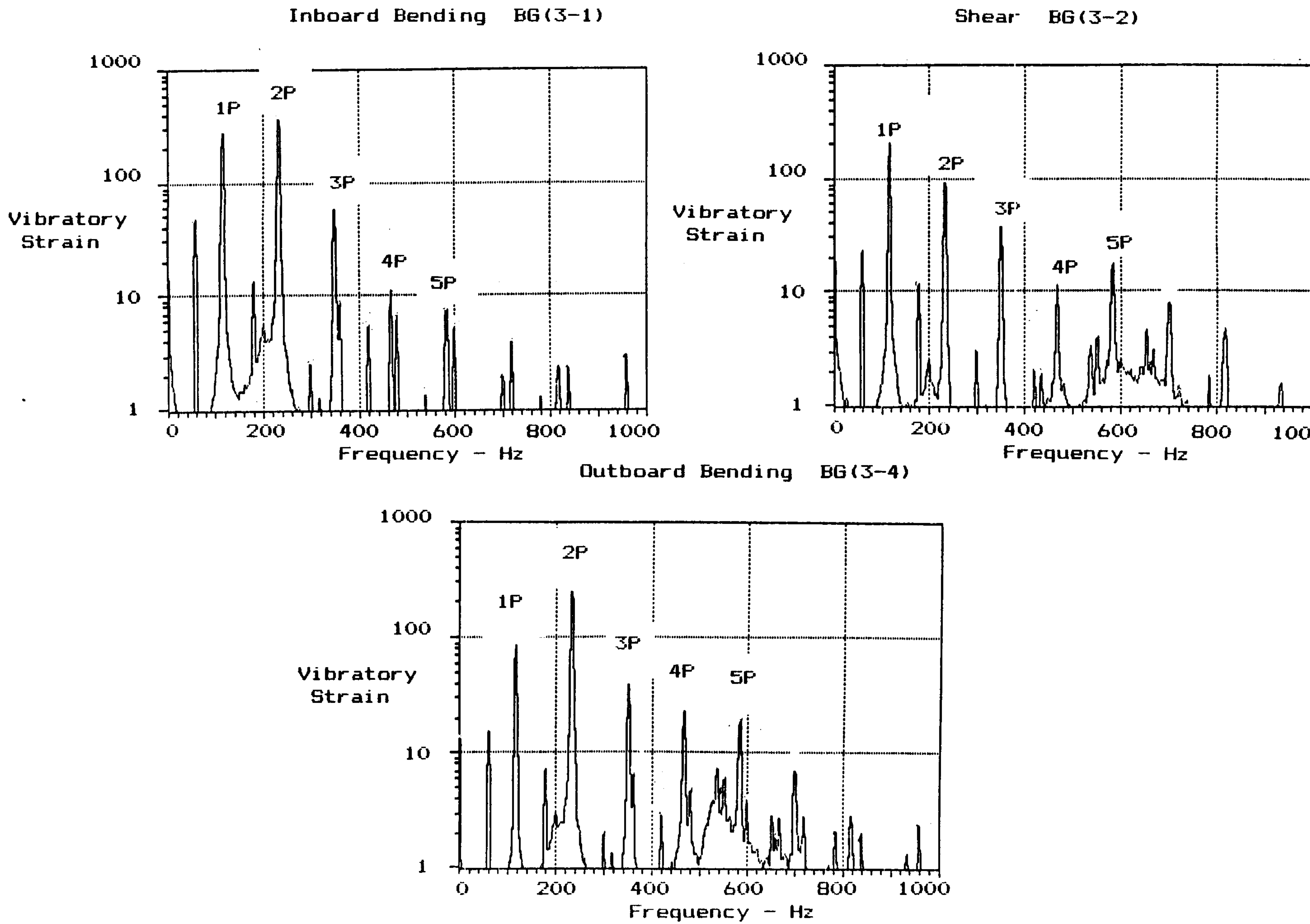


Figure 9. Spectral plots for the SR-2C wing/body/nacelle Prop-Fan tests, NASA-Ames 14 foot wind tunnel, 0.6 Mach number, 7000 RPM, 52.5 degree blade angle, 4 degree fuselage attitude.

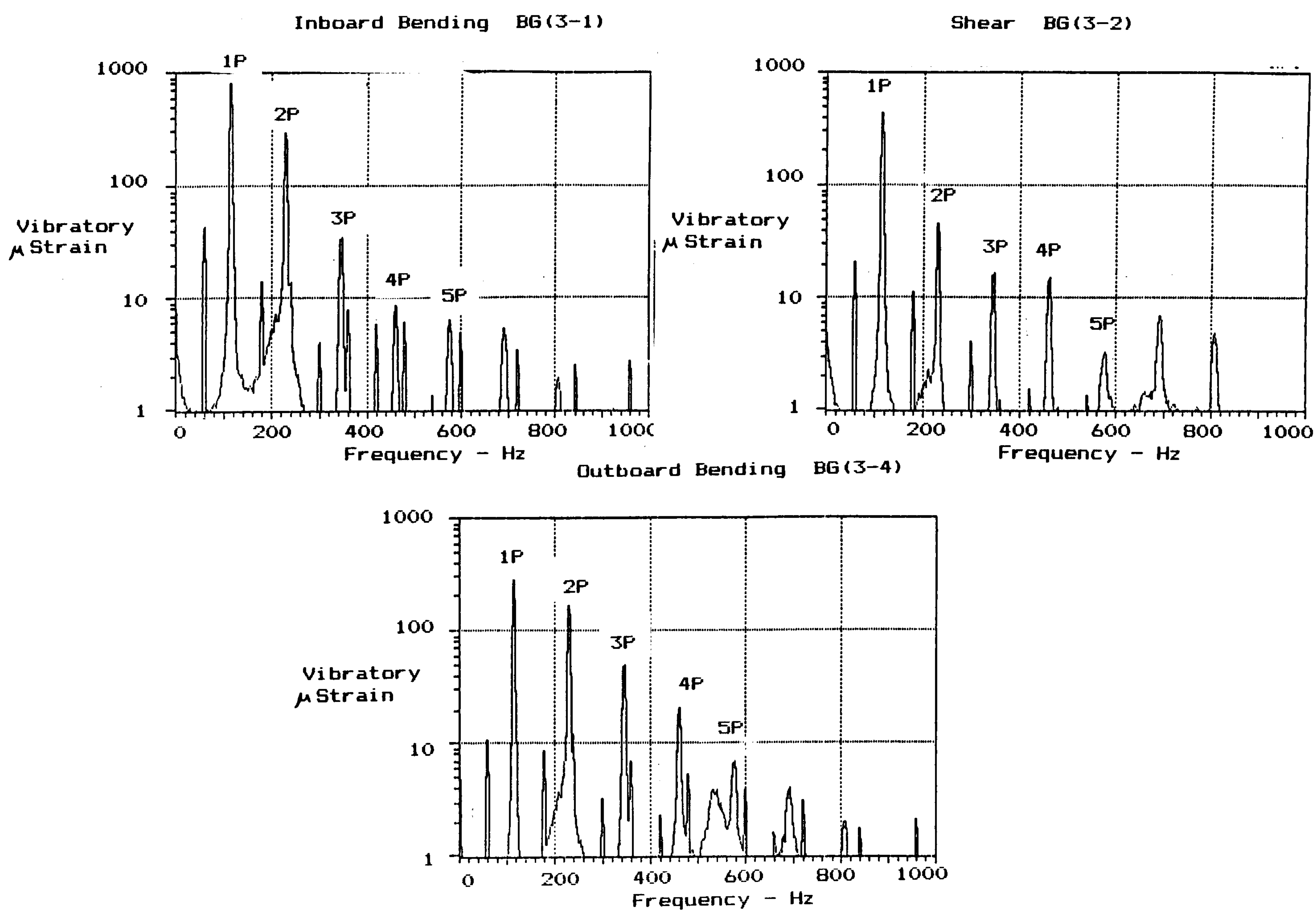


Figure 10. Spectral plots for the SR-2C wing/body/nacelle Prop-Fan tests, NASA-Ames 14 foot wind tunnel, 0.8 Mach number, 6900 RPM, 56.6 degree blade angle, 0.0 degree fuselage attitude.

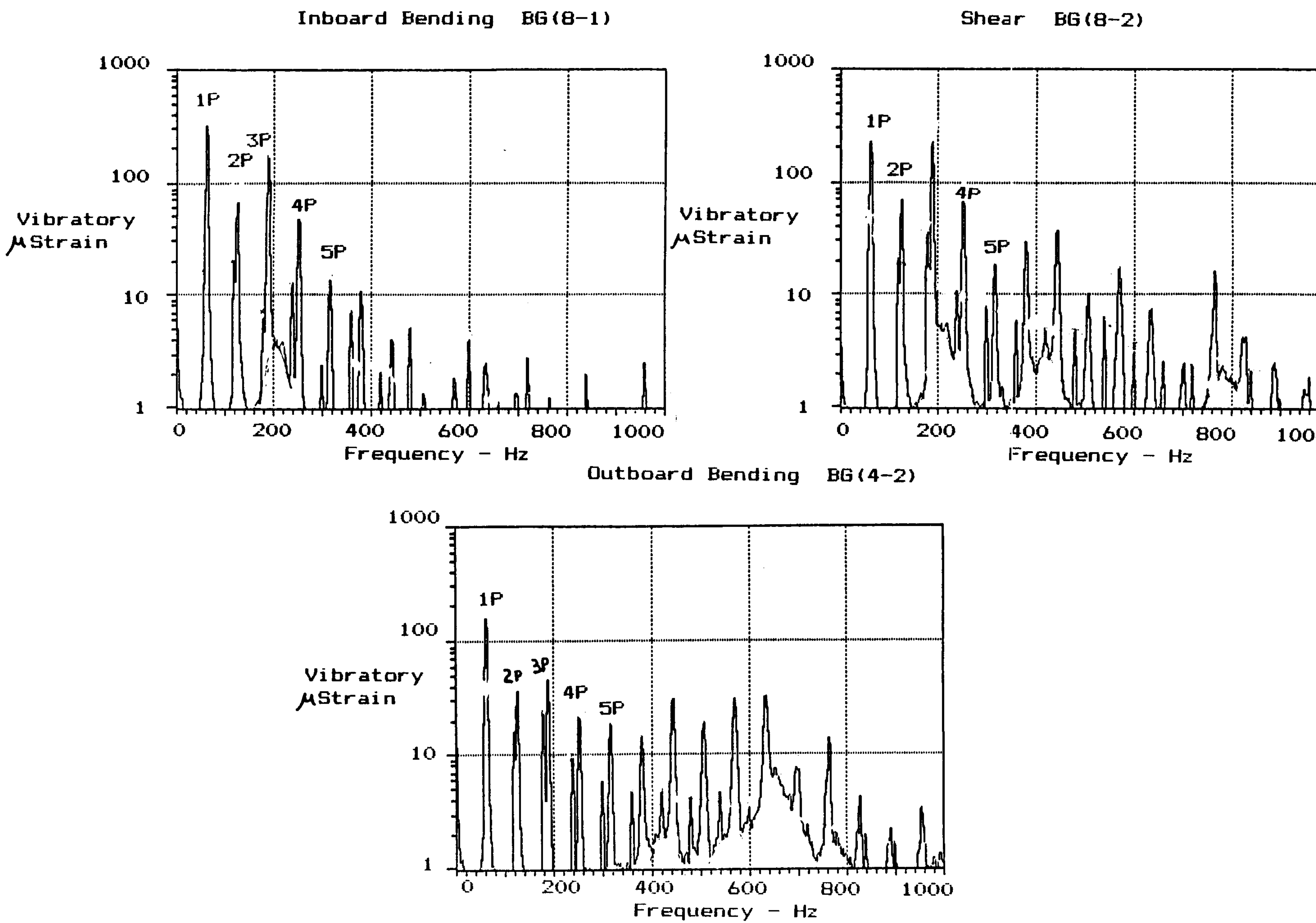


Figure 11. Spectral plots for the SR-3C-3 wing/body/nacelle Prop-Fan tests, NASA-Ames 14 foot wind tunnel, 0.6 Mach number, 3800 RPM, 62.7 degree blade angle, -1.0 degree fuselage attitude.

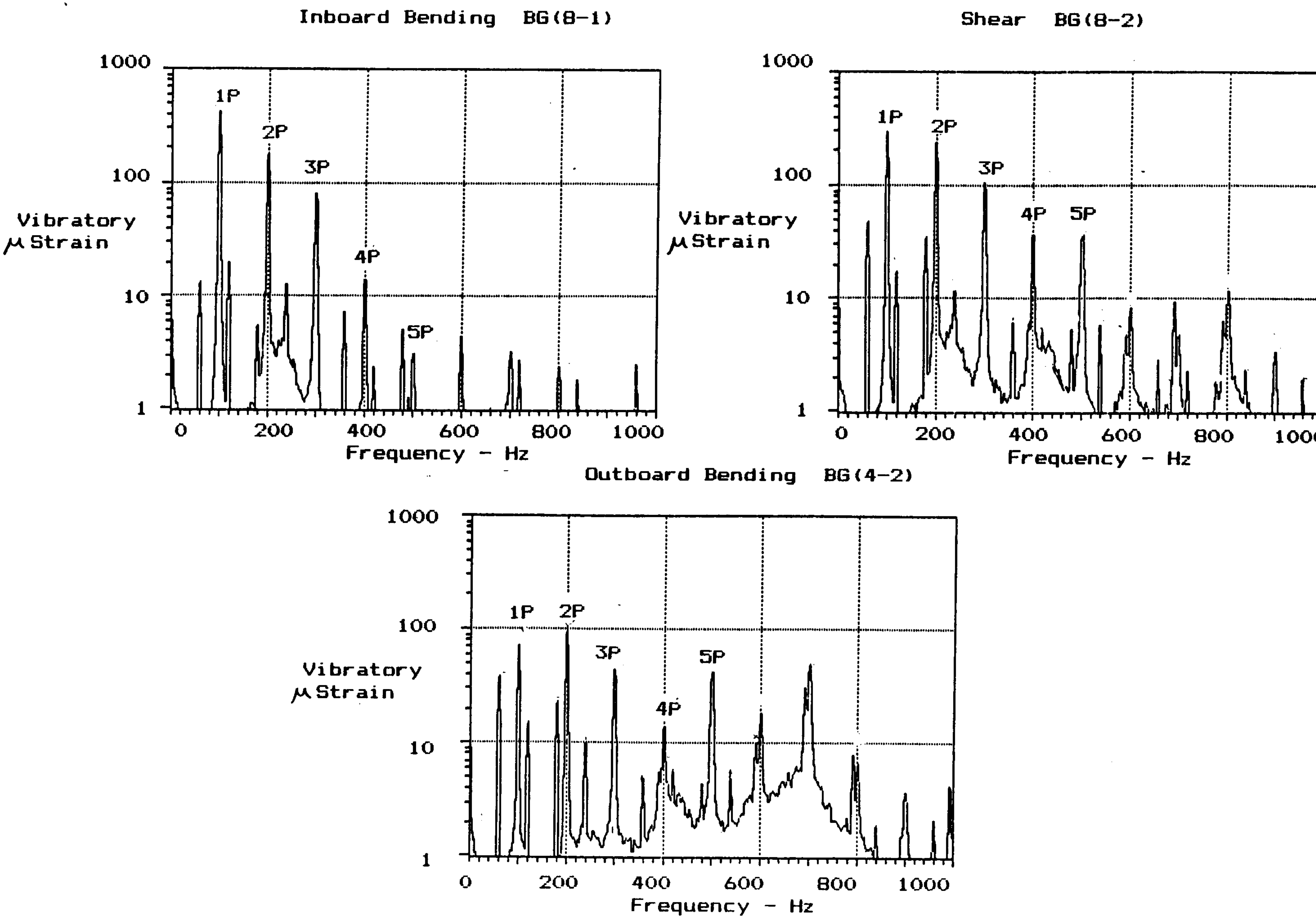


Figure 12. Spectral plots for the SR-3C-3 wing/body/nacelle Prop-Fan tests, NASA-Ames 14 foot wind tunnel, 0.6 Mach number, 6000 RPM, 62.7 degree blade angle, -1.0 degree fuselage attitude.

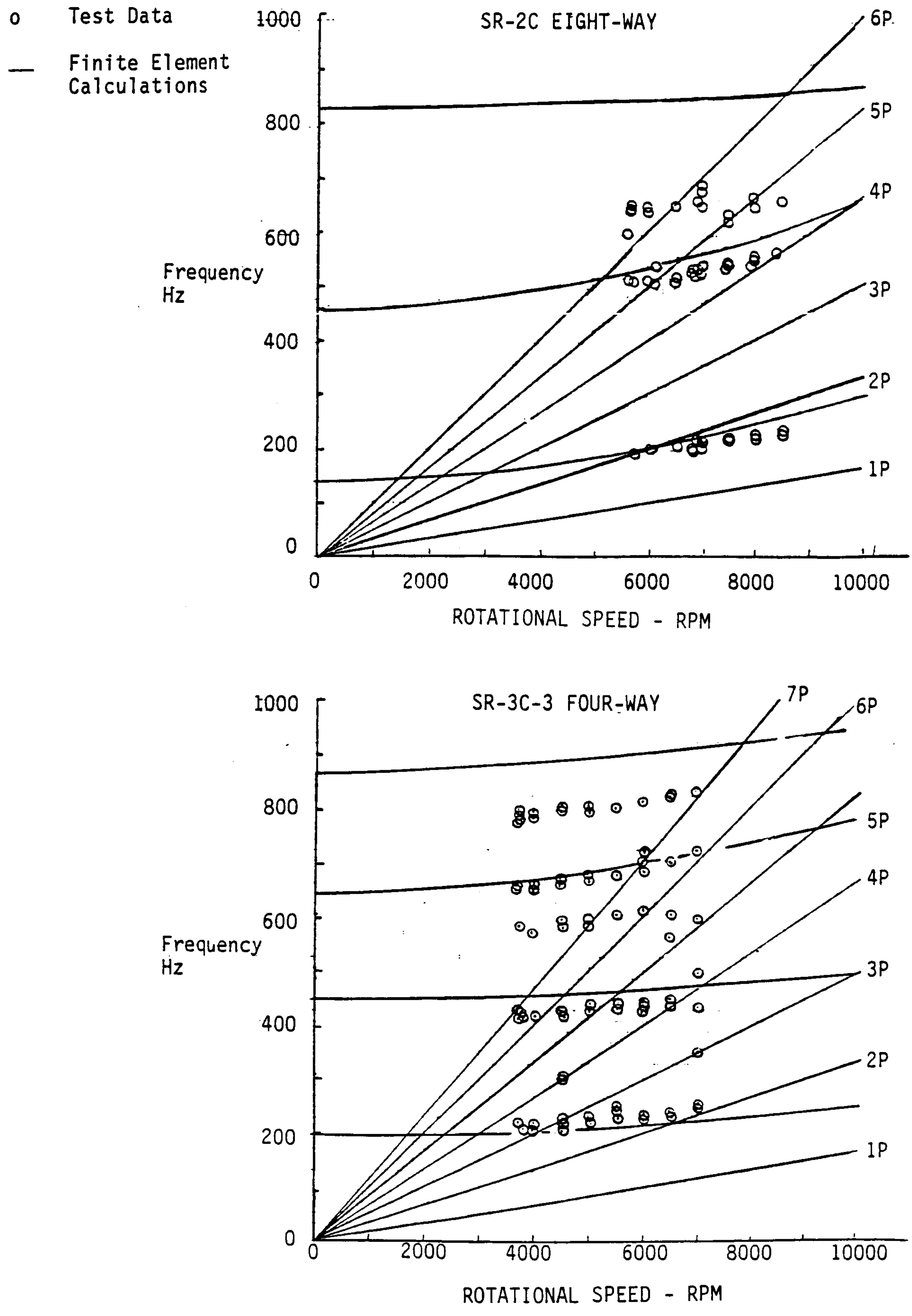


Figure 13. Campbell diagrams for the SR-2C and SR-3-C model Prop-Fans, measured and predicted modal responses.

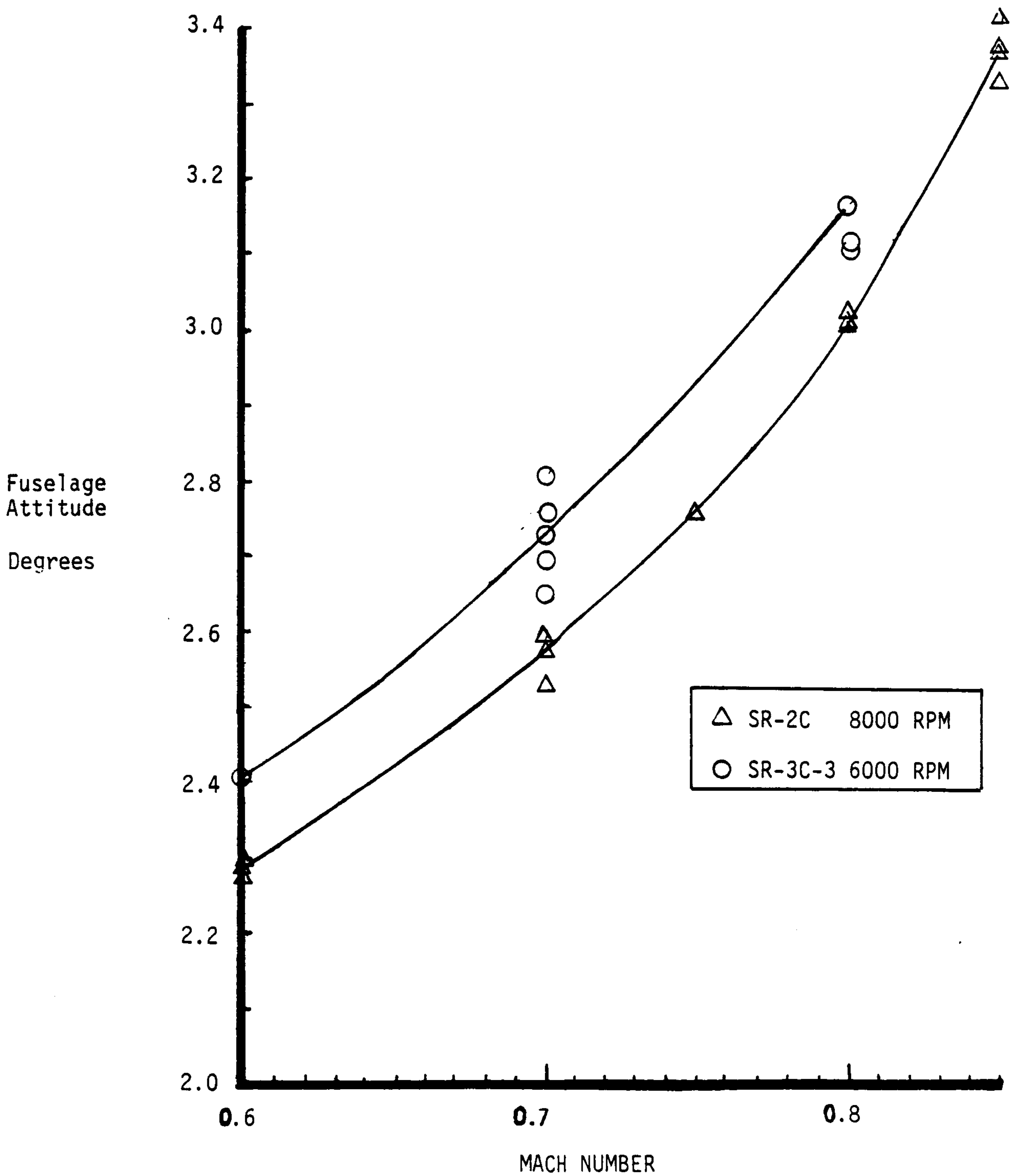


Figure 14. Approximate fuselage attitude for minimum measured 1P vibratory strain for the SR-2C and SR-3C-3 models.

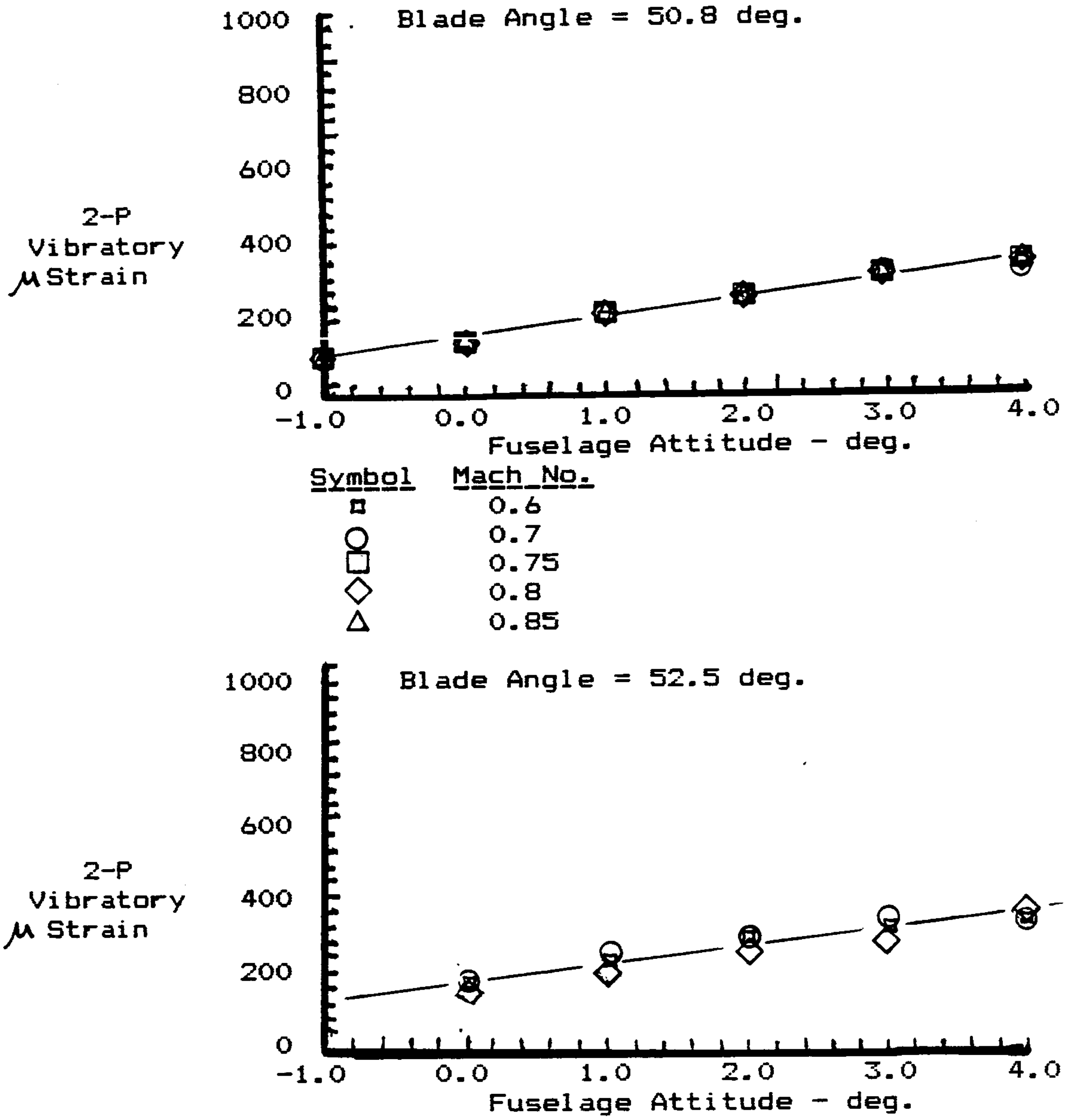


Figure 15. 2-P Inboard bending vibratory strain (BG3-1) as a function of fuselage attitude, SR-2C 8-way Prop-Fan Nacelle/Wing/Fuselage tests. 8000 RPM. NASA-Ames 14 ft transonic tunnel.

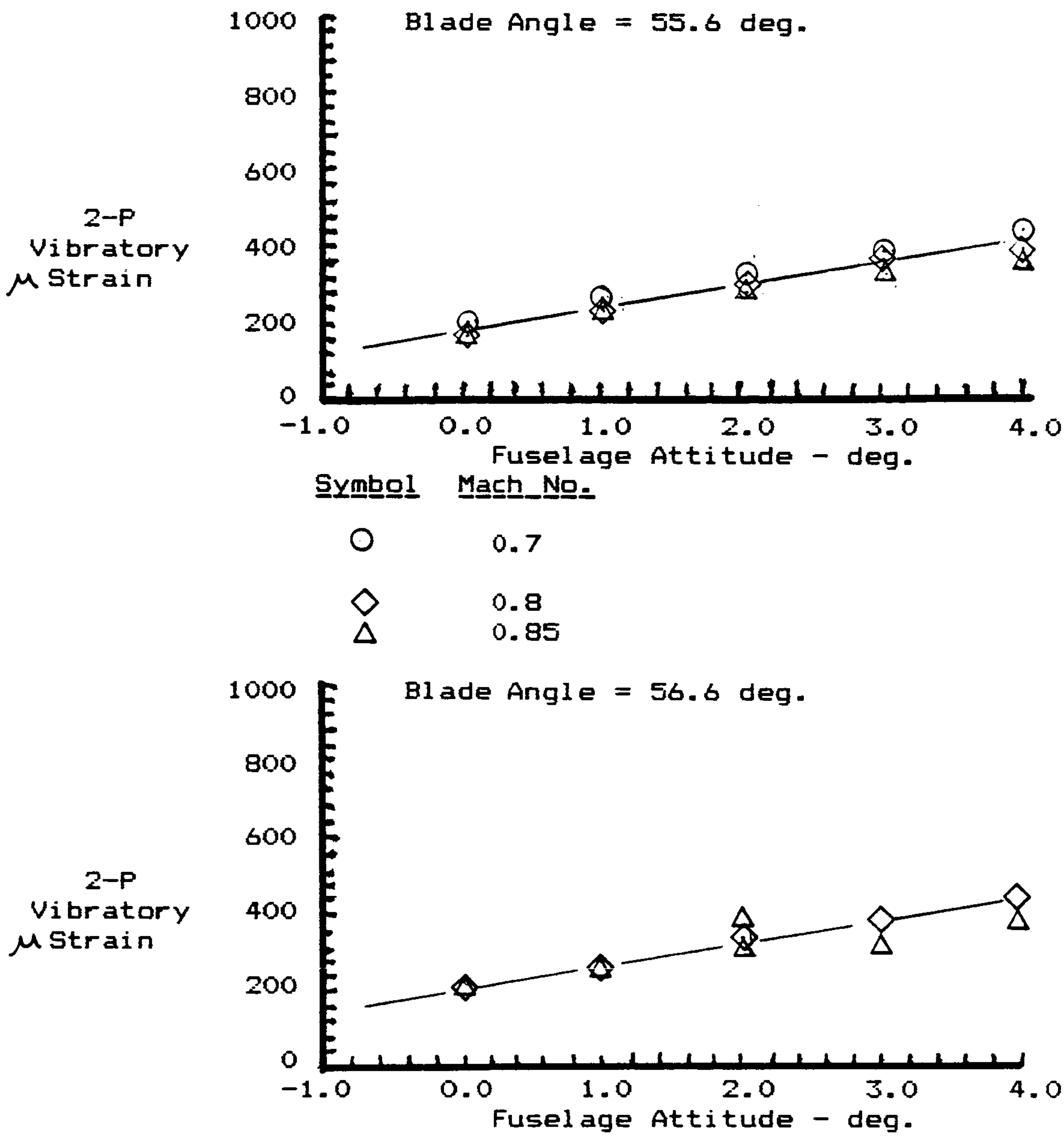


Figure 15 (Continued)

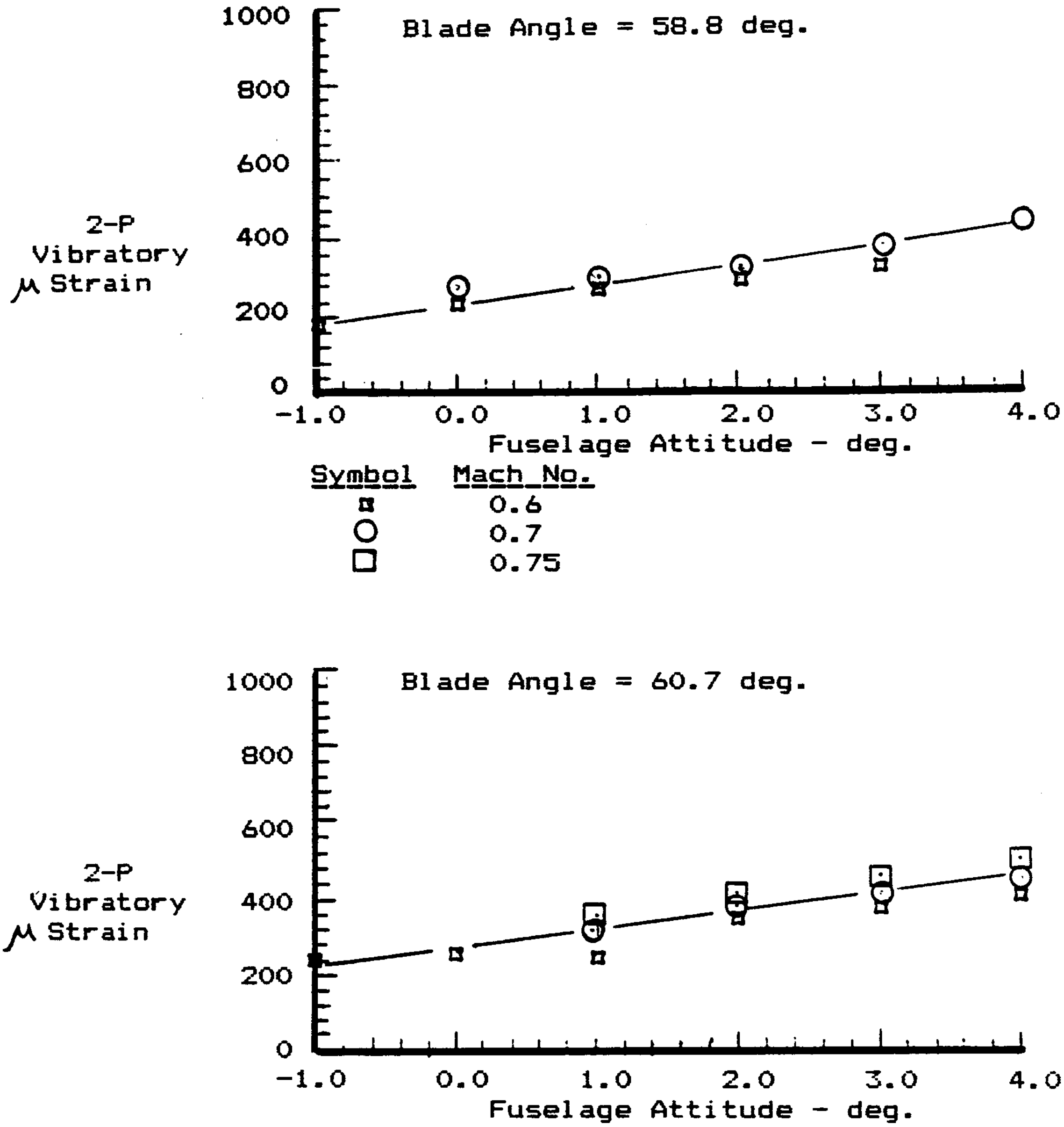
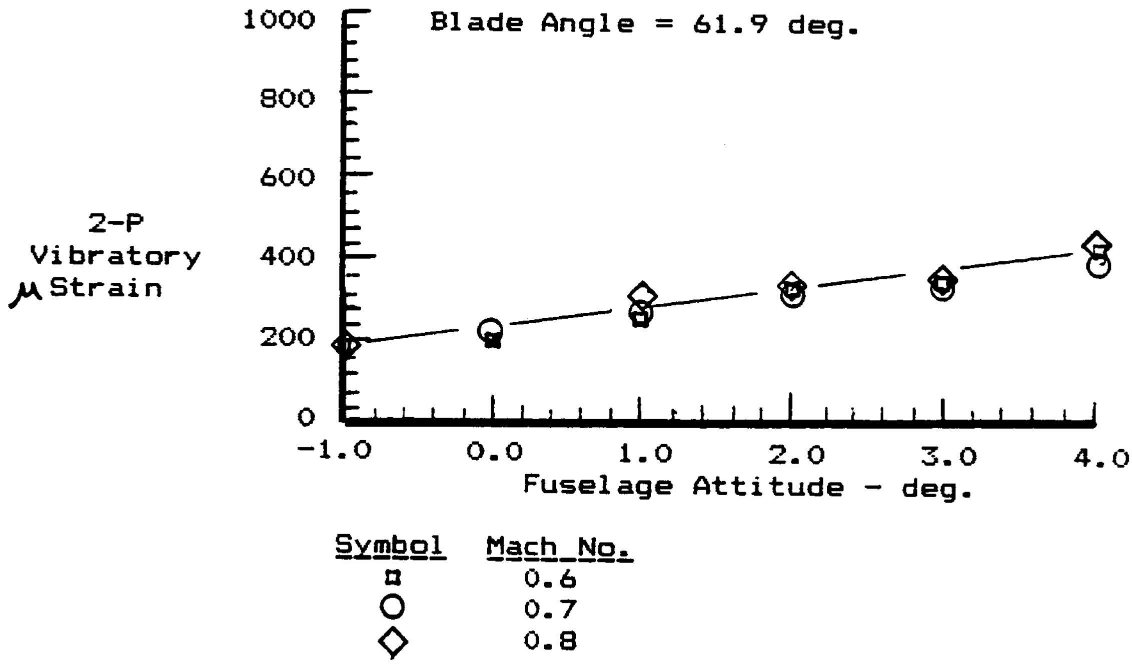


Figure 16. 2-P Inboard bending vibratory strain (BG4-1) as a function of fuselage attitude, SR-3C-3 4-way Prop-Fan Nacelle/Wing/Fuselage tests. 6000 RPM. NASA-Ames 14 ft transonic tunnel.



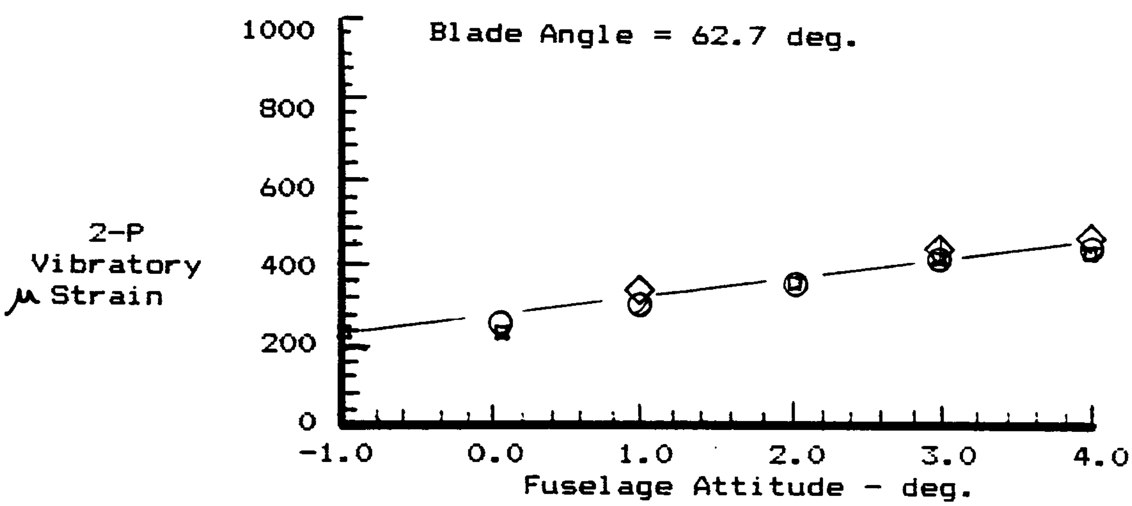


Figure 16 (Continued)

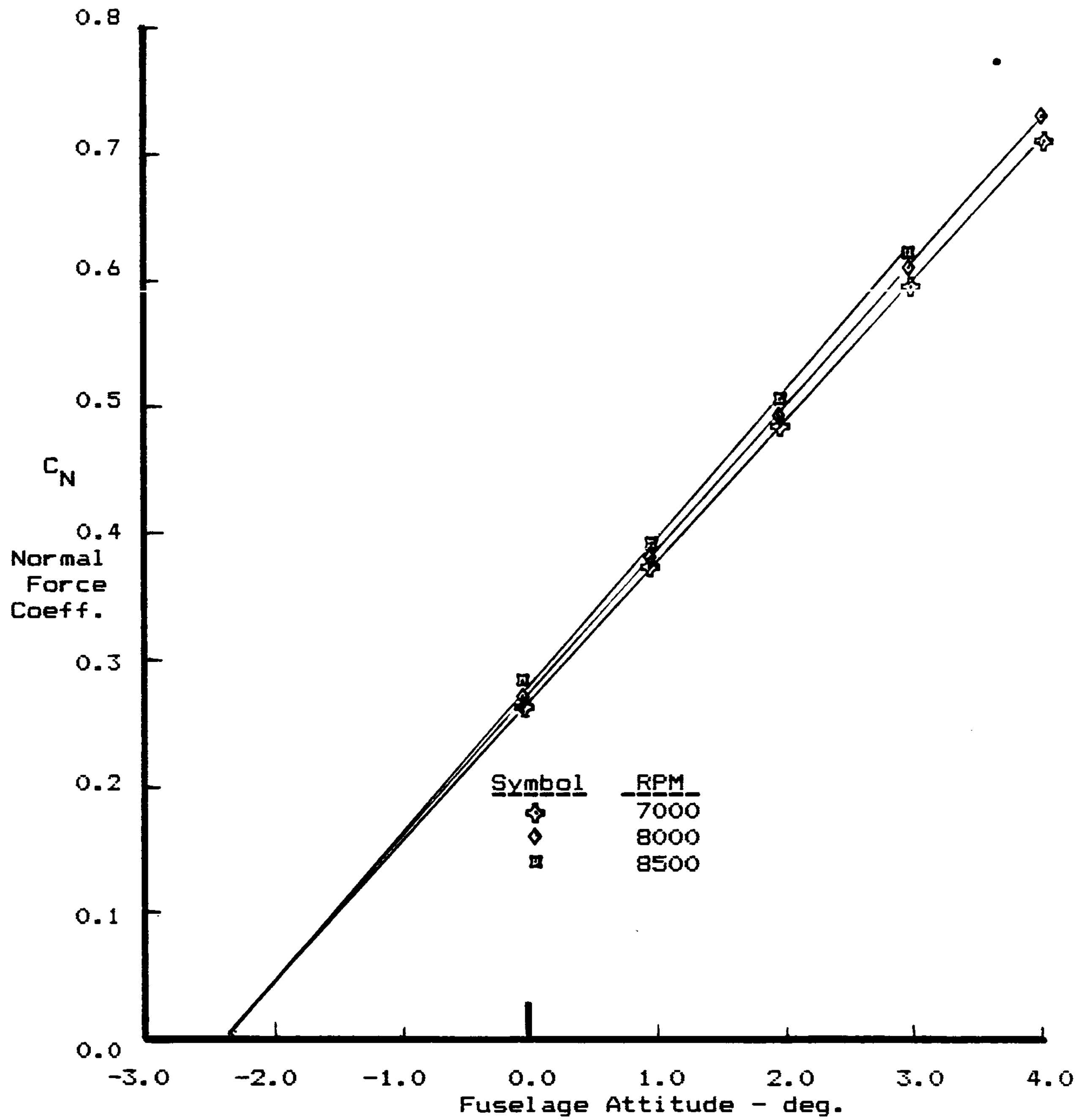


Figure 17. Aircraft normal force coefficient as a function of fuselage attitude, SR-2C 8-way Prop-Fan Nacelle/Wing/Fuselage tests. NASA-Ames 14 ft transonic tunnel. Mach number = 0.80, Blade angle = 56.6 deg.

