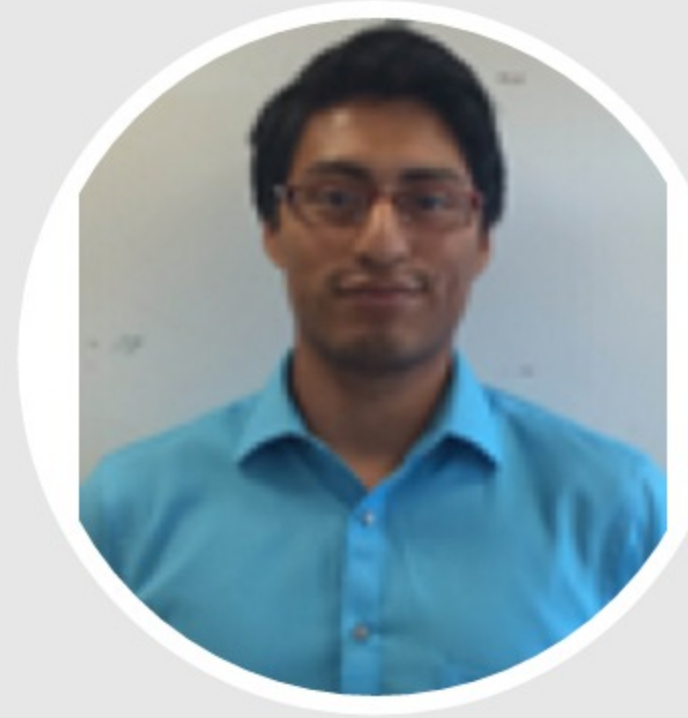


Universal Hydraulic Tank and Mounting System



Julio Romero
Project Manager



