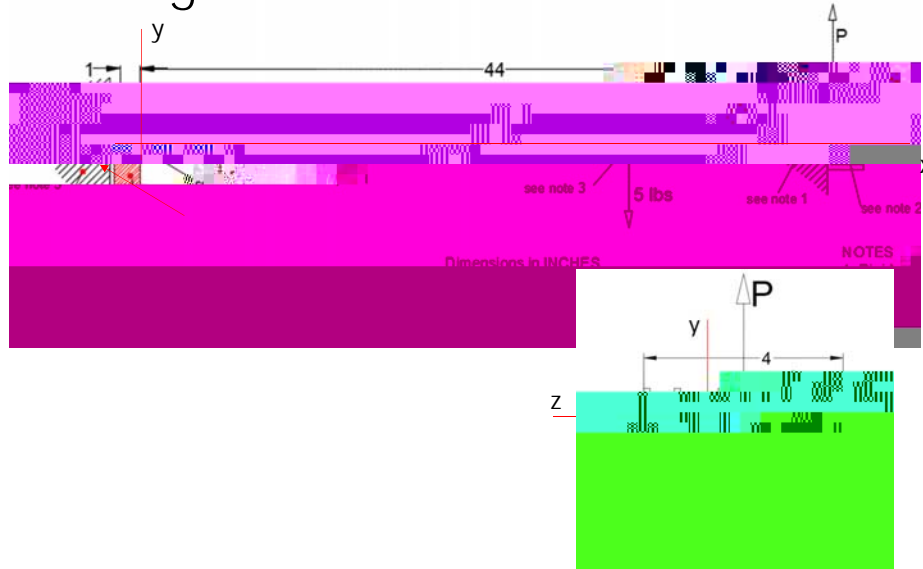# Loading

NOTE: The teams will be provided with end foam ribs (1.00in thick) to be inserted at the free and fixed ends. The stringers, spars and skin must extend the entire length (45 inches)

Scoring rubric

The designs will be scored based on the following formula

$$Score = S_{performance} + S_{analysis} + S_{report}$$

$$S_{performance} = 0.5 \frac{P_{max}}{W_{Wing}} + 0.1 \frac{Q}{\delta_Q} + 0.05 \left(\frac{P_{max}}{\delta_{max}} + \frac{P_{max}}{\theta_{max}}\right) + 10 \frac{W_{Wing}}{0.5}$$

$$S_{analysis} = 10\left[1 - f\left(P_{max}, P_{pred}, 0.1\right)\right] + 10\left[1 - f\left(\delta_Q, \delta_{Q\_pred}, 0.1\right)\right] + 10\left[1 - f\left(\delta_{10}, \delta_{10\_pred}, 0.1\right)\right]$$

$$f\left(A, A_{pred}, \varepsilon\right) = \begin{cases} 0 & \dfrac{\left|A - A_{pred}\right|}{A_{pred}} \leq \varepsilon \\[2ex] \dfrac{\left|A - A_{pred}\right|}{A_{pred}} & otherwise \end{cases}$$

Note : The tolerances for strength and stiffness are based on variability in material properties.

W_{TOTAL} ~ Total weight (wing box + end block)

$W_{SUPPORT}$ ~ Weight of end block

W_{WING} ~ weight of wingbox (lbs)
(should not exceed 0.7 lbs)

P_{max} ~ Measured failure load

P_{pred} ~ predicted failure load (lbs)

δ_{15} ~ Measured end deflection (along load) at P=15 lbs (+Q=5lbs)

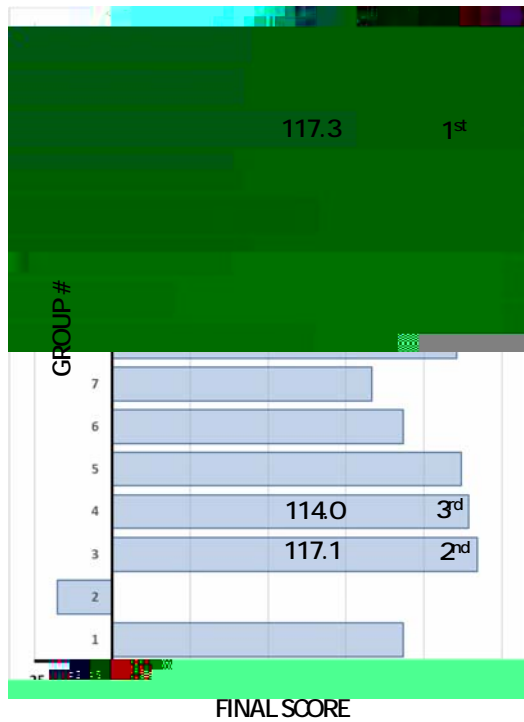δ_{15_pred} ~ Predicted end deflection (along load) at P=15 lbs (+Q=5lbs)

δ_Q ~ Measured end deflection (along load) at Q=5 lbs

δ_{Q_pred} ~ Predicted end deflection (along load) at Q=5 lbs

δ_{max} ~ Measured end deflection at failure

θ_{max} ~ Measured end twist at failure (degrees)

AirBus A525 Wingbox contest (2018 19) : Winners

- 1ST PLACE
  - Paul Fawcett, Jonathan Carlson, Leandre Copil, Selman Okmen, Kristopher Stewart
- 2ND PLACE
  - Chun Yu Lim, Jongwon Lee, Jun Chang Teoh, Yee Min Choo, Zhao Heng Tan
- 3RD PLACE
  - Darin Parker, Oleksiy Zadorozhnyy, Ruben Reyes, Ryan Lynch

BREAKDOWN OF SCORES