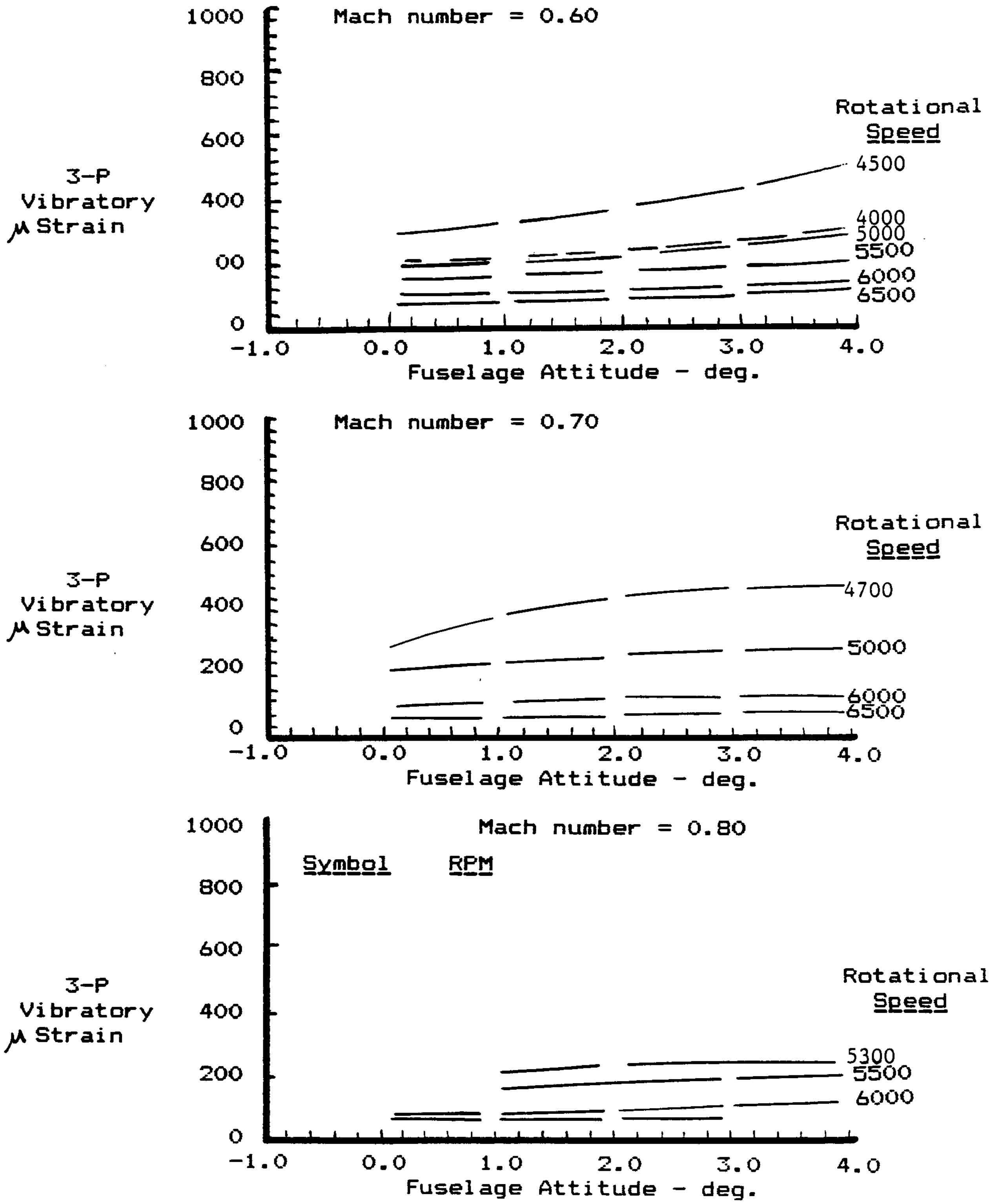
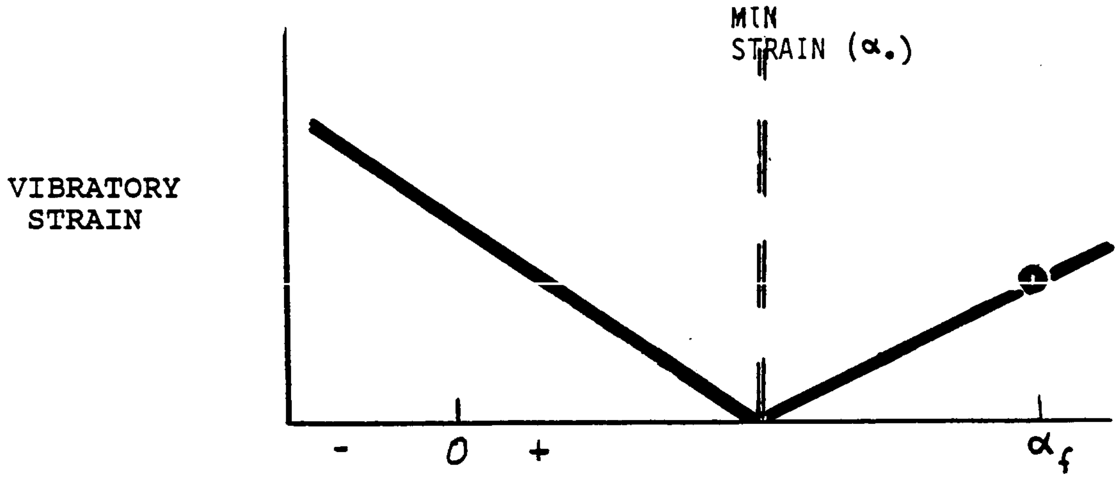


Figure 18. 3-P Outboard bending vibratory strain (BG4-2) as a function of fuselage attitude, SR-3C-3 4-way Prop-Fan Nacelle/Wing/Fuselage tests. Blade angle = 61.9 deg. NASA-Ames 14 ft. transonic tunnel.

EQUIVALENT TILT ANGLE



α_f, AIRCRAFT ATTITUDE

$$\alpha_{EQ} = \alpha_f - \alpha_o$$

EQUIVALENT EXCITATION FACTOR

$$EF_{EQ} = \alpha_{EQ} \cdot \left(\frac{V_{EQ}}{348}\right)^2$$

STRAIN SENSITIVITY

$$\text{STRAIN SENSITIVITY} = \frac{\text{MICRO STRAIN}}{EF_{EQ}}$$

Figure 19. Strain Sensitivity Analysis Definitions

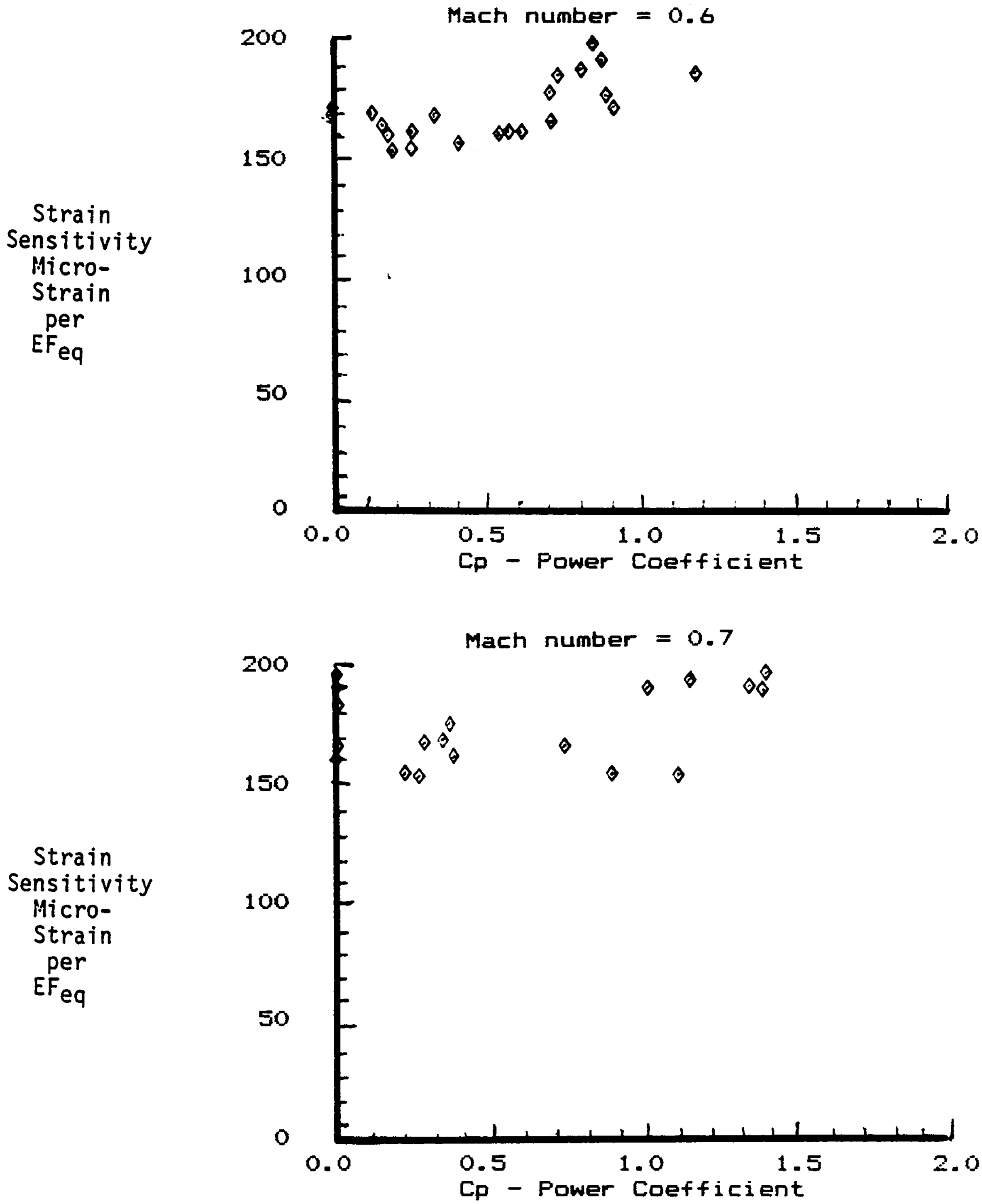
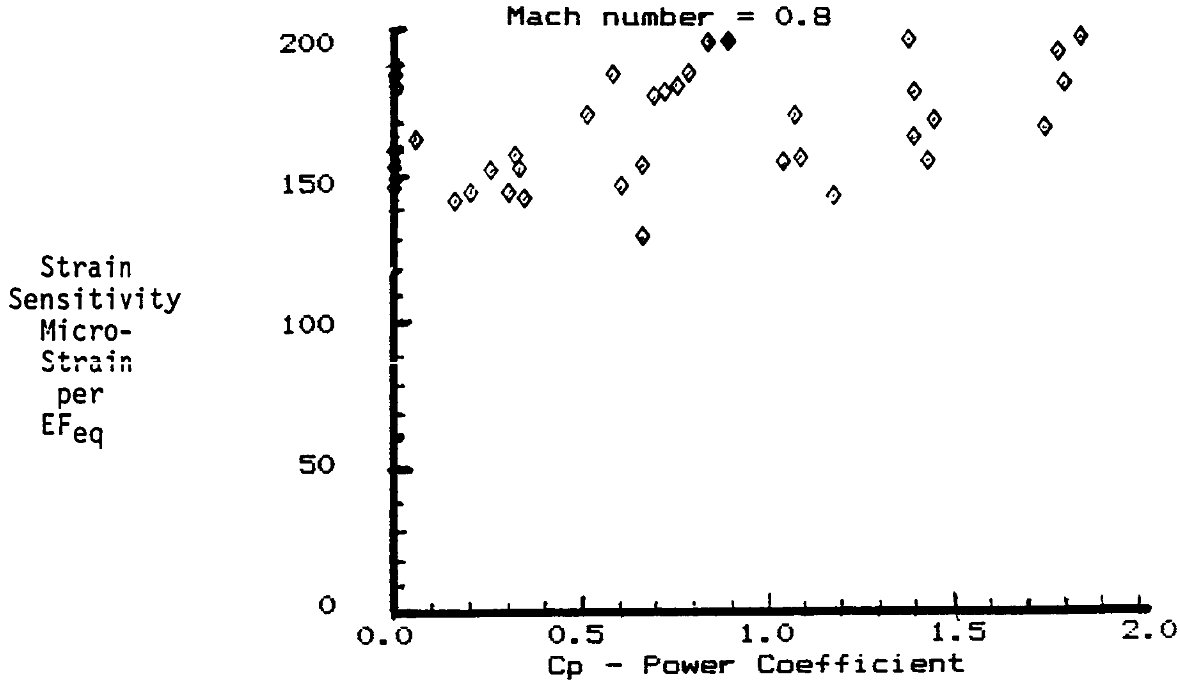


Figure 20. Comparison of 1-P vibratory strain sensitivity for the SR-2C Prop-Fan with the wing/body/nacelle configuration plotted as a function of Mach number.



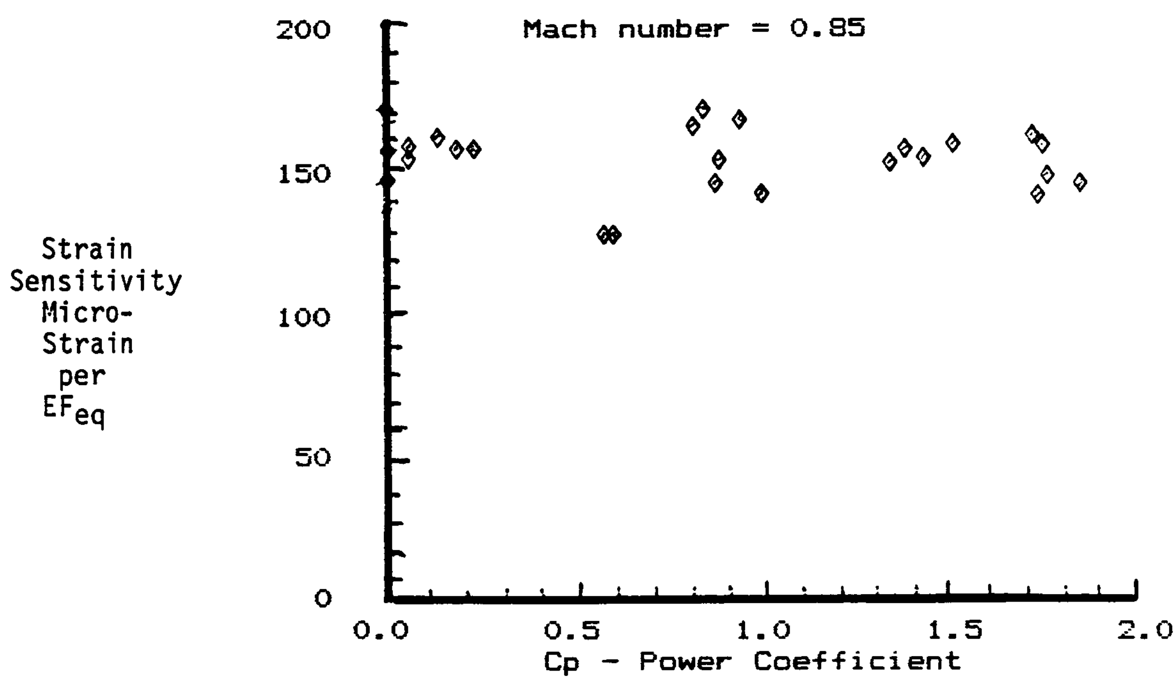


Figure 2o. (Continued)

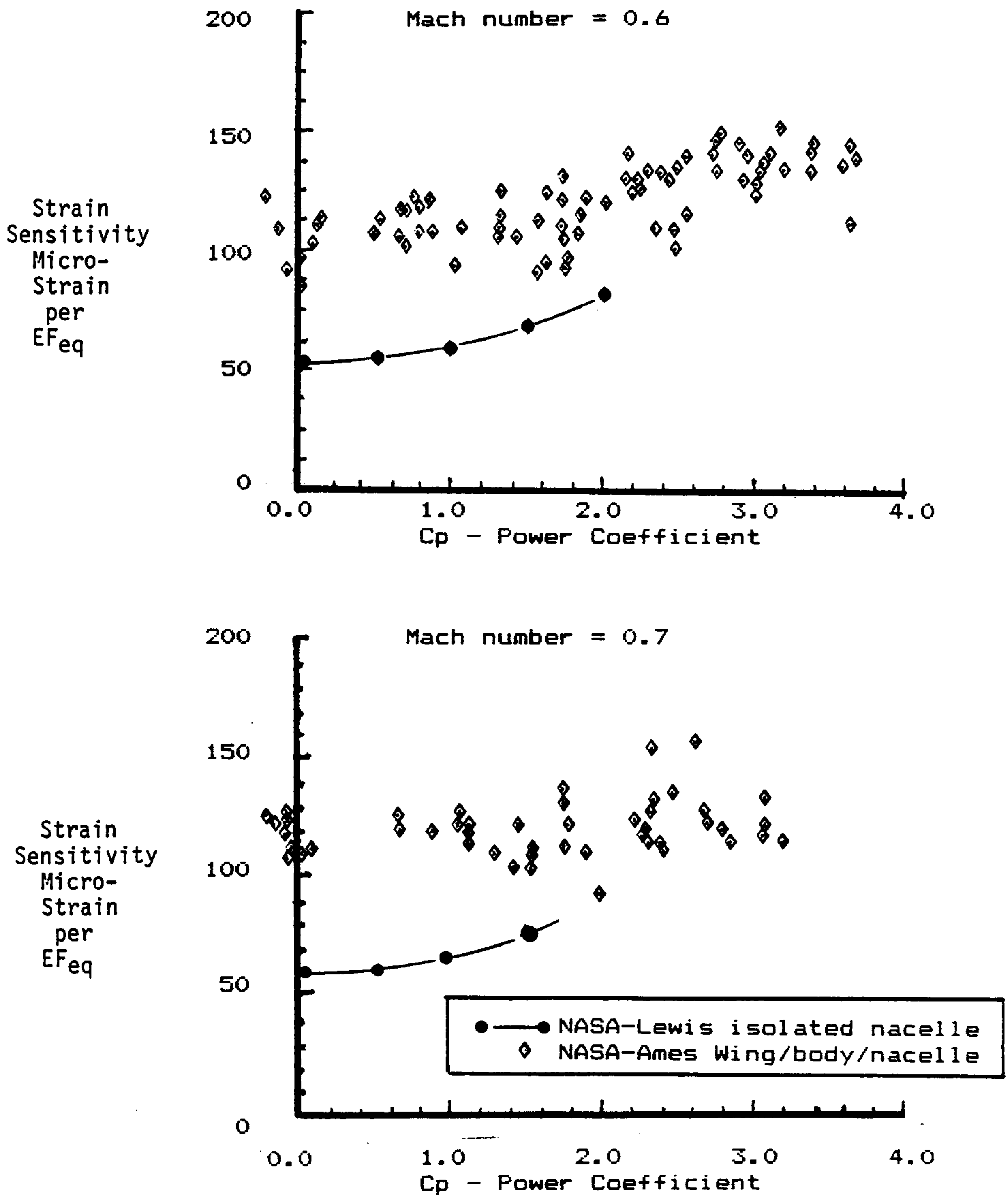
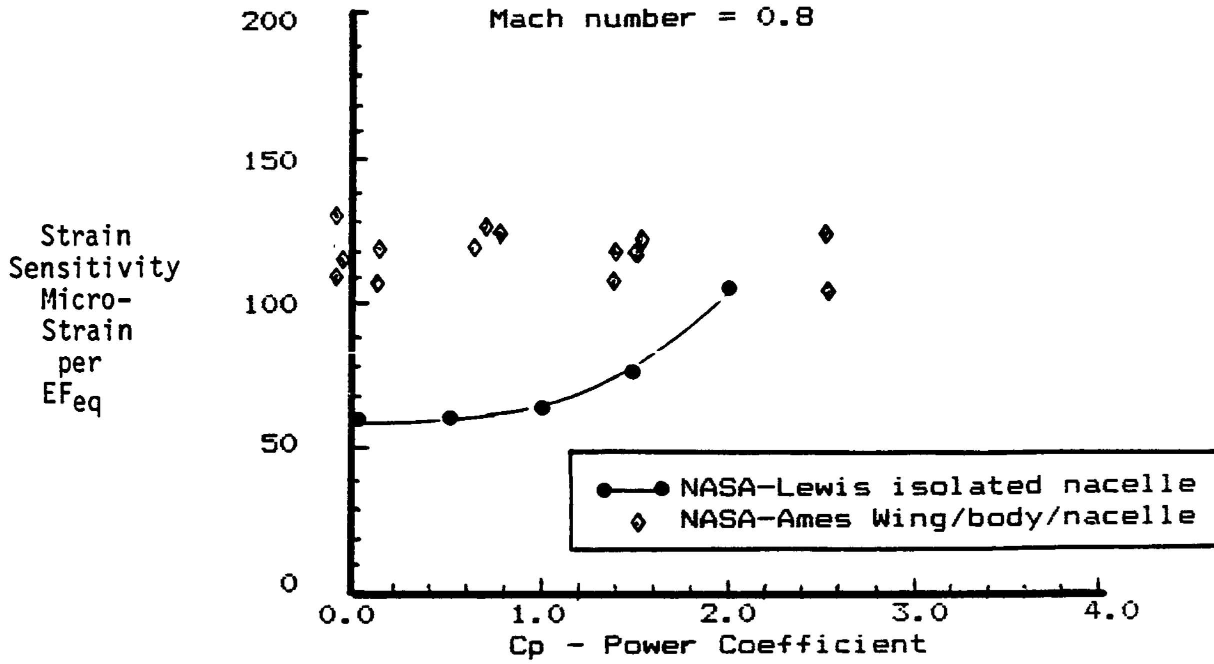
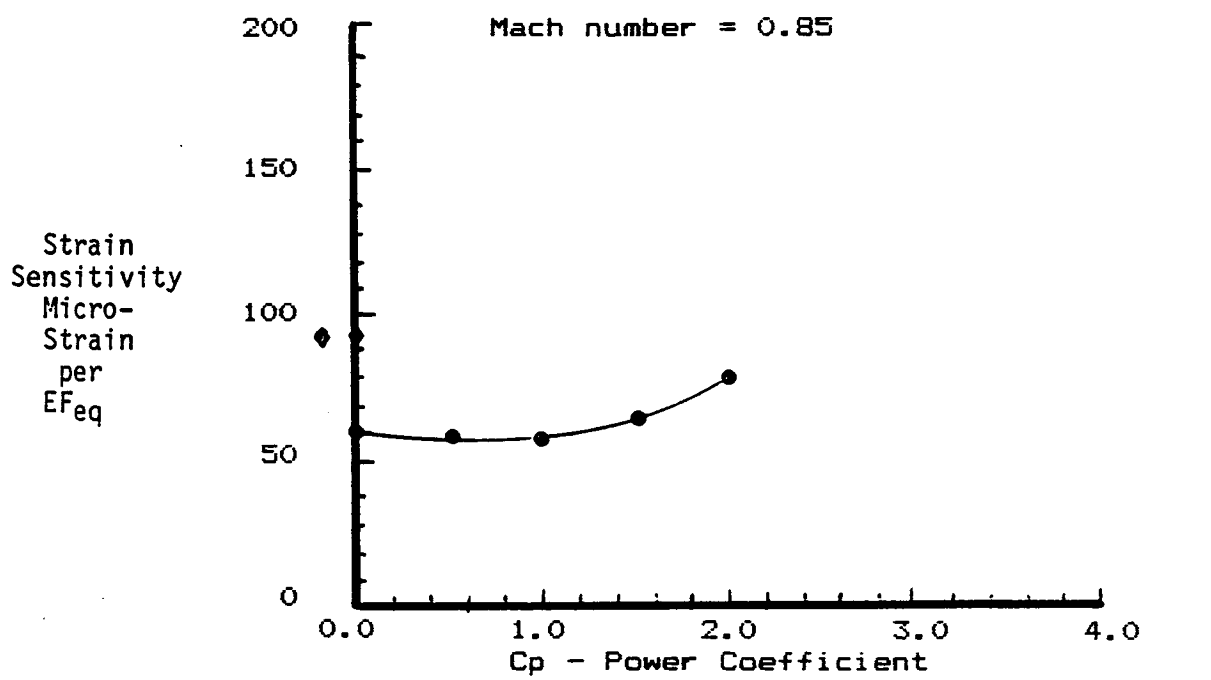


Figure 21. Comparison of 1-P vibratory strain sensitivity for the SR-3C-3 Prop-Fan with and without the wing/body/nacelle configuration plotted as a function of Mach number.





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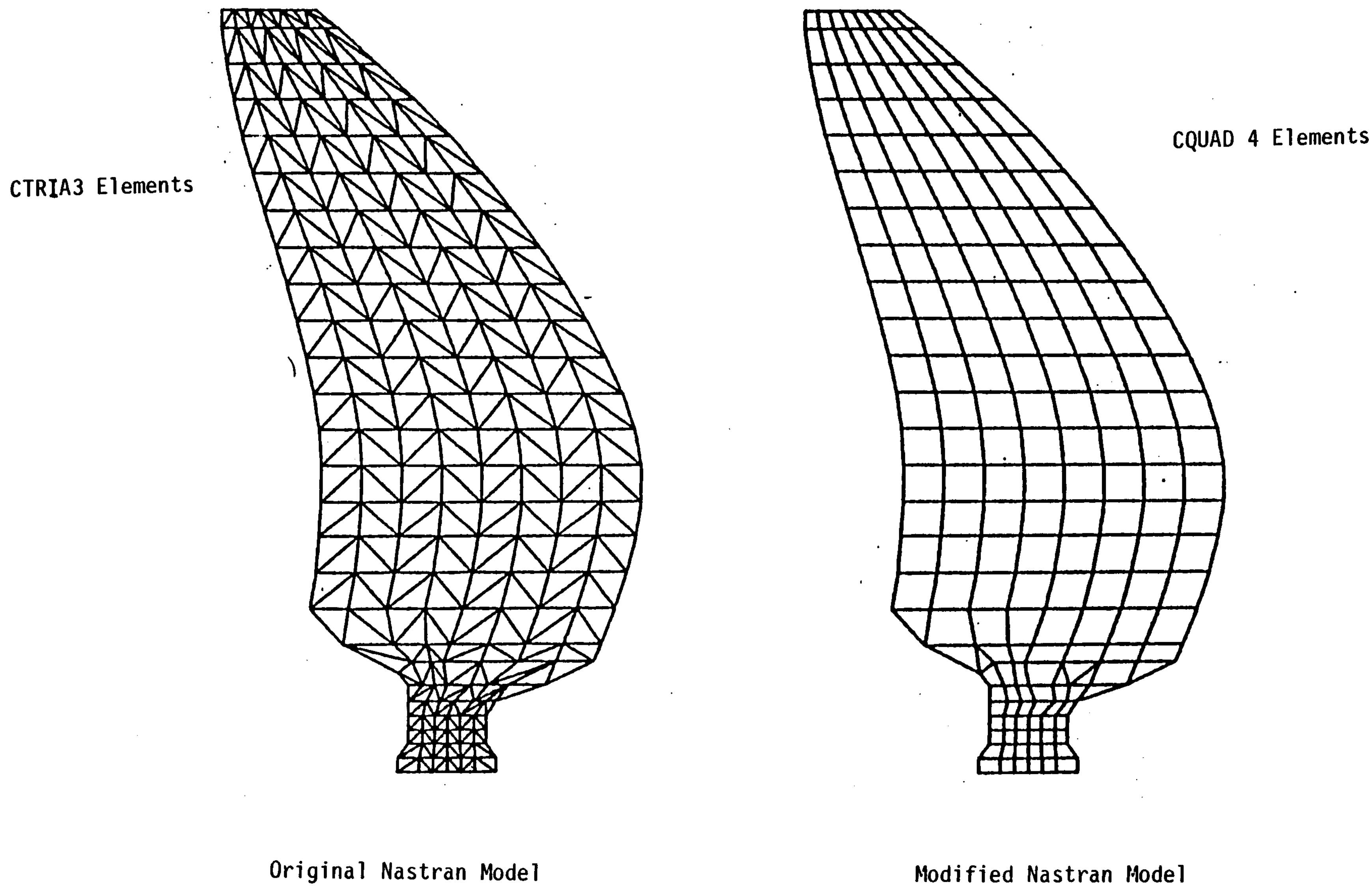
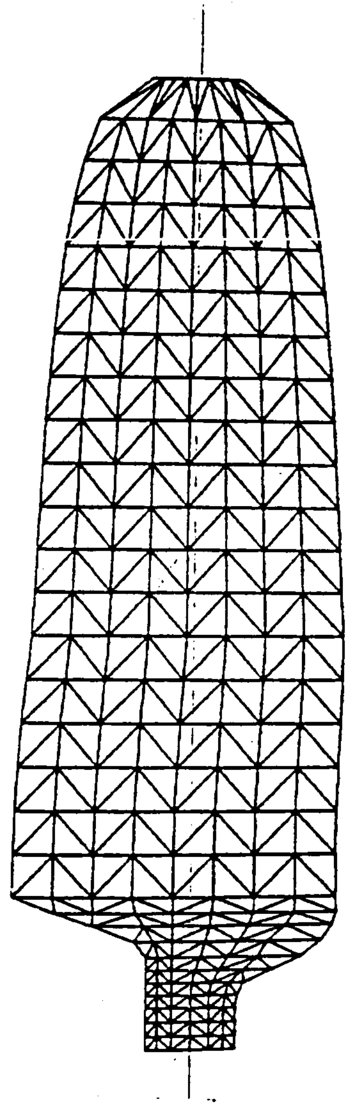


Figure 22. SR-3C-3 FINITE ELEMENT MODELS



CTRIA3 Model

Figure 23. SR-2C FINITE ELEMENT MODEL

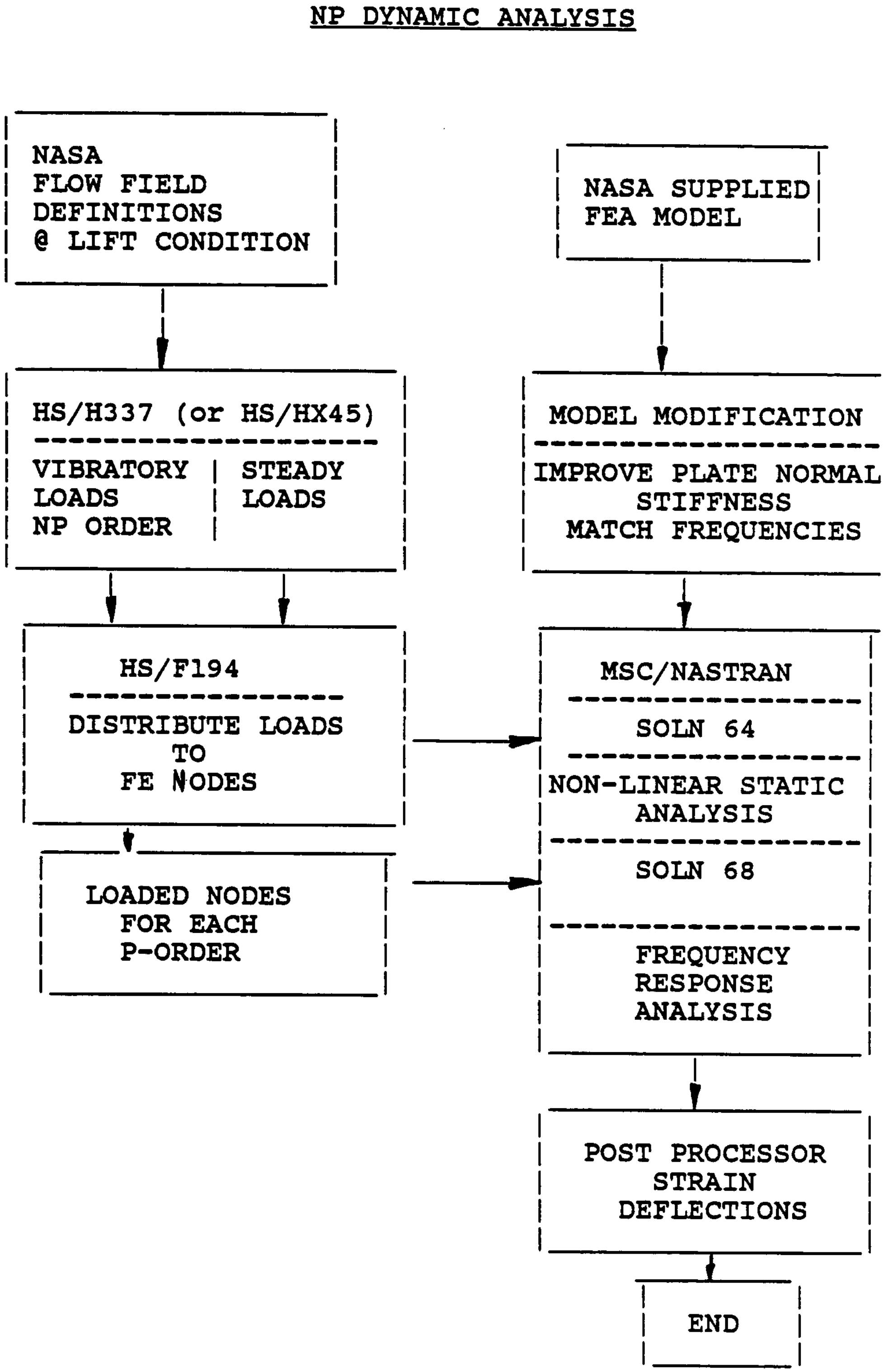


Figure 24. Analytical Blade Response Prediction Method

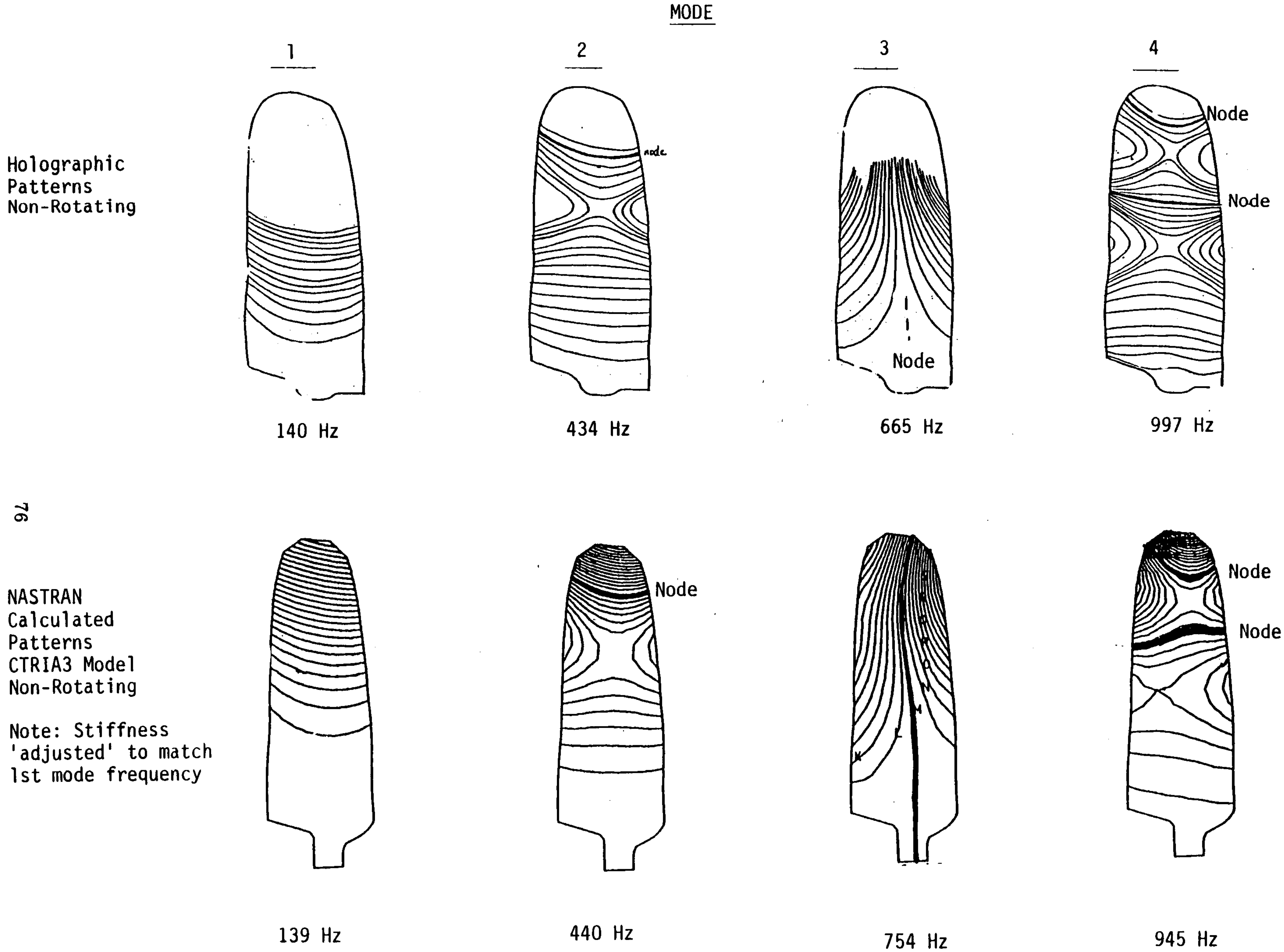


Figure 25. CALCULATED AND MEASURED MODE SHAPE PATTERNS AND FREQUENCIES

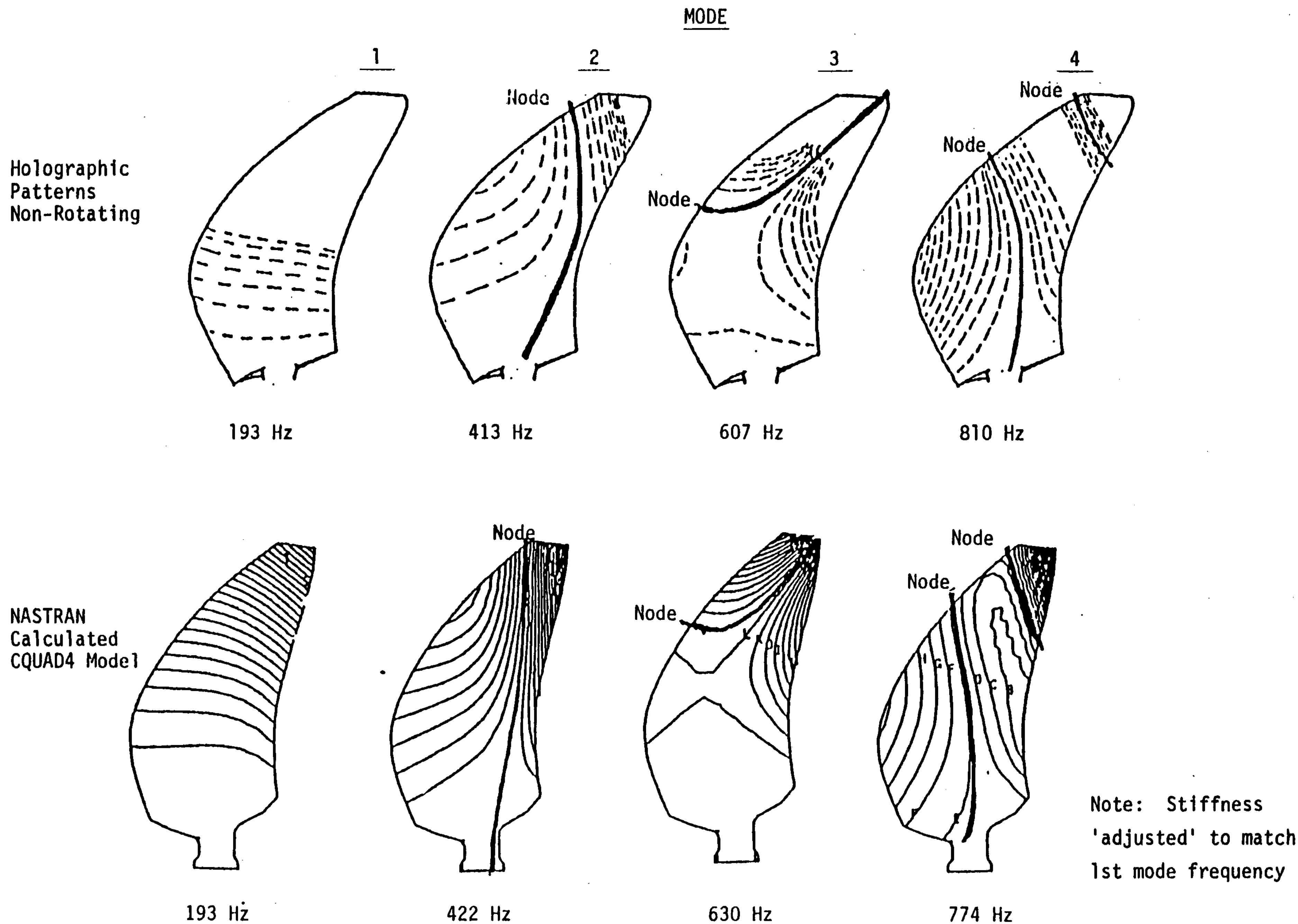


Figure 26. CALCULATED AND MEASURED MODE SHAPE PATTERNS AND FREQUENCIES SR-3C-3

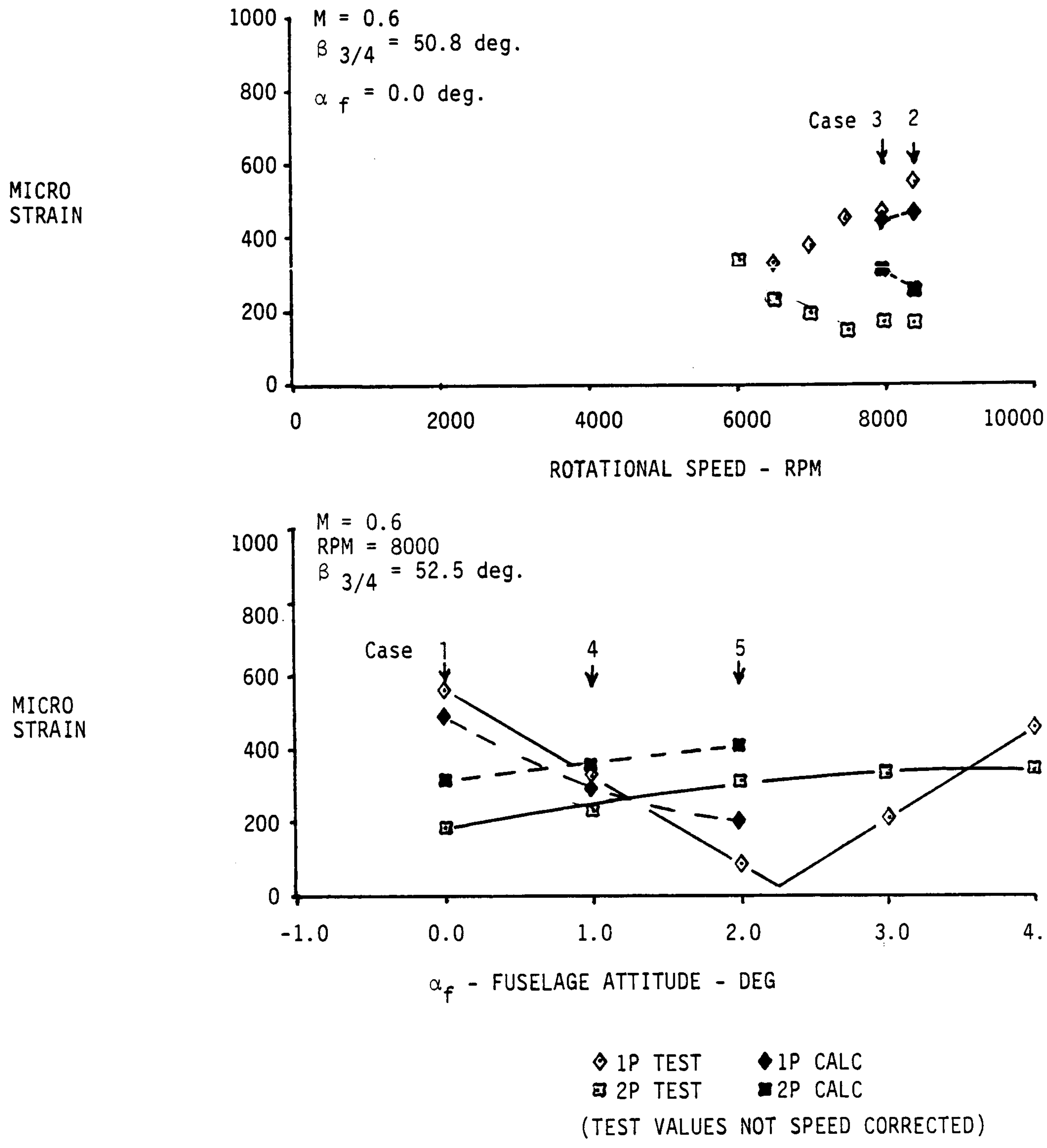


Figure 27. SR-2C PROP-FAN TESTS
WING/BODY/NACELLE
NASA AMES
(INBOARD BENDING STRAIN)