Krista Arnevik
Design Engineer

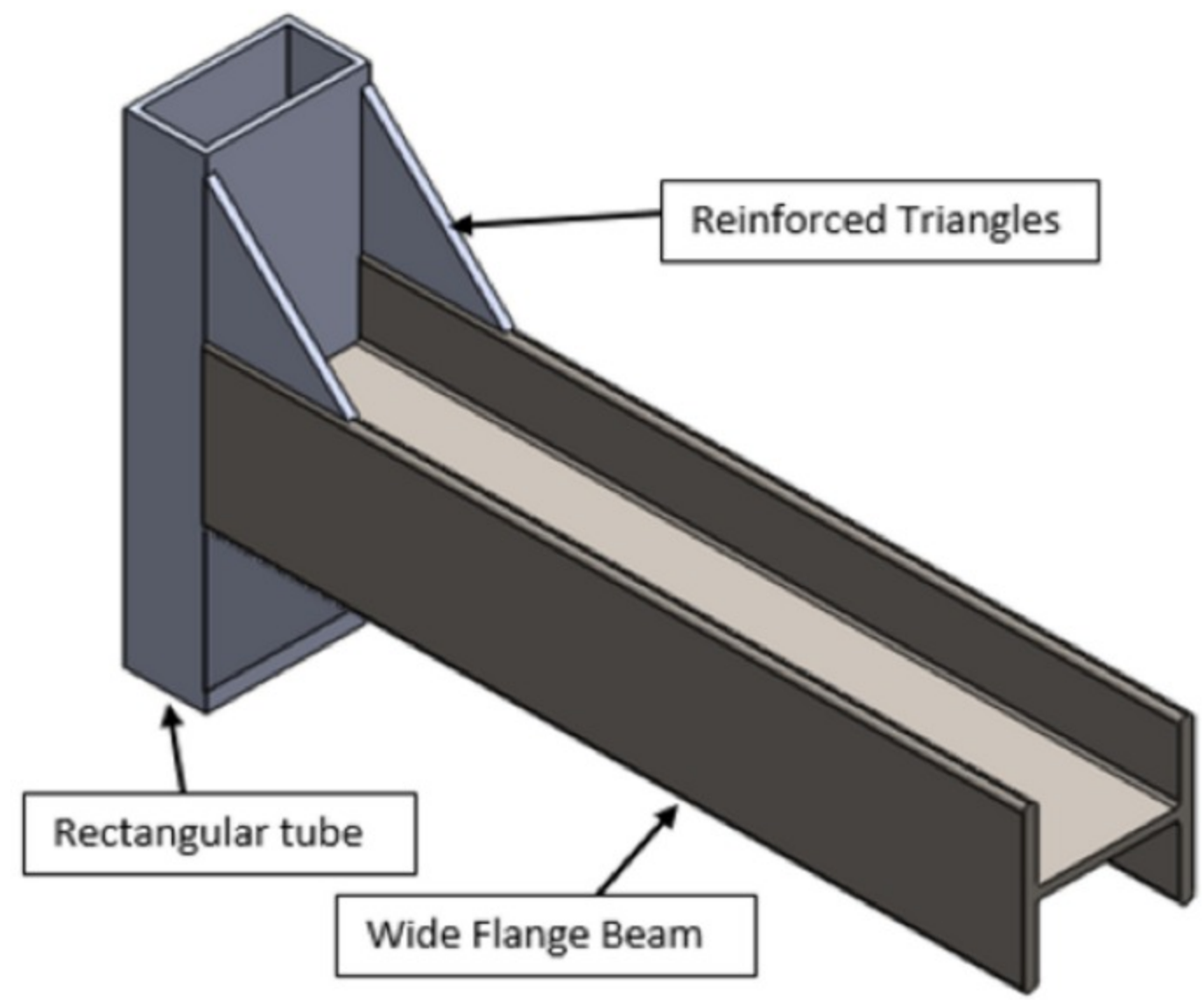


Kaz Anderson
Design Engineer

