

# AirBus A E 525 Wingbox contest (Fall 2021)

- Design and Build the **lightest semimonocoque wingbox** to withstand the bending and twisting loads. The cantilevered wingbox weighing **no more than 0.7 lbs** must carry a dead load 'Q' of 5 lbs and minimum end load 'P' of **15f** to qualify. The wingbox will be tested to failure and the team achieving the highest score based on a weighted rubric will be the winner. The score will be based on the wing design documentation, construction quality, and performance.

## Eligibility:

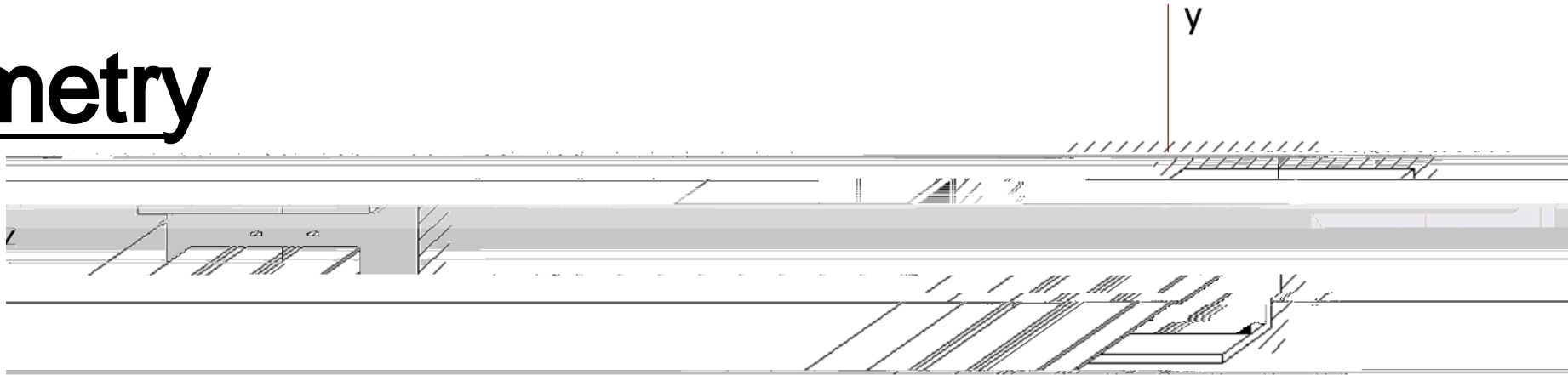
Open to student groups (4) enrolled

## Deadlines:

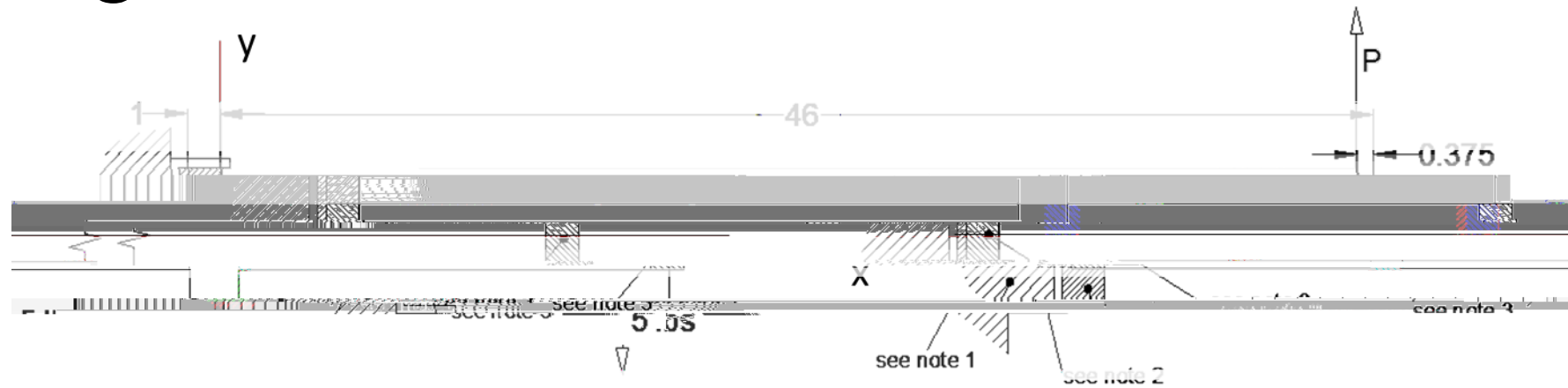
Entry : Enrolled in AE 525

Submission **5PM (CDT), December 3<sup>rd</sup> 2021**

# Geometry



# Loading

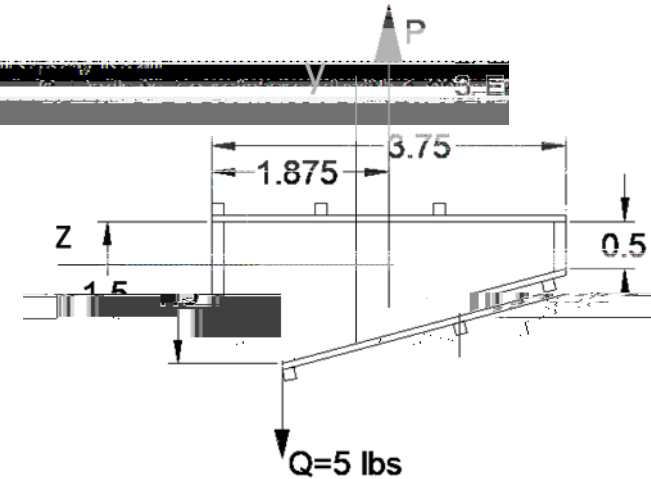


Dimensions in INCHES

NOTES

1. Rigid support
2. End potted in epoxy resin

ends to be reinforced with 1.00in thick balsa rib



NOTE: The teams will be provided with Balsa ribs (1.00in thick) to be inserted at the free and fixed ends. The stringers, spars and skin must extend the entire length (47 inches)

# Scoring rubric

The designs will be scored based on the following formula

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

$$S_{performance} = 0.5 \frac{P_{max}}{W_{Wing}} + 0.1 \frac{Q}{G} + 0.05 \frac{P_{max}}{G} + \frac{P_{max}^a}{P_{max}^b} \left( \frac{10}{G} \frac{W_{Wing}}{0.7} \right)^T$$

$$S_{analysis} = 10 \cdot 1 \cdot f_{P_{max}, P_{pred}} \cdot 0.1 + 10 \cdot 1 \cdot f_{Q, G_{Q_{pred}}} \cdot 0.1 + 10 \cdot 1 \cdot f_{15, G_{15_{pred}}} \cdot 0.1$$

~ Total weight (wing box + end block)

~ Weight of end block

~ weight of wingbox (lbs)

(should not exceed 0.7 lb )