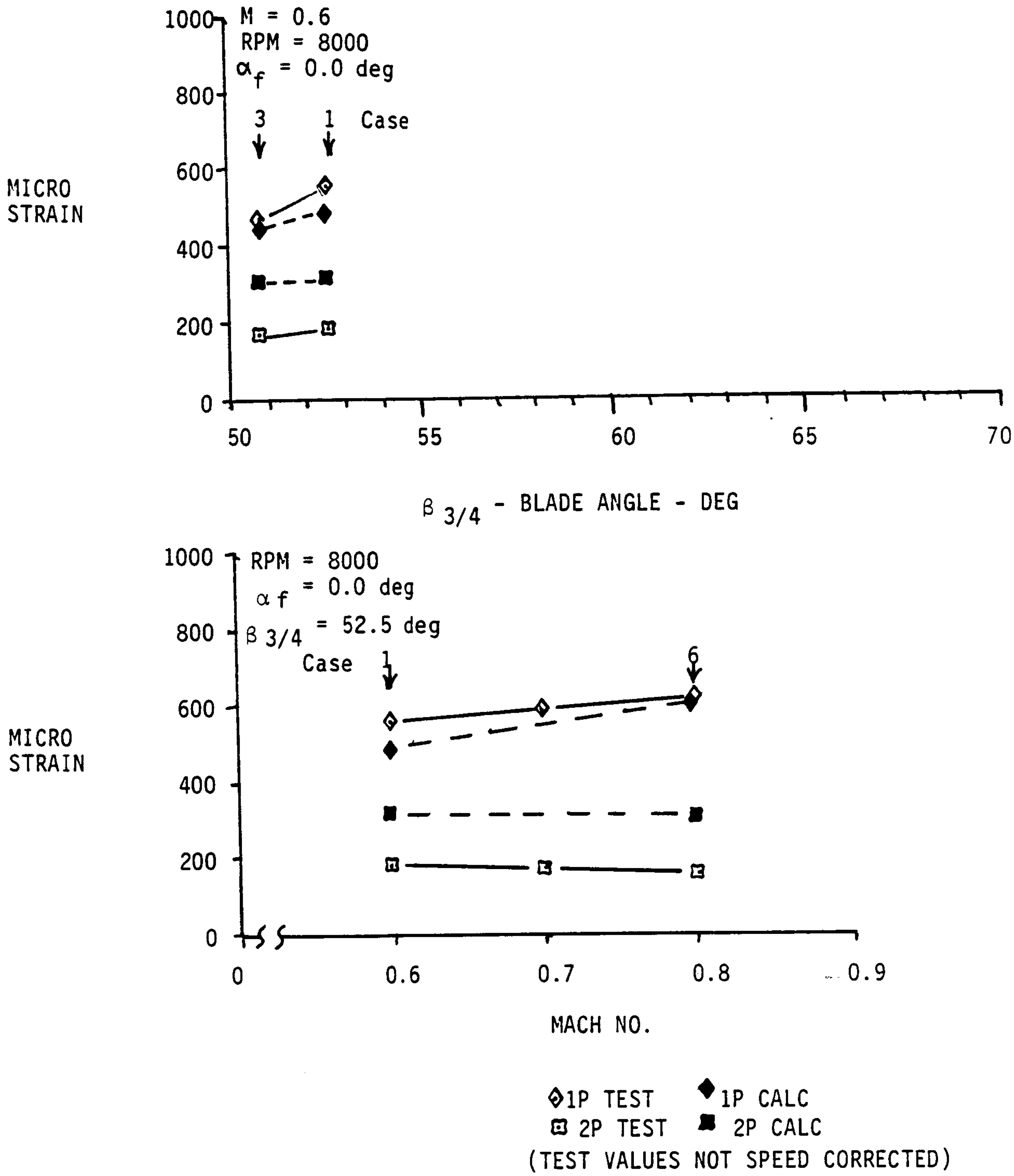


Figure 28. SR-2C PROP-FAN TESTS
WING/BODY/NACELLE
NASA AMES
(INBOARD BENDING STRAIN)

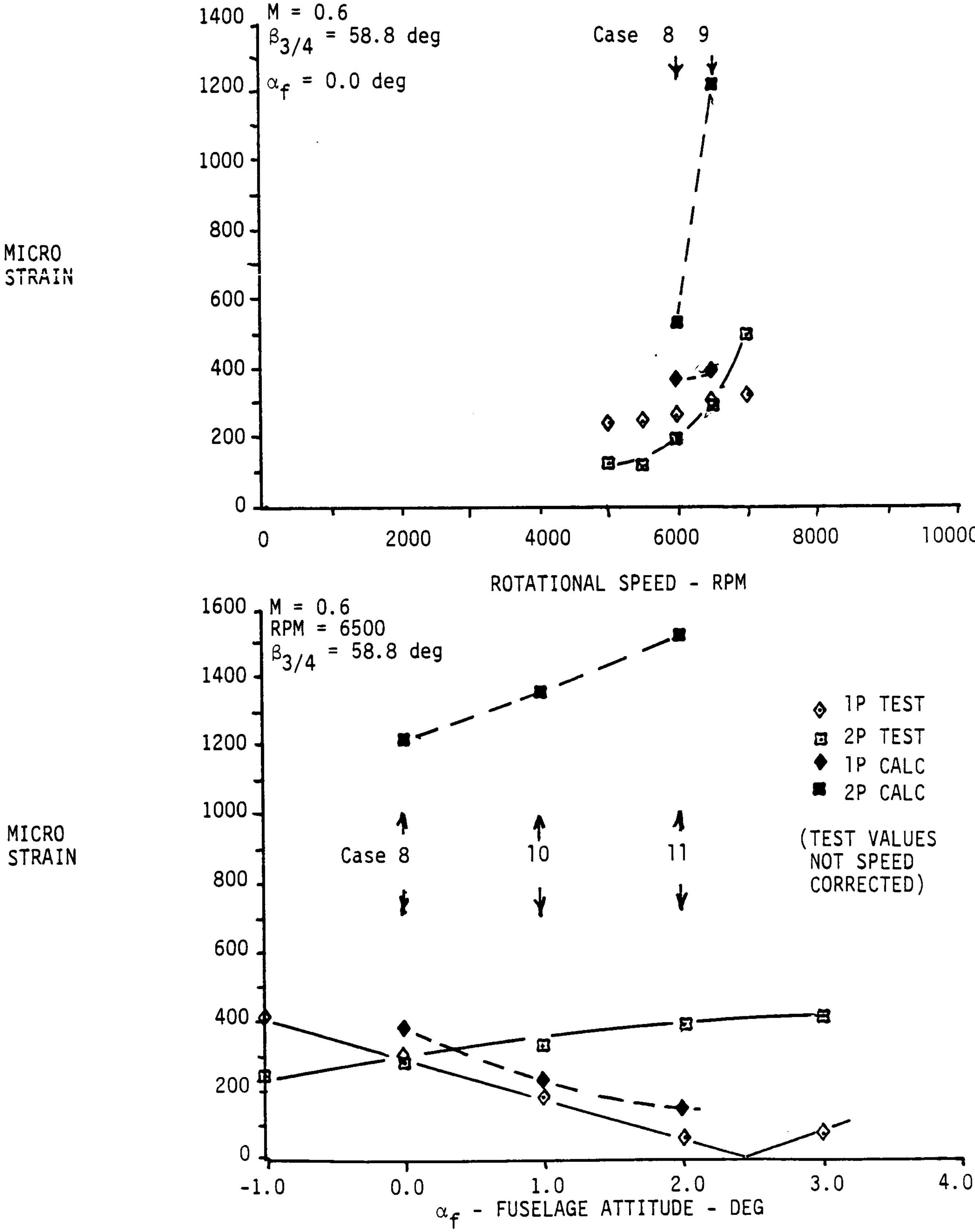


Figure 29. SR-3C-3 PROP-FAN TESTS
WING/BODY/NACELLE
NASA AMES
(INBOARD BENDING STRAIN)

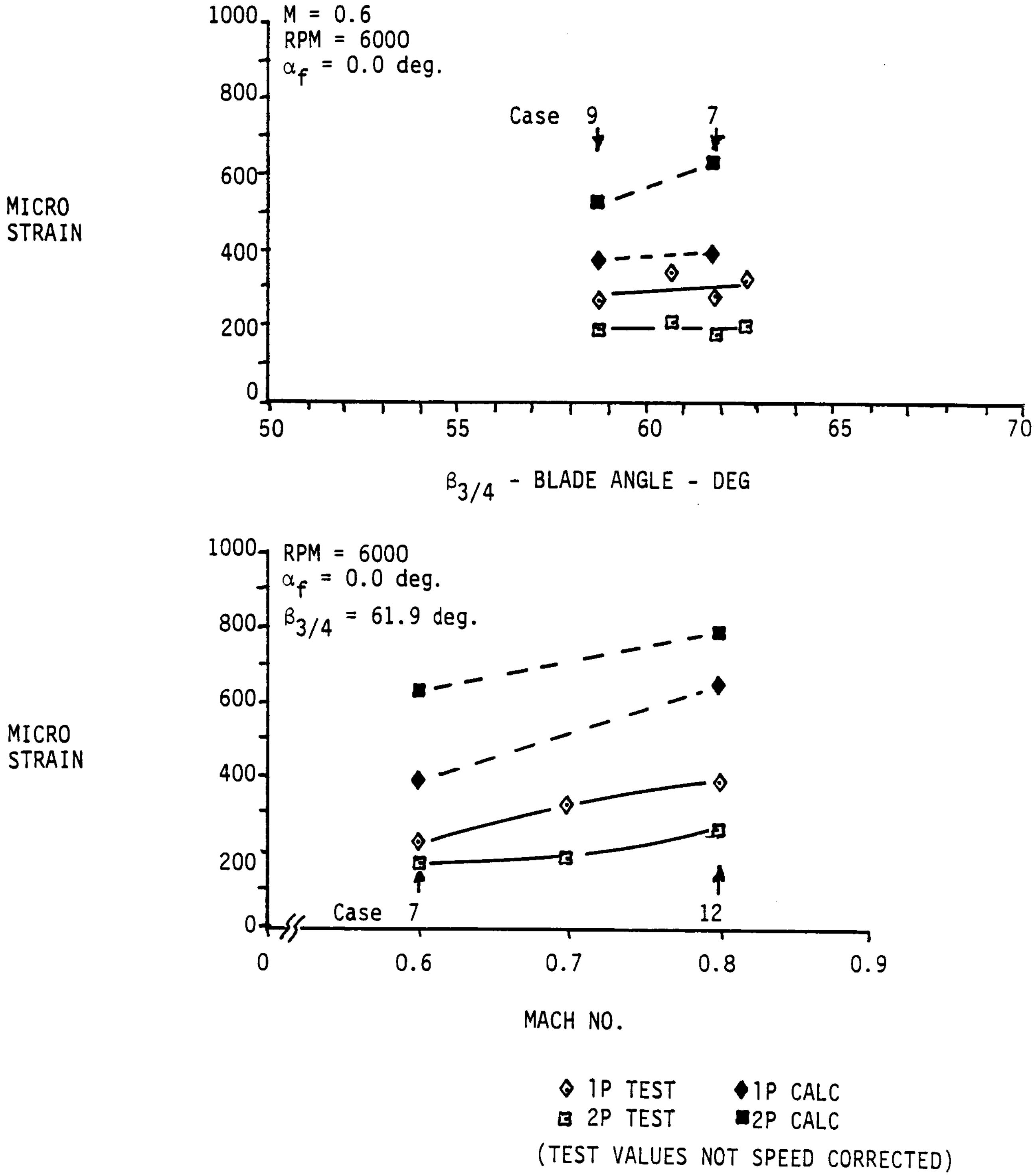


Figure 30. SR-3C-3 PROP-FAN TESTS
WING/BODY/NACELLE
NASA AMES

(INBOARD BENDING STRAIN)

APPENDIX I

ZERO TO PEAK TOTAL VIBRATORY STRAIN

AMPLITUDE TABULATION BY RUN NUMBER

AND STRAIN GAGE NUMBER (MICRO-STRAIN)

SR-2C MODEL

SR-3C-3 MODEL

PEAK DETECTOR SAMPLED DATA: XBAR + 2 * SIGMA

JOB I.D.: SR2AME DATE: 14-MAR-85
TITLE: SR2C PROP FAN MODEL/WING/NACELLE @ AMES

RUN#	BG1-1	BG3-1	BG3-2	BG3-4
3223	916.	848.	518.	355.
3224	948.	848.	549.	331.
3225	955.	870.	570.	310.
3226	939.	868.	557.	398.
3231	784.	768.	438.	396.
3232	759.	715.	457.	357.
3233	751.	700.	484.	333.
3234	716.	692.	452.	361.
3241	723.	773.	388.	477.
3242	664.	675.	375.	426.
3243	612.	625.	358.	375.
3244	561.	574.	337.	355.
3251	756.	867.	326.	537.
3252	634.	694.	289.	454.
3253	568.	610.	259.	407.
3254	508.	545.	238.	354.
3261	896.	970.	347.	529.
3262	799.	812.	350.	449.
3263	750.	739.	351.	407.
3264	673.	672.	309.	377.
3271	942.	913.	477.	405.
3272	945.	881.	484.	361.
3273	933.	873.	506.	348.
3281	764.	807.	377.	388.
3282	736.	711.	398.	340.
3283	720.	677.	402.	304.
3291	665.	704.	300.	374.
3292	592.	596.	329.	348.
3293	563.	564.	335.	307.
3301	621.	651.	263.	380.
3302	562.	564.	280.	341.
3303	519.	517.	283.	326.
3311	693.	709.	309.	449.
3312	623.	622.	335.	369.
3313	566.	565.	309.	404.
3321	1127.	1092.	686.	573.
3322	1171.	1024.	759.	425.
3323	1236.	1078.	788.	486.
3331	901.	946.	571.	545.
3332	866.	849.	537.	466.
3333	890.	781.	566.	399.
3334	973.	832.	617.	409.
3341	798.	904.	469.	558.
3342	734.	785.	420.	482.
3343	710.	680.	404.	422.
3344	746.	681.	446.	415.
3345	739.	687.	476.	367.
3346	682.	666.	444.	398.
3352	960.	887.	619.	434.
3353	929.	879.	582.	495.

JOB I.D.: SR2AME DATE: 14-MAR-85
TITLE: SR2C PROP FAN MODEL/WING/NACELLE @ AMES

RUN#	BG1-1	BG3-1	BG3-2	BG3-4
3361	766.	910.	362.	601.
3362	695.	758.	318.	497.
3363	689.	674.	300.	449.
3364	657.	664.	321.	424.
3365	570.	607.	317.	377.
3366	516.	561.	293.	379.
3371	806.	960.	319.	664.
3372	707.	810.	260.	558.
3373	677.	678.	229.	474.
3374	679.	673.	250.	438.
3375	612.	615.	262.	393.
3376	553.	572.	259.	392.
3381	1008.	1140.	449.	699.
3382	906.	970.	412.	561.
3383	885.	853.	380.	498.
3384	924.	851.	395.	475.
3385	891.	844.	431.	475.
3386	827.	806.	411.	479.
3401	952.	1069.	493.	670.
3402	799.	812.	393.	511.
3403	728.	727.	374.	434.
3404	652.	660.	348.	375.
3405	592.	611.	331.	349.
3411	926.	968.	539.	547.
3412	845.	823.	503.	465.
3413	861.	792.	496.	405.
3414	822.	787.	471.	372.
3415	762.	748.	445.	378.
3421	1033.	972.	591.	473.
3422	1054.	923.	620.	403.
3423	1081.	970.	626.	384.
3424	1054.	971.	603.	425.
3425	999.	952.	564.	497.
3435	974.	1166.	412.	718.
3436	834.	835.	303.	554.
3437	731.	728.	306.	473.
3438	607.	614.	286.	389.
3439	561.	562.	294.	359.
3441	1010.	981.	401.	560.
3442	907.	863.	390.	481.
3443	804.	777.	371.	415.
3444	741.	711.	345.	403.
3451	954.	1070.	484.	676.
3452	800.	814.	381.	506.
3453	732.	721.	365.	435.
3454	659.	656.	336.	371.
3455	601.	600.	331.	367.
3461	840.	937.	405.	551.
3462	781.	855.	387.	505.
3463	719.	690.	382.	405.

JOB I.D.: SR2AME DATE: 14-MAR-85
TITLE: SR2C PROP FAN MODEL/WING/NACELLE @ AMES

RUN#	BG1-1	BG3-1	BG3-2	BG3-4
3464	663.	647.	369.	364.
3465	617.	597.	361.	351.
3471	927.	960.	427.	504.
3472	886.	917.	433.	470.
3473	845.	803.	459.	370.
3474	845.	779.	463.	343.
3475	786.	736.	449.	346.
3481	1076.	1029.	530.	480.
3482	1071.	1010.	533.	467.
3483	1079.	972.	591.	404.
3484	1064.	957.	567.	390.
3485	1029.	953.	549.	430.
3491	862.	967.	358.	595.
3492	799.	869.	322.	544.
3493	724.	716.	302.	466.
3494	634.	614.	297.	391.
3495	561.	548.	291.	360.
3501	920.	1006.	375.	614.
3502	876.	907.	368.	549.
3503	795.	778.	360.	458.
3504	718.	684.	352.	387.
3505	656.	615.	333.	397.
3511	833.	920.	393.	534.
3512	785.	846.	380.	492.
3513	734.	701.	374.	411.
3514	695.	650.	378.	360.
3515	636.	602.	365.	342.
3521	962.	947.	441.	496.
3522	910.	912.	441.	467.
3523	873.	809.	470.	380.
3524	853.	772.	461.	343.
3525	815.	749.	453.	366.
3531	898.	834.	366.	526.
3532	645.	744.	299.	522.
3533	591.	626.	248.	428.
3534	566.	529.	223.	375.
3535	552.	521.	236.	338.
3536	506.	491.	222.	336.
3541	853.	821.	405.	503.
3542	666.	742.	346.	480.
3543	603.	613.	304.	407.
3544	604.	570.	310.	364.
3545	623.	569.	351.	353.
3546	623.	567.	365.	358.
3551	855.	838.	445.	485.
3552	731.	766.	403.	459.
3553	681.	629.	375.	396.
3554	723.	621.	437.	367.
3555	788.	665.	491.	377.
3556	821.	732.	553.	422.

JOB I.D.: SR2AME DATE: 14-MAR-85
TITLE: SR2C PROP FAN MODEL/WING/NACELLE @ AMES

RUN#	BG1-1	BG3-1	BG3-2	BG3-4
3561	1004.	949.	367.	579.
3562	775.	880.	340.	568.
3563	652.	647.	255.	431.
3564	644.	571.	233.	382.
3565	683.	580.	256.	361.
3566	711.	578.	275.	361.
3571	1269.	1145.	461.	662.
3572	969.	997.	411.	592.
3573	871.	782.	359.	452.
3574	876.	727.	354.	416.
3575	946.	741.	422.	419.
3576	970.	770.	489	452.
3581	715.	689.	273.	448.
3582	706.	599.	244.	393.
3583	722.	551.	246.	360.
3584	672.	535.	271.	331.
3585	663.	503.	254.	379.
3591	786.	710.	355.	431.
3592	783.	652.	338.	391.
3593	749.	598.	337.	350.
3594	783.	604.	387.	324.
3595	766.	593.	379.	411.
3601	919.	766.	457.	411.
3602	926.	726.	462.	380.
3603	975.	731.	505.	370.
3604	1030.	765.	535.	347.
3605	1012.	788.	518.	468.
3611	724.	704.	244.	463.
3612	645.	619.	220.	422.
3613	631.	564.	229.	391.
3614	629.	554.	264.	347.
3615	581.	512.	250.	391.
3621	895.	876.	378.	494.
3622	850.	803.	360.	451.
3623	842.	725.	352.	405.
3624	886.	727.	361.	402.
3625	867.	725.	357.	468.
3631	661.	585.	257.	326.
3632	627.	545.	290.	325.
3633	598.	488.	297.	286.
3641	760.	652.	335.	315.
3642	731.	618.	345.	306.
3643	734.	583.	367.	282.
3551	911.	762.	433.	338.
3652	946.	749.	452.	328.
3653	979.	746.	460.	297.
3661	697.	578.	258.	347.
3662	675.	526.	268.	331.
3663	628.	481.	263.	341.
3671	891.	714.	336.	401.

PEAK DETECTOR SAMPLED DATA: XBAR + 2 * SIGMA

JOB I.D.: SR2AME DATE: 14-MAR-85
TITLE: SR2C PROP FAN MODEL/WING/NACELLE @ AMES

RUN#	BG1-1	BG3-1	BG3-2	BG3-4
3672 ← (2672)	820.	639.	332.	358.
3673	763.	584.	314.	365.
3683	572.	708.	274.	458.
3684	504.	583.	224.	386.
3685	496.	495.	208.	334.
3686	501.	482.	220.	310.
3687	476.	482.	214.	309.
3688	422.	439.	203.	328.
3691	648.	774.	300.	492.
3692	550.	627.	253.	414.
3693	532.	538.	222.	331.
3694	557.	534.	226.	320.
3695	575.	551.	235.	328.
3696	553.	537.	245.	346.
3701	822.	971.	385.	564.
3702	695.	762.	326.	431.
3703	674.	657.	296.	359.
3704	738.	657.	344.	351.
3705	797.	702.	424.	396.
3706	786.	725.	422.	449.
3711	575.	699.	316.	433.
3712	512.	572.	266.	362.
3713	504.	509.	262.	317.
3714	537.	503.	312.	298.
3715	560.	527.	337.	305.
3716	0.	0.	0.	0.
3716	539.	513.	329.	361.
3721	615.	712.	363.	409.
3722	579.	587.	329.	348.
3723	607.	551.	360.	306.
3723	610.	554.	359.	305.
3724	669.	599.	429.	309.
3725	723.	652.	487.	343.
3726	718.	671.	487.	428.
3731	754.	767.	424.	409.
3732	753.	723.	424.	371.
3733	806.	710.	477.	311.
3734	889.	771.	550.	352.
3735	948.	845.	624.	415.
3736	961.	876.	625.	495.
3741	513.	564.	249.	378.
3742	490.	527.	235.	340.
3743	499.	492.	248.	309.
3744	470.	477.	251.	327.
3751	541.	576.	224.	375.
3752	512.	536.	236.	341.
3753	500.	491.	227.	326.
3754	493.	480.	242.	343.
3761	717.	741.	325.	385.
3762	696.	705.	327.	358.

JOB I.D.: SR2AME DATE: 14-MAR-85
TITLE: SR2C PROP FAN MODEL/WING/NACELLE @ AMES

RUN#	BG1-1	BG3-1	BG3-2	BG3-4
3763	691.	659.	349.	340.
3764	709.	655.	320.	391.
3771	552.	595.	321.	367.
3772	544.	570.	326.	338.
3773	559.	542.	335.	301.
3774	583.	552.	346.	333.
3781	710.	675.	411.	337.
3782	710.	673.	426.	324.
3783	749.	679.	454.	298.
3784	770.	693.	461.	332.
3791	907.	831.	509.	351.
3792	918.	842.	536.	339.
3793	947.	851.	558.	318.
3794	968.	866.	555.	340.
3795	921.	838.	539.	336.
3791	521.	557.	274.	323.
3792	487.	514.	274.	315.
3793	463.	484.	287.	299.
3801	513.	562.	284.	348.
3802	475.	510.	281.	338.
3803	440.	468.	249.	320.
3811	684.	698.	332.	341.
3812	650.	646.	317.	321.
3813	632.	612.	312.	308.
3821	564.	563.	320.	277.
3822	557.	543.	335.	276.
3823	555.	537.	352.	259.
3831	705.	669.	405.	274.
3832	713.	666.	423.	265.
3833	723.	665.	432.	258.
3841	893.	827.	521.	300.
3842	899.	827.	523.	303.
3643	928.	832.	541.	289.

STOP --

.BOOT RK0:

RT-11SJ V04.00C

JOB I.D.: SR3AME DATE: 09-MAR-85
TITLE: SR3C PROP FAN MODEL/WING/NACELLE @ AMES

RUN#	BG4-1	BG4-2	BG8-1	BG8-3
3861	357.	509.	341.	415.
3862	366.	432.	302.	461.
3863	434.	511.	364.	522.
3864	627.	691.	487.	544.
3871	393.	587.	404.	455.
3872	381.	494.	344.	486.
3873	499.	590.	412.	536.
3874	756.	822.	583.	589.
3881	486.	656.	491.	443.
3882	508.	779.	609.	321.
3891	349.	479.	347.	377.
3892	368.	453.	316.	451.
3893	463.	456.	376.	519.
3894	626.	640.	490.	576.
3895	794.	906.	726.	689.
3901	440.	523.	450.	420.
3902	465.	521.	411.	485.
3903	519.	490.	428.	514.
3904	665.	614.	505.	536.
3905	858.	907.	769.	608.
3911	554.	623.	564.	523.
3912	576.	622.	512.	593.
3914	736.	689.	582.	463.
3913	614.	573.	539.	535.
3921	447.	575.	406.	480.
3922	547.	532.	412.	486.
3923	661.	666.	515.	430.
3924	833.	895.	670.	634.
3931	462.	622.	414.	473.
3932	542.	608.	443.	505.
3933	754.	789.	571.	500.
3941	578.	717.	511.	439.
3942	686.	731.	574.	561.
3951	500.	610.	439.	458.
3952	553.	521.	446.	471.
3953	756.	616.	532.	494.
3954	855.	808.	682.	698.
3961	604.	704.	542.	502.
3962	640.	601.	534.	525.
3963	760.	662.	586.	546.
3971	729.	639.	570.	372.
3981	707.	659.	545.	385.
3991	814.	740.	584.	403.
4001	663.	650.	458.	272.
4002	367.	606.	417.	360.
4003	347.	536.	331.	469.
4004	407.	495.	348.	519.
4005	504.	580.	410.	558.
4006	653.	713.	520.	475.
4007	818.	949.	693.	625.

JOB I.D.: SR3AME DATE: 09-MAR-85
TITLE: SR3C PROP FAN MODEL/WING/NACELLE @ AMES

RUN#	BG4-1	BG4-2	BG8-1	BG8-3
4011	746.	738.	539.	297.
4012	449.	749.	564.	395.
4013	419.	620.	415.	516.
4014	452.	553.	383.	543.
4015	553.	663.	471.	636.
4016	819.	857.	625.	533.
4021	820.	806.	594.	339.
4022	535.	828.	641.	411.
4023	505.	709.	500.	564.
4024	538.	619.	472.	610.
4025	679.	743.	566.	691.
4026	980.	983.	749.	578.
4031	653.	617.	472.	306.
4032	454.	646.	483.	316.
4033	379.	536.	375.	462.
4034	407.	516.	359.	501.
4034	508.	529.	410.	497.
4036	675.	655.	510.	428.
4037	895.	989.	796.	610.
4041	792.	717.	569.	358.
4042	568.	729.	587.	365.
4043	466.	574.	476.	497.
4044	514.	565.	456.	466.
4045	566.	525.	484.	460.
4046	729.	664.	551.	384.
4047	906.	856.	730.	456.
4051	893.	841.	687.	417.
4052	659.	853.	693.	470.
4053	587.	689.	593.	591.
4054	636.	649.	564.	507.
4055	676.	608.	597.	448.
4056	840.	781.	655.	419.
4061	445.	668.	478.	455.
4062	455.	526.	395.	545.
4063	538.	563.	430.	545.
4064	740.	775.	581.	538.
4065	911.	975.	729.	794.
4071	456.	715.	540.	440.
4072	474.	593.	421.	573.
4073	578.	668.	466.	574.
4074	857.	852.	624.	545.
4081	562.	777.	633.	398.
4082	613.	707.	540.	585.
4083	722.	768.	591.	572.
4084	1042.	991.	766.	686.
4091	511.	678.	560.	441.
4092	498.	576.	434.	532.
4093	597.	534.	467.	541.
4094	804.	703.	594.	620.
4101	647.	785.	672.	434.

JOB I.D.: SR3AME DATE: 09-MAR-85
TITLE: SR3C PROP FAN MODEL/WING/NACELLE @ AMES

RUN#	BG4-1	BG4-2	BG8-1	BG8-3
4102	629.	693.	550.	632.
4103	671.	631.	562.	571.
4104	828.	735.	614.	608.
4111	792.	882.	806.	563.
4112	759.	834.	685.	717.
4121	471.	661.	479.	532.
4131	591.	681.	503.	518.
4132	680.	645.	539.	445.
4133	944.	725.	666.	540.
4141	555.	650.	477.	531.
4142	631.	644.	507.	483.
4143	919.	843.	642.	447.
4151	626.	764.	526.	519.
4152	745.	762.	584.	513.
4153	1054.	1009.	783.	526.
4154	687.	739.	569.	507.
4155	747.	676.	598.	508.
4156	985.	728.	720.	589.
4161	809.	906.	689.	551.
4162	721.	695.	579.	448.
4191	414.	504.	341.	286.
4192	611.	618.	444.	280.
4193	431.	670.	435.	371.
4194	368.	589.	370.	517.
4195	465.	540.	390.	542.
4196	516.	600.	431.	522.
4197	682.	747.	537.	456.
4198	917.	1159.	842.	756.
4201	506.	548.	410.	278.
4202	727.	696.	499.	323.
4203	444.	719.	533.	415.
4204	407.	619.	420.	544.
4205	478.	602.	408.	551.
4206	592.	703.	490.	666.
4207	848.	863.	626.	524.
4211	588.	583.	472.	318.
4212	839.	806.	595.	359.
4213	538.	849.	649.	477.
4214	517.	714.	512.	605.
4215	589.	673.	503.	637.
4216	722.	815.	601.	758.
4217	1025.	977.	756.	599.
4221	444.	441.	347.	317.
4222	623.	565.	432.	300.
4223	479.	647.	489.	338.
4224	401.	580.	418.	503.
4225	432.	539.	395.	454.
4231	546.	498.	431.	379.
4232	688.	605.	503.	359.
4233	584.	746.	601.	407.

JOB I.D.: SR3AME DATE: 09-MAR-85
TITLE: SR3C PROP FAN MODEL/WING/NACELLE @ AMES

RUN#	BG4-1	BG4-2	BG8-1	BG8-3
4234	513.	641.	526.	527.
4235	556.	610.	500.	419.
4236	601.	547.	511.	373.
4237	780.	681.	579.	383.
4241	677.	593.	543.	434.
4242	839.	731.	630.	424.
4243	729.	882.	733.	513.
4244	632.	722.	622.	619.
4245	660.	681.	605.	413.
4246	725.	625.	628.	356.
4251	687.	917.	642.	399.
4252	438.	601.	440.	490.
4253	489.	552.	398.	633.
4254	574.	626.	470.	622.
4255	802.	823.	604.	617.
4261	710.	979.	746.	392.
4262	463.	719.	510.	551.
4263	478.	604.	420.	627.
4264	624.	720.	504.	648.
4265	920.	924.	664.	601.
4271	599.	854.	626.	556.
4272	622.	721.	552.	678.
4273	733.	787.	608.	759.
4281	715.	918.	734.	403.
4282	488.	619.	511.	520.
4283	517.	598.	450.	614.
4284	626.	594.	501.	579.
4285	828.	757.	621.	607.
4291	619.	722.	630.	625.
4292	642.	701.	577.	663.
4293	697.	671.	590.	577.
4294	877.	835.	664.	589.
4301	772.	841.	784.	701.
4302	790.	832.	714.	722.
4311	524.	690.	561.	519.
4312	570.	654.	495.	620.
4313	683.	639.	537.	495.
4314	792.	685.	607.	492.
4321	509.	770.	563.	501.
4322	540.	651.	473.	652.
4323	629.	670.	509.	550.
4324	763.	725.	582.	417.
4331	622.	845.	673.	459.
4332	630.	753.	549.	656.
4333	746.	782.	605.	616.
4341	650.	745.	691.	573.
4342	663.	787.	574.	635.
4343	765.	689.	617.	581.
4351	773.	698.	588.	606.
4361	621.	898.	559.	595.

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PEAK DETECTOR SAMPLED DATA: XBAR + 2 * SIGMA

JOB I.D.: SR3AME DATE: 09-MAR-85
TITLE: SR3C PROP FAN MODEL/WING/NACELLE @ AMES

RUN#	BG4-1	BG4-2	BG8-1	BG8-3
4362	636.	798.	556.	576.
4373	494.	743.	367.	282.
4374	391.	609.	429.	353.
4375	358.	558.	353.	487.
4376	442.	559.	374.	520.
4377	509.	627.	422.	549.
4378	674.	751.	513.	477.
4379	828.	913.	655.	552.
4381	592.	592.	436.	289.
4382	426.	700.	532.	411.
4383	410.	628.	416.	529.
4384	474.	659.	407.	550.
4385	596.	845.	491.	668.
4386	811.	868.	603.	521.
4391	659.	620.	507.	314.
4392	521.	820.	638.	461.
4393	495.	690.	503.	582.
4394	571.	660.	491.	634.
4395	718.	788.	589.	691.
4396	960.	958.	715.	574.
4401	456.	431.	340.	261.
4402	395.	627.	420.	310.
4403	336.	491.	342.	427.
4404	383.	465.	341.	425.
4405	467.	474.	375.	361.
4406	611.	587.	452.	374.
4407	670.	637.	502.	407.
4411	535.	481.	410.	314.
4412	491.	629.	516.	348.
4403	432.	536.	438.	438.
4414	470.	510.	427.	379.
4415	513.	470.	437.	339.
4416	668.	598.	503.	335.
4417	730.	651.	547.	387.
4421	643.	560.	506.	352.
4422	604.	744.	610.	422.
4423	529.	629.	529.	516.
4424	564.	578.	514.	370.
4425	613.	528.	535.	322.
4426	740.	655.	585.	365.
4431	466.	674.	519.	381.
4432	381.	518.	390.	424.
4433	408.	475.	349.	528.
4434	502.	540.	406.	519.
4435	694.	697.	526.	530.
4441	482.	747.	591.	365.
4442	409.	629.	449.	449.
4443	416.	520.	369.	532.
4444	523.	600.	421.	547.
4445	782.	780.	566.	525.

JOB I.D.: SR3AME DATE: 09-MAR-85
TITLE: SR3C PROP FAN MODEL/WING/NACELLE @ AMES

RUN#	BG4-1	BG4-2	BG8-1	BG8-3
4445	547.	829.	673.	351.
4451	513.	712.	543.	439.
4452	533.	641.	479.	561.
4453	538.	637.	480.	561.
4454	651.	680.	533.	638.
4455	919.	858.	668.	613.
4461	509.	702.	583.	370.
4462	429.	549.	463.	418.
4463	449.	510.	392.	506.
4464	537.	494.	426.	508.
4465	738.	644.	545.	580.
4471	604.	794.	679.	376.
4472	539.	621.	553.	486.
4473	563.	615.	504.	586.
4474	607.	575.	514.	522.
4475	664.	594.	540.	479.
4481	516.	602.	454.	438.
4482	505.	580.	448.	509.
4483	596.	550.	473.	418.
4484	734.	624.	558.	453.
4501	478.	566.	431.	451.
4502	487.	618.	416.	580.
4503	552.	566.	443.	478.
4504	740.	687.	535.	361.
4511	576.	687.	514.	449.
4512	608.	741.	512.	535.
4513	686.	683.	535.	496.
4521	583.	745.	551.	500.
4522	596.	711.	508.	513.
4453	648.	599.	527.	506.
4524	725.	600.	567.	489.
4531	696.	818.	618.	565.
4532	737.	708.	622.	562.
4541	571.	675.	493.	474.
4542	637.	631.	535.	430.
4227	711.	665.	522.	419.
4228	802.	762.	599.	472.

STOP --

APPENDIX II

P-ORDER STRAIN (MICRO-STRAIN) AND

OPERATING CONDITION TABULATION BY

RUN NUMBER, STRAIN GAGE AND P-ORDER

SR-2C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE	P ORDER COMPONENTS μ STRAIN 1	2	3	4	5	6
3223	0.799	-0.070	55.600	7061.	-5.18	-0.042	BG1-1	694.	174.	35.	7.	0.	0.
							BG3-1	622.	174.	35.	6.	6.	0.
							BG3-2	449.	32.	21.	8.	8.	7.
							BG3-4	181.	87.	41.	10.	0.	0.
3224	0.803	-0.066	55.600	7517.	76.64	0.528	BG1-1	752.	164.	33.	9.	0.	0.
							BG3-1	659.	150.	31.	0.	0.	0.
							BG3-2	513.	33.	28.	8.	6.	5.
							BG3-4	194.	86.	31.	15.	8.	8.
3225	0.802	-0.066	55.600	8014.	184.19	1.048	BG1-1	715.	182.	32.	9.	7.	0.
							BG3-1	633.	166.	25.	8.	0.	0.
							BG3-2	482.	62.	25.	14.	8.	7.
							BG3-4	189.	91.	20.	11.	0.	0.
3226	0.803	-0.065	55.600	8435.	289.35	1.412	BG1-1	763.	152.	24.	8.	0.	0.
							BG3-1	691.	139.	23.	12.	8.	0.
							BG3-2	490.	64.	21.	14.	15.	6.
							BG3-4	219.	66.	7.	100.	12.	0.
3231	0.802	0.939	55.600	7062.	-5.22	-0.043	BG1-1	496.	301.	42.	10.	0.	0.
							BG3-1	453.	307.	44.	8.	0.	0.
							BG3-2	354.	85.	34.	9.	6.	0.
							BG3-4	137.	177.	48.	0.	9.	0.
3232	0.798	0.943	55.600	7503.	75.83	0.522	BG1-1	535.	265.	40.	13.	0.	0.
							BG3-1	482.	262.	38.	10.	0.	0.
							BG3-2	405.	87.	33.	5.	12.	0.
							BG3-4	144.	149.	40.	11.	11.	8.
3233	0.802	0.945	55.600	8026.	193.31	1.095	BG1-1	490.	240.	37.	12.	0.	0.
							BG3-1	435.	233.	33.	12.	0.	0.
							BG3-2	350.	100.	25.	13.	25.	7.
							BG3-4	135.	126.	28.	22.	16.	0.
3234	0.796	0.945	55.600	8469.	301.12	1.442	BG1-1	482.	210.	27.	9.	0.	0.
							BG3-1	446.	209.	25.	14.	5.	0.
							BG3-2	323.	99.	21.	10.	23.	0.
							BG3-4	147.	103.	16.	97.	11.	0.
3241	0.801	1.951	55.600	6992.	-4.21	0.036	BG1-1	253.	353.	45.	10.	0.	0.
							BG3-1	244.	390.	43.	8.	0.	0.
							BG3-2	204.	126.	38.	12.	7.	0.
							BG3-4	78.	226.	50.	5.	11.	7.
3242	0.798	1.954	55.600	7527.	85.52	0.567	BG1-1	295.	333.	44.	12.	0.	0.
							BG3-1	277.	343.	40.	11.	0.	0.
							BG3-2	252.	119.	38.	0.	17.	16.
							BG3-4	96.	205.	54.	9.	14.	11.
3243	0.798	1.955	55.600	7997.	189.73	1.086	BG1-1	275.	281.	40.	11.	0.	0.
							BG3-1	257.	291.	40.	11.	0.	0.
							BG3-2	217.	114.	25.	11.	30.	8.
							BG3-4	93.	166.	40.	7.	23.	0.
3244	0.799	1.955	55.600	8443.	300.33	1.461	BG1-1	272.	234.	29.	9.	0.	0.
							BG3-1	265.	245.	30.	13.	0.	0.
							BG3-2	199.	103.	15.	13.	24.	0.
							BG3-4	101.	129.	21.	80.	17.	0.

