Appendix G
Rotor Blade Data File Format

In order to be read by the *wtblade.exe* utility program, the rotor blade structural/aerodynamic data file must follow a specific format, as shown in the example file below. At the top of the file must be ten comment lines which are read using the 'A80' FORTRAN format. The content of these lines is up to the user and can be used to document the model in the file. Note again that the accuracy of the simulation is even more dependent, especially for coupled, high frequency response, on the accuracy of the blade input data.

The data lines in the file are organized by radial station into groups of four lines. All quantities in the data are read into double precision variables using list-directed (*) FORTRAN format. The first line of each group contains:

radius	m
mass/unit length	kg/m
mass moment of inertia about y-axis	kg-m
mass moment of inertia about z-axis	kg-m

The second line in each group contains:

CG offset along y-axis	m
CG offset along z-axis	m
elastic axis offset along y-axis	m
elastic axis offset along z-axis	m
structural twist	deg

The third line in each group contains:

torsional stiffness	$N\text{-}m^2$
extensional stiffness	N
bending stiffness about y-axis	$N\text{-}m^2$
bending stiffness about z-axis	$N\text{-}m^2$

The last line in each group contains:

chord length	m
chordwise aerodynamic center offset	m
aerodynamic twist	deg

This is an example input file for the wc86 rotor blade:

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#1 THERE MUST BE EXACTLY TEN COMMENT LINES AT THE TOP OF THIS FILE!
#2  Data in this file is organized in sets of four lines.
#3  Line 1 is radius, mass, Iy, Iz
#4  Line 2 is y_CG_offset, z_CG_offset, y_ea_offset, z_ea_offset,  twist.
#5  Line 3 is GJ, EA, EIy, EIz
#6  Line 4 is chord, z_ac_offset and aerodynamic twist.
#7 x is radial, y is to pressure, z is to leading edge. Twist is about
#8 +x Use consistent SI units. Twist is in degrees.
#9
#0 This example is by Andy Elliott @MDI. Feb, 1994.
  9.9609E-01  1.1806E+02  1.1120E+00  3.7180E-01
              0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -1.1000E+01
              8.4710E+06  7.9260E+08  1.0579E+08  3.5373E+07
              8.4338E-01  3.6576E-02 -1.1000E+01
  1.6160E+00  9.7626E+01  8.1020E-01  2.4360E-01
              0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -1.0400E+01
              5.8310E+06  7.4070E+08  9.3227E+07  2.8026E+07
              9.3543E-01  4.5720E-02 -1.0400E+01
  2.8257E+00  6.0925E+01  4.5180E-01  6.3970E-02
              0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -1.0200E+01
               3.3080E+06  6.3950E+08  8.3309E+07  1.1794E+07
              1.0817E+00  5.4864E-02 -1.0200E+01
  4.0340E+00  5.7549E+01  4.2340E-01  4.0690E-02
              0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -1.0100E+01
              2.1940E+06  5.3840E+08  8.2648E+07  7.9425E+06
              1.1360E+00  6.7056E-02 -1.0100E+01
  5.2438E+00  5.1005E+01  3.0620E-01  2.3990E-02
              0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -7.5000E+00
              1.4790E+06  4.3720E+08  6.7441E+07  5.2853E+06
              1.1064E+00  7.6200E-02 -7.5000E+00
  6.4535E+00  4.4031E+01  1.9570E-01  1.3530E-02
              0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -6.8000E+00
              9.9970E+05  3.3600E+08  4.9919E+07  3.4506E+06
              1.0308E+00  6.7056E-02 -6.8000E+00
  7.6633E+00  3.7204E+01  1.1390E-01  7.2100E-03
              0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -4.5500E+00
              6.3960E+05  2.3470E+08  3.4382E+07  2.1769E+06
              9.5951E-01  6.4008E-02 -4.5500E+00
  8.8730E+00  3.0809E+01  5.9190E-02  3.5400E-03
              0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -2.9000E+00
              3.7880E+05  1.8840E+08  2.1579E+07  1.2905E+06
              8.4704E-01  5.7912E-02 -2.9000E+00
  1.0082E+01  2.5753E+01  3.2980E-02  1.5720E-03
              0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -1.4670E+00
              2.1240E+05  1.8840E+08  1.4385E+07  6.8598E+05
              6.9586E-01  5.4864E-02 -1.4700E+00
  1.1293E+01  2.0079E+01  1.3800E-02  5.3530E-04
              0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -1.4140E+00
              9.8500E+04  1.8840E+08  7.7235E+06  2.9952E+05
              6.3490E-01  4.8768E-02 -1.4100E+00
  1.2502E+01  1.2090E+01  2.5250E-03  9.1820E-05
              0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -1.3230E+00
              3.2540E+04  1.8840E+08  2.3464E+06  8.5293E+04
              4.8616E-01  3.3528E-02 -1.3200E+00
  1.3106E+01  1.2090E+01  2.5250E-03  9.1820E-05
              0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -2.7000E-02
              3.2540E+04  1.8840E+08  2.3464E+06  8.5293E+04
              3.0480E-01  3.0480E-02  0.0000E+00
```