~ Measured failure load

~ predicted failure lo of end

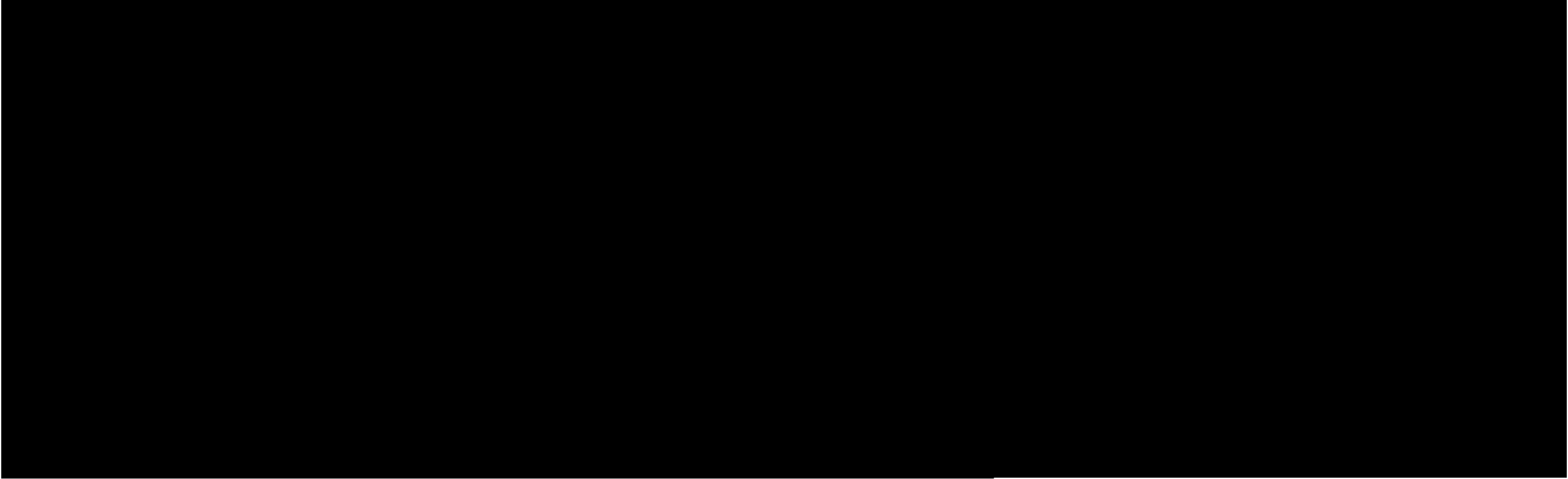
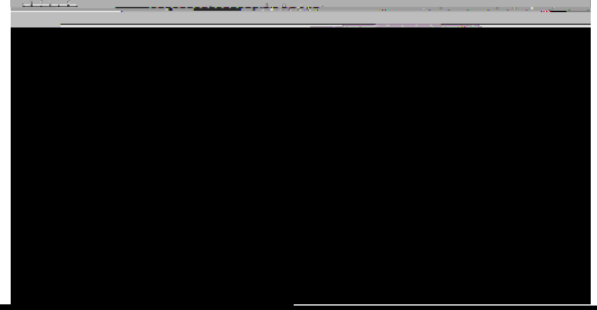
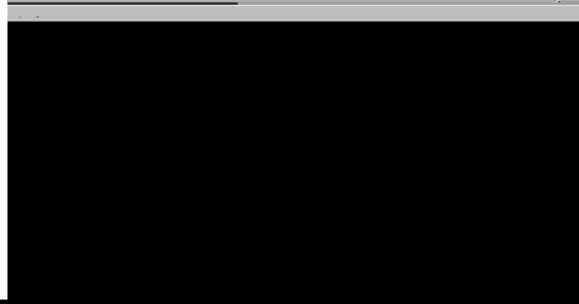
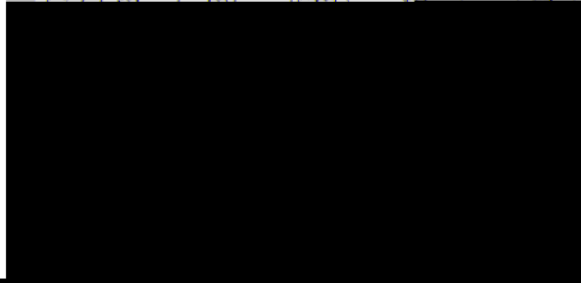
- 1<sup>ST</sup> PLACE

- David Nevarez Saenz, Lim Ze Shen (Jason), Manish Mahajan, Pedro Cupertino, Vicknes Prasad