3.02

SR-2C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE	P ORDER COMPONENTS µ STRAIN 1	2	3	4	5	6
3251	0.803	2.961	55.600	6962.	-4.49	-0.039	BG1-1	92.	521.	47.	9.	6.	0.
							BG3-1	103.	601.	52.	10.	8.	0.
							BG3-2	86.	205.	38.	16.	18.	8.
							BG3-4	56.	349.	51.	30.	11.	10.
3252	0.801	2.963	55.600	7528.	85.30	0.586	BG1-1	112.	350.	45.	7.	0.	0.
							BG3-1	112.	393.	44.	9.	8.	0.
							BG3-2	84.	135.	37.	13.	30.	12.
							BG3-4	58.	242.	54.	31.	17.	0.
3253	0.800	2.965	55.600	8018.	187.37	1.071	BG1-1	113.	328.	40.	12.	0.	0.
							BG3-1	112.	359.	40.	8.	7.	0.
							BG3-2	76.	129.	30.	19.	31.	7.
							BG3-4	64.	214.	42.	24.	24.	0.
3254	0.804	2.963	55.600	8438.	290.60	1.426	BG1-1	120.	247.	30.	12.	0.	0.
							BG3-1	124.	267.	32.	12.	0.	0.
							BG3-2	81.	101.	18.	22.	23.	0.
							BG3-4	76.	149.	25.	72.	19.	0.
3261	0.795	3.980	55.600	6998.	-4.06	-0.035	BG1-1	248.	545.	46.	9.	0.	0.
							BG3-1	215.	631.	50.	9.	5.	0.
							BG3-2	141.	200.	21.	18.	11.	9.
							BG3-4	65.	369.	36.	34.	12.	9.
3262	0.798	3.984	55.600	7471.	89.14	0.630	BG1-1	294.	444.	47.	10.	0.	0.
							BG3-1	246.	490.	47.	11.	0.	0.
							BG3-2	181.	155.	27.	13.	18.	10.
							BG3-4	56.	300.	37.	30.	15.	0.
3263	0.792	3.985	55.600	7784.	193.35	1.112	BG1-1	306.	352.	40.	9.	0.	0.
							BG3-1	259.	380.	39.	9.	0.	0.
							BG3-2	176.	136.	39.	12.	23.	0.
							BG3-4	83.	227.	31.	26.	15.	5.
3264	0.799	3.985	55.600	8430.	304.34	1.497	BG1-1	270.	313.	28.	10.	0.	0.
							BG3-1	243.	340.	32.	10.	0.	0.
							BG3-2	138.	131.	33.	18.	18.	0.
							BG3-4	91.	189.	18.	55.	18.	0.
3271	0.843	-0.075	55.600	7489.	-4.12	-0.030	BG1-1	762.	175.	28.	0.	0.	0.
							BG3-1	695.	196.	34.	0.	11.	0.
							BG3-2	410.	24.	19.	5.	18.	9.
							BG3-4	222.	109.	55.	20.	10.	0.
3272	0.851	-0.073	55.600	8001.	86.95	0.524	BG1-1	683.	175.	28.	8.	0.	0.
							BG3-1	617.	195.	28.	8.	0.	0.
							BG3-2	371.	18.	22.	7.	8.	0.
							BG3-4	177.	114.	42.	22.	11.	6.
3273	0.845	0.069	55.600	8385.	185.32	0.964	BG1-1	791.	154.	21.	7.	0.	0.
							BG3-1	717.	161.	20.	9.	0.	0.
							BG3-2	449.	16.	12.	9.	12.	0.
							BG3-4	204.	97.	18.	45.	14.	0.
3281	0.851	0.934	55.600	7515.	-4.54	-0.033	BG1-1	538.	232.	36.	7.	6.	0.
							BG3-1	524.	272.	28.	0.	0.	0.
							BG3-2	315.	38.	26.	10.	13.	7.
							BG3-4	189.	162.	50.	15.	11.	0.

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3.38

SR-2C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE	P ORDER COMPONENTS ±μ STRAIN 1	2	3	4	5	6
3282	0.849	0.937	55.600	8017.	99.48	0.592	BG1-1	503.	206.	29.	5.	0.	0.
							BG3-1	457.	224.	29.	6.	0.	0.
							BG3-2	302.	44.	23.	11.	8.	0.
							BG3-4	132.	137.	38.	8.	12.	0.
3283	0.852	0.939	55.600	8424.	194.83	1.000	BG1-1	556.	178.	22.	5.	0.	0.
							BG3-1	504.	186.	19.	7.	0.	0.
							BG3-2	338.	54.	9.	15.	7.	0.
							BG3-4	145.	112.	15.	39.	15.	0.
3291	0.851	1.945	55.600	7493.	-4.22	-0.031	BG1-1	339.	314.	34.	6.	0.	0.
							BG3-1	330.	346.	32.	6.	0.	0.
							BG3-2	201.	92.	31.	9.	9.	5.
							BG3-4	127.	192.	37.	23.	11.	0.
3292	0.854	1.949	55.600	8055.	103.28	0.610	BG1-1	296.	263.	33.	8.	0.	0.
							BG3-1	272.	262.	26.	5.	0.	0.
							BG3-2	200.	95.	31.	8.	17.	0.
							BG3-2	200.	95.	31.	8.	17.	0.
3293	0.853	1.950	55.600	8450.	196.34	1.005	BG1-1	330.	205.	24.	9.	0.	0.
							BG3-1	306.	209.	20.	9.	0.	0.
							BG3-2	223.	84.	22.	13.	15.	0.
							BG3-4	100.	116.	14.	39.	13.	5.
3301	0.849	2.959	55.600	7491.	-4.43	-0.032	BG1-1	132.	327.	29.	9.	0.	0.
							BG3-1	139.	355.	33.	8.	0.	0.
							BG3-2	98.	114.	28.	0.	11.	0.
							BG3-4	64.	190.	24.	19.	11.	0.
3302	0.847	2.961	55.600	8017.	107.59	0.641	BG1-1	131.	316.	35.	9.	0.	0.
							BG3-1	126.	318.	28.	7.	0.	0.
							BG3-2	98.	125.	32.	0.	21.	6.
							BG3-4	56.	173.	31.	23.	14.	0.
3303	0.846	2.961	55.600	8415.	199.70	1.035	BG1-1	152.	274.	26.	10.	6.	0.
							BG3-1	146.	275.	24.	9.	0.	0.
							BG3-2	110.	121.	27.	8.	25.	0.
							BG3-4	72.	141.	18.	58.	14.	0.
3311	0.848	3.973	55.600	7429.	-4.10	-0.031	BG1-1	177.	422.	37.	11.	0.	5.
							BG3-1	149.	468.	41.	10.	9.	0.
							BG3-2	93.	156.	31.	10.	19.	16.
							BG3-4	53.	260.	36.	20.	18.	14.
3312	0.845	3.975	55.600	8017.	118.26	0.709	BG1-1	197.	337.	30.	16.	5.	0.
							BG3-1	164.	361.	41.	14.	0.	0.
							BG3-2	116.	133.	36.	14.	28.	12.
							BG3-4	48.	204.	37.	46.	16.	6.
3313	0.850	3.974	55.600	8434.	207.10	1.066	BG1-1	199.	267.	28.	13.	0.	0.
							BG3-1	181.	277.	28.	14.	0.	0.
							BG3-2	115.	113.	23.	15.	22.	6.
							BG3-4	68.	146.	29.	95.	20.	0.
3322	0.700	-1.071	55.600	7020.	135.36	1.063	BG1-1	909.	86.	50.	10.	5.	0.
							BG3-1	746.	137.	51.	13.	7.	0.
							BG3-2	658.	73.	16.	10.	29.	9.
							BG3-4	242.	93.	56.	18.	23.	10.

C-2

SR-2C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE	P ORDER COMPONENTS µ STRAIN 1	2	3	4	5	6
3323	0.699	-1.071	55.600	7515.	236.44	1.513	BG1-1	1036.	90.	35.	13.	0.	0.
							BG3-1	877.	83.	42.	10.	0.	0.
							BG3-2	742.	41.	20.	31.	28.	0.
							BG3-4	341.	72.	30.	27.	31.	10.
3331	0.698	-0.054	55.600	6164.	-0.50	-0.006	BG1-1	550.	324.	53.	12.	5.	0.
							BG3-1	490.	413.	53.	14.	0.	0.
							BG3-2	422.	163.	21.	0.	8.	16.
							BG3-4	172.	242.	58.	24.	19.	13.
3332	0.699	-0.053	55.600	6518.	42.82	0.417	BG1-1	554.	268.	52.	12.	0.	0.
							BG3-1	479.	340.	50.	13.	0.	0.
							BG3-2	421.	125.	20.	0.	5.	12.
							BG3-4	159.	203.	56.	21.	8.	13.
3333	0.697	0.052	55.600	7002.	130.22	1.024	BG1-1	671.	171.	47.	8.	0.	0.
							BG3-1	545.	208.	49.	10.	0.	0.
							BG3-2	488.	76.	24.	15.	15.	7.
							BG3-4	166.	136.	45.	17.	18.	0.
3334	0.702	-0.043	55.600	7530.	235.01	1.486	BG1-1	748.	178.	35.	14.	0.	0.
							BG3-1	626.	166.	43.	8.	5.	0.
							BG3-2	549.	50.	34.	24.	17.	0.
							BG3-4	252.	107.	26.	16.	24.	5.
3341	0.693	0.955	55.600	6153.	-1.22	-0.014	BG1-1	355.	413.	53.	11.	0.	0.
							BG3-1	323.	524.	53.	11.	0.	0.
							BG3-2	288.	191.	18.	10.	0.	7.
							BG3-4	117.	318.	52.	15.	9.	8.
3342	0.702	0.955	55.600	6509.	39.25	0.384	BG1-1	327.	345.	52.	12.	0.	0.
							BG3-1	292.	419.	48.	10.	0.	0.
							BG3-2	262.	138.	22.	7.	5.	5.
							BG3-4	101.	260.	49.	16.	7.	9.
3343	0.701	0.956	55.600	7025.	120.35	0.937	BG1-1	406.	295.	53.	10.	0.	0.
							BG3-1	330.	310.	54.	11.	0.	0.
							BG3-2	299.	90.	37.	12.	12.	6.
							BG3-4	97.	199.	44.	15.	13.	0.
3344	0.702	0.956	55.600	7523.	220.06	1.396	BG1-1	486.	258.	39.	12.	0.	0.
							BG3-1	404.	253.	44.	9.	5.	0.
							BG3-2	371.	73.	41.	13.	14.	0.
							BG3-4	166.	153.	25.	17.	24.	0.
3345	0.702	0.956	55.600	8004.	337.45	1.788	BG1-1	460.	249.	36.	11.	0.	0.
							BG3-1	408.	252.	36.	11.	0.	0.
							BG3-2	345.	94.	27.	10.	16.	5.
							BG3-4	191.	134.	18.	36.	16.	8.
3346	0.704	0.965	55.600	8367.	431.16	1.987	BG1-1	470.	195.	26.	8.	0.	0.
							BG3-1	439.	206.	28.	12.	0.	0.
							BG3-2	322.	85.	16.	23.	14.	0.
							BG3-4	208.	102.	10.	113.	13.	8.
3352	0.703	-0.055	55.600	8044.	360.49	1.870	BG1-1	774.	180.	31.	5.	0.	0.
							BG3-1	690.	168.	31.	7.	0.	0.
							BG3-2	542.	57.	22.	11.	13.	5.
							BG3-4	304.	84.	17.	37.	15.	7.

SR-2C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE	P ORDER COMPONENTS μ STRAIN 1	2	3	4	5	6
3353	0.700	-0.045	55.600	8330.	434.10	2.016	BG1-1	720.	176.	23.	7.	0.	0.
							BG3-1	670.	173.	24.	13.	0.	0.
							BG3-2	477.	64.	15.	19.	9.	0.
							BG3-4	297.	78.	11.	117.	9.	9.
3361	0.698	1.963	55.600	6202.	-2.42	-0.027	BG1-1	141.	425.	58.	12.	0.	0.
							BG3-1	141.	532.	60.	12.	0.	0.
							BG3-2	132.	184.	23.	19.	0.	0.
							BG3-4	61.	329.	58.	10.	18.	0.
3362	0.701	1.967	55.600	6544.	42.90	0.411	BG1-1	159.	397.	56.	13.	5.	0.
							BG3-1	148.	450.	51.	12.	0.	0.
							BG3-2	140.	140.	25.	12.	0.	0.
							BG3-4	59.	286.	49.	15.	16.	0.
3363	0.701	1.967	55.600	7063.	124.96	0.952	BG1-1	155.	400.	59.	12.	0.	0.
							BG3-1	136.	397.	57.	11.	5.	0.
							BG3-2	123.	108.	43.	7.	15.	7.
							BG3-4	44.	251.	47.	20.	15.	0.
3364	0.701	1.967	55.600	7498.	221.13	1.408	BG1-1	206.	344.	43.	11.	0.	0.
							BG3-1	184.	348.	45.	11.	0.	0.
							BG3-2	175.	102.	40.	8.	10.	0.
							BG3-4	92.	206.	28.	23.	16.	0.
3365	0.706	1.965	55.600	8022.	342.98	1.783	BG1-1	177.	303.	39.	11.	0.	0.
							BG3-1	172.	327.	39.	11.	0.	0.
							BG3-2	151.	116.	27.	9.	7.	0.
							BG3-4	97.	174.	17.	41.	11.	9.
3366	0.705	1.975	55.600	8317.	426.71	1.991	BG1-1	175.	253.	30.	8.	0.	0.
							BG3-1	176.	281.	32.	11.	0.	0.
							BG3-2	136.	114.	17.	17.	11.	0.
							BG3-4	102.	144.	8.	75.	14.	8.
3371	0.696	2.974	55.600	6136.	-2.84	-0.033	BG1-1	98.	558.	61.	13.	0.	0.
							BG3-1	80.	681.	69.	13.	5.	0.
							BG3-2	38.	235.	30.	29.	9.	8.
							BG3-4	35.	420.	62.	0.	45.	6.
3372	0.700	2.976	55.600	6527.	41.26	0.396	BG1-1	95.	472.	59.	11.	0.	0.
							BG3-1	74.	554.	61.	11.	0.	0.
							BG3-2	41.	173.	34.	18.	0.	8.
							BG3-4	27.	351.	58.	7.	22.	9.
3373	0.700	2.977	55.600	7022.	121.95	0.940	BG1-1	92.	417.	59.	14.	0.	0.
							BG3-1	65.	427.	57.	12.	5.	0.
							BG3-2	23.	113.	39.	5.	11.	6.
							BG3-4	13.	273.	50.	20.	12.	6.
3374	0.699	2.978	55.600	7530.	226.13	1.413	BG1-1	157.	406.	52.	14.	0.	0.
							BG3-1	120.	422.	53.	14.	0.	0.
							BG3-2	77.	111.	43.	7.	13.	0.
							BG3-4	60.	253.	36.	26.	15.	5.
3375	0.702	2.977	55.600	8009.	349.11	1.824	BG1-1	163.	347.	43.	11.	0.	0.
							BG3-1	137.	379.	46.	11.	0.	0.
							BG3-2	83.	125.	36.	14.	16.	0.
							BG3-4	81.	206.	18.	48.	11.	8.

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SR-2C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE	P ORDER COMPONENTS STRAIN 1	2	3	4	5	6
3376	0.696	2.986	55.600	8319.	434.09	2.012	BG1-1	157.	295.	34.	8.	0.	0.
							BG3-1	140.	331.	35.	10.	0.	0.
							BG3-2	81.	129.	26.	14.	7.	7.
							BG3-4	86.	173.	5.	73.	10.	7.
3381	0.698	3.985	55.600	6155.	-2.77	-0.032	BG1-1	273.	637.	71.	14.	0.	0.
							BG3-1	227.	781.	78.	13.	0.	0.
							BG3-2	166.	261.	40.	41.	8.	17.
							BG3-4	60.	477.	56.	18.	66.	13.
3382	0.707	3.987	55.600	6542.	41.26	0.398	BG1-1	287.	523.	51.	12.	5.	0.
							BG3-1	235.	615.	65.	11.	5.	0.
							BG3-2	180.	188.	39.	29.	7.	17.
							BG3-4	58.	387.	60.	17.	31.	16.
3383	0.708	3.988	55.600	6996.	116.41	0.913	BG1-1	294.	479.	58.	13.	6.	0.
							BG3-1	230.	497.	57.	11.	0.	0.
							BG3-2	154.	117.	37.	9.	8.	12.
							BG3-4	43.	323.	54.	15.	7.	10.
3384	0.701	3.988	55.600	7485.	220.44	1.411	BG1-1	441.	457.	62.	16.	0.	0.
							BG3-1	343.	459.	60.	15.	5.	0.
							BG3-2	250.	107.	47.	8.	19.	9.
							BG3-4	121.	283.	47.	20.	20.	0.
3385	0.702	3.988	55.600	8001.	348.83	1.828	BG1-1	414.	391.	48.	13.	0.	0.
							BG3-1	346.	417.	51.	14.	0.	0.
							BG3-2	229.	121.	48.	10.	18.	0.
							BG3-4	158.	231.	27.	61.	13.	9.
3386	0.707	3.998	55.600	8328.	430.88	2.002	BG1-1	411.	338.	46.	7.	0.	0.
							BG3-1	361.	364.	46.	14.	0.	0.
							BG3-2	213.	121.	47.	15.	9.	7.
							BG3-4	171.	192.	18.	97.	0.	10.
3401	0.793	1.970	56.600	6319.	-6.69	-0.076	BG1-1	291.	569.	55.	11.	7.	0.
							BG3-1	279.	688.	58.	11.	0.	0.
							BG3-2	223.	213.	33.	34.	12.	14.
							BG3-4	114.	413.	61.	5.	15.	13.
3402	0.797	1.975	56.600	7030.	108.81	0.909	BG1-1	310.	443.	51.	12.	0.	0.
							BG3-1	273.	476.	51.	12.	6.	6.
							BG3-2	223.	145.	24.	7.	17.	14.
							BG3-4	77.	299.	63.	18.	15.	14.
3403	0.796	1.976	56.600	7488.	214.64	1.485	BG1-1	345.	333.	45.	13.	0.	0.
							BG3-1	306.	344.	42.	12.	5.	0.
							BG3-2	232.	115.	15.	9.	17.	10.
							BG3-4	125.	208.	45.	20.	18.	0.
3404	0.787	1.974	56.600	7972.	324.13	1.869	BG1-1	307.	308.	42.	15.	0.	0.
							BG3-1	288.	322.	44.	16.	6.	0.
							BG3-2	193.	122.	17.	6.	11.	7.
							BG3-4	125.	182.	33.	21.	18.	5.
3405	0.799	1.974	56.600	8336.	406.80	2.074	BG1-1	287.	270.	30.	12.	0.	0.
							BG3-1	279.	282.	32.	14.	0.	0.
							BG3-2	176.	118.	8.	6.	7.	5.
							BG3-4	122.	152.	19.	73.	10.	0.

SR-2C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP - SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE	P ORDER COMPONENTS μ STRAIN 1	2	3	4	5	6
3411	0.796	0.938	56.600	6491.	-3.80	-0.041	BG1-1	563.	378.	54.	12.	0.	0.
							BG3-1	513.	439.	49.	12.	0.	0.
							BG3-2	381.	139.	22.	18.	0.	10.
							BG3-4	190.	257.	56.	10.	17.	7.
3412	0.800	0.942	56.600	7051.	93.83	0.797	BG1-1	580.	319.	48.	13.	0.	0.
							BG3-1	502.	350.	45.	12.	0.	0.
							BG3-2	380.	109.	27.	0.	16.	10.
							BG3-4	143.	208.	50.	0.	22.	12.
3413	0.804	0.945	56.600	7545.	201.71	1.391	BG1-1	621.	262.	43.	14.	0.	0.
							BG3-1	536.	259.	44.	14.	0.	0.
							BG3-2	393.	92.	21.	15.	21.	9.
							BG3-4	187.	148.	35.	15.	26.	11.
3414	0.802	0.956	56.600	8035.	319.21	1.819	BG1-1	568.	256.	36.	19.	0.	0.
							BG3-1	520.	256.	48.	22.	6.	0.
							BG3-2	330.	103.	26.	13.	21.	9.
							BG3-4	199.	133.	34.	26.	16.	0.
3415	0.807	0.954	56.600	8406.	411.53	2.056	BG1-1	601.	224.	26.	14.	0.	0.
							BG3-1	569.	225.	28.	17.	0.	0.
							BG3-2	338.	100.	8.	11.	7.	0.
							BG3-4	222.	111.	21.	93.	9.	0.
3421	0.799	-0.070	56.600	6525.	-2.92	-0.031	BG1-1	724.	283.	47.	13.	0.	0.
							BG3-1	642.	339.	41.	10.	0.	0.
							BG3-2	443.	108.	14.	14.	0.	6.
							BG3-4	233.	191.	44.	0.	15.	0.
3422	0.798	-0.066	56.600	7022.	90.46	0.771	BG1-1	841.	203.	44.	11.	0.	0.
							BG3-1	719.	224.	40.	11.	0.	0.
							BG3-2	514.	64.	24.	9.	12.	14.
							BG3-4	218.	128.	37.	15.	18.	5.
3423	0.801	-0.065	56.600	7539.	203.87	1.407	BG1-1	831.	208.	39.	12.	0.	0.
							BG3-1	718.	194.	43.	10.	12.	5.
							BG3-2	505.	65.	28.	10.	19.	0.
							BG3-4	246.	109.	24.	15.	11.	11.
3424	0.803	-0.065	56.600	8033.	310.27	1.774	BG1-1	776.	206.	28.	17.	0.	0.
							BG3-1	703.	193.	34.	19.	6.	0.
							BG3-2	446.	81.	24.	9.	27.	7.
							BG3-4	260.	92.	22.	45.	7.	9.
3425	0.802	-0.065	56.600	8442.	414.20	2.039	BG1-1	819.	172.	24.	15.	0.	0.
							BG3-1	765.	165.	20.	15.	0.	0.
							BG3-2	449.	79.	11.	10.	22.	0.
							BG3-4	292.	72.	19.	126.	10.	0.
3435	0.800	2.960	56.600	6377.	-6.64	-0.075	BG1-1	123.	615.	60.	11.	7.	0.
							BG3-1	121.	762.	67.	8.	8.	0.
							BG3-2	113.	228.	33.	32.	17.	11.
							BG3-4	55.	444.	58.	30.	19.	10.
3436	0.801	2.974	56.600	7035.	103.62	0.864	BG1-1	99.	502.	59.	12.	0.	0.
							BG3-1	78.	509.	53.	9.	8.	0.
							BG3-2	65.	144.	26.	19.	15.	7.
							BG3-4	14.	319.	59.	30.	7.	7.

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WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE	P ORDER COMPONENTS µ STRAIN 1	2	3	4	5	6
3437	0.801	2.975	56.600	7570.	220.46	1.475	BG1-1	152.	419.	55.	10.	0.	0.
							BG3-1	125.	424.	47.	9.	7.	0.
							BG3-2	104.	136.	27.	13.	14.	8.
							BG3-4	60.	254.	46.	29.	15.	0.
3438	0.794	2.974	56.600	8011.	337.43	1.909	BG1-1	135.	378.	46.	13.	0.	0.
							BG3-1	116.	387.	40.	12.	6.	0.
							BG3-2	94.	143.	20.	10.	14.	0.
							BG3-4	59.	218.	31.	21.	18.	0.
3439	0.792	2.976	56.600	8226.	403.90	2.111	BG1-1	149.	296.	44.	12.	0.	0.
							BG3-1	131.	301.	38.	11.	0.	0.
							BG3-2	108.	124.	19.	8.	11.	0.
							BG3-4	69.	164.	26.	58.	14.	5.
3441	0.785	3.987	56.600	6978.	116.07	0.989	BG1-1	307.	560.	58.	14.	5.	0.
							BG3-1	228.	579.	58.	10.	8.	0.
							BG3-2	164.	156.	29.	13.	25.	0.
							BG3-4	24.	356.	58.	40.	15.	0.
3442	0.800	3.985	56.600	7519.	211.69	1.467	BG1-1	365.	464.	56.	13.	0.	0.
							BG3-1	277.	475.	51.	11.	8.	0.
							BG3-2	200.	145.	37.	7.	24.	8.
							BG3-4	78.	285.	41.	38.	21.	9.
3443	0.801	3.994	56.600	8024.	336.49	1.918	BG1-1	347.	407.	50.	8.	0.	0.
							BG3-1	286.	421.	45.	0.	8.	0.
							BG3-2	181.	151.	34.	8.	19.	9.
							BG3-4	98.	237.	29.	21.	22.	6.
3444	0.804	3.993	56.600	8366.	417.51	2.109	BG1-1	337.	347.	38.	13.	5.	0.
							BG3-1	287.	357.	33.	12.	6.	0.
							BG3-2	177.	139.	20.	8.	13.	7.
							BG3-4	97.	192.	18.	76.	15.	6.
3451	0.799	1.951	56.600	6420.	-5.30	-0.059	BG1-1	331.	538.	59.	12.	7.	0.
							BG3-1	309.	649.	63.	13.	0.	0.
							BG3-2	247.	197.	35.	34.	12.	14.
							BG3-4	120.	372.	64.	5.	16.	13.
3452	0.799	1.955	56.600	7005.	97.95	0.836	BG1-1	316.	448.	55.	12.	0.	0.
							BG3-1	271.	481.	53.	11.	6.	0.
							BG3-2	221.	139.	28.	6.	17.	16.
							BG3-4	67.	287.	62.	18.	10.	11.
3453	0.798	1.955	56.600	7518.	201.66	1.403	BG1-1	328.	391.	49.	16.	0.	0.
							BG3-1	285.	392.	45.	14.	8.	0.
							BG3-2	216.	126.	15.	8.	20.	13.
							BG3-4	105.	227.	48.	13.	22.	7.
3454	0.798	1.956	56.600	8042.	317.68	1.809	BG1-1	310.	323.	41.	15.	0.	0.
							BG3-1	284.	329.	39.	14.	0.	0.
							BG3-2	189.	120.	10.	8.	17.	0.
							BG3-4	117.	180.	32.	24.	17.	0.
3455	0.799	1.955	56.600	8374.	413.64	2.082	BG1-1	333.	271.	33.	10.	0.	0.
							BG3-1	318.	277.	29.	14.	0.	0.
							BG3-2	199.	116.	0.	7.	7.	0.
							BG3-4	137.	144.	17.	91.	10.	0.

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SR-2C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE	P ORDER COMPONENTS μ STRAIN 1	2	3	4	5	6
3461	0.849	1.946	56.600	6855.	5.51	0.051	B61-1	360.	458.	45.	12.	0.	0.
							B63-1	339.	541.	48.	7.	0.	0.
							B63-2	208.	145.	28.	13.	6.	8.
							B63-4	135.	311.	48.	17.	18.	6.
3462	0.849	1.247	56.600	7023.	27.24	0.244	B61-1	362.	411.	44.	12.	0.	0.
							B63-1	348.	473.	41.	8.	0.	0.
							B63-2	214.	126.	29.	9.	6.	6.
							B63-4	115.	274.	47.	19.	13.	10.
3463	0.846	1.950	56.600	74[illegible].	130.37	0.959	B61-1	385.	328.	54.	14.	7.	0.
							B63-1	346.	324.	39.	10.	6.	0.
							B63-2	242.	102.	25.	13.	17.	15.
							B63-4	115.	191.	42.	19.	12.	10.
3464	0.84[illegible]	1.9[illegible]1	56.600	803[illegible].	253.44	1.515	B61-1	367.	299.	47.	9.	0.	0.
							B63-1	336.	294.	38.	0.	0.	6.
							B63-2	215.	111.	16.	7.	16.	11.
							B63-4	123.	160.	37.	17.	13.	0.
3465	0.847	1.950	56.600	8466.	362.94	1.851	B61-1	330.	263.	35.	15.	0.	0.
							B63-1	309.	258.	30.	12.	6.	0.
							B63-2	189.	108.	15.	13.	18.	0.
							B63-4	122.	126.	29.	79.	12.	0.
3471	0.851	0.944	56.600	5908.	4.64	-0.044	B61-1	657.	358.	40.	8.	0.	0.
							B63-1	596.	401.	39.	12.	0.	0.
							B63-2	339.	74.	22.	15.	7.	8.
							B63-4	215.	235.	52.	8.	13.	8.
3472	0.852	0.946	56.600	7051.	16.22	0.144	B61-1	636.	327.	43.	11.	0.	0.
							B63-1	559.	386.	41.	0.	0.	0.
							B63-2	323.	68.	25.	9.	8.	7.
							B63-4	168.	228.	52.	9.	15.	0.
3473	0.852	0.949	56.600	7542.	124.80	0.902	B61-1	604.	268.	46.	12.	10.	0.
							B63-1	537.	281.	33.	7.	7.	8.
							B63-2	340.	67.	27.	8.	7.	7.
							B63-4	172.	165.	36.	18.	0.	0.
3474	0.853	0.951	56.600	8044.	241.01	1.438	B61-1	611.	246.	34.	21.	0.	0.
							B63-1	537.	239.	35.	16.	6.	5.
							B63-2	325.	81.	25.	12.	18.	0.
							B63-4	173.	133.	22.	14.	7.	6.
3475	0.847	0.952	56.600	8444.	345.12	1.773	B61-1	579.	222.	25.	13.	6.	0.
							B63-1	522.	212.	17.	8.	8.	0.
							B63-2	304.	83.	0.	15.	20.	7.
							B63-4	176.	103.	14.	73.	0.	0.
3481	0.851	0.076	56.600	6916.	8.47	0.079	B61-1	898.	252.	36.	6.	0.	0.
							B63-1	792.	292.	35.	8.	6.	5.
							B63-2	444.	45.	16.	15.	0.	7.
							B63-4	276.	162.	50.	20.	7.	0.
3482	0.847	-0.074	56.600	[illegible]004.	8.29	0.074	B61-1	875.	234.	36.	7.	0.	0.
							B63-1	764.	272.	35.	7.	6.	5.
							B63-2	423.	41.	18.	14.	6.	7.
							B63-4	240.	151.	49.	19.	10.	0.

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SR-2C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE	P ORDER COMPONENTS μ STRAIN 1	2	3	4	5	6
3483	0.847	-0.070	56.600	7566.	124.42	0.886	BG1-1	809.	206.	32.	7.	6.	0.
							BG3-1	699.	215.	32.	8.	17.	0.
							BG3-2	418.	16.	32.	10.	19.	11.
							BG3-4	222.	127.	33.	20.	9.	0.
3484	0.849	-0.068	56.600	8002.	225.66	1.359	BG1-1	849.	196.	30.	11.	0.	0.
							BG3-1	742.	196.	34.	10.	9.	0.
							BG3-2	428.	40.	37.	14.	11.	8.
							BG3-4	239.	112.	23.	19.	8.	6.
3485	0.849	-0.068	56.600	8436.	339.97	1.751	BG1-1	780.	185.	25.	14.	0.	0.
							BG3-1	701.	180.	27.	16.	10.	0.
							BG3-2	383.	54.	34.	17.	16.	0.
							BG3-4	230.	89.	17.	96.	10.	6.
3491	0.848	2.959	56.600	6811.	-9.72	-0.095	BG1-1	146.	555.	52.	11.	6.	0.
							BG3-1	145.	655.	49.	9.	8.	0.
							BG3-2	111.	197.	21.	13.	13.	9.
							BG3-4	68.	353.	48.	21.	20.	8.
3492	0.850	2.960	56.600	6995.	22.08	0.200	BG1-1	124.	475.	54.	7.	0.	9.
							BG3-1	116.	539.	45.	5.	8.	0.
							BG3-2	86.	164.	26.	5.	24.	6.
							BG3-4	32.	296.	52.	21.	10.	6.
3493	0.849	2.962	56.600	7508.	122.88	0.902	BG1-1	172.	442.	52.	13.	0.	0.
							BG3-1	152.	432.	44.	13.	10.	8.
							BG3-2	118.	144.	26.	10.	28.	12.
							BG3-4	61.	245.	52.	25.	23.	0.
3494	0.850	2.962	56.600	8035.	245.79	1.472	BG1-1	177.	324.	48.	10.	0.	0.
							BG3-1	157.	315.	37.	5.	9.	0.
							BG3-2	118.	115.	21.	6.	34.	9.
							BG3-4	69.	163.	38.	7.	28.	0.
3495	0.849	2.972	56.600	8418.	346.62	1.804	BG1-1	152.	318.	31.	12.	0.	0.
							BG3-1	139.	303.	25.	12.	0.	0.
							BG3-2	104.	124.	20.	12.	24.	0.
							BG3-4	64.	143.	21.	87.	18.	6.
3501	0.851	3.978	56.600	6824.	-8.96	-0.088	BG1-1	209.	605.	53.	8.	8.	0.
							BG3-1	166.	700.	59.	11.	12.	0.
							BG3-2	126.	213.	21.	12.	22.	16.
							BG3-4	44.	375.	51.	30.	9.	15.
3502	0.846	3.980	56.600	6969.	17.26	0.158	BG1-1	186.	591.	55.	8.	6.	0.
							BG3-1	140.	647.	58.	13.	6.	0.
							BG3-2	103.	196.	23.	12.	29.	16.
							BG3-4	7.	352.	56.	36.	0.	15.
3503	0.846	3.980	56.600	7511.	125.57	0.920	BG1-1	261.	489.	47.	8.	0.	0.
							BG3-1	202.	501.	42.	9.	8.	0.
							BG3-2	162.	158.	21.	7.	16.	15.
							BG3-4	38.	282.	46.	34.	10.	6.
3504	0.852	3.978	56.600	8057.	254.63	1.520	BG1-1	281.	386.	41.	7.	0.	0.
							BG3-1	226.	385.	36.	9.	6.	0.
							BG3-2	160.	135.	18.	0.	14.	13.
							BG3-4	60.	202.	31.	22.	18.	0.

SR-2C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE	P ORDER COMPONENTS μ STRAIN 1	2	3	4	5	6
3505	0.853	3.977	56.600	8458.	350.06	1.807	B61-1	262.	316.	37.	14.	0.	0.
							B63-1	217.	315.	28.	24.	0.	0.
							B63-2	152.	119.	12.	14.	16.	7.
							B63-4	63.	154.	23.	82.	19.	0.
3511	0.844	1.946	56.600	6837.	-9.58	-0.093	B61-1	390.	412.	47.	10.	0.	0.
							B63-1	371.	483.	43.	7.	0.	0.
							B63-2	221.	127.	27.	14.	8.	9.
							B63-4	139.	258.	44.	18.	17.	5.
3512	0.855	1.948	56.600	7046.	22.66	0.202	B61-1	367.	420.	48.	12.	0.	0.
							B63-1	348.	482.	43.	7.	0.	0.
							B63-2	210.	127.	29.	9.	8.	6.
							B63-4	103.	261.	48.	20.	12.	7.
3513	0.850	1.950	56.600	7552.	118.69	0.859	B61-1	401.	337.	45.	13.	0.	0.
							B63-1	358.	340.	36.	9.	5.	0.
							B63-2	248.	105.	24.	11.	12.	11.
							B63-4	109.	186.	35.	18.	8.	12.
3514	0.850	1.951	56.600	7992.	232.90	1.415	B61-1	352.	315.	40.	15.	0.	0.
							B63-1	316.	308.	37.	10.	0.	0.
							B63-2	204.	114.	16.	13.	13.	10.
							B63-4	105.	156.	28.	18.	12.	0.
3515	0.846	1.951	56.600	8457.	341.81	1.747	B61-1	365.	250.	29.	12.	7.	0.
							B63-1	338.	238.	28.	14.	6.	0.
							B63-2	209.	99.	10.	16.	16.	0.
							B63-4	120.	107.	19.	73.	9.	5.
3521	0.849	0.945	56.600	[illegible]	-10.37	-0.099	B61-1	655.	372.	43.	8.	0.	0.
							B63-1	589.	408.	44.	9.	0.	5.
							B63-2	343.	76.	23.	18.	11.	9.
							B63-4	195.	220.	52.	8.	14.	7.
3522	0.850	0.947	56.600	7017.	7.53	0.067	B61-1	608.	310.	41.	8.	0.	0.
							B63-1	544.	342.	40.	7.	0.	0.
							B63-2	313.	61.	23.	13.	7.	0.
							B63-4	156.	186.	48.	10.	12.	0.
3523	0.849	0.949	56.600	7500.	114.07	0.834	B61-1	651.	261.	34.	10.	0.	0.
							B63-1	577.	274.	34.	7.	0.	0.
							B63-2	369.	66.	24.	8.	8.	7.
							B63-4	159.	149.	39.	17.	6.	0.
3524	0.850	0.951	56.600	[illegible]	234.98	1.596	B61-1	615.	249.	38.	15.	5.	0.
							B63-1	542.	243.	38.	9.	7.	5.
							B63-2	328.	82.	29.	8.	16.	0.
							B63-4	164.	126.	27.	11.	6.	6.
3525	0.854	0.952	56.600	8477.	335.24	1.737	B61-1	636.	202.	27.	12.	6.	0.
							B63-1	579.	197.	19.	9.	0.	0.
							B63-2	333.	76.	7.	18.	19.	0.
							B63-4	191.	92.	15.	73.	8.	0.
3531	0.591	2.003	52.500	5698.	4.17	-0.056	B61-1	74.	600.	50.	13.	5.	0.
							B63-1	70.	581.	50.	13.	5.	0.
							B63-2	68.	220.	7.	25.	0.	0.
							B63-4	36.	369.	40.	11.	0.	6.

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SR-2C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE	P ORDER COMPONENTS μ STRAIN 1	2	3	4	5	6
3532	0.590	1.995	52.500	6083.	29.45	0.325	BG1-1	73.	391.	49.	11.	0.	0.
							BG3-1	67.	484.	46.	11.	0.	0.
							BG3-2	67.	169.	12.	15.	0.	8.
							BG3-4	37.	313.	39.	12.	31.	8.
3533	0.590	1.996	52.500	6535.	84.27	0.750	BG1-1	80.	380.	59.	14.	0.	0.
							BG3-1	71.	421.	51.	12.	0.	0.
							BG3-2	72.	135.	7.	12.	0.	12.
							BG3-4	41.	274.	39.	14.	19.	11.
3534	0.590	1.996	52.500	7081.	165.72	1.159	BG1-1	56.	359.	64.	15.	0.	0.
							BG3-1	47.	338.	56.	11.	5.	0.
							BG3-2	51.	87.	34.	14.	24.	7.
							BG3-4	18.	223.	36.	24.	24.	0.
3535	0.590	1.997	52.500	7518.	256.16	1.499	BG1-1	84.	322.	52.	15.	0.	0.
							BG3-1	79.	299.	49.	11.	0.	0.
							BG3-2	84.	73.	34.	18.	20.	7.
							BG3-4	54.	183.	19.	34.	15.	7.
3536	0.594	1.995	52.500	7981.	362.55	1.777	BG1-1	79.	309.	47.	13.	0.	0.
							BG3-1	82.	296.	46.	13.	0.	0.
							BG3-2	83.	80.	29.	20.	11.	0.
							BG3-4	64.	163.	8.	69.	7.	9.
3541	0.589	0.985	52.500	5689.	-3.12	-0.042	BG1-1	221.	534.	45.	11.	0.	0.
							BG3-1	195.	536.	46.	11.	0.	0.
							BG3-2	155.	207.	6.	17.	0.	0.
							BG3-4	77.	341.	37.	12.	6.	5.
3543	0.590	0.988	52.500	6467.	78.30	0.721	BG1-1	228.	309.	53.	15.	0.	0.
							BG3-1	190.	344.	46.	14.	0.	0.
							BG3-2	158.	112.	16.	11.	6.	15.
							BG3-4	80.	225.	34.	16.	19.	14.
3544	0.593	0.989	52.500	7016.	156.96	1.133	BG1-1	265.	260.	58.	16.	0.	0.
							BG3-1	209.	259.	55.	14.	7.	0.
							BG3-2	179.	69.	31.	19.	13.	9.
							BG3-4	75.	170.	35.	21.	22.	0.
3545	0.592	0.988	52.500	7508.	254.13	1.496	BG1-1	344.	284.	49.	15.	0.	0.
							BG3-1	280.	274.	52.	13.	0.	0.
							BG3-2	249.	67.	27.	15.	12.	5.
							BG3-4	139.	169.	20.	33.	13.	8.
3546	0.593	0.987	52.500	[illegible]	365.85	1.779	BG1-1	349.	223.	10.	11.	0.	0.
							BG3-1	303.	222.	38.	11.	7.	0.
							BG3-2	250.	62.	18.	13.	14.	5.
							BG3-4	178.	119.	9.	58.	12.	9.
3551	0.592	-0.001	52.500	5745.	-2.45	0.032	BG1-1	382.	465.	44.	13.	0.	0.
							BG3-1	331.	476.	42.	11.	0.	0.
							BG3-2	253.	187.	0.	13.	0.	0.
							BG3-4	126.	301.	36.	13.	7.	6.
3552	0.594	0.000	52.500	6061.	30.33	0.340	BG1-1	385.	297.	35.	14.	0.	0.
							BG3-1	329.	362.	29.	13.	0.	0.
							BG3-2	257.	136.	0.	9.	0.	0.
							BG3-4	120.	231.	26.	16.	12.	5.

