

Case Study

Image Courtesy of Trinity Trailer

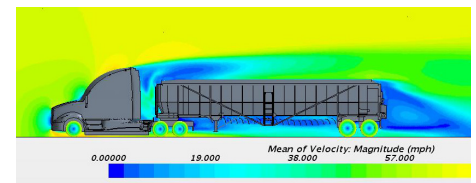
Prediction of Wind Drag on a Semi-Trailer

OVERVIEW

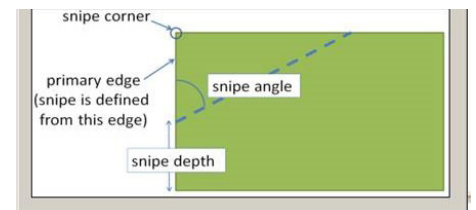
Trinity Trailer has a unique design for their Eagle Bridge semi-trailer. It does not have the typical “boxy” shape of the more conventional trailers, and as a result there is a certain amount of structure exposed to the wind. Trinity was interested in knowing how the wind drag on their trailer compares to the drag on a more conventional trailer. They were also interested in knowing what aspects of the trailer’s shape contribute most to the drag.

TASKS PERFORMED & KEY OUTCOMES

- Created CFD models of Trinity semi-trailer and a more conventional trailer, each being pulled by a generic tractor.
- Performed CFD analysis to determine flow field around each. Analyses were performed both with headwind only and with a sidewind component.
- Compared predicted wind drag on the Trinity trailer with the conventional trailer.
- Identified major sources of drag for each and generated comparisons of the major drag contributors for the two designs.
- Analysis results suggest that the drag is more affected by the overall size/shape of the trailer and the “aerodynamic match” to the tractor than by any small amount of trailer structure that is exposed to the wind.



Velocity contours



Velocity streamlines