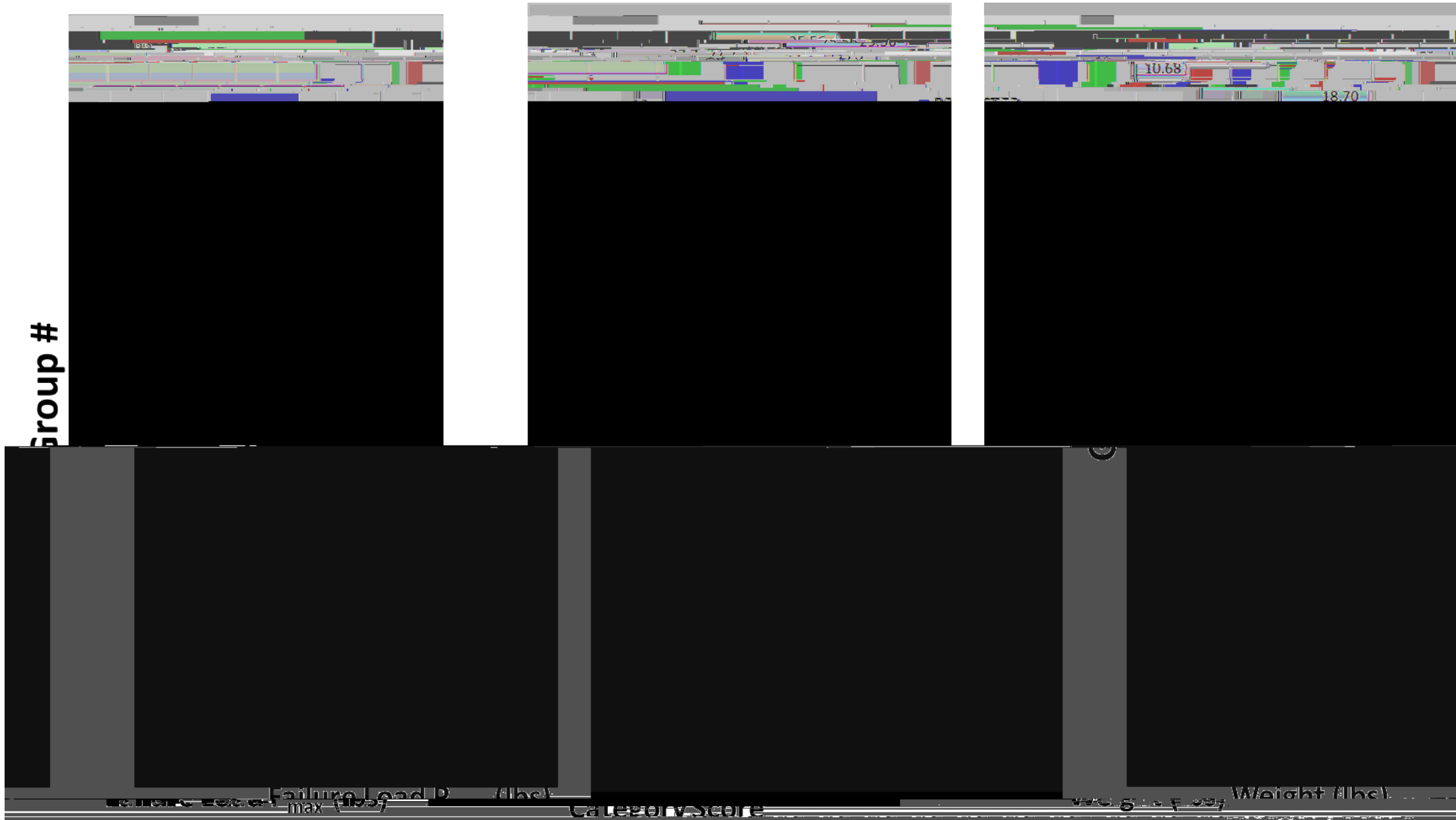
- 2<sup>ND</sup> PLACE

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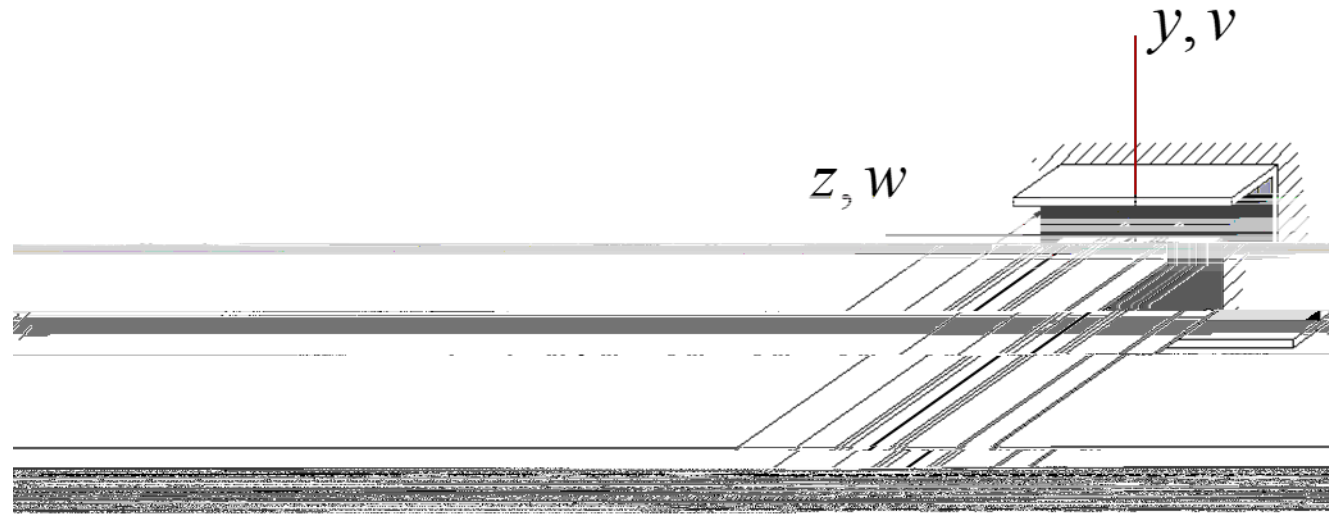
