Unsteady Pressure Measurements – PSD data - Tecplot files

The power spectral density (PSD) data for each model angle of attack, alpha, is stored in one data file. The form of the data file name is, for example,

Txxx_Rxxx_Pxxx_unsteadypressPSD

Where Txxx: denotes the test number (638 or 640)

Rxxx: denotes the run number, and

Pxxx: denotes the point number

Correlation of these run and point numbers with model angle of attack are given in the tables below.

The internal file structure for these data start with header lines, for example,

```
#Rec,alpha(deg),Q(Pa)
#  23478.56 0.01     0.20
variables=freq(Hz),PSD(Pa^2/Hz)
```

where Rec is chord Reynolds number, alpha is model angle of attack in degrees, and Q is free stream dynamic pressure in Pascals. The numerical values of these quantities are on the line after the variable names. The next line shows the two variables representing the spectra; freq is frequency in Hz and PSD is the power spectral density in Pa^2/Hz. The next line contains the zone information, which is repeated for each sensor. For example,

```
zone, t="chan=26, x=1904.213, y=220.2180, z=194.056"
```

where chan is the sensor number, and x, y, and z, are the geometrical locations, in millimeters, of the sensor. Sensor numbers start at 0 and go through 53. Sensor 2 data are always missing, due to non-function. Sensor 15 data exhibits some noise (peaks at 60 Hz and odd harmonics) at the wind-off zero conditions and at alphas less than -2.5 degrees. At -2.5 degrees and higher, the spectra cover over the noise.

Following the zone information line are the two-columns of spectra data, one frequency/PSD pair per line, from 0 Hz to 50 kHz, in 10 Hz increments.

After a set of PSD data for a sensor (chan) is complete, the next line of zone information for the next sensor (chan) is listed, followed by the corresponding set of frequency/PSD data. This continues until all of the data for all of the sensors is complete.

Below is a table showing the run and point numbers and the corresponding model angles of attack, alpha, and free stream dynamic pressures, Q, for a baseline set of measurements for the model with the F6 wing (Test 638).

Test 638

November 21, 2017

Run	Point	alpha (deg)	Q (Pa)	Comment
13	123	0	0	Wind-off zero
13	124	-5.0	2429.78	
13	126	-7.5	2458.49	
13	127	0.0	2479.95	
13	128	7.5	2496.15	
13	129	-2.5	2523.97	
13	130	0.0	2518.22	
13	131	5.0	2534.63	
13	132	-10.0	2553.62	
13	133	2.5	2560.90	
13	134	0.0	2577.10	
13	136	10	2587.69	
13	137	0	0	Wind-off zero

Test 640

Below is a table showing the run and point numbers and the corresponding model angles of attack, alpha, and free stream dynamic pressures, Q, for a baseline set of measurements for the model with the F6 wing with wing leading-edge extension (Test 640). The maximum negative angle of attack was -7.5 degrees due to the electronically-scanned pressure modules (ESP) over-ranging for some of the steady pressures.

Along with the missing sensor 2 data, data are also missing for sensors 27-31 (covered up by the LE extension) and sensor 50, due to malfunction.

March 16, 2018

Run	Point	alpha (deg)	Q (Pa)	Comment
121	734	0	0	Wind-off zero
121	735	-7.5	2301.79	
121	736	-5.0	2318.15	
121	737	-2.5	2332.44	
121	738	0	2342.02	
121	739	2.5	2348.25	
121	740	5.0	2361.11	
121	741	7.5	2376.23	
121	742	10.0	2394.38	