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SR-2C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE	P ORDER COMPONENTS (μ) STRAIN 1	2	3	4	5	6
3553	0.592	0.000	52.500	6503.	82.88	0.751	BG1-1	419.	233.	56.	15.	0.	0.
							BG3-1	342.	259.	46.	13.	0.	0.
							BG3-2	274.	89.	16.	11.	0.	14.
							BG3-4	129.	169.	36.	14.	24.	13.
3554	0.592	0.001	52.500	7057.	169.55	1.203	BG1-1	502.	203.	53.	11.	0.	0.
							BG3-1	396.	214.	50.	11.	8.	0.
							BG3-2	327.	67.	29.	16.	8.	9.
							BG3-4	148.	138.	34.	19.	23.	5.
3555	0.595	0.000	52.500	7526.	260.39	1.527	BG1-1	609.	199.	43.	11.	0.	0.
							BG3-1	494.	194.	51.	11.	0.	0.
							BG3-2	421.	53.	29.	8.	11.	0.
							BG3-4	233.	123.	20.	33.	16.	5.
3556	0.596	0.001	52.500	8025.	370.55	1.792	BG1-1	601.	183.	57.	13.	0.	0.
							BG3-1	515.	176.	42.	15.	0.	0.
							BG3-2	407.	55.	16.	6.	15.	0.
							BG3-4	282.	98.	11.	40.	7.	11.
3561	0.586	3.011	52.500	5690.	-2.25	-0.030	BG1-1	99.	703.	59.	14.	0.	0.
							BG3-1	73.	663.	59.	14.	7.	5.
							BG3-2	44.	250.	13.	32.	0.	0.
							BG3-4	9.	417.	48.	12.	7.	9.
3562	0.587	3.014	52.500	5968.	22.55	0.264	BG1-1	110.	499.	40.	9.	0.	0.
							BG3-1	82.	612.	39.	11.	0.	0.
							BG3-2	49.	221.	0.	23.	0.	0.
							BG3-4	10.	393.	32.	8.	16.	0.
3563	0.588	3.015	52.500	6471.	79.24	0.729	BG1-1	118.	430.	60.	13.	0.	0.
							BG3-1	90.	452.	54.	12.	0.	0.
							BG3-2	57.	145.	21.	12.	0.	11.
							BG3-4	15.	298.	40.	13.	19.	10.
3564	0.587	3.025	52.500	7061.	167.16	1.182	BG1-1	133.	385.	58.	16.	5.	0.
							BG3-1	90.	363.	55.	12.	10.	0.
							BG3-2	55.	96.	29.	11.	13.	8.
							BG3-4	0.	241.	36.	20.	24.	6.
3565	0.587	3.025	52.500	7481.	246.36	1.464	BG1-1	203.	372.	54.	19.	0.	0.
							BG3-1	144.	350.	54.	16.	7.	0.
							BG3-2	108.	82.	33.	24.	14.	12.
							BG3-4	39.	222.	27.	30.	23.	5.
3566	0.589	3.025	52.500	7981.	360.13	1.766	BG1-1	233.	332.	49.	16.	0.	0.
							BG3-1	170.	322.	50.	19.	0.	0.
							BG3-2	129.	83.	32.	27.	9.	5.
							BG3-4	61.	184.	13.	62.	0.	10.
3571	0.585	3.999	52.500	5677.	-1.25	-0.017	BG1-1	225.	847.	62.	13.	5.	0.
							BG3-1	178.	799.	59.	15.	5.	0.
							BG3-2	116.	298.	16.	36.	6.	0.
							BG3-4	44.	502.	48.	12.	17.	5.
3572	0.581	4.001	52.500	6078.	37.84	0.419	BG1-1	258.	512.	49.	12.	7.	0.
							BG3-1	206.	639.	52.	13.	0.	0.
							BG3-2	140.	224.	13.	25.	5.	7.
							BG3-4	51.	411.	43.	6.	34.	10.

ORIGINAL PAGE IS
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SR-2C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE	P ORDER COMPONENTS μ STRAIN 1	2	3	4	5	6
3573	0.581	4.002	52.500	6535.	92.05	0.819	BG1-1	310.	400.	57.	10.	0.	0.
							BG3-1	243.	441.	53.	10.	0.	0.
							BG3-2	171.	140.	27.	12.	0.	12.
							BG3-4	64.	294.	40.	12.	16.	9.
3574	0.586	4.002	52.500	7025.	167.23	1.201	BG1-1	337.	365.	60.	15.	0.	0.
							BG3-1	249.	360.	58.	11.	8.	0.
							BG3-2	180.	95.	36.	11.	17.	8.
							BG3-4	55.	243.	38.	22.	19.	7.
3575	0.589	4.004	52.500	7510.	259.14	1.526	BG1-1	457.	387.	62.	22.	0.	0.
							BG3-1	345.	369.	58.	16.	10.	0.
							BG3-2	272.	82.	45.	24.	26.	13.
							BG3-4	121.	239.	34.	28.	26.	0.
3576	0.587	4.002	52.500	7998.	370.37	1.804	BG1-1	508.	344.	56.	21.	0.	0.
							BG3-1	394.	332.	57.	23.	6.	0.
							BG3-2	304.	79.	48.	38.	36.	9.
							BG3-4	168.	198.	22.	62.	16.	7.
3581	0.700	1.983	52.500	6743.	-3.99	-0.035	BG1-1	142.	377.	49.	10.	0.	0.
							BG3-1	133.	428.	49.	9.	0.	0.
							BG3-2	119.	114.	25.	12.	6.	6.
							BG3-4	52.	268.	51.	11.	14.	9.
3582	0.697	1.974	52.500	6991.	32.16	0.254	BG1-1	121.	354.	50.	10.	0.	0.
							BG3-1	109.	366.	46.	9.	5.	0.
							BG3-2	91.	89.	22.	8.	6.	0.
							BG3-4	22.	237.	48.	15.	11.	0.
3583	0.702	1.976	52.500	7565.	117.85	0.736	BG1-1	167.	345.	52.	13.	0.	0.
							BG3-1	142.	319.	46.	10.	0.	0.
							BG3-2	125.	75.	26.	7.	14.	11.
							BG3-4	57.	205.	41.	18.	15.	0.
3584	0.697	1.977	52.500	8103.	230.81	1.171	BG1-1	163.	311.	43.	12.	0.	0.
							BG3-1	141.	292.	36.	12.	0.	0.
							BG3-2	123.	83.	19.	9.	13.	0.
							BG3-4	67.	170.	27.	28.	15.	6.
3585	0.700	1.975	52.500	8482.	330.29	1.462	BG1-1	175.	245.	29.	8.	5.	0.
							BG3-1	158.	241.	25.	15.	0.	0.
							BG3-2	129.	80.	0.	5.	8.	0.
							BG3-4	85.	131.	3.	106.	12.	0.
3591	0.697	0.983	52.500	6753.	[illegible]	[illegible]	BG1-1	344.	336.	49.	10.	0.	0.
							BG3-1	313.	398.	49.	11.	8.	0.
							BG3-2	249.	115.	23.	7.	10.	12.
							BG3-4	108.	239.	53.	23.	14.	13.
3592	0.700	0.986	52.500	7020.	37.55	0.294	BG1-1	319.	267.	46.	11.	0.	0.
							BG3-1	272.	294.	44.	10.	10.	0.
							BG3-2	216.	80.	22.	5.	11.	8.
							BG3-4	67.	181.	48.	23.	11.	9.
3593	0.699	0.987	52.500	7565.	117.85	0.748	BG1-1	406.	253.	44.	10.	0.	0.
							BG3-1	330.	260.	46.	9.	0.	0.
							BG3-2	262.	61.	21.	0.	17.	8.
							BG3-4	107.	168.	11.	18.	13.	0.

SR-2C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

ORIGINAL PAGE IS
OF POOR QUALITY

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE	P ORDER COMPONENTS μ STRAIN 1	2	3	4	5	6
3594	0.698	0.986	52.500	8049.	218.60	1.132	BG1-1	403.	249.	36.	16.	0.	0.
							BG3-1	329.	238.	32.	15.	0.	0.
							BG3-2	254.	62.	9.	6.	15.	0.
							BG3-4	129.	141.	24.	20.	14.	0.
3595	0.699	0.987	52.500	8511.	331.91	1.455	BG1-1	436.	213.	31.	10.	0.	0.
							BG3-1	377.	205.	22.	13.	5.	0.
							BG3-2	259.	67.	0.	17.	15.	0.
							BG3-4	167.	109.	15.	140.	13.	0.
3601	0.703	-0.056	52.500	6756.	-3.85	-0.034	BG1-1	581.	280.	48.	11.	0.	0.
							BG3-1	499.	314.	45.	13.	9.	0.
							BG3-2	380.	101.	20.	10.	12.	21.
							BG3-4	168.	177.	55.	24.	10.	19.
3602	0.701	-0.053	52.500	7038.	39.83	0.310	BG1-1	571.	223.	43.	12.	5.	0.
							BG3-1	474.	250.	43.	14.	13.	0.
							BG3-2	362.	80.	19.	8.	11.	18.
							BG3-4	129.	142.	51.	18.	18.	14.
3603	0.699	-0.053	52.500	7520.	123.75	0.788	BG1-1	663.	145.	40.	10.	7.	0.
							BG3-1	542.	173.	43.	8.	8.	7.
							BG3-2	424.	46.	21.	9.	33.	0.
							BG3-4	175.	110.	44.	17.	31.	6.
3604	0.700	-0.052	52.500	8064.	231.08	1.195	BG1-1	647.	179.	31.	23.	5.	0.
							BG3-1	530.	162.	41.	24.	9.	0.
							BG3-2	393.	38.	15.	11.	13.	5.
							BG3-4	194.	97.	26.	19.	20.	9.
3605	0.702	-0.054	52.500	8479.	326.19	1.450	BG1-1	657.	181.	25.	14.	0.	0.
							BG3-1	567.	165.	17.	18.	0.	0.
							BG3-2	375.	51.	8.	21.	5.	0.
							BG3-4	237.	80.	8.	141.	10.	6.
3611	0.692	2.984	52.500	6681.	-2.87	0.026	BG1-1	101.	432.	55.	11.	0.	0.
							BG3-1	79.	470.	58.	10.	6.	0.
							BG3-2	68.	121.	30.	18.	11.	7.
							BG3-4	7.	293.	51.	12.	12.	12.
3612	0.692	2.986	52.500	7058.	45.30	0.351	BG1-1	80.	428.	56.	11.	0.	0.
							BG3-1	51.	445.	54.	9.	5.	0.
							BG3-2	42.	104.	32.	12.	13.	9.
							BG3-4	0.	286.	54.	15.	7.	10.
3613	0.697	2.986	52.500	7490.	107.46	0.692	BG1-1	127.	401.	54.	12.	0.	0.
							BG3-1	93.	370.	46.	8.	0.	0.
							BG3-2	77.	85.	33.	7.	12.	11.
							BG3-4	16.	238.	48.	10.	10.	0.
3614	0.702	2.987	52.500	7989.	193.86	1.036	BG1-1	144.	370.	48.	14.	0.	0.
							BG3-1	104.	347.	42.	13.	0.	0.
							BG3-2	87.	94.	31.	10.	14.	0.
							BG3-4	30.	205.	31.	33.	15.	6.
3615	0.708	2.986	52.500	8532.	320.23	1.411	BG1-1	170.	304.	44.	9.	0.	0.
							BG3-1	125.	297.	38.	10.	0.	0.
							BG3-2	99.	93.	22.	7.	6.	0.
							BG3-4	45.	159.	23.	105.	9.	6.

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RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE	P ORDER COMPONENTS μ STRAIN 1	2	3	4	5	6
3621	0.693	4.016	52.500	6778.	-3.19	-0.028	BG1-1	324.	497.	58.	9.	6.	0.
							BG3-1	256.	554.	59.	7.	0.	0.
							BG3-2	192.	146.	31.	16.	10.	9.
							BG3-4	57.	343.	47.	21.	18.	10.
3622	0.701	4.017	52.500	7110.	53.00	0.402	BG1-1	288.	410.	56.	9.	6.	0.
							BG3-1	218.	446.	57.	8.	0.	0.
							BG3-2	158.	109.	34.	13.	15.	6.
							BG3-4	19.	283.	51.	29.	11.	6.
3623	0.700	4.018	52.500	7514.	111.85	0.717	BG1-1	369.	415.	55.	11.	5.	0.
							BG3-1	279.	404.	52.	11.	7.	0.
							BG3-2	214.	87.	34.	8.	26.	12.
							BG3-4	54.	261.	50.	17.	13.	6.
3624	0.702	4.018	52.500	8084.	224.23	1.158	BG1-1	433.	358.	49.	6.	0.	0.
							BG3-1	321.	338.	49.	10.	7.	0.
							BG3-2	247.	86.	32.	0.	17.	6.
							BG3-4	89.	201.	37.	31.	16.	0.
3625	0.698	4.017	52.500	8526.	334.19	1.466	BG1-1	422.	339.	45.	8.	0.	0.
							BG3-1	329.	326.	47.	12.	7.	0.
							BG3-2	231.	98.	28.	10.	9.	0.
							BG3-4	114.	180.	28.	114.	0.	0.
3631	0.795	1.971	52.500	7591.	-5.45	-0.035	BG1-1	242.	286.	41.	6.	0.	0.
							BG3-1	227.	289.	33.	0.	0.	0.
							BG3-2	143.	79.	20.	5.	17.	8.
							BG3-4	94.	163.	37.	20.	9.	6.
3632	0.800	1.974	52.500	8043.	57.28	0.324	BG1-1	247.	240.	37.	11.	0.	0.
							BG3-1	228.	248.	29.	13.	0.	0.
							BG3-2	152.	77.	18.	9.	16.	0.
							BG3-4	83.	143.	38.	24.	14.	0.
3633	0.793	1.976	52.500	8394.	135.68	0.674	BG1-1	238.	250.	30.	10.	8.	0.
							BG3-1	206.	223.	16.	8.	0.	6.
							BG3-2	151.	89.	12.	8.	12.	0.
							BG3-4	68.	125.	23.	40.	12.	6.
3641	0.804	0.971	52.500	7772.	-8.13	-0.051	BG1-1	469.	198.	28.	7.	5.	0.
							BG3-1	427.	214.	23.	5.	0.	0.
							BG3-2	255.	40.	11.	0.	7.	0.
							BG3-4	148.	125.	36.	14.	12.	0.
3642	0.796	0.973	52.500	7958.	27.99	0.164	BG1-1	428.	199.	18.	7.	0.	0.
							BG3-1	381.	204.	25.	0.	0.	0.
							BG3-2	241.	46.	14.	0.	11.	0.
							BG3-4	122.	122.	38.	16.	12.	0.
3643	0.800	0.976	52.500	8466.	121.80	0.607	BG1-1	446.	189.	29.	9.	0.	0.
							BG3-1	391.	173.	24.	8.	0.	0.
							BG3-2	254.	60.	10.	7.	8.	0.
							BG3-4	114.	102.	27.	16.	12.	0.
3651	0.798	-0.048	52.500	7776.	5.17	-0.032	BG1-1	693.	144.	25.	6.	0.	0.
							BG3-1	612.	165.	28.	6.	0.	0.
							BG3-2	362.	10.	6.	0.	0.	0.
							BG3-4	197.	94.	45.	12.	10.	0.

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WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE	P ORDER COMPONENTS μ STRAIN 1	2	3	4	5	6
3652	0.800	-0.045	52.500	8007.	33.95	0.196	BG1-1	653.	147.	25.	11.	0.	0.
							BG3-1	578.	152.	27.	7.	0.	0.
							BG3-2	357.	11.	9.	0.	10.	0.
							BG3-4	175.	89.	42.	18.	15.	0.
3653	0.803	-0.054	52.500	8522.	138.83	0.665	BG1-1	586.	134.	34.	28.	17.	0.
							BG3-1	544.	136.	13.	10.	0.	0.
							BG3-2	338.	29.	6.	0.	9.	5.
							BG3-4	157.	83.	19.	17.	15.	0.
3661	0.787	2.993	52.500	7581.	-6.09	-0.041	BG1-1	81.	337.	37.	18.	16.	13.
							BG3-1	82.	353.	31.	7.	0.	0.
							BG3-2	78.	109.	17.	6.	14.	11.
							BG3-4	41.	195.	35.	16.	14.	0.
3662	0.806	2.992	52.500	7994.	34.73	0.203	BG1-1	86.	281.	38.	21.	14.	0.
							BG3-1	82.	297.	35.	7.	0.	0.
							BG3-2	83.	100.	23.	12.	18.	7.
							BG3-4	33.	168.	41.	27.	17.	0.
3663	0.804	2.994	52.500	8413.	125.30	0.628	BG1-1	103.	246.	32.	11.	10.	7.
							BG3-1	91.	244.	21.	14.	0.	0.
							BG3-2	83.	94.	11.	11.	17.	0.
							BG3-4	38.	136.	25.	61.	16.	0.
3671	0.797	3.980	52.500	7659.	-6.20	-0.041	BG1-1	244.	374.	39.	28.	21.	13.
							BG3-1	212.	416.	38.	11.	8.	6.
							BG3-2	148.	124.	21.	8.	21.	16.
							BG3-4	46.	239.	40.	29.	18.	9.
3672	0.794	3.983	52.500	8065.	65.65	0.371	BG1-1	223.	342.	36.	18.	14.	11.
							BG3-1	191.	362.	36.	17.	8.	0.
							BG3-2	140.	111.	21.	16.	21.	11.
							BG3-4	29.	215.	41.	37.	21.	0.
3673	0.797	3.984	52.500	8406.	144.00	0.721	BG1-1	231.	296.	31.	15.	13.	0.
							BG3-1	193.	313.	27.	12.	0.	0.
							BG3-2	143.	106.	8.	14.	10.	6.
							BG3-4	31.	180.	33.	77.	21.	0.
3683	0.592	1.992	50.800	6115.	4.66	-0.050	BG1-1	58.	385.	46.	10.	0.	0.
							BG3-1	63.	492.	46.	10.	0.	0.
							BG3-2	64.	167.	12.	13.	0.	7.
							BG3-4	33.	309.	39.	13.	11.	6.
3684	0.590	1.994	50.800	6514.	33.60	0.299	BG1-1	57.	321.	43.	10.	0.	0.
							BG3-1	57.	378.	38.	10.	0.	0.
							BG3-2	57.	118.	15.	8.	6.	9.
							BG3-4	29.	243.	30.	16.	9.	8.
3685	0.591	1.996	50.800	7011.	96.29	0.690	BG1-1	39.	272.	53.	12.	5.	0.
							BG3-1	37.	267.	47.	10.	7.	0.
							BG3-2	39.	74.	25.	12.	12.	8.
							BG3-4	8.	171.	33.	16.	15.	7.
3686	0.589	1.995	50.800	7523.	179.09	1.042	BG1-1	75.	304.	50.	12.	0.	0.
							BG3-1	74.	276.	46.	14.	0.	0.
							BG3-2	80.	63.	33.	11.	21.	7.
							BG3-4	45.	174.	26.	22.	22.	0.

SR-2C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE	P ORDER COMPONENTS µ STRAIN 1	2	3	4	5	6
3687	0.588	1.995	50.800	7979.	274.67	1.339	B61-1	68.	282.	45.	12.	0.	0.
							B63-1	70.	266.	44.	14.	0.	0.
							B63-2	72.	64.	31.	10.	9.	0.
							B63-4	51.	150.	11.	49.	7.	10.
3688	0.590	1.995	50.800	8386.	371.55	1.564	B61-1	59.	262.	34.	9.	0.	0.
							B63-1	68.	252.	34.	6.	0.	0.
							B63-2	69.	72.	16.	12.	9.	0.
							B63-4	58.	126.	0.	89.	13.	6.
3691	0.586	2.982	50.800	6110.	-4.24	-0.046	B61-1	96.	447.	47.	8.	0.	0.
							B63-1	77.	541.	49.	9.	0.	0.
							B63-2	50.	186.	15.	16.	0.	5.
							B63-4	7.	338.	41.	9.	20.	5.
3692	0.586	2.983	50.800	6516.	34.56	0.310	B61-1	94.	378.	45.	9.	0.	0.
							B63-1	70.	438.	44.	11.	0.	0.
							B63-2	48.	139.	18.	10.	0.	8.
							B63-4	0.	279.	36.	12.	15.	8.
3693	0.588	2.984	50.800	7025.	97.63	0.698	B61-1	97.	325.	49.	11.	0.	0.
							B63-1	66.	323.	44.	12.	0.	0.
							B63-2	37.	88.	24.	9.	18.	0.
							B63-4	0.	208.	31.	12.	13.	5.
3694	0.590	2.985	50.800	7520.	177.72	1.037	B61-1	158.	339.	51.	13.	0.	0.
							B63-1	114.	316.	46.	12.	0.	5.
							B63-2	85.	69.	34.	9.	25.	9.
							B63-4	16.	203.	27.	21.	22.	0.
3695	0.588	2.984	50.800	8007.	279.98	1.352	B61-1	173.	324.	47.	15.	0.	0.
							B63-1	125.	310.	42.	19.	0.	0.
							B63-2	97.	68.	39.	14.	11.	6.
							B63-4	31.	181.	15.	56.	8.	9.
3696	0.587	2.984	50.800	8394.	372.61	1.564	B61-1	227.	286.	38.	11.	0.	0.
							B63-1	172.	281.	33.	7.	0.	0.
							B63-2	129.	74.	29.	20.	6.	0.
							B63-4	60.	146.	0.	96.	8.	0.
3701	0.583	3.989	50.800	6101.	3.95	0.043	B61-1	223.	518.	53.	10.	0.	0.
							B63-1	181.	647.	57.	12.	0.	0.
							B63-2	122.	221.	21.	22.	5.	6.
							B63-4	40.	401.	45.	0.	37.	8.
3702	0.583	3.991	50.800	6519.	[illegible]	0.348	B61-1	232.	412.	46.	11.	0.	0.
							B63-1	186.	491.	47.	12.	0.	0.
							B63-2	131.	154.	23.	14.	0.	8.
							B63-4	38.	313.	37.	10.	19.	10.
3703	0.580	4.002	50.800	6991.	101.79	0.737	B61-1	269.	321.	52.	11.	5.	0.
							B63-1	205.	333.	52.	11.	10.	0.
							B63-2	141.	89.	30.	11.	8.	0.
							B63-4	24.	219.	37.	11.	13.	5.
3704	0.581	4.003	50.800	7514.	185.99	1.085	B61-1	376.	321.	54.	16.	0.	0.
							B63-1	283.	300.	49.	13.	10.	0.
							B63-2	219.	64.	37.	17.	24.	12.
							B63-4	76.	195.	29.	20.	27.	0.

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SR-2C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE	P ORDER COMPONENTS μ STRAIN 1	2	3	4	5	6
3705	0.585	4.005	50.800	8016.	289.52	1.523	BG1-1	394.	345.	53.	18.	0.	0.
							BG3-1	304.	329.	54.	22.	9.	0.
							BG3-2	239.	71.	46.	24.	16.	7.
							BG3-4	107.	196.	22.	58.	19.	7.
3706	0.587	4.003	50.800	8401.	382.13	1.599	BG1-1	479.	308.	41.	9.	6.	0.
							BG3-1	385.	297.	45.	16.	0.	0.
							BG3-2	289.	76.	33.	25.	11.	0.
							BG3-4	158.	159.	7.	122.	5.	0.
3711	0.586	0.987	50.800	6119.	-3.83	0.041	BG1-1	194.	329.	41.	10.	0.	0.
							BG3-1	181.	431.	41.	9.	0.	0.
							BG3-2	146.	150.	7.	10.	0.	5.
							BG3-4	67.	276.	36.	13.	8.	7.
3712	0.589	0.989	50.800	6568.	34.00	0.310	BG1-1	183.	270.	44.	12.	0.	0.
							BG3-1	162.	329.	37.	11.	0.	0.
							BG3-2	133.	102.	12.	7.	6.	9.
							BG3-4	60.	205.	30.	15.	17.	9.
3713	0.590	0.988	50.800	7038.	99.04	0.705	BG1-1	215.	233.	50.	14.	0.	0.
							BG3-1	179.	243.	45.	11.	0.	0.
							BG3-2	146.	66.	25.	15.	12.	9.
							BG3-4	54.	155.	32.	10.	16.	7.
3714	0.591	0.989	50.800	7512.	179.42	1.049	BG1-1	282.	225.	47.	11.	0.	0.
							BG3-1	236.	205.	45.	10.	0.	0.
							BG3-2	208.	49.	33.	14.	16.	0.
							BG3-4	100.	128.	25.	25.	18.	0.
3715	0.589	0.988	50.800	7976.	277.93	1.357	BG1-1	279.	235.	36.	11.	0.	0.
							BG3-1	241.	218.	36.	11.	0.	0.
							BG3-2	207.	57.	21.	11.	6.	0.
							BG3-4	122.	122.	8.	38.	9.	7.
3716	0.592	0.986	50.800	8429.	375.86	1.559	BG1-1	310.	205.	26.	8.	0.	0.
							BG3-1	280.	195.	20.	8.	0.	0.
							BG3-2	222.	61.	6.	6.	17.	0.
							BG3-4	162.	97.	0.	95.	16.	0.
3721	0.588	-0.040	50.800	6125.	-3.98	-0.043	BG1-1	351.	283.	40.	11.	0.	0.
							BG3-1	319.	371.	40.	10.	0.	0.
							BG3-2	244.	131.	5.	6.	0.	5.
							BG3-4	112.	226.	38.	16.	8.	9.
3722	0.590	-0.037	50.800	6599.	36.48	0.325	BG1-1	346.	208.	45.	13.	0.	0.
							BG3-1	299.	242.	37.	10.	0.	0.
							BG3-2	235.	79.	11.	8.	6.	10.
							BG3-4	102.	151.	32.	13.	17.	10.
3723	0.590	-0.038	50.800	7025.	101.92	0.730	BG1-1	410.	178.	50.	14.	0.	0.
							BG3-1	335.	194.	47.	13.	0.	0.
							BG3-2	265.	57.	23.	19.	8.	6.
							BG3-4	100.	122.	34.	10.	16.	0.
3724	0.592	-0.040	50.800	7497.	179.98	1.06[illegible]	BG1-1	490.	137.	41.	8.	0.	0.
							BG3-1	403.	140.	43.	10.	0.	0.
							BG3-2	339.	36.	27.	10.	12.	0.
							BG3-4	159.	88.	24.	18.	17.	7.

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SR-2C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE	P ORDER COMPONENTS, μ STRAIN 1	2	3	4	5	6
3725	0.596	-0.040	50.800	7996.	273.19	1.332	BG1-1	507.	174.	31.	9.	0.	0.
							BG3-1	429.	158.	34.	11.	0.	0.
							BG3-2	354.	43.	17.	6.	10.	0.
							BG3-4	201.	90.	9.	17.	13.	7.
3726	0.596	-0.041	50.800	8417.	371.57	1.553	BG1-1	581.	167.	20.	8.	0.	0.
							BG3-1	512.	152.	20.	9.	0.	0.
							BG3-2	388.	52.	0.	9.	14.	0.
							BG3-4	268.	77.	0.	86.	13.	0.
3731	0.596	-1.038	50.800	6181.	-5.09	-0.054	BG1-1	495.	229.	37.	12.	0.	0.
							BG3-1	443.	286.	35.	10.	0.	0.
							BG3-2	330.	103.	0.	0.	0.	0.
							BG3-4	156.	168.	39.	15.	15.	7.
3732	0.596	-1.036	50.800	6498.	28.73	0.261	BG1-1	502.	196.	44.	15.	0.	0.
							BG3-1	436.	233.	37.	12.	0.	0.
							BG3-2	334.	76.	9.	9.	0.	11.
							BG3-4	147.	139.	40.	13.	16.	10.
3733	0.597	-1.047	50.800	7018.	97.95	0.705	BG1-1	592.	129.	43.	15.	0.	0.
							BG3-1	484.	149.	39.	12.	0.	0.
							BG3-2	381.	49.	18.	20.	0.	6.
							BG3-4	147.	90.	32.	12.	15.	5.
3734	0.596	-1.046	50.800	7516.	180.87	1.061	BG1-1	733.	86.	42.	6.	0.	0.
							BG3-1	601.	98.	44.	9.	0.	0.
							BG3-2	493.	31.	21.	11.	20.	7.
							BG3-4	235.	62.	28.	22.	20.	5.
3735	0.598	-1.048	50.800	8025.	286.00	1.379	BG1-1	721.	110.	27.	12.	0.	0.
							BG3-1	611.	89.	33.	14.	0.	0.
							BG3-2	485.	28.	12.	10.	7.	7.
							BG3-4	281.	59.	10.	13.	17.	8.
3736	0.597	-1.049	50.800	8399.	373.31	1.568	BG1-1	830.	124.	16.	9.	0.	0.
							BG3-1	728.	104.	17.	11.	0.	0.
							BG3-2	531.	38.	6.	12.	12.	0.
							BG3-4	362.	55.	0.	73.	16.	0.
3741	0.697	1.973	50.800	7227.	-5.34	-0.038	BG1-1	84.	276.	37.	0.	0.	0.
							BG3-1	88.	302.	36.	0.	10.	0.
							BG3-2	75.	66.	23.	0.	10.	12.
							BG3-4	18.	177.	40.	7.	10.	12.
3742	0.696	1.976	50.800	7478.	29.71	0.191	BG1-1	127.	279.	42.	9.	0.	0.
							BG3-1	123.	298.	41.	6.	0.	0.
							BG3-2	116.	68.	26.	6.	12.	12.
							BG3-4	43.	188.	46.	14.	8.	0.
3743	0.696	1.976	50.800	7999.	115.27	0.605	BG1-1	134.	276.	41.	10.	0.	0.
							BG3-1	119.	259.	37.	14.	0.	0.
							BG3-2	111.	66.	22.	6.	13.	0.
							BG3-4	47.	160.	32.	9.	15.	0.
3744	0.699	1.977	50.800	8455.	204.79	0.911	BG1-1	145.	250.	32.	10.	0.	0.
							BG3-1	132.	237.	27.	12.	0.	0.
							BG3-2	117.	73.	6.	12.	10.	0.
							BG3-4	60.	132.	21.	89.	14.	0.

SR-2C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE	P ORDER COMPONENTS STRAIN 1	2	3	4	5	6
3751	0.693	2.974	50.800	7224.	-4.74	-0.034	BG1-1	73.	321.	35.	0.	0.	0.
							BG3-1	54.	347.	32.	0.	0.	0.
							BG3-2	47.	70.	16.	0.	0.	0.
							BG3-4	0.	208.	28.	10.	6.	0.
3752	0.702	2.975	50.800	7554.	29.45	0.185	BG1-1	106.	328.	46.	10.	0.	0.
							BG3-1	83.	341.	40.	0.	6.	0.
							BG3-2	77.	76.	25.	6.	15.	14.
							BG3-4	0.	214.	39.	17.	11.	0.
3753	0.696	2.976	50.800	8025.	115.29	0.600	BG1-1	112.	318.	45.	11.	0.	0.
							BG3-1	86.	308.	37.	10.	5.	0.
							BG3-2	73.	77.	29.	18.	16.	7.
							BG3-4	21.	189.	37.	13.	17.	0.
3754	0.697	2.976	50.800	8447.	202.25	0.904	BG1-1	126.	294.	41.	10.	0.	0.
							BG3-1	97.	287.	35.	13.	0.	0.
							BG3-2	80.	86.	25.	8.	12.	5.
							BG3-4	29.	163.	27.	78.	14.	0.
3761	0.703	4.005	50.800	7350.	-5.18	-0.035	BG1-1	284.	376.	44.	8.	0.	0.
							BG3-1	228.	404.	39.	8.	6.	0.
							BG3-2	174.	95.	17.	0.	14.	0.
							BG3-4	22.	243.	29.	22.	11.	7.
3762	0.706	4.006	50.800	7525.	20.66	0.132	BG1-1	308.	361.	44.	8.	0.	0.
							BG3-1	258.	378.	38.	7.	7.	0.
							BG3-2	204.	89.	20.	0.	15.	7.
							BG3-4	46.	230.	32.	24.	13.	0.
3763	0.706	4.017	50.800	8037.	106.91	0.559	BG1-1	296.	344.	43.	11.	0.	0.
							BG3-1	237.	348.	36.	13.	8.	0.
							BG3-2	184.	87.	26.	8.	31.	6.
							BG3-4	34.	214.	34.	19.	26.	0.
3764	0.702	4.018	50.800	8395.	186.67	0.855	BG1-1	363.	283.	33.	10.	0.	0.
							BG3-1	284.	285.	32.	11.	0.	0.
							BG3-2	211.	77.	25.	6.	16.	0.
							BG3-4	59.	167.	23.	74.	18.	0.
3771	0.691	0.955	50.800	7221.	-4.60	-0.033	BG1-1	274.	202.	31.	0.	0.	0.
							BG3-1	253.	234.	31.	0.	0.	0.
							BG3-2	194.	51.	16.	0.	6.	5.
							BG3-4	64.	128.	38.	11.	7.	6.
3772	0.702	0.956	50.800	7534.	27.62	0.175	BG1-1	332.	218.	40.	9.	0.	0.
							BG3-1	301.	245.	39.	8.	5.	0.
							BG3-2	243.	63.	23.	10.	15.	12.
							BG3-4	91.	144.	48.	17.	16.	9.
3773	0.704	0.957	50.800	8036.	119.15	0.622	BG1-1	332.	205.	35.	12.	0.	0.
							BG3-1	282.	195.	32.	10.	0.	0.
							BG3-2	223.	51.	17.	7.	15.	0.
							BG3-4	86.	121.	33.	10.	16.	0.
3774	0.701	0.958	50.800	8415.	195.82	0.887	BG1-1	396.	187.	26.	11.	0.	0.
							BG3-1	339.	173.	21.	17.	0.	0.
							BG3-2	251.	53.	0.	11.	17.	0.
							BG3-4	118.	98.	18.	110.	15.	0.

SR-2C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE	P ORDER COMPONENTS μ STRAIN 1	2	3	4	5	6
3781	0.703	-0.035	50.800	7301.	-5.99	-0.042	BG1-1	470.	169.	41.	11.	0.	0.
							BG3-1	417.	185.	38.	9.	0.	0.
							BG3-2	306.	48.	21.	13.	10.	7.
							BG3-4	111.	88.	50.	13.	13.	12.
3782	0.704	-0.033	50.800	7524.	31.49	0.200	BG1-1	511.	149.	38.	10.	0.	0.
							BG3-1	450.	176.	36.	9.	0.	0.
							BG3-2	342.	51.	19.	11.	15.	11.
							BG3-4	135.	92.	48.	11.	20.	8.
3783	0.706	-0.033	50.800	8045.	120.79	0.629	BG1-1	540.	141.	34.	14.	0.	0.
							BG3-1	458.	134.	36.	13.	0.	0.
							BG3-2	347.	35.	18.	13.	25.	5.
							BG3-4	133.	76.	38.	10.	27.	0.
3784	0.707	-0.032	50.800	8444.	203.56	0.917	BG1-1	573.	156.	24.	12.	0.	0.
							BG3-1	490.	134.	21.	20.	5.	0.
							BG3-2	350.	45.	0.	16.	22.	0.
							BG3-4	157.	68.	13.	88.	22.	0.
3791	0.701	-1.053	50.800	7282.	-5.16	-0.036	BG1-1	640.	137.	38.	16.	0.	0.
							BG3-1	562.	158.	33.	10.	0.	0.
							BG3-2	392.	54.	15.	18.	13.	0.
							BG3-4	157.	60.	49.	7.	17.	10.
3792	0.697	-1.051	50.800	7464.	26.74	0.173	BG1-1	754.	112.	37.	15.	0.	0.
							BG3-1	653.	144.	33.	10.	6.	0.
							BG3-2	475.	54.	13.	21.	7.	9.
							BG3-4	195.	64.	46.	0.	21.	7.
3793	0.703	-1.050	50.800	8001.	109.41	0.578	BG1-1	749.	73.	34.	12.	0.	0.
							BG3-1	636.	78.	35.	16.	0.	0.
							BG3-2	468.	24.	21.	13.	26.	0.
							BG3-4	184.	39.	38.	20.	26.	0.
3794	0.703	-1.051	50.800	8438.	200.62	0.902	BG1-1	813.	93.	18.	14.	0.	0.
							BG3-1	694.	69.	20.	18.	0.	0.
							BG3-2	490.	24.	8.	16.	23.	8.
							BG3-4	215.	35.	7.	47.	20.	0.
3795	0.698	-1.051	50.800	7526.	40.61	0.256	BG1-1	741.	108.	37.	15.	0.	0.
							BG3-1	641.	143.	31.	10.	6.	0.
							BG3-2	469.	54.	13.	22.	7.	12.
							BG3-4	191.	66.	46.	0.	22.	6.
3796	0.741	1.968	50.800	7705.	6.50	0.040	BG1-1	175.	249.	36.	9.	0.	0.
							BG3-1	174.	255.	29.	8.	0.	0.
							BG3-2	130.	81.	21.	0.	10.	5.
							BG3-4	69.	144.	33.	12.	13.	0.
3797	0.754	1.969	50.800	8024.	53.32	0.291	BG1-1	170.	236.	35.	0.	0.	0.
							BG3-1	166.	242.	29.	0.	0.	0.
							BG3-2	132.	81.	22.	0.	14.	6.
							BG3-4	58.	139.	43.	7.	15.	0.
3798	0.754	1.971	50.800	8449.	145.79	0.681	BG1-1	183.	208.	31.	12.	5.	0.
							BG3-1	173.	202.	23.	10.	0.	5.
							BG3-2	142.	75.	13.	10.	21.	0.
							BG3-4	56.	117.	32.	22.	19.	0.

SR-2C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE	P ORDER COMPONENTS μ STRAIN 1	2	3	4	5	6
3801	0.743	2.970	50.800	7715.	43.65	0.267	BG1-1	91.	323.	40.	8.	0.	0.
							BG3-1	82.	335.	38.	6.	6.	0.
							BG3-2	85.	103.	19.	10.	16.	14.
							BG3-4	20.	191.	40.	27.	16.	0.
3802	0.746	2.971	50.800	8009.	85.31	0.465	BG1-1	87.	304.	37.	7.	0.	0.
							BG3-1	75.	315.	32.	0.	7.	0.
							BG3-2	74.	100.	20.	14.	23.	11.
							BG3-4	17.	187.	38.	29.	20.	0.
3803	0.738	2.973	50.800	8381.	169.44	0.803	BG1-1	94.	274.	30.	8.	0.	0.
							BG3-1	82.	283.	25.	13.	0.	0.
							BG3-2	68.	94.	12.	8.	19.	0.
							BG3-4	29.	168.	25.	40.	19.	0.
3811	0.754	3.979	50.800	7829.	45.61	0.269	BG1-1	295.	342.	36.	7.	0.	0.
							BG3-1	246.	358.	32.	9.	6.	0.
							BG3-2	183.	98.	19.	12.	20.	8.
							BG3-4	45.	207.	28.	25.	15.	0.
3812	0.748	3.981	50.800	7977.	91.20	0.506	BG1-1	264.	326.	36.	8.	0.	0.
							BG3-1	225.	337.	36.	12.	6.	0.
							BG3-2	173.	97.	15.	6.	15.	8.
							BG3-4	34.	198.	27.	25.	16.	0.
3813	0.744	3.983	50.800	8385.	178.40	0.850	BG1-1	298.	295.	28.	10.	0.	0.
							BG3-1	246.	299.	26.	10.	0.	0.
							BG3-2	191.	95.	9.	11.	14.	0.
							BG3-4	27.	174.	18.	37.	12.	0.
3821	0.753	0.958	50.800	7850.	54.57	0.319	BG1-1	372.	185.	31.	11.	0.	0.
							BG3-1	343.	191.	27.	0.	0.	0.
							BG3-2	236.	51.	17.	6.	6.	0.
							BG3-4	113.	105.	36.	6.	9.	0.
3822	0.751	0.960	50.800	8021.	95.98	0.524	BG1-1	352.	193.	33.	11.	0.	0.
							BG3-1	322.	195.	27.	7.	0.	0.
							BG3-2	232.	57.	19.	12.	6.	0.
							BG3-4	96.	108.	38.	5.	9.	0.
3823	0.752	0.961	50.800	8373.	162.69	0.781	BG1-1	393.	181.	27.	12.	6.	0.
							BG3-1	349.	169.	18.	13.	0.	0.
							BG3-2	261.	62.	10.	11.	12.	0.
							BG3-4	96.	93.	25.	26.	7.	0.
3831	0.753	-0.041	50.800	7855.	58.17	0.338	BG1-1	495.	139.	25.	7.	0.	0.
							BG3-1	447.	141.	25.	7.	0.	0.
							BG3-2	297.	27.	10.	5.	0.	0.
							BG3-4	134.	74.	33.	8.	0.	0.
3832	0.752	-0.029	50.800	8021.	92.33	0.505	BG1-1	528.	140.	27.	10.	0.	0.
							BG3-1	470.	140.	25.	8.	0.	0.
							BG3-2	325.	31.	10.	6.	0.	0.
							BG3-4	134.	73.	34.	11.	9.	0.
3833	0.751	0.028	50.800	8431.	180.92	0.848	BG1-1	578.	120.	21.	12.	0.	0.
							BG3-1	505.	111.	13.	9.	0.	0.
							BG3-2	357.	38.	0.	6.	8.	0.
							BG3-4	135.	58.	20.	17.	7.	0.