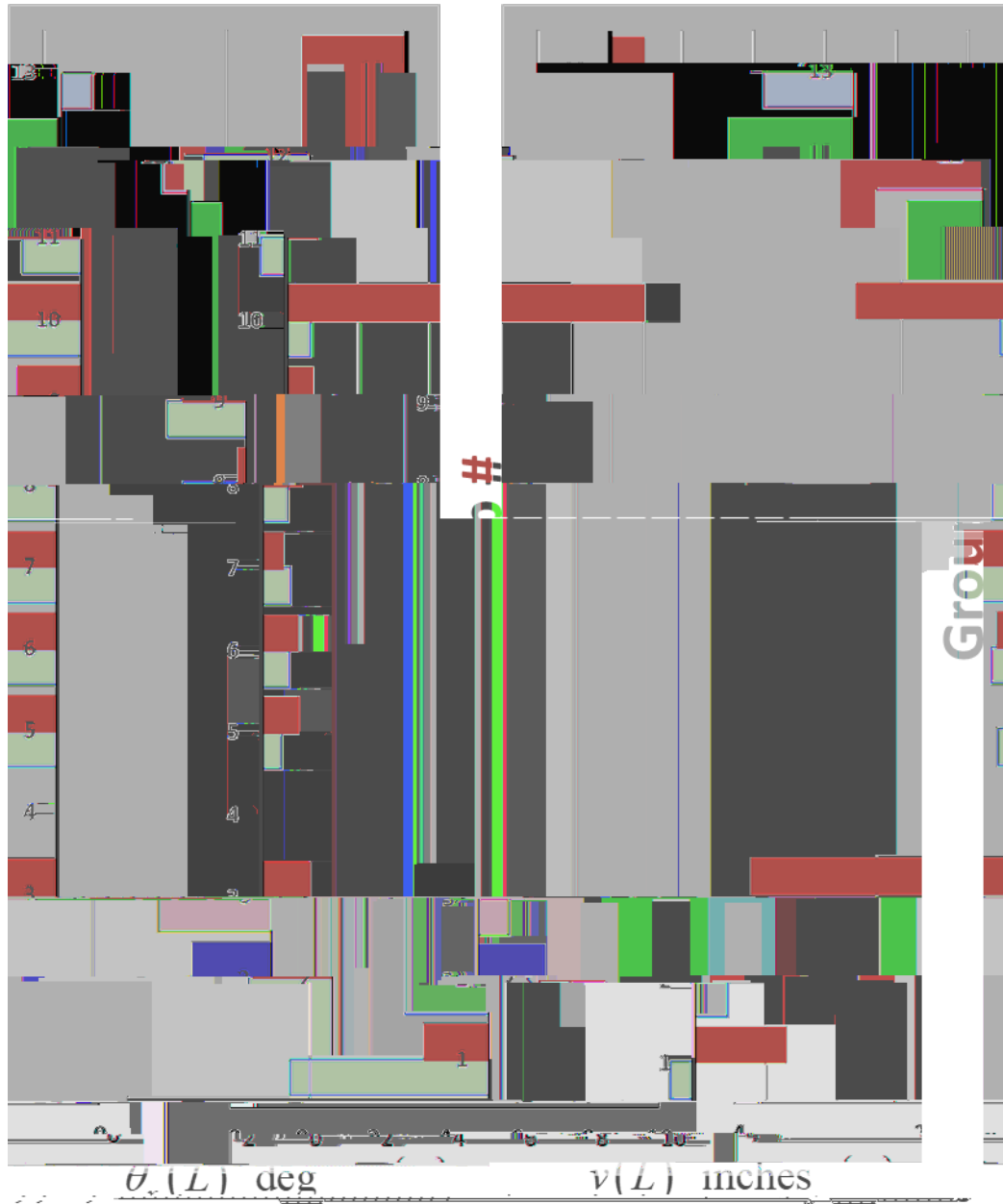
# Crosssection geometries..



# BREAKDOWN OF SCORES



# MEASUREMENTS & PREDICTIONS (P-5)





# MEASUREMENTS & PREDICTIONS ~~(\$Q=515 lb)~~