2.76

SR-2C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE	P ORDER COMPONENTS μ STRAIN 1	2	3	4	5	6
3841	0.748	1.059	50.800	7825.	124.91	0.730	BG1-1	690.	85.	22.	0.	0.	0.
							BG3-1	612.	89.	23.	8.	7.	0.
							BG3-2	400.	16.	9.	8.	9.	6.
							BG3-4	178.	32.	22.	12.	12.	0.
3842	0.751	-1.058	50.800	7985.	123.32	0.680	BG1-1	716.	82.	24.	6.	0.	0.
							BG3-1	628.	88.	23.	7.	0.	0.
							BG3-2	419.	10.	11.	7.	9.	7.
							BG3-4	176.	36.	32.	16.	10.	0.
3843	0.753	-1.056	50.800	8427.	236.10	1.110	BG1-1	785.	75.	13.	11.	0.	0.
							BG3-1	685.	67.	12.	9.	0.	0.
							BG3-2	459.	16.	0.	0.	0.	9.
							BG3-4	184.	33.	18.	16.	14.	0.

2.76

*** END DATA ***

SR-3C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE		P ORDER COMPONENTS FOR STRAIN 1	2	3	4	5	6
3861	0.591	2.003	58.800	5000.	15.82	0.314	B64-1	-147	58.	151.	112.	27.	9.	0.
							B64-2		27.	139.	247.	90.	65.	17.
							B68-1		41.	136.	168.	30.	11.	0.
							B68-3		37.	69.	102.	56.	44.	39.
3862	0.590	1.995	58.800	5500.	42.33	0.632	B64-1	-149	60.	171.	92.	14.	0.	6.
							B64-2		34.	156.	165.	53.	50.	23.
							B68-1		46.	136.	109.	19.	0.	0.
							B68-3		46.	29.	97.	64.	71.	59.
3863	0.590	1.996	58.800	6000.	77.45	0.891	B64-1	-174	70.	299.	66.	17.	0.	0.
							B64-2		43.	279.	116.	43.	44.	12.
							B68-1		57.	237.	72.	19.	0.	0.
							B68-3		51.	29.	109.	77.	96.	60.
3864	0.590	1.995	58.800	6500.	119.91	1.084	B64-1	-162	65.	438.	76.	24.	0.	10.
							B64-2		40.	412.	100.	27.	51.	31.
							B68-1		54.	340.	69.	26.	0.	12.
							B68-3		32.	70.	128.	39.	117.	125.
3871	0.586	3.001	58.800	5000.	16.68	0.332	B64-1	76	45.	184.	120.	29.	10.	8.
							B64-2		49.	172.	259.	86.	76.	16.
							B68-1		59.	163.	186.	32.	17.	0.
							B68-3		63.	75.	106.	52.	54.	38.
3872	0.590	3.003	58.800	5500.	44.81	0.672	B64-1	79	47.	210.	99.	14.	0.	0.
							B64-2		49.	191.	186.	50.	56.	26.
							B68-1		61.	173.	119.	22.	0.	0.
							B68-3		60.	38.	115.	59.	86.	56.
3873	0.587	3.004	58.800	6000.	79.86	0.921	B64-1	104	62.	336.	66.	15.	5.	0.
							B64-2		63.	310.	120.	46.	40.	18.
							B68-1		75.	269.	72.	17.	0.	0.
							B68-3		70.	26.	114.	72.	90.	76.
3874	0.588	3.005	58.800	6500.	125.62	1.140	B64-1	124	74.	464.	75.	30.	19.	10.
							B64-2		77.	448.	105.	26.	65.	31.
							B68-1		85.	370.	74.	27.	7.	14.
							B68-3		77.	82.	142.	55.	141.	122.
3881	0.585	4.009	58.800	5000.	17.54	0.349	B64-1	97	153.	198.	138.	36.	21.	5.
							B64-2		121.	184.	285.	99.	92.	24.
							B68-1		161.	174.	200.	38.	24.	0.
							B68-3		131.	71.	103.	46.	68.	39.
3882	0.581	4.011	58.800	[illegible]	[illegible]	[illegible]	B64-1	88	137.	187.	178.	20.	9.	6.
							B64-2		105.	165.	411.	25.	16.	16.
							B68-1		139.	161.	293.	20.	9.	0.
							B68-3		99.	71.	66.	9.	16.	9.
3891	0.589	0.985	58.800	5000.	18.52	0.368	B64-1	-122	171.	126.	90.	21.	8.	0.
							B64-2		96.	118.	189.	79.	74.	21.
							B68-1		148.	110.	128.	27.	8.	0.
							B68-3		118.	52.	83.	55.	60.	42.
3892	0.591	0.987	58.800	5500.	43.41	0.650	B64-1	-125	175.	164.	82.	19.	7.	0.
							B64-2		95.	154.	146.	57.	55.	20.
							B68-1		148.	133.	96.	21.	0.	0.
							B68-3		114.	38.	86.	67.	81.	52.

SR-3C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE		P ORDER COMPONENTS μ STRAIN 1	2	3	4	5	6
3893	0.590	0.988	58.800	6000.	76.24	0.879	BG4-1	-136	191.	257.	59.	18.	5.	0.
							BG4-2		106.	226.	103.	47.	34.	14.
							BG8-1		167.	190.	67.	18.	0.	0.
							BG8-3		133.	28.	93.	80.	87.	61.
3894	0.593	0.989	58.800	6500.	120.51	1.094	BG4-1	-142	200.	377.	68.	22.	5.	13.
							BG4-2		118.	349.	106.	51.	52.	31.
							BG8-1		175.	282.	68.	31.	0.	9.
							BG8-3		115.	70.	115.	53.	104.	121.
3895	0.592	0.988	58.800	7000.	169.95	1.235	BG4-1	-131	185.	549.	49.	21.	18.	11.
							BG4-2		104.	630.	54.	84.	40.	21.
							BG8-1		159.	508.	52.	12.	9.	13.
							BG8-3		0.	223.	52.	119.	69.	145.
3901	0.592	-0.001	58.800	5000.	11.50	0.229	BG4-1	-106	256.	124.	85.	21.	7.	0.
							BG4-2		152.	117.	190.	88.	63.	22.
							BG8-1		229.	106.	127.	28.	7.	0.
							BG8-3		172.	44.	86.	61.	47.	41.
3902	0.594	0.000	58.800	5500.	35.87	0.538	BG4-1	-109	263.	130.	87.	19.	7.	0.
							BG4-2		151.	128.	152.	61.	70.	23.
							BG8-1		236.	103.	102.	21.	0.	0.
							BG8-3		185.	24.	86.	71.	95.	56.
3903	0.593	0.000	58.800	6000.	79.79	0.921	BG4-1	-116	279.	224.	61.	22.	11.	0.
							BG4-2		163.	196.	100.	46.	43.	19.
							BG8-1		250.	158.	66.	21.	6.	0.
							BG8-3		198.	30.	91.	84.	84.	68.
3904	0.592	0.000	58.800	6500.	121.60	1.103	BG4-1	-131	313.	347.	62.	23.	0.	9.
							BG4-2		194.	288.	93.	53.	43.	18.
							BG8-1		284.	227.	63.	29.	0.	0.
							BG8-3		177.	66.	89.	54.	73.	77.
3905	0.592	0.001	58.800	7000.	174.70	1.270	BG4-1	-140	336.	522.	46.	13.	9.	9.
							BG4-2		198.	582.	54.	90.	27.	12.
							BG8-1		300.	459.	51.	14.	5.	9.
							BG8-3		25.	207.	44.	110.	47.	116.
3911	0.596	-1.028	58.800	5000.	12.48	0.248	BG4-1	-113	389.	102.	94.	23.	13.	0.
							BG4-2		240.	95.	209.	103.	46.	24.
							BG8-1		353.	86.	143.	32.	13.	0.
							BG8-3		242.	28.	102.	73.	31.	41.
3912	0.596	-1.026	58.800	5500.	43.69	0.654	BG4-1	-113	388.	125.	87.	20.	0.	0.
							BG4-2		235.	122.	145.	60.	86.	29.
							BG8-1		355.	95.	103.	25.	7.	0.
							BG8-3		276.	15.	90.	73.	110.	70.
3913	0.597	-1.027	58.800	6000.	82.78	0.953	BG4-1	-121.3	419.	187.	63.	26.	9.	0.
							BG4-2		254.	177.	99.	45.	39.	23.
							BG8-1		383.	133.	70.	22.	0.	0.
							BG8-3		277.	29.	91.	76.	67.	51.
3914	0.596	-1.026	58.800	6500.	125.76	1.123	BG4-1	-127.	437.	309.	64.	25.	0.	8.
							BG4-2		274.	251.	89.	64.	25.	11.
							BG8-1		399.	189.	63.	30.	0.	0.
							BG8-3		207.	90.	87.	61.	32.	50.

SR-3C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE		P ORDER COMPONENTS µ STRAIN 1	2	3	4	5	6
3921	0.700	1.983	58.800	5500.	-3.68	-0.060	BG4-1	-123	117.	214.	124.	11.	0.	0.
							BG4-2		65.	194.	215.	53.	108.	25.
							BG8-1		99.	173.	156.	18.	11.	0.
							BG8-3		83.	44.	105.	55.	101.	33.
3922	0.697	1.974	58.800	6000.	26.10	0.326	BG4-1	-124	119.	319.	70.	18.	8.	0.
							BG4-2		67.	268.	115.	42.	51.	21.
							BG8-1		98.	241.	76.	20.	0.	0.
							BG8-3		75.	47.	93.	67.	90.	71.
3923	0.702	1.976	58.800	6500.	58.99	0.581	BG4-1	-121	117.	480.	62.	29.	0.	6.
							BG4-2		66.	397.	95.	26.	37.	31.
							BG8-1		98.	342.	64.	28.	0.	7.
							BG8-3		73.	35.	93.	25.	92.	96.
3924	0.697	1.977	58.800	6800.	84.20	0.723	BG4-1	-122	116.	593.	59.	33.	27.	10.
							BG4-2		64.	573.	86.	82.	50.	31.
							BG8-1		98.	473.	60.	22.	13.	10.
							BG8-3		69.	127.	104.	110.	94.	140.
3931	0.692	2.984	58.800	5500.	-7.13	-0.116	BG4-1	150	48.	257.	133.	13.	0.	0.
							BG4-2		62.	236.	229.	42.	92.	27.
							BG8-1		60.	213.	163.	18.	10.	0.
							BG8-3		67.	53.	106.	37.	96.	33.
3932	0.692	2.986	58.800	6000.	27.31	0.341	BG4-1	162	52.	386.	72.	19.	9.	0.
							BG4-2		60.	342.	129.	29.	50.	10.
							BG8-1		66.	310.	83.	20.	0.	0.
							BG8-3		77.	58.	115.	56.	83.	48.
3933	0.697	2.986	58.800	6500.	59.88	0.590	BG4-1	173	56.	533.	73.	36.	15.	6.
							BG4-2		59.	477.	100.	26.	48.	30.
							BG8-1		65.	407.	69.	21.	0.	7.
							BG8-3		65.	48.	119.	63.	93.	119.
3941	0.693	4.016	52.500 (8.8)	5400.	-5.44	-0.094	BG4-1	97	157.	325.	132.	25.	0.	8.
							BG4-2		135.	299.	224.	43.	94.	21.
							BG8-1		161.	266.	158.	27.	7.	0.
							BG8-3		110.	42.	97.	24.	85.	24.
3942	0.701	4.017	52.500 (9.8)	6000.	31.22	0.394	BG4-1	106	174.	428.	88.	23.	10.	0.
							BG4-2		138.	374.	144.	42.	58.	22.
							BG8-1		182.	338.	99.	23.	0.	0.
							BG8-3		154.	53.	122.	63.	92.	65.
3951	0.697	0.985	58.800	5600.	-7.04	0.108	BG4-1	-122	270.	213.	95.	18.	0.	0.
							BG4-2		162.	185.	165.	52.	72.	12.
							BG8-1		239.	169.	117.	17.	5.	0.
							BG8-3		150.	39.	90.	67.	77.	26.
3952	0.700	0.986	58.800	6000.	25.73	0.322	BG4-1	-118	263.	304.	67.	18.	6.	0.
							BG4-2		147.	256.	113.	36.	57.	15.
							BG8-1		232.	226.	75.	19.	0.	0.
							BG8-3		181.	45.	85.	56.	84.	53.
3953	0.699	0.987	58.800	6500.	65.87	0.649	BG4-1	-1.01	236.	486.	64.	27.	0.	7.
							BG4-2		132.	371.	92.	41.	35.	26.
							BG8-1		207.	310.	64.	29.	0.	0.
							BG8-3		144.	42.	87.	24.	86.	102.

SR-3C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE		P ORDER COMPONENTS µ STRAIN 1	2	3	4	5	6
3954	0.698	0.986	58.800	6800.	92.37	0.792	BG4-1	-112	248.	572.	53.	26.	13.	8.
							BG4-2		139.	521.	86.	127.	49.	31.
							BG8-1		221.	426.	59.	31.	7.	13.
							BG8-3		162.	116.	95.	147.	114.	128.
3961	0.703	-0.036	58.800	5500.	-6.08	-0.099	BG4-1	-109	385.	163.	100.	13.	0.	6.
							BG4-2		236.	144.	170.	55.	104.	32.
							BG8-1		348.	122.	125.	24.	12.	0.
							BG8-3		201.	6.	100.	64.	106.	50.
3962	0.701	-0.033	58.800	6000.	27.41	0.344	BG4-1	-117	413.	276.	65.	26.	0.	0.
							BG4-2		246.	240.	105.	35.	61.	18.
							BG8-1		375.	203.	76.	17.	0.	0.
							BG8-3		264.	26.	82.	56.	89.	47.
3963	0.699	-0.033	58.800	6500.	66.02	0.651	BG4-1	-109	383.	412.	64.	26.	0.	0.
							BG4-2		223.	328.	82.	60.	28.	26.
							BG8-1		347.	266.	62.	31.	0.	0.
							BG8-3		248.	50.	72.	50.	74.	98.
3971	0.799	1.974	58.800	6250.	-5.96	-0.072	BG4-1	-124	223.	449.	84.	17.	0.	0.
							BG4-2		142.	347.	100.	10.	36.	31.
							BG8-1		192.	309.	92.	17.	0.	0.
							BG8-3		127.	42.	75.	37.	59.	54.
3981	0.792	2.986	58.800	6300.	-8.10	-0.094	BG4-1	-346	95.	586.	90.	19.	0.	0.
							BG4-2		96.	449.	102.	11.	41.	40.
							BG8-1		91.	402.	97.	18.	0.	0.
							BG8-3		89.	48.	79.	33.	64.	69.
3991	0.785	3.997	58.800	6200.	7.66	-0.093	BG4-1	92	112.	622.	86.	22.	11.	10.
							BG4-2		147.	479.	115.	23.	45.	33.
							BG8-1		137.	428.	101.	24.	0.	0.
							BG8-3		78.	36.	88.	32.	65.	58.
4001	0.591	2.003	60.700	4125.	-1.92	-0.068	BG4-1	-147	58.	124.	403.	30.	14.	20.
							BG4-2		38.	116.	354.	49.	7.	59.
							BG8-1		49.	111.	266.	34.	12.	13.
							BG8-3		41.	67.	31.	36.	16.	35.
4002	0.590	1.995	60.700	4570.	18.40	0.479	BG4-1	-112	45.	153.	154.	23.	0.	6.
							BG4-2		26.	103.	359.	35.	22.	18.
							BG8-1		37.	107.	250.	15.	7.	0.
							BG8-3		33.	75.	91.	33.	32.	34.
4003	0.590	1.996	60.700	5045.	43.74	0.846	BG4-1	-160	64.	150.	120.	28.	0.	6.
							BG4-2		35.	141.	251.	100.	73.	26.
							BG8-1		49.	129.	168.	33.	6.	0.
							BG8-3		51.	58.	113.	73.	71.	48.
4004	0.590	1.996	60.700	5500.	74.85	1.117	BG4-1	155	62.	196.	110.	16.	0.	0.
							BG4-2		39.	184.	204.	62.	65.	25.
							BG8-1		50.	158.	133.	25.	6.	0.
							BG8-3		49.	30.	137.	74.	97.	62.
4005	0.590	1.997	60.700	6050.	119.84	1.346	BG4-1	-150	60.	344.	78.	23.	6.	6.
							BG4-2		44.	327.	127.	38.	40.	25.
							BG8-1		49.	265.	84.	22.	0.	7.
							BG8-3		14.	46.	113.	64.	91.	74.

SR-3C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE		P ORDER COMPONENTS μ STRAIN 1	2	3	4	5	6
4006	0.594	1.995	60.700	6550.	169.78	1.505	BG4-1	-160	65.	488.	76.	26.	5.	9.
							BG4-2		44.	464.	107.	44.	46.	25.
							BG8-1		52.	372.	79.	28.	0.	10.
							BG8-3		37.	135.	82.	48.	100.	104.
4007	0.593	1.996	60.700	6920.	220.15	1.655	BG4-1	-159	64.	626.	60.	30.	15.	13.
							BG4-2		35.	657.	85.	79.	35.	27.
							BG8-1		48.	529.	62.	15.	9.	14.
							BG8-3		43.	234.	66.	111.	70.	145.
4011	0.586	3.011	60.700	4115.	-0.39	-0.014	BG4-1	80	48.	158.	470.	32.	14.	22.
							BG4-2		50.	123.	406.	60.	0.	72.
							BG8-1		57.	123.	305.	42.	13.	17.
							BG8-3		59.	84.	21.	36.	13.	47.
4012	0.590	3.013	60.700	4520.	16.74	0.452	BG4-1	86	52.	154.	215.	14.	14.	8.
							BG4-2		52.	137.	436.	21.	15.	36.
							BG8-1		63.	134.	309.	13.	13.	0.
							BG8-3		67.	80.	90.	21.	7.	42.
4013	0.587	3.014	60.700	5000.	41.97	0.836	BG4-1	81	49.	191.	124.	28.	7.	9.
							BG4-2		49.	179.	269.	102.	64.	20.
							BG8-1		61.	167.	180.	35.	13.	0.
							BG8-3		60.	74.	125.	68.	59.	43.
4014	0.588	3.015	60.700	5500.	77.01	1.153	BG4-1	104	63.	265.	110.	19.	0.	0.
							BG4-2		64.	247.	202.	59.	65.	22.
							BG8-1		77.	216.	131.	23.	0.	0.
							BG8-3		72.	49.	143.	69.	102.	55.
4015	0.587	3.025	60.700	6000.	114.74	1.323	BG4-1	120.3	74.	374.	86.	21.	0.	0.
							BG4-2		78.	350.	152.	55.	43.	19.
							BG8-1		87.	293.	95.	20.	0.	0.
							BG8-3		79.	34.	142.	89.	108.	79.
4016	0.587	3.025	60.700	6525.	169.41	1.517	BG4-1	147	90.	547.	85.	29.	14.	9.
							BG4-2		98.	520.	119.	33.	51.	22.
							BG8-1		101.	421.	84.	29.	0.	13.
							BG8-3		42.	140.	109.	25.	118.	103.
4021	0.585	4.009	60.700	4105.	-1.02	-0.037	BG4-1	91.	144.	176.	492.	30.	14.	18.
							BG4-2		114.	133.	425.	60.	6.	71.
							BG8-1		149.	136.	319.	41.	12.	16.
							BG8-3		111.	81.	13.	30.	14.	49.
4022	0.581	4.011	60.700	[illegible]	17.55	0.512	BG4-1	93	145.	183.	246.	13.	9.	0.
							BG4-2		112.	167.	498.	31.	17.	31.
							BG8-1		150.	160.	354.	14.	12.	0.
							BG8-3		128.	82.	101.	11.	5.	34.
4023	0.581	4.012	60.700	5040.	45.25	0.877	BG4-1	95	149.	218.	134.	30.	14.	5.
							BG4-2		111.	205.	264.	93.	91.	24.
							BG8-1		156.	189.	192.	35.	18.	0.
							BG8-3		136.	79.	143.	63.	78.	40.
4024	0.586	[illegible]	60.700	5500.	28.85	1.177	BG4-1	110	174.	251.	115.	21.	0.	0.
							BG4-2		152.	229.	212.	62.	73.	22.
							BG8-1		182.	205.	139.	25.	0.	0.
							BG8-3		162.	30.	147.	68.	109.	54.

SR 3C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE	P ORDER COMPONENTS μ STRAIN 1	2	3	4	5	6	
4025	0.589	4.014	60.700	6010.	120.79	1.387	BG4-1	213.	406.	87.	23.	0.	0.	134
							BG4-2	167.	371.	152.	57.	43.	18.	
							BG8-1	217.	316.	95.	18.	6.	0.	
							BG8-3	157.	40.	140.	95.	102.	84.	
4026	0.587	4.012	60.700	6525.	171.71	1.540	BG4-1	225.	644.	91.	30.	12.	8.	142
							BG4-2	184.	597.	132.	54.	62.	25.	
							BG8-1	227.	485.	87.	37.	0.	12.	
							BG8-3	56.	138.	137.	30.	142.	130.	
4031	0.589	0.985	60.700	4150.	0.16	0.005	BG4-1	170.	104.	393.	24.	16.	20.	-122
							BG4-2	107.	80.	362.	46.	7.	58.	
							BG8-1	153.	78.	271.	30.	13.	14.	
							BG8-3	95.	34.	41.	39.	13.	42.	
4032	0.591	0.987	60.700	4515.	15.71	0.425	BG4-1	172.	118.	193.	9.	11.	7.	-123
							BG4-2	98.	104.	386.	23.	19.	34.	
							BG8-1	152.	101.	269.	8.	10.	0.	
							BG8-3	124.	62.	80.	23.	13.	44.	
4033	0.590	0.988	60.700	5055.	42.25	0.814	BG4-1	172.	127.	104.	26.	0.	0.	-123
							BG4-2	95.	125.	223.	101.	82.	26.	
							BG8-1	147.	110.	148.	32.	9.	0.	
							BG8-3	119.	51.	107.	78.	76.	47.	
4034	0.593	0.989	60.700	5500.	71.97	1.078	BG4-1	183.	163.	110.	22.	8.	0.	-130
							BG4-2	104.	152.	196.	72.	61.	22.	
							BG8-1	160.	126.	131.	26.	0.	0.	
							BG8-3	133.	24.	127.	89.	87.	53.	
4035	0.592	0.988	60.700	6000.	114.02	1.315	BG4-1	206.	258.	73.	22.	6.	0.	-146
							BG4-2	123.	240.	122.	42.	36.	16.	
							BG8-1	180.	193.	81.	24.	0.	0.	
							BG8-3	110.	40.	97.	54.	75.	51.	
4036	0.593	0.987	60.700	6500.	162.66	1.476	BG4-1	199.	441.	68.	21.	0.	9.	-141
							BG4-2	126.	390.	93.	59.	36.	22.	
							BG8-1	174.	310.	71.	30.	0.	7.	
							BG8-3	14.	90.	61.	69.	77.	90.	
4037	0.593	0.987	60.700	7000.	219.50	1.595	BG4-1	188.	631.	52.	22.	16.	12.	-133
							BG4-2	90.	682.	66.	71.	44.	26.	
							BG8-1	156.	542.	53.	12.	9.	14.	
							BG8-3	51.	245.	49.	103.	70.	146.	
4041	0.592	-0.021	60.700	4180.	0.00	0.000	BG4-1	289.	97.	390.	21.	14.	12.	-120
							BG4-2	184.	88.	366.	38.	13.	63.	
							BG8-1	264.	83.	267.	23.	13.	0.	
							BG8-3	158.	12.	46.	37.	10.	41.	
4042	0.594	-0.020	60.700	4510.	14.62	0.398	BG4-1	289.	104.	180.	7.	9.	6.	-119
							BG4-2	172.	93.	367.	28.	26.	30.	
							BG8-1	259.	85.	256.	6.	10.	0.	
							BG8-3	195.	41.	79.	29.	19.	43.	
4043	0.593	-0.020	60.700	5015.	43.25	0.855	BG4-1	256.	128.	94.	24.	0.	0.	-106
							BG4-2	148.	131.	201.	114.	69.	28.	
							BG8-1	230.	112.	134.	35.	11.	0.	
							BG8-3	187.	58.	97.	88.	57.	52.	

SR-3C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE		P ORDER COMPONENTS μ STRAIN 1	2	3	4	5	6
4044	0.592	-0.020	60.700	5550.	78.45	1.143	BG4-1	-133	320.	170.	101.	26.	8.	0.
							BG4-2		187.	164.	175.	70.	61.	18.
							BG8-1		286.	131.	121.	25.	0.	0.
							BG8-3		226.	35.	113.	86.	83.	44.
4045	0.592	-0.019	60.700	6000.	118.10	1.364	BG4-1	-147	354.	241.	74.	28.	6.	0.
							BG4-2		221.	224.	118.	35.	42.	6.
							BG8-1		317.	175.	83.	23.	0.	0.
							BG8-3		169.	59.	83.	29.	58.	30.
4046	0.595	-0.020	60.700	6500.	167.99	1.529	BG4-1	-137	332.	391.	63.	21.	0.	8.
							BG4-2		205.	340.	85.	65.	36.	12.
							BG8-1		295.	259.	65.	27.	0.	0.
							BG8-3		34.	86.	46.	80.	65.	70.
4047	0.596	-0.021	60.700	6930.	211.63	1.589	BG4-1	-152	370.	547.	50.	9.	8.	9.
							BG4-2		222.	517.	56.	98.	25.	14.
							BG8-1		330.	396.	52.	19.	0.	9.
							BG8-3		86.	170.	25.	114.	41.	80.
4051	0.596	-1.028	60.700	4190.	-1.14	-0.039	BG4-1	-115	397.	88.	408.	18.	16.	14.
							BG4-2		251.	72.	407.	39.	22.	76.
							BG8-1		363.	64.	296.	23.	15.	7.
							BG8-3		204.	28.	51.	36.	17.	50.
4052	0.596	-1.026	60.700	4550.	16.90	0.447	BG4-1	-107	370.	105.	185.	7.	8.	0.
							BG4-2		230.	92.	396.	48.	30.	22.
							BG8-1		336.	84.	273.	18.	8.	0.
							BG8-3		237.	29.	102.	49.	30.	39.
4053	0.597	-1.027	60.700	5000.	43.12	0.858	BG4-1	-110	379.	126.	95.	23.	0.	0.
							BG4-2		226.	125.	214.	108.	54.	28.
							BG8-1		344.	107.	144.	34.	11.	0.
							BG8-3		272.	47.	108.	83.	34.	47.
4054	0.596	-1.026	60.700	5550.	81.81	1.192	BG4-1	-131	451.	165.	95.	23.	6.	0.
							BG4-2		279.	170.	159.	71.	68.	26.
							BG8-1		411.	128.	112.	29.	0.	0.
							BG8-3		288.	36.	105.	77.	80.	35.
4055	0.598	-1.028	60.700	6015.	118.86	1.361	BG4-1	-141	490.	218.	71.	28.	6.	0.
							BG4-2		306.	215.	109.	30.	38.	9.
							BG8-1		443.	157.	78.	20.	0.	0.
							BG8-3		198.	95.	79.	19.	37.	29.
4056	0.597	-1.029	60.700	6580.	158.36	1.384	BG4-1	-149	517.	404.	61.	22.	0.	6.
							BG4-2		311.	345.	79.	83.	41.	9.
							BG8-1		464.	259.	63.	27.	0.	0.
							BG8-3		62.	125.	36.	101.	56.	63.
4061	0.700	1.983	60.700	4900.	-2.53	0.058	BG4-1	-130	124.	192.	154.	36.	20.	0.
							BG4-2		67.	173.	358.	144.	63.	18.
							BG8-1		104.	164.	255.	43.	17.	0.
							BG8-3		93.	81.	121.	78.	44.	29.
4062	0.697	1.974	60.700	5500.	32.87	0.533	BG4-1	-122	117.	228.	124.	19.	0.	0.
							BG4-2		66.	199.	221.	62.	82.	31.
							BG8-1		98.	183.	150.	28.	8.	5.
							BG8-3		81.	51.	127.	67.	101.	65.

SR-3C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE		P ORDER COMPONENTS µ STRAIN 1	2	3	4	5	6
4063	0.702	1.976	60.700	6000.	69.91	0.875	BG64-1	-136	131.	380.	80.	24.	0.	0.
							BG64-2		74.	319.	137.	44.	51.	24.
							BG8-1		111.	278.	87.	24.	0.	0.
							BG8-3		93.	42.	116.	80.	108.	79.
4064	0.697	1.977	60.700	6500.	113.70	1.117	BG64-1	-127	121.	578.	76.	33.	0.	9.
							BG64-2		73.	507.	100.	65.	44.	36.
							BG8-1		106.	418.	76.	37.	0.	11.
							BG8-3		78.	79.	125.	53.	112.	124.
4065	0.700	1.975	60.700	6800.	143.74	1.235	BG64-1	-133	128.	722.	72.	33.	15.	14.
							BG64-2		75.	684.	97.	117.	39.	37.
							BG8-1		109.	553.	80.	30.	12.	15.
							BG8-3		71.	205.	124.	164.	102.	184.
4071	0.692	2.994	60.700	4930.	-2.19	-0.049	BG64-1	-151	50.	226.	165.	39.	19.	0.
							BG64-2		63.	208.	370.	145.	78.	17.
							BG8-1		60.	194.	263.	46.	22.	0.
							BG8-3		71.	88.	115.	59.	64.	21.
4072	0.692	2.996	60.700	5500.	33.88	0.550	BG64-1	-156	52.	284.	117.	22.	0.	0.
							BG64-2		61.	253.	208.	56.	83.	28.
							BG8-1		66.	234.	142.	28.	7.	0.
							BG8-3		71.	74.	125.	66.	107.	53.
4073	0.697	2.996	60.700	6000.	68.88	0.863	BG64-1	-161	54.	418.	79.	22.	7.	0.
							BG64-2		63.	369.	144.	44.	54.	24.
							BG8-1		65.	323.	88.	21.	0.	0.
							BG8-3		63.	43.	133.	80.	107.	82.
4074	0.702	2.997	60.700	6500.	112.02	1.111	BG64-1	-190	65.	633.	89.	32.	9.	9.
							BG64-2		71.	549.	111.	37.	59.	33.
							BG8-1		75.	462.	86.	31.	0.	13.
							BG8-3		72.	83.	152.	40.	130.	124.
4081	0.693	4.016	60.700	4870.	-1.92	0.045	BG64-1	110	178.	251.	179.	41.	19.	0.
							BG64-2		148.	229.	407.	134.	66.	11.
							BG8-1		179.	212.	286.	44.	18.	0.
							BG8-3		123.	79.	114.	34.	62.	9.
4082	0.701	4.017	60.700	5500.	34.89	0.571	BG64-1	113	185.	363.	141.	28.	0.	0.
							BG64-2		150.	330.	237.	57.	93.	29.
							BG8-1		193.	299.	167.	31.	5.	0.
							BG8-3		163.	83.	144.	58.	112.	51.
4083	0.700	4.018	60.700	6050.	72.40	0.890	BG64-1	112	184.	447.	90.	25.	10.	0.
							BG64-2		134.	390.	164.	50.	54.	27.
							BG8-1		188.	343.	104.	21.	6.	0.
							BG8-3		164.	41.	166.	89.	108.	89.
4084	0.702	4.018	60.700	6500.	117.83	1.170	BG64-1	130	214.	643.	92.	29.	16.	0.
							BG64-2		163.	537.	116.	37.	73.	28.
							BG8-1		218.	458.	89.	33.	5.	7.
							BG8-3		189.	88.	164.	33.	149.	121.
4091	0.697	0.983	60.700	4900.	-2.11	-0.048	BG64-1	-117	259.	168.	149.	33.	17.	0.
							BG64-2		156.	149.	351.	144.	50.	19.
							BG8-1		228.	141.	245.	41.	15.	0.
							BG8-3		153.	59.	127.	93.	35.	34.

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE		P ORDER COMPONENTS μ STRAIN 1	2	3	4	5	6
4092	0.700	0.986	60.700	5500.	34.10	0.555	BG4-1	−118	261.	208.	102.	20.	5.	0.
							BG4-2		146.	191.	180.	62.	83.	24.
							BG8-1		230.	170.	125.	26.	5.	0.
							BG8-3		190.	57.	102.	66.	102.	56.
4093	0.699	0.987	60.700	6000.	71.18	0.892	BG4-1	−122	271.	315.	68.	25.	9.	0.
							BG4-2		152.	271.	114.	36.	58.	27.
							BG8-1		239.	227.	75.	25.	0.	0.
							BG8-3		177.	36.	96.	74.	107.	85.
4094	0.698	0.986	60.700	6500.	116.16	1.142	BG4-1	−118	260.	523.	70.	33.	0.	12.
							BG4-2		150.	430.	98.	67.	44.	35.
							BG8-1		233.	347.	72.	41.	0.	7.
							BG8-3		173.	75.	104.	52.	103.	132.
4101	0.703	−0.036	60.700	4900.	−2.08	−0.048	BG4-1	−107	379.	151.	143.	28.	10.	0.
							BG4-2		233.	132.	330.	134.	32.	20.
							BG8-1		341.	125.	232.	36.	9.	0.
							BG8-3		207.	34.	119.	87.	39.	34.
4102	0.701	−0.033	60.700	5500.	35.90	0.585	BG4-1	−119	419.	214.	99.	20.	0.	0.
							BG4-2		248.	201.	171.	61.	105.	34.
							BG8-1		377.	171.	122.	28.	9.	0.
							BG8-3		294.	46.	109.	69.	124.	72.
4103	0.699	−0.033	60.700	6050.	77.63	0.949	BG4-1	−107	377.	297.	82.	34.	9.	0.
							BG4-2		218.	271.	114.	34.	67.	35.
							BG8-1		342.	215.	88.	30.	0.	0.
							BG8-3		259.	40.	99.	79.	114.	87.
4104	0.700	−0.032	60.700	6500.	119.15	1.177	BG4-1	−114	400.	433.	69.	35.	0.	11.
							BG4-2		236.	344.	91.	89.	28.	22.
							BG8-1		359.	267.	70.	43.	0.	0.
							BG8-3		258.	78.	88.	80.	64.	92.
4111	0.703	−0.750	60.700	4925.	−4.47	−0.101	BG4-1	−125	557.	153.	140.	27.	12.	6.
							BG4-2		348.	125.	301.	135.	28.	34.
							BG8-1		508.	116.	216.	39.	6.	0.
							BG8-3		279.	48.	116.	101.	29.	40.
4112	0.703	−0.799	60.700	5500.	33.03	0.537	BG4-1	−126	568.	203.	97.	20.	0.	0.
							BG4-2		350.	197.	161.	65.	141.	42.
							BG8-1		518.	160.	120.	28.	14.	6.
							BG8-3		365.	27.	110.	75.	153.	85.
4131	0.796	2.000	60.700	5560.	−4.12	−0.070	BG4-1	−130	229.	331.	139.	27.	0.	10.
							BG4-2		150.	285.	215.	64.	133.	21.
							BG8-1		202.	255.	172.	28.	10.	0.
							BG8-3		139.	68.	104.	75.	123.	30.
4132	0.787	2.000	60.700	6000.	26.47	0.358	BG4-1	−127	220.	403.	78.	21.	8.	0.
							BG4-2		137.	338.	109.	27.	59.	38.
							BG8-1		195.	300.	87.	26.	0.	0.
							BG8-3		157.	60.	82.	51.	80.	74.
4133	0.799	2.000	60.700	6500.	68.66	0.738	BG4-1	−117	206.	647.	74.	24.	0.	10.
							BG4-2		127.	487.	95.	60.	45.	30.
							BG8-1		182.	415.	75.	29.	0.	0.
							BG8-3		139.	81.	66.	61.	92.	103.

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SR-3C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE		P ORDER COMPONENTS με STRAIN 1	2	3	4	5	6
4141	0.801	3.000	60.700	5500.	-3.22	-0.056	BG4-1	-346	89.	351.	136.	25.	0.	7.
							BG4-2		88.	315.	210.	64.	126.	22.
							BG8-1		87.	282.	166.	29.	10.	6.
							BG8-3		97.	74.	100.	68.	120.	45.
4142	0.794	3.000	60.700	6000.	26.47	0.356	BG4-1	-345	88.	455.	84.	24.	6.	0.
							BG4-2		92.	382.	123.	28.	59.	29.
							BG8-1		88.	347.	96.	27.	0.	0.
							BG8-3		78.	70.	102.	58.	97.	72.
4143	0.792	3.000	60.700	6500.	66.43	0.704	BG4-1	-335	85.	741.	79.	36.	19.	8.
							BG4-2		87.	580.	98.	51.	53.	31.
							BG8-1		81.	503.	77.	29.	10.	7.
							BG8-3		55.	81.	88.	44.	91.	104.
4151	0.785	4.000	60.700	5500.	-3.51	-0.061	BG4-1	131	161.	402.	165.	26.	6.	6.
							BG4-2		165.	355.	259.	57.	127.	20.
							BG8-1		163.	320.	198.	30.	11.	6.
							BG8-3		104.	69.	116.	45.	115.	35.
4152	0.800	4.000	60.700	6000.	29.12	0.397	BG4-1	124	155.	483.	102.	24.	10.	9.
							BG4-2		148.	414.	147.	33.	61.	18.
							BG8-1		161.	367.	117.	29.	0.	0.
							BG8-3		124.	55.	122.	57.	97.	56.
4153	0.801	4.000	60.700	6500.	72.13	0.774	BG4-1	119	150.	879.	84.	39.	26.	14.
							BG4-2		156.	705.	110.	57.	73.	24.
							BG8-1		171.	619.	89.	34.	14.	0.
							BG8-3		112.	90.	117.	40.	114.	124.
4154	0.796	1.000	60.700	5630.	-3.20	-0.053	BG4-1	-114	371.	301.	133.	22.	0.	7.
							BG4-2		249.	266.	196.	51.	127.	29.
							BG8-1		334.	235.	161.	27.	11.	7.
							BG8-3		190.	38.	98.	68.	122.	39.
4155	0.800	1.000	60.700	6000.	22.97	0.317	BG4-1	-118	388.	359.	80.	26.	6.	0.
							BG4-2		243.	305.	109.	31.	60.	42.
							BG8-1		349.	259.	91.	22.	0.	0.
							BG8-3		246.	38.	69.	46.	73.	75.
4156	0.804	1.000	60.700	6500.	64.89	0.700	BG4-1	-119	394.	571.	70.	23.	6.	0.
							BG4-2		240.	409.	90.	77.	50.	23.
							BG8-1		355.	348.	69.	30.	8.	0.
							BG8-3		254.	90.	68.	87.	99.	106.
4161	0.799	0.000	60.700	5600.	-2.79	-0.047	BG4-1	-108	516.	255.	118.	18.	7.	9.
							BG4-2		346.	232.	175.	52.	140.	53.
							BG8-1		469.	197.	148.	30.	16.	6.
							BG8-3		247.	13.	90.	61.	125.	58.
4162	0.849	2.000	60.700	5860.	-3.70	-0.057	BG4-1	-118	288.	383.	113.	33.	0.	7.
							BG4-2		201.	307.	151.	54.	82.	20.
							BG8-1		258.	275.	132.	22.	0.	0.
							BG8-3		167.	55.	82.	73.	81.	47.
4191	0.591	2.003	62.700	3755.	-3.22	-0.151	BG4-1	-71	28.	109.	228.	49.	13.	13.
							BG4-2		14.	109.	220.	102.	16.	14.
							BG8-1		10.	105.	171.	69.	15.	8.
							BG8-3		0.	68.	43.	32.	20.	8.

SR-3C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE		P ORDER COMPONENTS μ STRAIN 1	2	3	4	5	6
4192	0.590	1.995	62.700	4000.	6.05	0.235	BG4-1	-162	65.	103.	379.	36.	14.	25.
							BG4-2		36.	98.	345.	69.	12.	36.
							BG8-1		53.	97.	261.	46.	15.	10.
							BG8-3		41.	70.	30.	41.	21.	21.
4193	0.590	1.996	62.700	4500.	31.04	0.846	BG4-1	-130	52.	137.	205.	12.	15.	14.
							BG4-2		29.	95.	386.	28.	49.	46.
							BG8-1		42.	95.	266.	13.	11.	7.
							BG8-3		43.	62.	96.	25.	46.	55.
4194	0.590	1.996	62.700	5000.	61.49	1.222	BG4-1	-170	68.	155.	139.	33.	0.	0.
							BG4-2		43.	152.	291.	118.	74.	31.
							BG8-1		54.	135.	194.	39.	8.	0.
							BG8-3		56.	56.	143.	85.	73.	51.
4195	0.590	1.997	62.700	5530.	99.63	1.465	BG4-1	-183	73.	256.	126.	23.	5.	13.
							BG4-2		48.	254.	219.	74.	76.	17.
							BG8-1		60.	212.	145.	27.	8.	0.
							BG8-3		30.	36.	146.	81.	110.	62.
4196	0.594	1.995	62.700	6050.	147.76	1.663	BG4-1	-153	62.	355.	85.	22.	0.	7.
							BG4-2		37.	348.	128.	46.	35.	27.
							BG8-1		50.	280.	89.	22.	0.	8.
							BG8-3		28.	81.	81.	56.	83.	75.
4197	0.593	1.996	62.700	6565.	203.00	1.787	BG4-1	-164	66.	533.	74.	29.	10.	0.
							BG4-2		40.	507.	98.	58.	41.	17.
							BG8-1		53.	407.	71.	29.	0.	7.
							BG8-3		44.	161.	68.	59.	79.	68.
4198	0.593	1.996	62.700	7000.	256.77	1.865	BG4-1	-74	30.	777.	53.	30.	7.	22.
							BG4-2		0.	880.	83.	72.	32.	43.
							BG8-1		16.	700.	54.	9.	12.	21.
							BG8-3		16.	326.	53.	106.	52.	206.
4201	0.586	3.011	62.700	3765.	-0.91	-0.042	BG4-1	23.	14.	130.	254.	53.	15.	14.
							BG4-2		20.	117.	234.	103.	16.	12.
							BG8-1		20.	117.	180.	69.	15.	8.
							BG8-3		17.	78.	31.	31.	14.	0.
4202	0.590	3.013	62.700	4000.	7.81	0.305	BG4-1	84	51.	132.	439.	39.	14.	28.
							BG4-2		52.	105.	363.	75.	6.	47.
							BG8-1		60.	108.	271.	50.	15.	13.
							BG8-3		68.	84.	24.	46.	20.	25.
4203	0.587	3.014	62.700	4500.	31.72	0.867	BG4-1	-79	48.	144.	215.	15.	12.	10.
							BG4-2		48.	128.	441.	25.	21.	27.
							BG8-1		59.	125.	305.	14.	12.	0.
							BG8-3		62.	73.	110.	25.	15.	43.
4204	0.588	3.015	62.700	5100.	66.59	1.251	BG4-1	94	57.	208.	136.	29.	8.	7.
							BG4-2		58.	199.	280.	88.	80.	40.
							BG8-1		71.	177.	187.	34.	16.	0.
							BG8-3		67.	67.	148.	62.	87.	67.
4205	0.587	3.025	62.700	5500.	97.43	1.458	BG4-1	104	64.	227.	126.	24.	5.	0.
							BG4-2		68.	216.	230.	70.	76.	20.
							BG8-1		77.	180.	149.	27.	6.	0.
							BG8-3		70.	19.	157.	79.	110.	56.

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NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE		P ORDER COMPONENTS μ STRAIN 1	2	3	4	5	6
4206	0.587	3.025	62.700	6000.	146.28	1.685	BG4-1	137	84.	401.	74.	22.	0.	7.
							BG4-2		89.	377.	157.	56.	42.	22.
							BG8-1		95.	308.	101.	19.	0.	7.
							BG8-3		44.	78.	117.	87.	110.	87.
4207	0.589	3.025	62.700	6530.	201.60	1.804	BG4-1	158	98.	568.	76.	26.	16.	0.
							BG4-2		93.	515.	116.	50.	51.	19.
							BG8-1		108.	414.	76.	33.	0.	8.
							BG8-3		15.	158.	31.	42.	103.	91.
4211	0.585	3.999	62.700	3740.	-0.64	-0.031	BG4-1	78	122.	158.	302.	64.	17.	15.
							BG4-2		93.	137.	272.	125.	17.	12.
							BG8-1		123.	140.	210.	81.	18.	8.
							BG8-3		71.	77.	22.	30.	11.	13.
4212	0.581	4.001	62.700	4060.	8.94	0.347	BG4-1	101	156.	151.	511.	43.	15.	28.
							BG4-2		121.	123.	427.	86.	7.	71.
							BG8-1		161.	124.	320.	57.	16.	20.
							BG8-3		142.	84.	18.	43.	15.	45.
4213	0.581	4.002	62.700	4525.	33.52	0.898	BG4-1	96	153.	170.	263.	18.	13.	6.
							BG4-2		112.	157.	538.	26.	18.	32.
							BG8-1		156.	149.	373.	19.	13.	0.
							BG8-3		140.	83.	139.	22.	7.	49.
4214	0.586	4.002	62.700	5030.	63.95	1.251	BG4-1	101	160.	220.	134.	32.	12.	0.
							BG4-2		118.	209.	295.	96.	72.	27.
							BG8-1		166.	189.	196.	35.	15.	0.
							BG8-3		149.	75.	159.	65.	71.	51.
4215	0.589	4.004	62.700	5515.	101.20	1.504	BG4-1	129	205.	300.	122.	20.	0.	6.
							BG4-2		157.	278.	224.	60.	74.	19.
							BG8-1		209.	242.	146.	24.	0.	0.
							BG8-3		161.	50.	154.	68.	113.	59.
4216	0.587	4.002	62.700	6020.	146.92	1.678	BG4-1	147	231.	417.	90.	28.	6.	0.
							BG4-2		184.	387.	158.	60.	50.	19.
							BG8-1		232.	319.	94.	21.	6.	0.
							BG8-3		73.	65.	132.	105.	124.	90.
4217	0.587	4.002	62.700	6500.	199.75	1.812	BG4-1	144	227.	692.	88.	31.	10.	12.
							BG4-2		176.	615.	137.	31.	44.	21.
							BG8-1		229.	494.	87.	33.	0.	12.
							BG8-3		21.	168.	109.	26.	118.	121.
4221	0.589	0.985	62.700	[illegible]	0.52	0.016	BG4-1	-88	123.	97.	231.	41.	13.	11.
							BG4-2		66.	86.	215.	86.	18.	17.
							BG8-1		103.	87.	167.	58.	15.	8.
							BG8-3		46.	44.	50.	30.	25.	11.
4222	0.591	0.987	62.700	4050.	9.91	0.37[illegible]	BG4-1	-123	173.	108.	366.	26.	12.	20.
							BG4-2		105.	89.	225.	52.	9.	35.
							BG8-1		155.	84.	241.	35.	12.	10.
							BG8-3		117.	49.	33.	31.	17.	23.
4223	0.590	0.988	62.700	4550.	31.81	0.852	BG4-1	-122	170.	106.	204.	13.	12.	8.
							BG4-2		91.	94.	296.	31.	17.	31.
							BG8-1		147.	90.	269.	12.	12.	0.
							BG8-3		122.	58.	98.	33.	17.	39.

SR-3C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE		P ORDER COMPONENTS µ STRAIN 1	2	3	4	5	6
4224	0.593	0.989	62.700	5040.	62.40	1.215	BG4-1	-128	180.	140.	118.	30.	6.	6.
							BG4-2		101.	136.	266.	118.	84.	25.
							BG8-1		156.	118.	176.	38.	10.	0.
							BG8-3		134.	53.	141.	97.	78.	47.
4225	0.592	0.988	62.700	5500.	96.95	1.452	BG4-1	-144	202.	187.	118.	24.	7.	0.
							BG4-2		121.	186.	206.	69.	70.	21.
							BG8-1		176.	151.	141.	31.	7.	0.
							BG8-3		119.	19.	124.	63.	85.	48.
4227	0.592	0.988	62.700	6550.	202.22	1.793	BG4-1	-134	189.	405.	62.	16.	5.	10.
							BG4-2		104.	352.	88.	42.	33.	19.
							BG8-1		163.	274.	63.	24.	0.	7.
							BG8-3		69.	105.	54.	49.	60.	65.
4228	0.593	0.987	62.700	6720.	223.76	1.838	BG4-1	-140	198.	510.	54.	12.	7.	10.
							BG4-2		109.	446.	82.	75.	36.	21.
							BG8-1		173.	347.	57.	26.	0.	9.
							BG8-3		82.	147.	50.	85.	62.	76.
4231	0.592	-0.021	62.700	3800.	-0.28	-0.013	BG4-1	-87	210.	70.	208.	33.	11.	10.
							BG4-2		123.	68.	196.	73.	15.	17.
							BG8-1		187.	66.	147.	48.	11.	7.
							BG8-3		94.	20.	46.	24.	19.	9.
4232	0.594	-0.020	62.700	4000.	8.12	0.316	BG4-1	-106	256.	74.	314.	28.	14.	20.
							BG4-2		165.	70.	278.	49.	12.	44.
							BG8-1		236.	65.	204.	34.	12.	10.
							BG8-3		161.	19.	37.	26.	13.	29.
4233	0.593	-0.020	62.700	4530.	33.37	0.895	BG4-1	-107	259.	92.	192.	11.	9.	6.
							BG4-2		154.	86.	391.	37.	19.	30.
							BG8-1		234.	76.	262.	11.	10.	0.
							BG8-3		197.	51.	100.	41.	25.	43.
4234	0.592	-0.020	62.700	5000.	62.38	1.243	BG4-1	-107	257.	123.	103.	29.	0.	0.
							BG4-2		154.	126.	232.	124.	74.	21.
							BG8-1		231.	101.	153.	38.	11.	0.
							BG8-3		186.	45.	119.	98.	59.	37.
4235	0.592	-0.019	62.700	5500.	100.48	1.507	BG4-1	-133	322.	165.	97.	20.	5.	0.
							BG4-2		206.	170.	166.	53.	61.	19.
							BG8-1		290.	132.	116.	27.	0.	0.
							BG8-3		163.	52.	93.	35.	63.	35.
4236	0.595	-0.020	62.700	6025.	146.92	1.679	BG4-1	-140	340.	227.	61.	23.	6.	0.
							BG4-2		213.	226.	100.	36.	34.	9.
							BG8-1		302.	169.	68.	17.	5.	0.
							BG8-3		41.	55.	39.	17.	53.	25.
4237	0.596	-0.021	62.700	6500.	198.66	1.808	BG4-1	-124	301.	404.	55.	19.	0.	10.
							BG4-2		181.	362.	70.	47.	27.	13.
							BG8-1		268.	267.	55.	24.	0.	0.
							BG8-3		76.	95.	33.	53.	46.	55.
4241	0.596	-1.038	62.700	3800.	-0.26	-0.012	BG4-1	-85	293.	63.	233.	32.	13.	13.
							BG4-2		175.	67.	222.	66.	18.	29.
							BG8-1		268.	64.	166.	45.	13.	11.
							BG8-3		117.	36.	46.	20.	18.	14.

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RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE		P ORDER COMPONENTS µ STRAIN 1	2	3	4	5	6
4242	0.596	1.036	62.700	4000.	8.49	0.330	BG4-1	-105	364.	70.	322.	24.	14.	22.
							BG4-2		234.	78.	293.	42.	15.	57.
							BG8-1		338.	70.	214.	29.	14.	12.
							BG8-3		206.	21.	40.	23.	15.	40.
4243	0.597	1.047	62.700	4500.	32.15	0.878	BG4-1	-109	380.	103.	202.	14.	10.	0.
							BG4-2		234.	92.	384.	33.	36.	29.
							BG8-1		349.	79.	261.	11.	11.	0.
							BG8-3		272.	39.	99.	44.	39.	44.
4244	0.596	1.046	62.700	5060.	66.76	1.284	BG4-1	-114	396.	107.	103.	30.	0.	0.
							BG4-2		245.	116.	214.	116.	73.	15.
							BG8-1		362.	88.	145.	39.	12.	0.
							BG8-3		252.	34.	108.	83.	56.	20.
4245	0.598	1.048	62.700	5500.	100.94	1.511	BG4-1	-121	424.	141.	71.	20.	0.	0.
							BG4-2		266.	136.	155.	56.	64.	22.
							BG8-1		387.	111.	112.	28.	6.	0.
							BG8-3		179.	50.	70.	25.	53.	26.
4246	0.597	1.049	62.700	6000.	145.28	1.674	BG4-1	-134	467.	231.	66.	24.	0.	0.
							BG4-2		290.	236.	78.	37.	37.	0.
							BG8-1		425.	171.	71.	14.	0.	0.
							BG8-3		69.	93.	34.	14.	41.	13.
4251	0.700	1.983	62.700	4450.	1.59	0.049	BG4-1	-111	106.	171.	354.	12.	9.	11.
							BG4-2		49.	148.	517.	35.	6.	75.
							BG8-1		91.	134.	337.	19.	10.	7.
							BG8-3		82.	79.	77.	29.	14.	66.
4252	0.697	1.974	62.700	5000.	33.12	0.714	BG4-1	-103	99.	188.	121.	30.	8.	0.
							BG4-2		60.	175.	279.	111.	70.	20.
							BG8-1		87.	166.	190.	36.	13.	0.
							BG8-3		72.	81.	120.	75.	51.	41.
4253	0.702	1.976	62.700	5530.	69.10	1.105	BG4-1	-122	118.	257.	116.	20.	7.	10.
							BG4-2		67.	233.	209.	71.	73.	28.
							BG8-1		100.	204.	136.	28.	7.	0.
							BG8-3		89.	57.	128.	83.	104.	70.
4254	0.697	1.977	62.700	6010.	107.51	1.336	BG4-1	-125	119.	342.	79.	28.	0.	0.
							BG4-2		77.	304.	133.	48.	55.	26.
							BG8-1		105.	253.	38.	27.	0.	0.
							BG8-3		71.	31.	111.	78.	107.	71.
4255	0.700	1.975	62.700	6520.	156.34	1.524	BG4-1	-116	111.	589.	33.	33.	7.	13.
							BG4-2		75.	506.	96.	80.	48.	29.
							BG8-1		99.	408.	85.	40.	0.	9.
							BG8-3		45.	118.	111.	65.	104.	131.
4261	0.692	2.984	62.700	4490.	0.46	0.014	BG4-1	167	53.	195.	376.	17.	12.	9.
							BG4-2		56.	176.	587.	22.	22.	62.
							BG8-1		60.	168.	427.	16.	12.	0.
							BG8-3		80.	100.	83.	14.	19.	48.
4262	0.692	2.986	62.700	5030.	32.72	0.694	BG4-1	140	45.	230.	147.	38.	11.	6.
							BG4-2		53.	214.	322.	117.	106.	20.
							BG8-1		57.	202.	223.	44.	22.	0.
							BG8-3		59.	93.	143.	73.	82.	41.

SR-3C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE		P ORDER COMPONENTS μ STRAIN 1	2	3	4	5	6
4263	0.697	2.986	62.700	5510.	65.55	1.061	BG4-1	151	49.	242.	121.	20.	0.	0.
							BG4-2		61.	221.	226.	66.	68.	26.
							BG8-1		62.	195.	145.	27.	5.	0.
							BG8-3		58.	40.	144.	79.	102.	55.
4264	0.702	2.987	62.700	6040.	110.35	1.364	BG4-1	183	60.	411.	89.	21.	5.	0.
							BG4-2		67.	361.	150.	37.	52.	39.
							BG8-1		71.	310.	96.	21.	0.	8.
							BG8-3		62.	33.	154.	75.	119.	96.
4265	0.708	2.986	62.700	6510.	155.98	1.547	BG4-1	230	76.	649.	97.	35.	12.	9.
							BG4-2		84.	569.	97.	57.	65.	30.
							BG8-1		84.	468.	90.	35.	6.	12.
							BG8-3		72.	122.	139.	27.	137.	134.
4271	0.693	4.016	62.700	5010.	29.63	0.639	BG4-1	94	152.	275.	158.	44.	16.	0.
							BG4-2		124.	259.	327.	121.	113.	27.
							BG8-1		158.	238.	230.	48.	20.	0.
							BG8-3		127.	96.	131.	57.	88.	37.
4272	0.701	4.017	62.700	5500.	66.76	1.093	BG4-1	102	167.	264.	132.	27.	0.	0.
							BG4-2		125.	248.	245.	64.	91.	25.
							BG8-1		173.	216.	163.	27.	0.	0.
							BG8-3		142.	39.	158.	71.	115.	50.
4273	0.700	4.018	62.700	6000.	105.38	1.327	BG4-1	118	193.	437.	98.	22.	8.	0.
							BG4-2		144.	389.	172.	55.	57.	23.
							BG8-1		198.	336.	109.	21.	6.	0.
							BG8-3		171.	33.	173.	95.	116.	89.
4281	0.697	0.983	62.700	4500.	3.10	0.092	BG4-1	-113	251.	148.	300.	13.	11.	0.
							BG4-2		160.	132.	513.	31.	15.	62.
							BG8-1		227.	124.	368.	11.	11.	7.
							BG8-3		154.	53.	91.	46.	10.	62.
4282	0.700	0.986	62.700	5050.	36.41	0.765	BG4-1	-105	234.	156.	116.	28.	9.	0.
							BG4-2		134.	149.	262.	112.	87.	26.
							BG8-1		210.	134.	176.	35.	12.	0.
							BG8-3		177.	66.	121.	83.	72.	50.
4283	0.699	0.987	62.700	5540.	71.64	1.140	BG4-1	-114	252.	224.	112.	24.	9.	0.
							BG4-2		145.	213.	196.	69.	77.	26.
							BG8-1		225.	179.	132.	30.	6.	0.
							BG8-3		179.	49.	124.	86.	109.	60.
4284	0.698	0.986	62.700	6020.	111.49	1.380	BG4-1	-121	268.	295.	76.	32.	8.	0.
							BG4-2		158.	265.	122.	42.	66.	25.
							BG8-1		242.	215.	87.	30.	0.	0.
							BG8-3		186.	39.	113.	86.	118.	74.
4285	0.699	0.987	62.700	6500.	157.98	1.555	BG4-1	-120	266.	477.	80.	29.	0.	11.
							BG4-2		169.	409.	93.	78.	39.	26.
							BG8-1		241.	324.	82.	35.	0.	6.
							BG8-3		134.	98.	81.	83.	62.	103.
4291	0.703	-0.036	62.700	5095.	37.83	0.775	BG4-1	-107	380.	167.	110.	27.	12.	0.
							BG4-2		231.	162.	239.	104.	98.	21.
							BG8-1		349.	140.	161.	33.	20.	0.
							BG8-3		274.	60.	125.	82.	77.	43.

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WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE		P ORDER COMPONENTS μ STRAIN 1	2	3	4	5	6
4292	0.701	-0.033	62.700	5550.	72.05	1.141	BG4-1	-110	390.	198.	108.	25.	8.	0.
							BG4-2		232.	200.	182.	70.	94.	30.
							BG8-1		359.	160.	127.	34.	6.	0.
							BG8-3		285.	45.	116.	89.	128.	64.
4293	0.699	-0.033	62.700	6000.	111.76	1.401	BG4-1	-118	415.	258.	75.	32.	8.	0.
							BG4-2		251.	241.	117.	31.	63.	20.
							BG8-1		378.	185.	86.	28.	0.	0.
							BG8-3		272.	50.	94.	52.	81.	45.
4294	0.700	-0.032	62.700	6500.	161.92	1.599	BG4-1	-112	394.	439.	73.	34.	0.	10.
							BG4-2		257.	364.	84.	113.	36.	14.
							BG8-1		359.	283.	74.	42.	0.	0.
							BG8-3		173.	108.	66.	117.	47.	91.
4301	0.701	-1.053	62.700	5040.	37.05	0.782	BG4-1	-102	490.	155.	128.	31.	9.	0.
							BG4-2		305.	151.	284.	122.	72.	26.
							BG8-1		452.	129.	194.	39.	13.	0.
							BG8-3		322.	46.	151.	98.	43.	51.
4302	0.697	-1.051	62.700	5550.	75.96	1.196	BG4-1	-113	540.	202.	94.	24.	0.	0.
							BG4-2		331.	209.	158.	66.	115.	36.
							BG8-1		499.	161.	118.	34.	10.	0.
							BG8-3		379.	32.	106.	77.	139.	65.
4313	0.793	1.970	62.700	6020.	91.88	1.210	BG4-1	-109	195.	363.	82.	26.	6.	0.
							BG4-2		123.	313.	111.	28.	54.	39.
							BG8-1		175.	266.	90.	27.	0.	0.
							BG8-3		130.	45.	84.	49.	94.	88.
4314	0.797	1.975	62.700	6500.	122.46	1.422	BG4-1	-112	201.	520.	85.	24.	7.	6.
							BG4-2		131.	428.	94.	12.	45.	40.
							BG8-1		183.	358.	87.	22.	0.	0.
							BG8-3		139.	59.	81.	33.	91.	103.
4321	0.800	2.960	62.700	5030.	0.87	0.020	BG4-1	-230	73.	266.	182.	39.	12.	0.
							BG4-2		70.	248.	384.	121.	100.	16.
							BG8-1		73.	228.	286.	45.	16.	0.
							BG8-3		85.	97.	136.	63.	82.	21.
4322	0.801	2.974	62.700	5500.	38.04	0.664	BG4-1		77.	273.	145.	26.	0.	0.
							BG4-2		78.	248.	246.	67.	119.	33.
							BG8-1		78.	223.	180.	33.	12.	0.
							BG8-3		72.	60.	139.	71.	128.	61.
4323	0.801	2.975	62.700	6015.	87.55	1.194	BG4-1		87.	431.	84.	25.	7.	0.
							BG4-2		91.	372.	122.	29.	57.	29.
							BG8-1		87.	326.	94.	24.	0.	0.
							BG8-3		66.	58.	106.	59.	102.	80.
4324	0.794	2.974	62.700	6300.	124.06	1.443	BG4-1	-306	90.	580.	88.	30.	7.	0.
							BG4-2		106.	491.	90.	17.	38.	30.
							BG8-1		91.	416.	91.	24.	5.	7.
							BG8-3		61.	57.	102.	31.	86.	84.
4331	0.785	3.987	62.700	5005.	2.44	0.056	BG4-1	119	143.	285.	203.	39.	14.	11.
							BG4-2		137.	260.	435.	116.	80.	16.
							BG8-1		143.	237.	318.	44.	10.	0.
							BG8-3		96.	85.	136.	34.	75.	11.

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WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE		P ORDER COMPONENTS μ STRAIN 1	2	3	4	5	6
4332	0.800	3.985	62.700	5510.	44.25	0.779	BG4-1	122	150.	350.	138.	26.	0.	0.
							BG4-2		136.	320.	224.	54.	125.	38.
							BG8-1		157.	287.	168.	32.	9.	0.
							BG8-3		125.	75.	125.	56.	131.	61.
4333	0.801	3.994	62.700	6000.	93.16	1.270	BG4-1	124	155.	451.	85.	30.	13.	0.
							BG4-2		132.	394.	133.	44.	58.	16.
							BG8-1		158.	350.	99.	27.	6.	0.
							BG8-3		121.	57.	124.	82.	107.	72.
4341	0.796	0.938	62.700	5080.	1.96	0.044	BG4-1	-107	360.	213.	139.	34.	10.	7.
							BG4-2		239.	192.	291.	117.	93.	24.
							BG8-1		326.	176.	216.	43.	13.	0.
							BG8-3		202.	61.	124.	95.	60.	32.
4342	0.800	0.942	62.700	5500.	38.55	0.690	BG4-1	-105	353.	248.	117.	23.	6.	7.
							BG4-2		226.	232.	190.	57.	148.	36.
							BG8-1		322.	198.	149.	33.	14.	0.
							BG8-3		241.	48.	101.	60.	145.	57.
4343	0.804	0.945	62.700	6000.	91.80	1.259	BG4-1	-104	353.	321.	78.	27.	9.	0.
							BG4-2		213.	290.	101.	37.	63.	37.
							BG8-1		320.	238.	84.	25.	0.	0.
							BG8-3		240.	51.	62.	50.	91.	86.
4361	0.849	1.946	62.700	5310.	-6.07	-0.126	BG4-1	-93	234.	288.	136.	27.	21.	11.
							BG4-2		175.	256.	227.	79.	249.	40.
							BG8-1		214.	228.	186.	39.	37.	5.
							BG8-3		140.	58.	100.	72.	189.	53.
4362	0.849	1.947	62.700	5525.	168.50	3.099	BG4-1	-106	267.	304.	133.	23.	0.	7.
							BG4-2		186.	269.	209.	62.	189.	30.
							BG8-1		242.	239.	168.	33.	20.	0.
							BG8-3		177.	68.	99.	74.	161.	51.
4373	0.591	2.003	61.900	3880.	-2.24	-0.095	BG4-1	-150	59.	99.	246.	38.	11.	17.
							BG4-2		0.	98.	232.	74.	18.	16.
							BG8-1		47.	93.	175.	50.	13.	8.
							BG8-3		36.	59.	31.	30.	22.	7.
4374	0.590	1.995	61.900	4525.	27.10	0.726	BG4-1	-127	51.	115.	177.	9.	14.	6.
							BG4-2		27.	89.	367.	29.	17.	19.
							BG8-1		41.	88.	252.	8.	13.	0.
							BG8-3		37.	55.	87.	23.	17.	30.
4375	0.590	1.996	61.900	5000.	53.93	1.072	BG4-1	-137	55.	152.	108.	26.	0.	6.
							BG4-2		34.	149.	243.	97.	68.	22.
							BG8-1		43.	133.	160.	31.	8.	0.
							BG8-3		43.	58.	115.	70.	63.	39.
4376	0.590	1.996	61.900	5540.	92.42	1.350	BG4-1	-164	66.	223.	105.	21.	7.	0.
							BG4-2		43.	217.	188.	61.	58.	18.
							BG8-1		53.	181.	123.	22.	6.	0.
							BG8-3		35.	34.	124.	69.	84.	49.
4377	0.590	1.997	61.900	6000.	135.76	1.563	BG4-1	-158	63.	300.	68.	18.	0.	0.
							BG4-2		44.	292.	111.	41.	36.	14.
							BG8-1		50.	231.	75.	18.	0.	0.
							BG8-3		15.	52.	72.	53.	84.	62.

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NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE		P ORDER COMPONENTS μ STRAIN 1	2	3	4	5	6
4378	0.594	1.995	61.900	6512.	188.21	1.698	BG4-1	-143	58.	444.	67.	22.	5.	6.
							BG4-2		37.	402.	102.	60.	41.	21.
							BG8-1		46.	322.	69.	30.	0.	8.
							BG8-3		36.	119.	72.	54.	76.	74.
4379	0.593	1.996	61.900	6800.	224.23	1.777	BG4-1	-139	56.	590.	57.	23.	11.	11.
							BG4-2		34.	576.	87.	74.	32.	17.
							BG8-1		44.	457.	60.	17.	6.	12.
							BG8-3		39.	202.	59.	88.	65.	93.
4381	0.586	3.011	61.900	3874.	-0.70	-0.030	BG4-1	85	51.	121.	279.	41.	11.	16.
							BG4-2		52.	104.	246.	80.	15.	21.
							BG8-1		58.	103.	187.	54.	13.	10.
							BG8-3		53.	69.	23.	29.	15.	9.
4382	0.590	3.013	61.900	4546.	29.30	0.778	BG4-1	74	45.	138.	199.	9.	12.	9.
							BG4-2		43.	128.	435.	32.	19.	18.
							BG8-1		56.	123.	299.	9.	12.	0.
							BG8-3		57.	69.	107.	20.	13.	33.
4383	0.587	3.014	61.900	5027.	55.65	1.091	BG4-1	73	44.	179.	100.	30.	0.	9.
							BG4-2		44.	174.	229.	97.	57.	22.
							BG8-1		55.	157.	151.	33.	10.	0.
							BG8-3		52.	66.	114.	67.	57.	45.
4384	0.588	3.015	61.900	5525.	92.63	1.368	BG4-1	102	62.	245.	104.	18.	0.	0.
							BG4-2		69.	234.	191.	53.	58.	20.
							BG8-1		76.	200.	122.	21.	0.	0.
							BG8-3		69.	39.	131.	62.	90.	51.
4385	0.587	3.025	61.900	6028.	138.84	1.578	BG4-1	127	78.	334.	85.	25.	0.	5.
							BG4-2		88.	318.	145.	54.	34.	18.
							BG8-1		91.	257.	91.	18.	0.	6.
							BG8-3		55.	55.	113.	87.	93.	83.
4386	0.587	3.025	61.900	6519.	190.27	1.709	BG4-1	130	80.	551.	72.	26.	0.	7.
							BG4-2		78.	495.	110.	24.	39.	20.
							BG8-1		92.	400.	75.	28.	0.	7.
							BG8-3		18.	141.	81.	16.	90.	88.
4391	0.585	3.999	61.900	3853.	-0.05	-0.002	BG4-1	92.6	145.	130.	319.	45.	15.	17.
							BG4-2		117.	109.	287.	87.	17.	23.
							BG8-1		149.	110.	220.	58.	15.	11.
							BG8-3		106.	61.	14.	27.	12.	21.
4392	0.581	4.001	61.900	4533.	29.51	0.787	BG4-1	89.5	139.	159.	229.	14.	9.	0.
							BG4-2		104.	147.	481.	24.	19.	25.
							BG8-1		143.	140.	334.	14.	11.	0.
							BG8-3		125.	75.	119.	13.	9.	37.
4393	0.581	4.002	61.900	5010.	56.25	1.110	BG4-1	91.4	142.	189.	118.	27.	11.	0.
							BG4-2		106.	182.	267.	83.	64.	21.
							BG8-1		150.	166.	177.	29.	13.	0.
							BG8-3		133.	68.	139.	57.	56.	38.
4394	0.586	4.002	61.900	5525.	95.39	1.408	BG4-1	115	180.	275.	114.	18.	0.	5.
							BG4-2		139.	257.	207.	52.	67.	21.
							BG8-1		188.	225.	135.	23.	0.	5.
							BG8-3		154.	46.	147.	62.	104.	52.

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RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE		P ORDER COMPONENTS μ STRAIN 1	2	3	4	5	6
4395	0.589	4.004	61.900	6014.	139.37	1.598	BG4-1	130	206.	386.	81.	22.	7.	0.
							BG4-2		166.	358.	140.	47.	33.	11.
							BG8-1		211.	298.	86.	18.	6.	0.
							BG8-3		88.	51.	120.	80.	95.	74.
4396	0.587	4.002	61.900	6461.	184.21	1.702	BG4-1	141	223.	600.	84.	31.	0.	8.
							BG4-2		181.	537.	116.	35.	42.	20.
							BG8-1		228.	439.	82.	27.	0.	9.
							BG8-3		22.	127.	108.	71.	101.	103.
4401	0.589	0.985	61.900	3925.	-0.28	-0.011	BG4-1	-101	141.	76.	228.	29.	9.	12.
							BG4-2		100.	72.	205.	60.	11.	20.
							BG8-1		130.	73.	157.	40.	10.	7.
							BG8-3		78.	33.	35.	24.	18.	10.
4402	0.591	0.987	61.900	4513.	26.40	0.715	BG4-1	-93	131.	100.	169.	6.	13.	0.
							BG4-2		77.	67.	331.	20.	38.	28.
							BG8-1		118.	68.	228.	7.	6.	5.
							BG8-3		97.	49.	74.	19.	38.	35.
4403	0.590	0.988	61.900	5040.	56.55	1.100	BG4-1	-96	134.	112.	89.	20.	0.	0.
							BG4-2		78.	111.	201.	85.	71.	18.
							BG8-1		117.	96.	131.	26.	7.	0.
							BG8-3		100.	45.	103.	68.	65.	37.
4404	0.593	0.989	61.900	5550.	94.62	1.380	BG4-1	-119	166.	170.	88.	19.	8.	0.
							BG4-2		101.	171.	154.	54.	59.	21.
							BG8-1		145.	138.	104.	22.	6.	0.
							BG8-3		103.	30.	97.	55.	75.	48.
4405	0.592	0.988	61.900	6070.	141.66	1.578	BG4-1	-108	152.	255.	62.	18.	0.	8.
							BG4-2		98.	238.	95.	29.	24.	16.
							BG8-1		132.	188.	68.	18.	0.	0.
							BG8-3		20.	37.	54.	24.	52.	43.
4406	0.593	0.987	61.900	6535.	191.96	1.714	BG4-1	-113	159.	367.	53.	17.	0.	7.
							BG4-2		95.	326.	79.	53.	34.	16.
							BG8-1		138.	251.	55.	24.	0.	6.
							BG8-3		51.	92.	53.	56.	60.	61.
4407	0.593	0.987	61.900	6700.	210.37	1.743	BG4-1	-117	165.	412.	51.	12.	0.	9.
							BG4-2		90.	364.	78.	76.	28.	20.
							BG8-1		142.	282.	54.	23.	0.	8.
							BG8-3		60.	113.	52.	83.	53.	75.
4411	0.592	-0.021	61.900	3930.	0.21	0.009	BG4-1	-94	227.	66.	214.	24.	11.	12.
							BG4-2		147.	60.	190.	47.	10.	31.
							BG8-1		210.	56.	141.	31.	10.	9.
							BG8-3		124.	16.	31.	22.	16.	16.
4412	0.594	-0.020	61.900	4520.	27.16	0.734	BG4-1	16	229.	84.	144.	7.	6.	6.
							BG4-2		137.	78.	299.	24.	17.	26.
							BG8-1		207.	71.	203.	5.	8.	0.
							BG8-3		168.	44.	71.	27.	20.	38.
4413	0.593	-0.020	61.900	5025.	56.40	1.108	BG4-1	-89	216.	103.	86.	23.	0.	0.
							BG4-2		127.	106.	190.	104.	70.	20.
							BG8-1		193.	87.	125.	32.	10.	0.
							BG8-3		157.	40.	97.	83.	60.	37.

SR-3C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE	P ORDER COMPONENTS μ STRAIN 1	2	3	4	5	6	
4414	0.592	-0.020	61.900	5526.	92.98	1.377	BG4-1	267.	123.	83.	18.	5.	0.	-111
							BG4-2	165.	128.	143.	58.	51.	28.	
							BG8-1	238.	99.	99.	26.	0.	0.	
							BG8-3	159.	33.	85.	47.	56.	43.	
4415	0.592	-0.019	61.900	6000.	136.80	1.580	BG4-1	294.	204.	57.	20.	0.	0.	-122
							BG4-2	183.	201.	93.	31.	33.	0.	
							BG8-1	261.	150.	64.	15.	0.	0.	
							BG8-3	69.	53.	45.	17.	44.	28.	
4416	0.595	-0.020	61.900	6530.	191.76	1.721	BG4-1	277.	336.	50.	17.	0.	7.	-114
							BG4-2	163.	302.	65.	57.	35.	12.	
							BG8-1	246.	220.	52.	23.	0.	0.	
							BG8-3	53.	77.	32.	61.	49.	54.	
4417	0.596	-0.021	61.900	6700.	209.65	1.[illegible]42	BG4-1	287.	351.	46.	13.	0.	9.	-118
							BG4-2	171.	310.	64.	68.	35.	16.	
							BG8-1	258.	230.	47.	21.	0.	0.	
							BG8-3	79.	90.	37.	71.	50.	57.	
4421	0.596	-1.038	61.900	3937.	0.10	0.004	BG4-1	305.	56.	249.	25.	12.	17.	-88
							BG4-2	204.	54.	228.	48.	13.	41.	
							BG8-1	286.	50.	168.	33.	12.	11.	
							BG8-3	157.	30.	38.	22.	15.	24.	
4422	0.596	-1.036	61.900	4520.	27.14	0.731	BG4-1	323.	87.	164.	10.	8.	0.	-93
							BG4-2	203.	79.	326.	24.	30.	22.	
							BG8-1	296.	69.	222.	5.	8.	0.	
							BG8-3	229.	32.	83.	33.	30.	37.	
4423	0.597	-1.047	61.900	5000.	56.85	1.132	BG4-1	308.	104.	90.	25.	7.	0.	-89
							BG4-2	195.	114.	188.	110.	69.	22.	
							BG8-1	283.	88.	127.	35.	12.	0.	
							BG8-3	217.	34.	93.	82.	52.	32.	
4424	0.596	-1.046	61.900	5500.	93.51	1.401	BG4-1	356.	99.	79.	16.	0.	0.	-103
							BG4-2	226.	111.	133.	51.	49.	23.	
							BG8-1	324.	73.	95.	25.	0.	0.	
							BG8-3	181.	31.	86.	34.	44.	29.	
4425	0.598	-1.048	61.900	6000.	137.88	1.590	BG4-1	400.	198.	58.	23.	0.	0.	-115
							BG4-2	251.	201.	86.	32.	29.	6.	
							BG8-1	362.	144.	62.	13.	0.	0.	
							BG8-3	92.	85.	40.	9.	33.	23.	
4426	0.597	-1.049	61.900	6500.	188.[illegible]1	1.70[illegible]	BG4-1	379.	337.	51.	22.	0.	7.	-109
							BG4-2	234.	297.	60.	62.	37.	7.	
							BG8-1	343.	218.	52.	25.	0.	0.	
							BG8-3	36.	98.	22.	69.	55.	31.	
4431	0.700	1.983	61.900	4670.	-0.33	-0.009	BG4-1	107.	158.	191.	17.	10.	7.	-113
							BG4-2	62.	139.	423.	62.	30.	28.	
							BG8-1	94.	132.	304.	19.	12.	0.	
							BG8-3	86.	74.	91.	37.	18.	33.	
4432	0.697	1.974	61.900	5005.	46.12	0.992	BG4-1	87.	172.	106.	27.	8.	0.	-91
							BG4-2	50.	160.	240.	97.	73.	18.	
							BG8-1	76.	152.	153.	33.	11.	0.	
							BG8-3	67.	78.	107.	65.	50.	35.	

SR-3C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE		P ORDER COMPONENTS μ STRAIN 1	2	3	4	5	6
4433	0.702	1.976	61.900	5540.	54.59	0.868	BG4-1	-106	102.	225.	99.	18.	6.	6.
							BG4-2		59.	207.	179.	60.	63.	28.
							BG8-1		86.	182.	118.	23.	5.	0.
							BG8-3		73.	49.	106.	67.	90.	62.
4434	0.697	1.977	61.900	6035.	93.04	1.142	BG4-1	-108	103.	292.	69.	24.	0.	0.
							BG4-2		65.	258.	120.	38.	48.	27.
							BG8-1		89.	216.	76.	22.	0.	6.
							BG8-3		72.	28.	111.	73.	100.	73.
4435	0.700	1.975	61.900	6520.	138.73	1.352	BG4-1	-103	99.	508.	69.	28.	6.	10.
							BG4-2		64.	434.	77.	56.	47.	32.
							BG8-1		86.	351.	66.	34.	0.	9.
							BG8-3		57.	82.	104.	38.	103.	118.
4441	0.692	2.984	61.900	4640.	-0.12	-0.003	BG4-1	132	42.	176.	220.	17.	12.	7.
							BG4-2		47.	162.	457.	60.	35.	20.
							BG8-1		49.	153.	326.	19.	13.	0.
							BG8-3		64.	83.	89.	17.	27.	20.
4442	0.692	2.986	61.900	5000.	21.14	0.456	BG4-1	118	38.	187.	122.	30.	9.	0.
							BG4-2		46.	177.	275.	92.	76.	14.
							BG8-1		48.	165.	189.	33.	14.	0.
							BG8-3		52.	76.	116.	51.	55.	30.
4443	0.697	2.986	61.900	5500.	54.14	0.881	BG4-1	130	42.	236.	90.	18.	0.	0.
							BG4-2		51.	216.	167.	53.	62.	20.
							BG8-1		56.	195.	108.	22.	0.	0.
							BG8-3		53.	55.	106.	64.	90.	47.
4444	0.702	2.987	61.900	6000.	92.54	1.167	BG4-1	152	50.	330.	62.	18.	6.	0.
							BG4-2		57.	293.	112.	38.	48.	22.
							BG8-1		60.	251.	69.	18.	0.	0.
							BG8-3		54.	29.	107.	70.	98.	77.
4445	0.708	2.986	61.900	6500.	131.96	1.315	BG4-1	154	51.	554.	72.	32.	6.	6.
							BG4-2		59.	479.	82.	40.	45.	31.
							BG8-1		59.	394.	68.	31.	0.	10.
							BG8-3		55.	89.	121.	26.	106.	117.
4451	0.693	4.016	61.900	4680.	0.75	0.020	BG4-1	90	145.	185.	208.	23.	11.	0.
							BG4-2		119.	165.	462.	76.	36.	11.
							BG8-1		144.	155.	325.	23.	14.	0.
							BG8-3		102.	71.	92.	10.	38.	7.
4452	0.701	4.017	61.900	5000.	19.05	0.415	BG4-1	84	137.	229.	138.	32.	13.	0.
							BG4-2		112.	216.	293.	86.	98.	18.
							BG8-1		143.	196.	206.	33.	16.	0.
							BG8-3		115.	73.	107.	39.	75.	26.
4453	0.700	4.018	61.900	5500.	50.02	0.818	BG4-1	88	145.	255.	116.	24.	0.	0.
							BG4-2		118.	242.	205.	49.	88.	23.
							BG8-1		154.	214.	137.	27.	0.	0.
							BG8-3		129.	56.	130.	57.	107.	43.
4454	0.702	4.018	61.900	6000.	93.51	1.161	BG4-1	93	153.	374.	78.	18.	0.	5.
							BG4-2		115.	329.	138.	43.	48.	23.
							BG8-1		158.	284.	87.	16.	0.	0.
							BG8-3		136.	29.	143.	74.	103.	83.

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SR-3C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE	P ORDER COMPONENTS μ STRAIN 1	2	3	4	5	6
4455	0.698	4.017	61.900	6520.	133.46	1.309	BG4-1	163.	608.	75.	24.	9.	8.
							BG4-2	131.	502.	91.	32.	48.	27.
							BG8-1	167.	423.	73.	29.	0.	9.
							BG8-3	142.	84.	131.	30.	112.	115.
4461	0.697	0.983	61.900	4711.	0.39	0.010	BG4-1	205.	140.	167.	16.	12.	0.
							BG4-2	136.	123.	384.	83.	30.	23.
							BG8-1	188.	118.	272.	19.	12.	0.
							BG8-3	128.	55.	99.	52.	19.	34.
4462	0.700	0.986	61.900	5000.	15.65	0.339	BG4-1	204.	156.	106.	22.	8.	0.
							BG4-2	121.	144.	245.	90.	69.	20.
							BG8-1	184.	132.	167.	28.	9.	0.
							BG8-3	145.	58.	108.	65.	53.	39.
4463	0.699	0.987	61.900	5540.	52.20	0.831	BG4-1	224.	188.	94.	17.	6.	0.
							BG4-2	129.	181.	16[illegible]	56.	59.	23.
							BG8-1	201.	156.	108.	23.	0.	0.
							BG8-3	163.	48.	93.	64.	82.	54.
4464	0.698	0.986	61.900	6010.	92.28	1.148	BG4-1	236.	272.	68.	25.	6.	0.
							BG4-2	133.	243.	113.	38.	53.	15.
							BG8-1	210.	198.	76.	24.	0.	0.
							BG8-3	163.	33.	98.	74.	98.	63.
4465	0.699	0.987	61.900	6550.	139.40	1.341	BG4-1	241.	414.	69.	26.	0.	10.
							BG4-2	148.	343.	84.	68.	41.	27.
							BG8-1	219.	271.	70.	32.	0.	6.
							BG8-3	151.	76.	88.	63.	78.	104.
4471	0.703	0.036	61.900	4660.	-0.01	-0.000	BG4-1	338.	119.	168.	12.	0.	6.
							BG4-2	214.	104.	375.	60.	14.	20.
							BG8-1	308.	99.	263.	16.	6.	0.
							BG8-3	189.	29.	90.	56.	16.	31.
4472	0.701	-0.033	61.900	5040.	19.80	0.419	BG4-1	317.	136.	98.	21.	7.	0.
							BG4-2	194.	128.	219.	84.	56.	20.
							BG8-1	288.	114.	149.	27.	7.	0.
							BG8-3	208.	39.	109.	64.	44.	38.
4473	0.699	-0.033	61.900	5530.	53.40	0.855	BG4-1	346.	174.	87.	18.	0.	0.
							BG4-2	205.	173.	150.	58.	84.	30.
							BG8-1	316.	142.	104.	26.	7.	0.
							BG8-3	251.	41.	93.	68.	105.	61.
4474	0.700	0.032	61.900	6030.	95.33	1.179	BG4-1	350.	211.	67.	31.	7.	0.
							BG4-2	208.	199.	101.	31.	56.	25.
							BG8-1	319.	153.	74.	27.	0.	0.
							BG8-3	238.	30.	86.	65.	88.	59.
4475	0.702	-0.034	61.900	6300.	67.17	0.728	BG4-1	384.	296.	70.	24.	0.	5.
							BG4-2	231.	258.	89.	16.	33.	20.
							BG8-1	349.	198.	74.	22.	0.	0.
							BG8-3	246.	56.	85.	20.	51.	61.
4481	0.793	1.970	61.900	5250.	-4.61	-0.092	BG4-1	185.	259.	133.	31.	10.	21.
							BG4-2	123.	200.	241.	85.	126.	28.
							BG8-1	166.	181.	192.	35.	16.	0.
							BG8-3	122.	74.	112.	65.	90.	31.

SR-3C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE	P ORDER COMPONENTS μ STRAIN 1	2	3	4	5	6
4482	0.797	1.975	61.900	5550.	13.74	0.233	BG4-1	184.	265.	103.	20.	0.	6.
							BG4-2	120.	240.	173.	53.	105.	18.
							BG8-1	164.	214.	129.	23.	9.	0.
							BG8-3	132.	63.	96.	66.	110.	46.
4483	0.796	1.976	61.900	6050.	50.44	0.662	BG4-1	184.	347.	67.	20.	7.	0.
							BG4-2	115.	296.	94.	26.	45.	27.
							BG8-1	162.	257.	75.	21.	0.	0.
							BG8-3	130.	49.	69.	39.	68.	64.
4484	0.787	1.974	61.900	6400.	82.61	0.920	BG4-1	182.	491.	65.	26.	0.	6.
							BG4-2	117.	404.	77.	37.	47.	35.
							BG8-1	163.	335.	66.	24.	0.	6.
							BG8-3	123.	63.	62.	44.	92.	93.
4502	0.801	2.975	61.900	5550.	18.14	0.308	BG4-1	71.	308.	125.	20.	7.	14.
							BG4-2	71.	266.	210.	58.	118.	40.
							BG8-1	72.	239.	156.	27.	11.	7.
							BG8-3	75.	70.	113.	59.	118.	54.
4503	0.794	2.974	61.900	6000.	48.43	0.652	BG4-1	77.	377.	78.	20.	9.	0.
							BG4-2	72.	325.	117.	16.	52.	14.
							BG8-1	74.	288.	87.	23.	0.	0.
							BG8-3	63.	54.	97.	46.	89.	50.
4504	0.792	2.976	61.900	6400.	82.57	0.916	BG4-1	80.	515.	68.	35.	9.	0.
							BG4-2	79.	420.	76.	46.	41.	25.
							BG8-1	75.	358.	68.	28.	6.	6.
							BG8-3	53.	53.	79.	37.	79.	83.
4511	0.785	3.987?	61.900	5500.?	2.92?	0.057?	BG4-1	136.	310.	135.	29.	16.	23.
							BG4-2	140.	246.	256.	71.	120.	28.
							BG8-1	141.	221.	190.	30.	21.	10.
							BG8-3	92.	76.	111.	37.	101.	34.
4512	0.800	3.985	61.900	5570.	14.01	0.239	BG4-1	131.	304.	122.	15.	11.	24.
							BG4-2	148.	231.	210.	60.	137.	39.
							BG8-1	141.	207.	162.	23.	20.	0.
							BG8-3	100.	51.	111.	26.	126.	30.
4513	0.801	3.994	61.900	6100.	55.60	0.721	BG4-1	129.	431.	94.	22.	9.	5.
							BG4-2	119.	359.	130.	20.	44.	29.
							BG8-1	135.	317.	103.	26.	0.	0.
							BG8-3	100.	49.	121.	60.	85.	74.
4521	0.796	0.938	61.900	5550.?	1.65?	0.032?	BG4-1	292.	204.	116.	20.	11.	13.
							BG4-2	199.	180.	203.	70.	176.	37.
							BG8-1	264.	155.	158.	31.	25.	0.
							BG8-3	161.	24.	102.	68.	147.	49.
4522	0.800	0.942	61.900	5500.	7.60	0.136	BG4-1	297.	216.	105.	16.	0.	8.
							BG4-2	198.	193.	174.	52.	144.	36.
							BG8-1	268.	163.	137.	28.	17.	0.
							BG8-3	177.	19.	94.	56.	133.	50.
4523	0.804	0.945	61.900	6100.	46.82	0.611	BG4-1	326.	305.	62.	27.	0.	0.
							BG4-2	202.	269.	86.	28.	53.	26.
							BG8-1	291.	224.	70.	18.	0.	0.
							BG8-3	217.	42.	50.	35.	69.	61.

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OF POOR QUALITY

SR-3C PROP-FAN
WING/BODY/NACELLE TESTS
NASA AMES

RUN NO.	MACH NO.	FUSELAGE ATTITUDE DEG	BLADE ANGLE DEG	PROP SPEED RPM	SHAFT POWER KW	POWER COEFF	BLADE GAGE	P ORDER COMPONENTS µ STRAIN 1	2	3	4	5	6
4524	0.802	0.956	61.900	6250.	13.15	0.159	BG4-1	316.	340.	71.	18.	0.	0.
							BG4-2	191.	285.	80.	35.	29.	28.
							BG8-1	283.	235.	71.	16.	0.	0.
							BG8-3	210.	53.	57.	44.	62.	77.
4532	0.799	-0.050	61.900	6050.	15.51	0.206	BG4-1	409.	302.	50.	37.	7.	7.
							BG4-2	261.	276.	78.	39.	51.	39.
							BG8-1	371.	219.	62.	20.	0.	0.
							BG8-3	251.	52.	54.	48.	72.	85.
4541	0.849	1.946	61.900	5570.	1.70	0.030	BG4-1 -93	233.	273.	107.	27.	9.	8.
							BG4-2	172.	247.	173.	59.	143.	23.
							BG8-1	215.	219.	142.	27.	14.	5.
							BG8-3	140.	55.	72.	69.	123.	35.
4542	0.849	1.947	61.900	6040.	42.79	0.602	BG4-1 -83	209.	331.	51.	45.	12.	11.
							BG4-2	156.	298.	100.	31.	54.	39.
							BG8-1	210.	261.	81.	22.	0.	5.
							BG8-3	163.	52.	63.	43.	67.	74.

*** END DATA ***

APPENDIX III

RESOLUTION OF IRREGULARITIES WITH SR-3C AND SR-2C BLADE RESPONSE FINITE ELEMENT MODELS

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DECEMBER, 1985

Introduction

NASA contract NAS3-24088 calls for the calculation, and comparison to test data, of vibratory stresses for the SR3C-3 and SR2C model Prop-Fan blades (2 ft. diameter). The SR-3C-3 and SR-2C finite element models were supplied by NASA, and are shown in Figures A1 and A2, respectively. These models were originally developed by NASA using COSMIC NASTRAN format with CTRIA2 elements. NASA later reran them using MSC NASTRAN with CTRIA3 elements for this work. Calculations to date (SR-3C-3) have indicated overprediction of 1P strain, slow convergence of the finite element solution, and erratic element-to-element variations in calculated strain response. Additionally the NASA-supplied SR-2C finite element model was found to be too stiff (relative to test) when analyzed with MSC/NASTRAN. A contract add-on was received to investigate these problems before continuing with the analyses. Four specific items (discussed below) were to be investigated. This memo reports resolution of these problems.

The 1P analysis for Run 204 (NASA-Lewis wind tunnel tests) was chosen, with NASA concurrence, to investigate the influence of finite element model changes. This was a case at 8508 RPM, Mn = 0.8; SHP = 565, inflow angle = 2.06°. Previous calculation showed strains too high relative to test (477 u in/in calculated versus 321 u in/in measured at root bending gage #1) as well as calculated strains which varied erratically element to element, particularly the shear strain near the tip (see Run A of Figure A3). The following changes were investigated:

Plate Normal Stiffness (SR-3C-3)

A parameter exists in MSC/NASTRAN (versions 63 and higher) which adds artificial stiffness about the direction normal to the plane of a plate element, to alleviate problems associated with singularities of the finite element stiffness matrix. In past calculations, stiffness terms were added to the diagonal of the assembled stiffness matrix to avoid singularity problems. A recently completed study demonstrated that a value of the parameter K6ROT of 10,000 avoided the singularity problems and gave responses which were smoother on an element-to-element and node-to-node basis. Calculations of centrifugally induced deflections of an SR-5 blade in a vacuum (without airloads) compared favorably with measured values.

Run B in Figure A3 shows the effect of using K6ROT = 10,000 for the same SR-3C-3 finite element model as was previously used without the K6ROT parameter (Run A). The steady state portion of the calculation (solution 64 in NASTRAN) used to obtain the centrifugal stiffening effects converged in six subcases, instead of the previous 25, and gave much reduced element-to-element strain variation. The calculated strain for gage #1 reduced from 477 to 407 u in/in (closer to the test). As discussed later, variation of K6ROT from 1000 to 100,000 did not significantly affect the calculated response. It is noted that the most element-to-element strain variation occurred between triangular elements that are the most obtuse.

Transverse Shear (SR-3C-3)

During the analysis of a Lockheed-Georgia one foot diameter graphite Prop-Fan model blade, with a geometry designated SR-7, Hamilton Standard found that the computer analysis would run successfully only when transverse shear flexibility was included. This was thought to be a possible problem with the SR-3C-3 model. It was decided to investigate adding this flexibility to the SR-3C-3 model. This was done by using MAT8 material cards (instead of MAT2) and assuming that the transverse shear moduli (G_{xz} and G_{yz}) were equal to the inplane shear modulus (G_{xy}). Run C in Figure A3 shows how the strains vary element-to-element. Comparison to Run B shows the same tendency for strain variations between badly shaped (obtuse) triangles. The root strain did go up 5% but this is probably because the frequency of the model was lowered (closer to 1P excitation frequency, causing higher dynamic magnification due to more flexibility in the model). It was concluded that transverse shear should not be included in future analyses because 1) the response is not significantly improved, 2) we do not know the actual transverse shear moduli, and 3) the material properties were adjusted to approach test frequencies.

Airload Variation (SR-3C-3)

Variation of the chordwise distribution of 1P aerodynamic loads is known to significantly affect the calculated response at the blade tip. Run 204 was rerun with an assumed center of pressure of the aero loads near the trailing edge (90% chord) instead of the previously calculated center of pressure nearer the leading edge (about 30% for 1P loads). Run D in Figure A3 shows some change in root strain but very large changes in strains further outboard. While this is a significant effect, and certainly the load distribution has a strong influence on our correlation with strains, the tendency for element-to-element strain variations (especially for obtuse triangles) is still there. While more accurate calculations of airload distributions may improve correlation, there is no justification for changing the procedures currently used on the basis of this study.

Finite Element Type (SR-3C-3)

The NASA-supplied finite element model was constructed using CTRIA3 elements with properties adjusted to approximate the test frequencies at zero rotational speed. MSC/NASTRAN recommends the use of CQUAD4 elements for this type of application with CTRIA3 elements to be used only for transition regions. It is also known that more nearly square CQUAD4 elements, or more nearly equilateral CTRIA3 elements, behave better than oddly shaped elements. Because of the way the original finite element model was set up (see Figure A1) triangles near the tip (and some near the root) were very obtuse. Two new models were derived from this one using the same grid point locations. A modified CTRIA3 model was set up (see Figure A1) with the triangles laid out to be more nearly equilateral, and a version of mostly CQUAD4 elements was also set up. In order to set up these models, several steps were necessary.

The material properties were averaged for "pairs" of triangles to be converted to quadrilaterals (or a different "pair" of triangles). Additionally, the material axis direction was recalculated for each element based on a new direction of the local element coordinate system. Run E of Figure A4 shows the strains calculated using the original triangle configuration but merely averaging the properties for pairs of triangles. This was done in order to see the influence of material property variation on the strain distributions. Runs F and G were then made with the new models. Review of Figure A4 shows that the element-to-element variation problem was in fact due largely to the obtuse triangles in the original model. Material property averaging had only a small effect.

Both the modified CTRIA3 model and the CQUAD4 model showed similar and much "smoother" response than the original model. Since the CQUAD4 element is the recommended element, it is felt that the CQUAD4 model is the one to use for future calculations. Zero RPM frequencies were calculated using the CQUAD4 model for this model to compare to tests. The first mode frequency was calculated as 203.6 Hz. The test frequency was 193 Hz. It was decided, consistent with previous procedures, to soften the blade to match test frequencies, in order to obtain correct values of dynamic magnification when performing vibratory analyses. This was done by multiplying all of the stiffness values on the MAT2 cards by a factor of 0.9. Figure A5 shows the calculated frequencies. When the stiffnesses are adjusted to give a first mode frequency of 193 Hz the other modes become reasonably consistent with test values. Calculated and measured mode shapes are shown in Figure A6 and are seen to be in reasonable agreement. The value of K6ROT was also varied (1000; 10000; 100000) to show that frequencies and response is not significantly changed with the variation of this artificial plate normal stiffness. It is also noted that predicted strains are not significantly affected by changes in K6ROT.

Using the CQUAD4 model (with K6ROT and adjusted stiffness) the calculated strain for the root bending (Gage 1) became 423 u in/in instead of the original 477. This is shown in Figure A5. This is better with respect to the test value of 321 u in/in (Run 204-NASA-Lewis wind tunnel tests). The other gages do not compare as well. It is noted, however, that the strains at these locations are very sensitive to the assumed chordwise load distribution.

<u>SR-2C</u>

The NASA-supplied SR-2C finite element model (CTRIA3 elements) is pictured in Figure A2. Because the blade is not swept, there is not the problem with obtuse triangles (except at the tip) that there was for the SR-3C-3. For this reason, it was decided not to modify this model. Additionally, since the model was originally set up as a CTRIA2 model in COSMIC/NASTRAN, the elements have constant thickness. This would mean averaging thicknesses (as well as material properties) when converting to quadrilaterals. Note that, in general CTRIA2 COSMIC elements are stiffer than CTRIA3 elements. When a frequency check of this model was made, a first mode frequency of 160

Hz was found (zero speed). Measured values of 134, 139, and 140 have been reported (see Figure 7). It was decided, consistent with previous procedures, to soften the blade to match measured frequencies, in order to obtain correct values of dynamic magnification when performing vibratory analyses. This was done by multiplying all of the stiffness values on the MAT2 cards by a factor of 0.752. As noted in Figure 7, this gave a first mode frequency of 139 Hz. Correlations of the higher modal frequency calculations with test values, previous calculations using an HSD beam model, and an older SR-2C finite element model (COSMIC/NASTRAN) were also improved. Figure A8 shows that the calculated mode shapes are in good agreement with those measured using holography.

Conclusions

1) The strain variation difficulty found with the NASA supplied SR-3C-3 finite element model was caused by the use of obtuse triangular elements. The element-to-element strain variations became much "smoother" when the triangles were made more nearly equilateral or when the triangles were eliminated and CQUAD4 elements were used.

2) The use of K6ROT to add artificial plate normal stiffness significantly reduced the unrealistic element to element strain variations of the calculated SR-3C-3 finite element model response. Additionally the nonlinear steady state solution converged much faster than when older procedures were used. A value of K6ROT = 10,000 was shown to give good results for the SR-3C-3 and SR-2C models.

3) Use of the CQUAD4 elements (with K6ROT) improved the agreement between predicted and measured 1P inboard bending strains. However the material properties had to be softened by about 10% to obtain a model with frequencies and mode shapes which matched test.

4) The introduction of transverse shear flexibility did not significantly change the character of the 1P response calculations and need not be considered for the SR-3C-3 model.

5) Although the chordwise distribution of 1P airloads has a significant effect on calculated strains (especially near the tip), the influence of airload distribution was not the cause of the noted irregularities in the SR-3C-3 model response.

6) The NASA-supplied SR-2C finite element model was too stiff (relative to tests), but softening the material properties by about 25% resulted in a model with good frequencies and mode shapes.

Recommendations

1. Use the CQUAD4 model, with adjusted stiffness, for future SR-3C-3 vibratory response calculations.

2. Use the CTRIA3 model, with adjusted stiffness, for future SR-2C vibratory response calculations.

3. Redo previous calculations (five other SR-3C-3 points) to quantify the improvement in correlation with test.

4. Consider the use of CQUAD4 elements in future modeling.

5. A trend has been noted that we generally overpredict vibratory response for composite blades, whereas the trend has been for underprediction for solid metal blades (SR-3, SR-5). It has been recently found that the influence of aeroelasticity on the 1P aero loads tends to decrease response. Perhaps the composite blades behave more "aeroelastically" than the metal blades. As a first approximation to modeling the effect of aeroelastic behavior, we do have the ability to study the affect of response attenuation due to 1P blade untwist in NASTRAN. I recommend that this be done for the SR-3 and SR-3C-3 blades, to see if the noted trends can be explained.

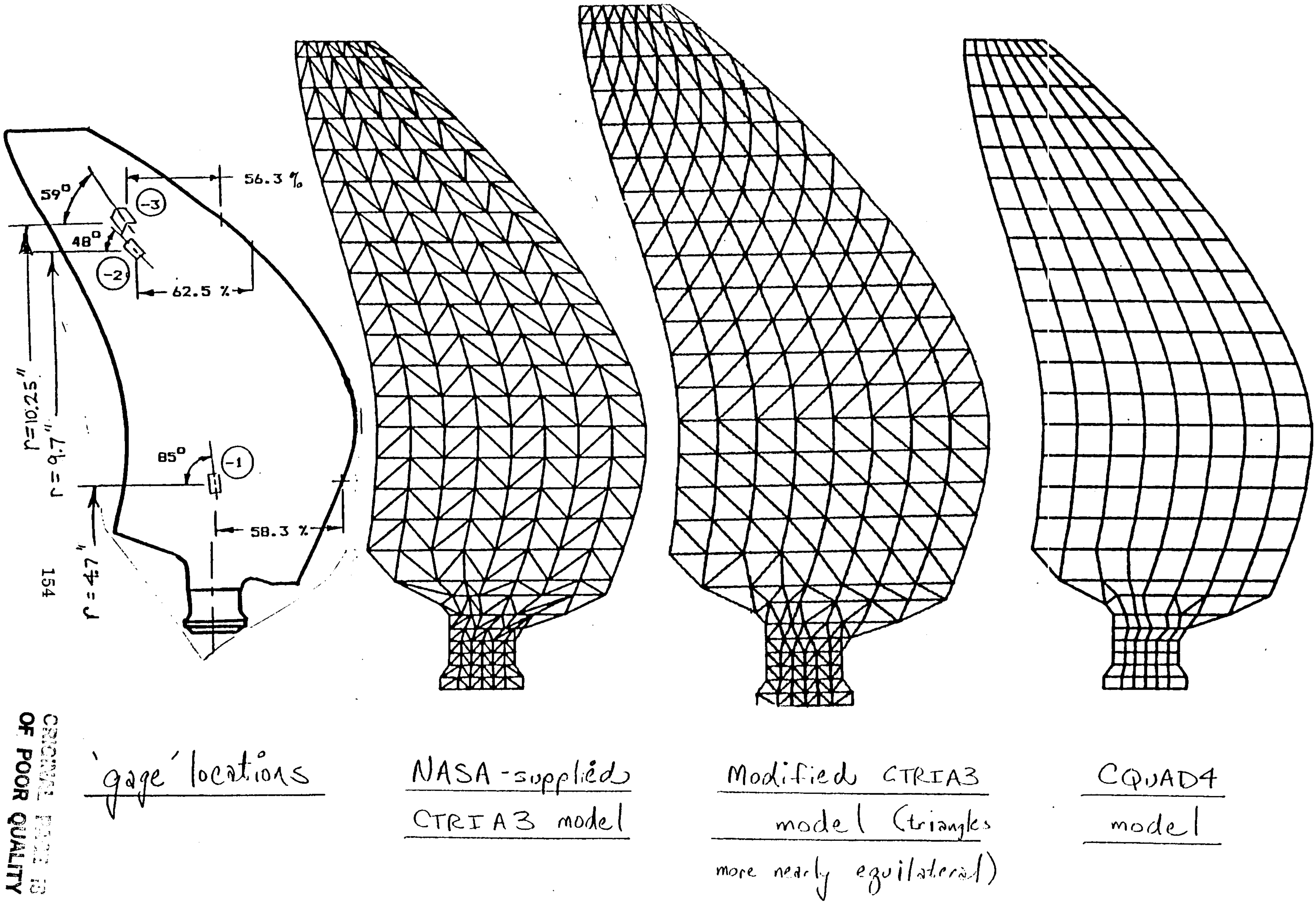
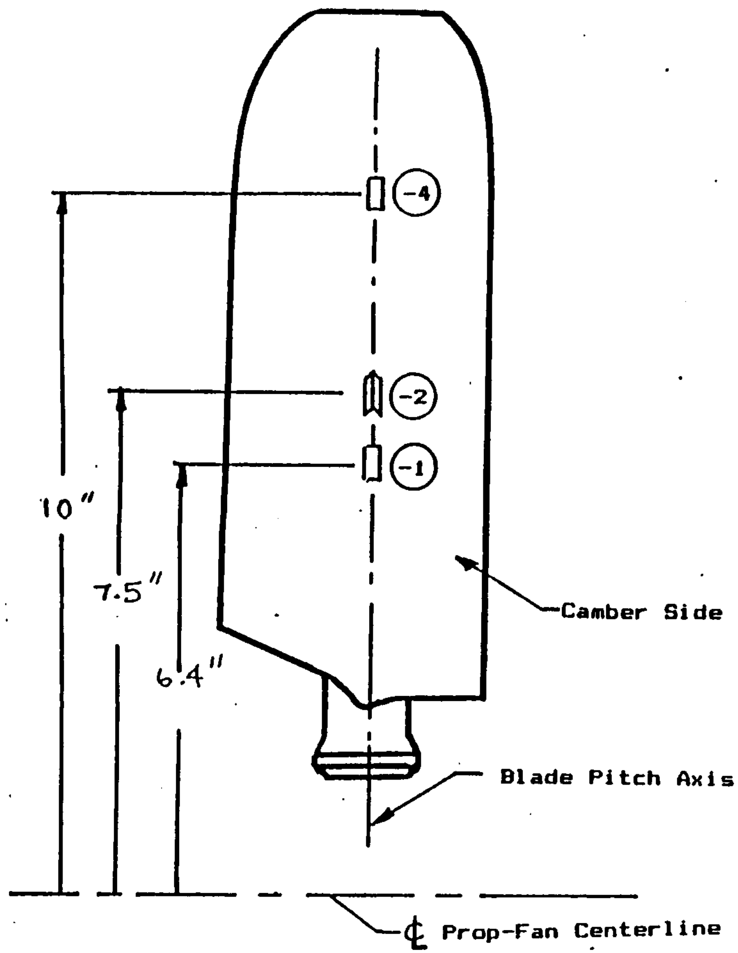
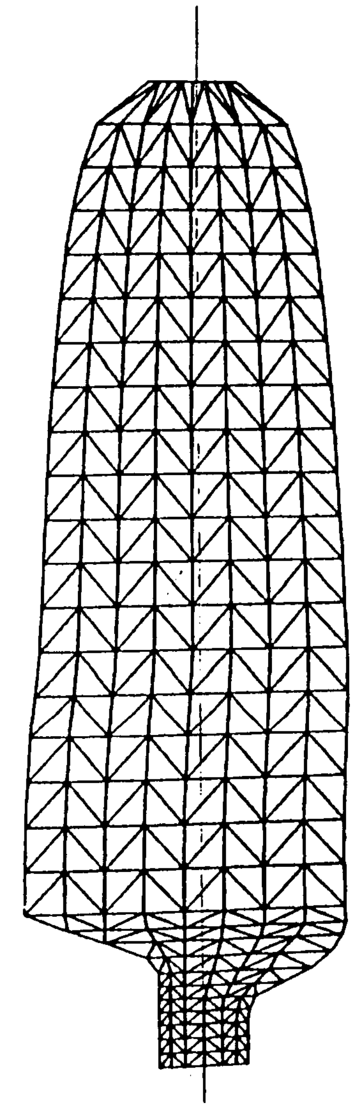


Figure A1 - SR3C-3 Finite Element Models



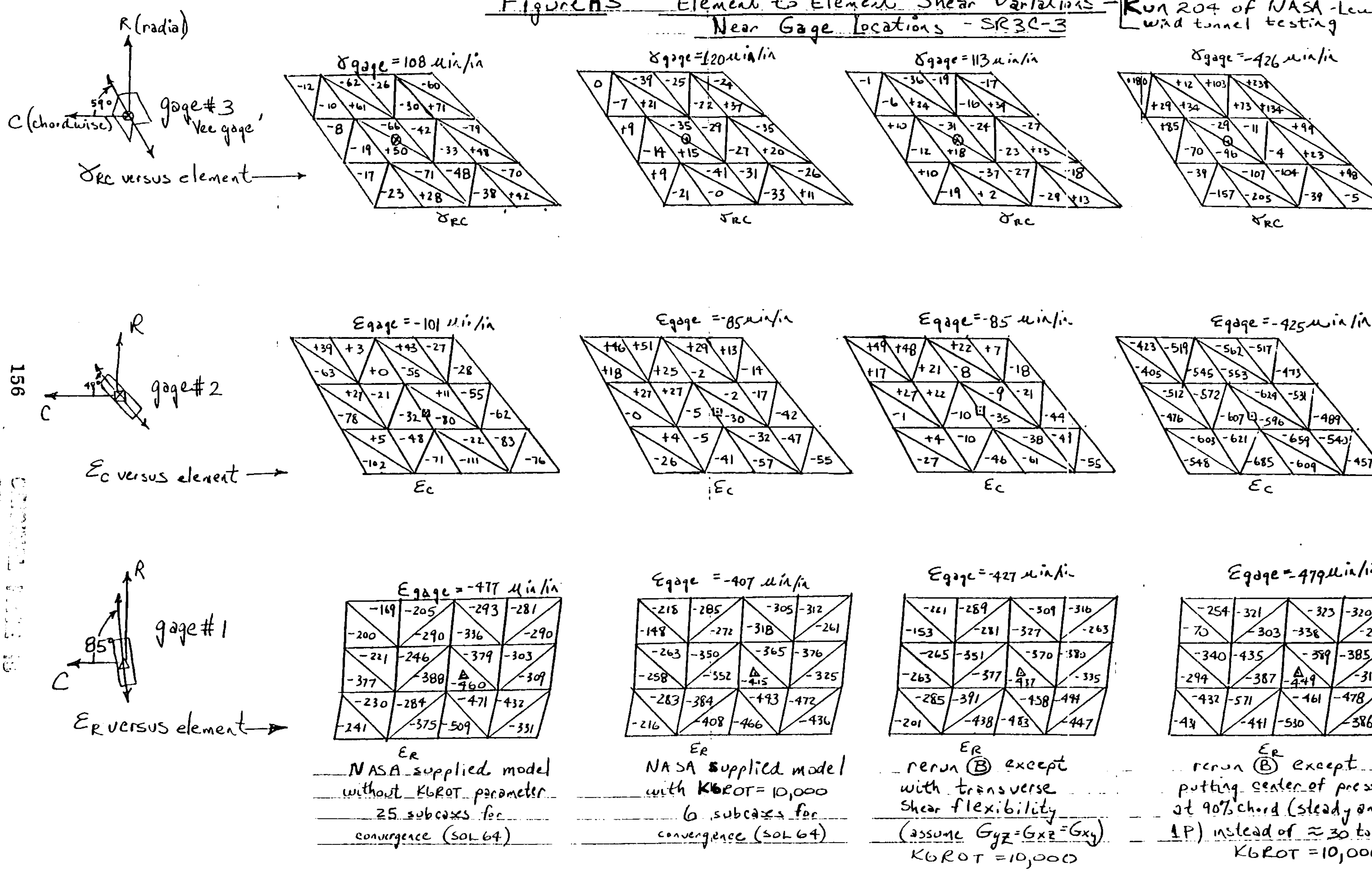
"gage" locations



NASA - supplied
CTRIA3 model

FigureA2 SR2C Finite Element Model

Figure A3 Calculated Element to Element Shear Variations Near Gage Locations - SR3C-3 — [Run 204 of NASA-Lew[is] wind tunnel testing



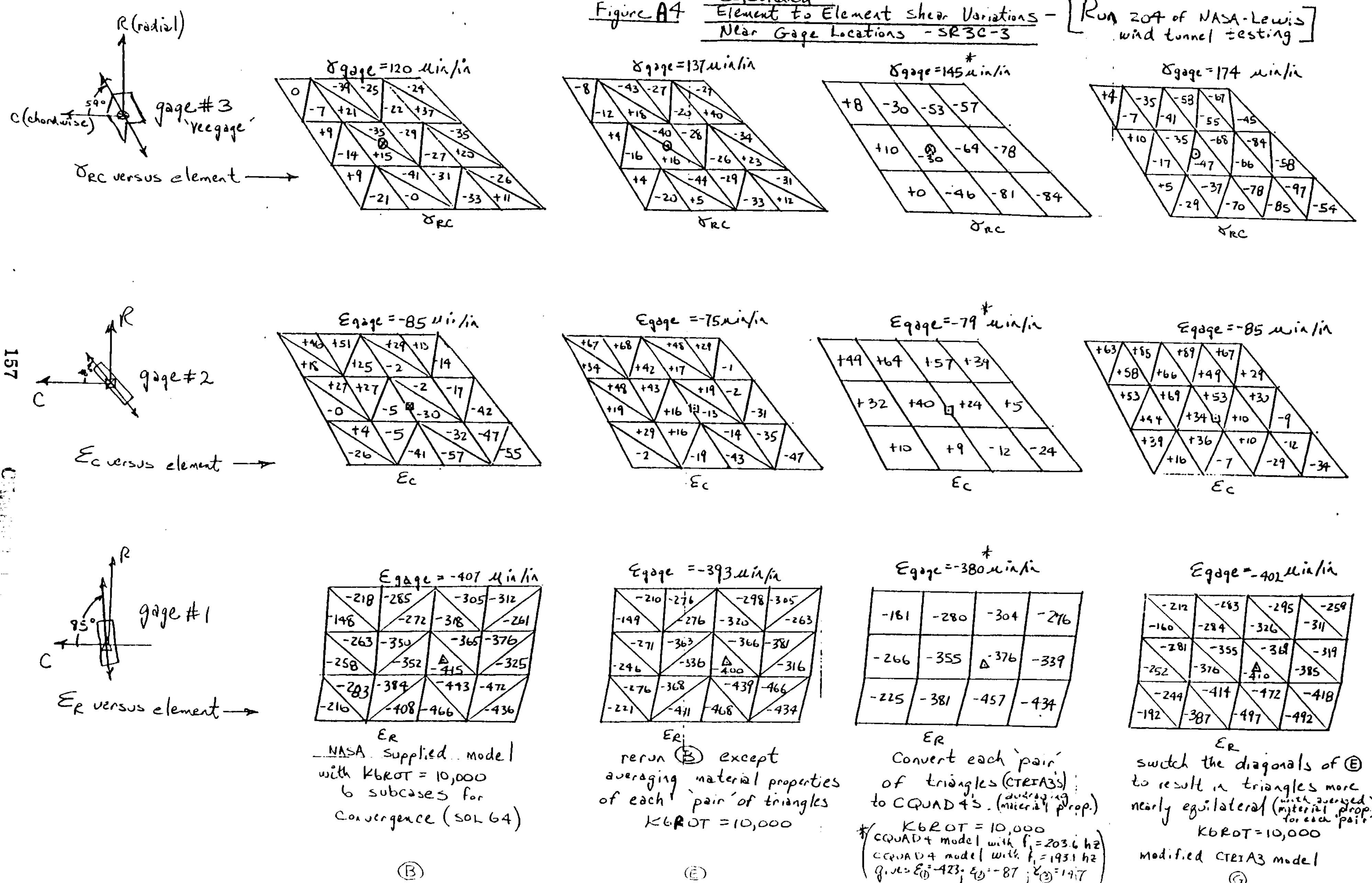


Figure A4 Calculated Element to Element Shear Variations Near Gage Locations - SR3C-3 - [Run 204 of NASA-Lewis wind tunnel testing]

Model to be used for vibration analysis [Stiffness (on MAT2 cards) multiplied by 0.9]

SR-3C-3 - Zero RPM

mode	MSC/NASTRAN with CQUAD4 model				NASA-Lewis Holographic Tests
	K6ROT = 1000	K6ROT = 10,000	K6ROT = 100,000	[G]' = 0.9 [G] K6ROT = 10,000	
①	203.5 hz	(206.8)* 203.6 hz	204.1 hz	193.1 hz	193 hz
②	444.8 hz	(458.1)* 445.1 hz	446.8 hz	422.3 hz	413 hz
③	663.3 hz	(665.8)* 663.5 hz	664.7 hz	629.5 hz	607 hz
④	815.2 hz	(858.6)* 816.2 hz	821.1 hz	774.3 hz	810 hz

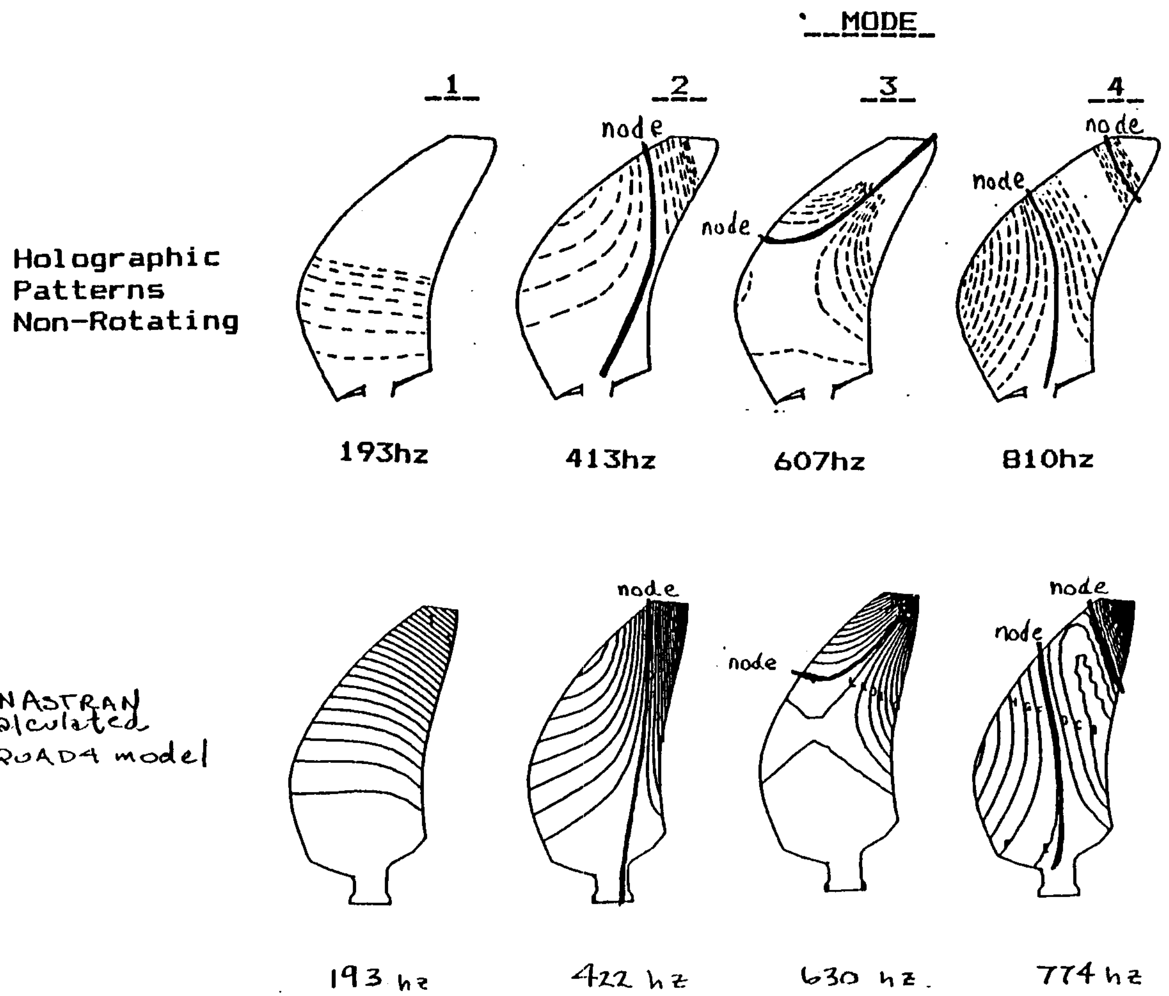
SR3C-3 - Run 204 (NASA-Lewis Tests)

gage	MSC/NASTRAN with CQUAD4 model				Test (from speed-corrected spectrum analysis - average of blades 1 & 5)
	K6ROT = 1000	K6ROT = 10,000	K6ROT = 100,000	[G]' = 0.9 [G] K6ROT = 10,000	
①	380.7 μin/in	(402)* 380.4 μin/in	380.0 μin/in	423 μin/in	321 μin/in
②	79.5 μin/in	(85)* 79.4 μin/in	78.9 μin/in	87 μin/in	248 μin/in
③	145.1 μin/in	(174)* 145.3 μin/in	146.7 μin/in	147 μin/in	190 μin/in

( )* modified CTRIA3 model

model "softened" to match first mode frequency

Figure A5 Effect of K6ROT Parameter on calculated frequencies and gage strains (and comparison to tests) for SR-3C-3 model



note: Stiffness 'adjusted' to match 1st mode frequency

Figure A6 Calculated and Measured Mode Shape Patterns and Frequencies SR3C-3 model to be used for vibration analysis [stiffness (on MAT2 cards) multiplied by 0.75

Mode	HSD MSC/NASTRAN CTRIA3 model				NASA Ames bench tests	NASA Lewis bench tests	NASA Lewis Holographic Tests	HSD Beam model	NASA Cosmic NASTRAN model
	KBROT = 1000	KBROT = 10,000	KBROT = 100,000	[G]' = 0.752 [G] KBROT = 10,000					
①	bomb - non positive definite matrix	160.3	160.6	139	134	139	140	134	138
②		507.2	508.9	439.8	435	401* & 535*	434	437	461
③		869.8	877.0	754.2	750	665	665	756	825
④		1087.6	1096.2	944.9	1026	974	997	1024	1032

NASA supplied Finite Element model (KBROT = 10,000 and KBROT = 100,000 columns)

model 'softened' to match first mode frequency ([G]' = 0.752 [G] column)

* questionable test data

Figure A7 Effect of KBROT Parameter on calculated frequencies (and comparison to tests) for SR2C model

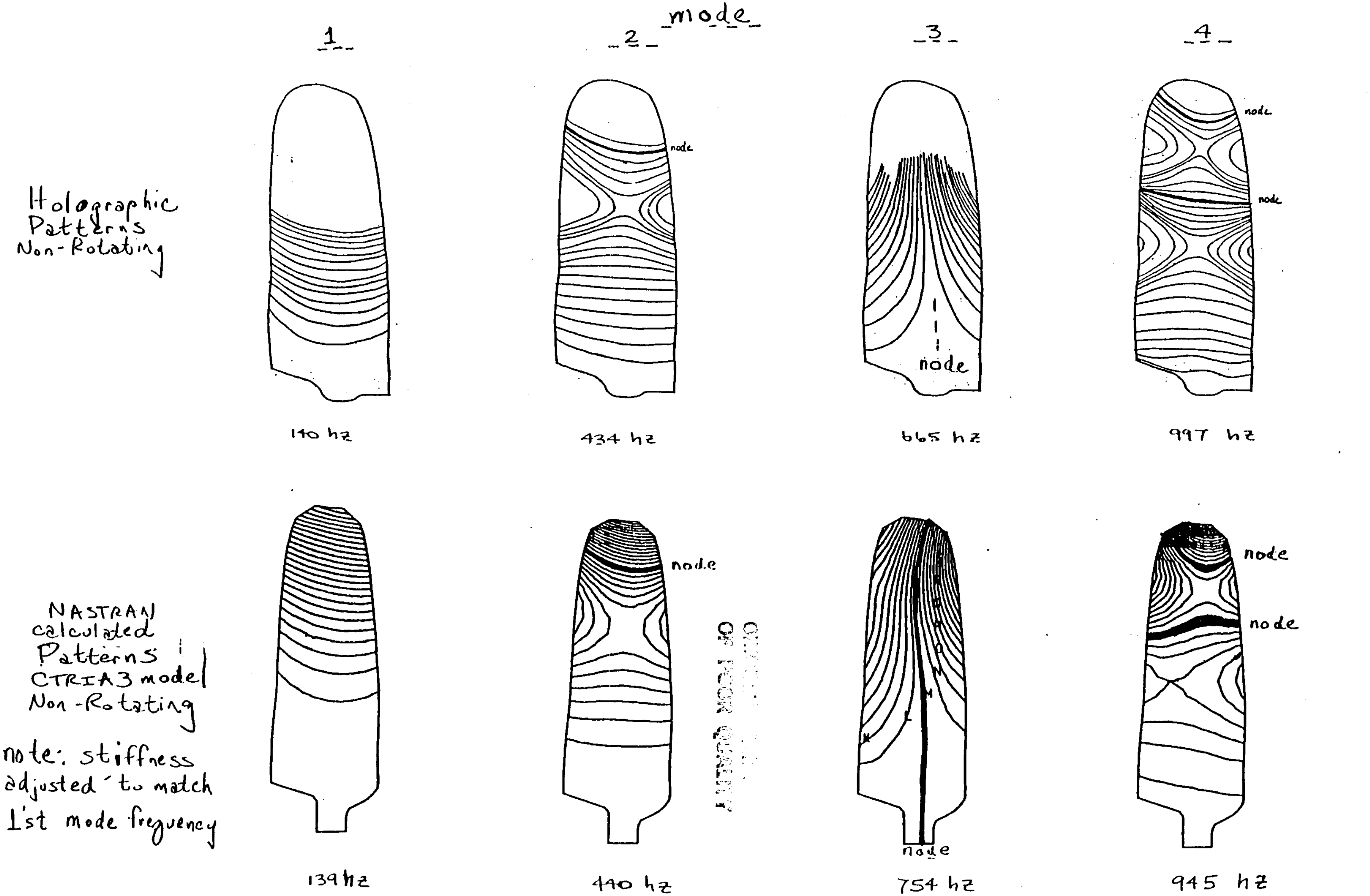


Figure A8

Calculated and Measured Mode Shape Patterns and Frequencies SR2C