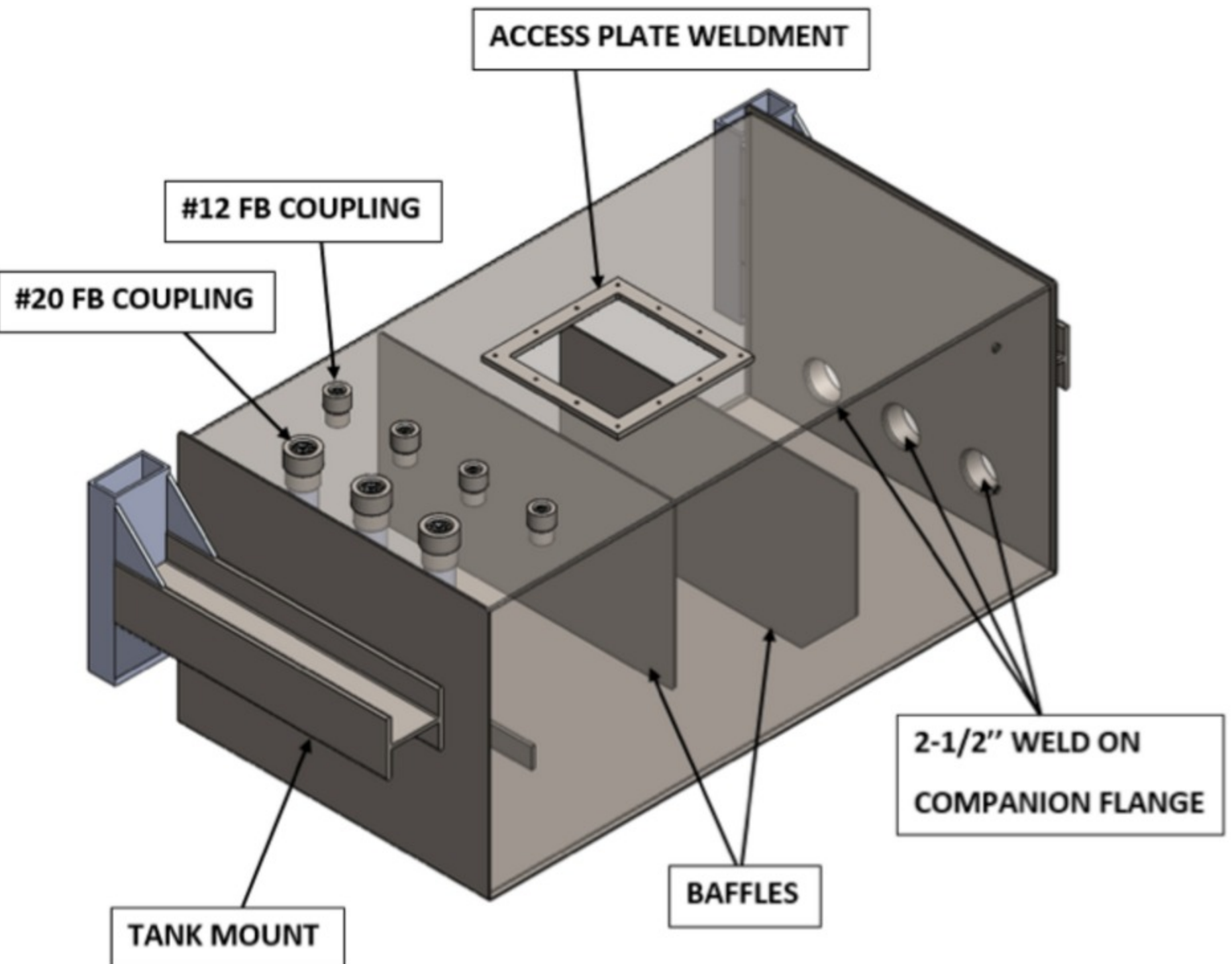


Ana Gonzalez
Industrial Engineer

Mounting System

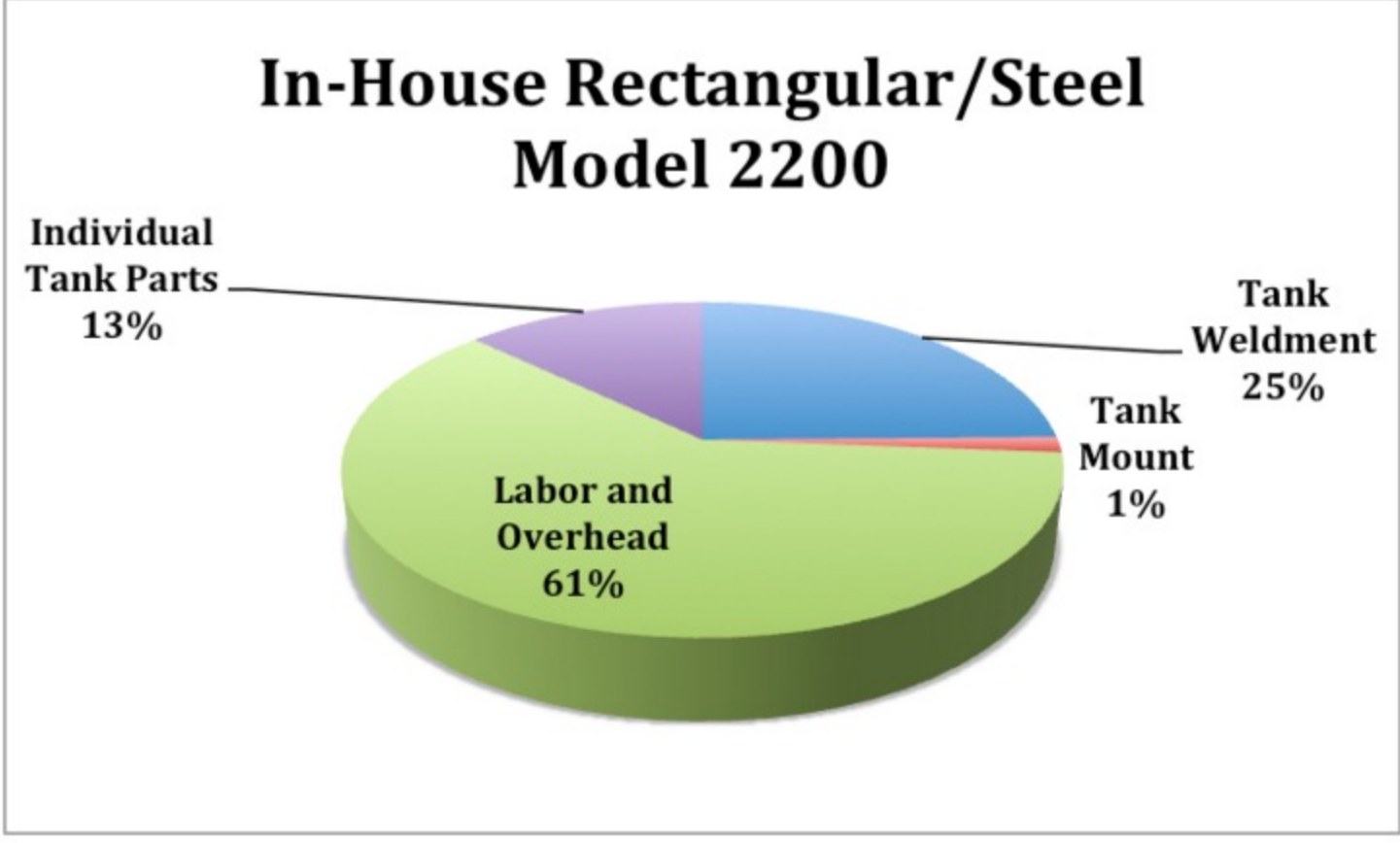
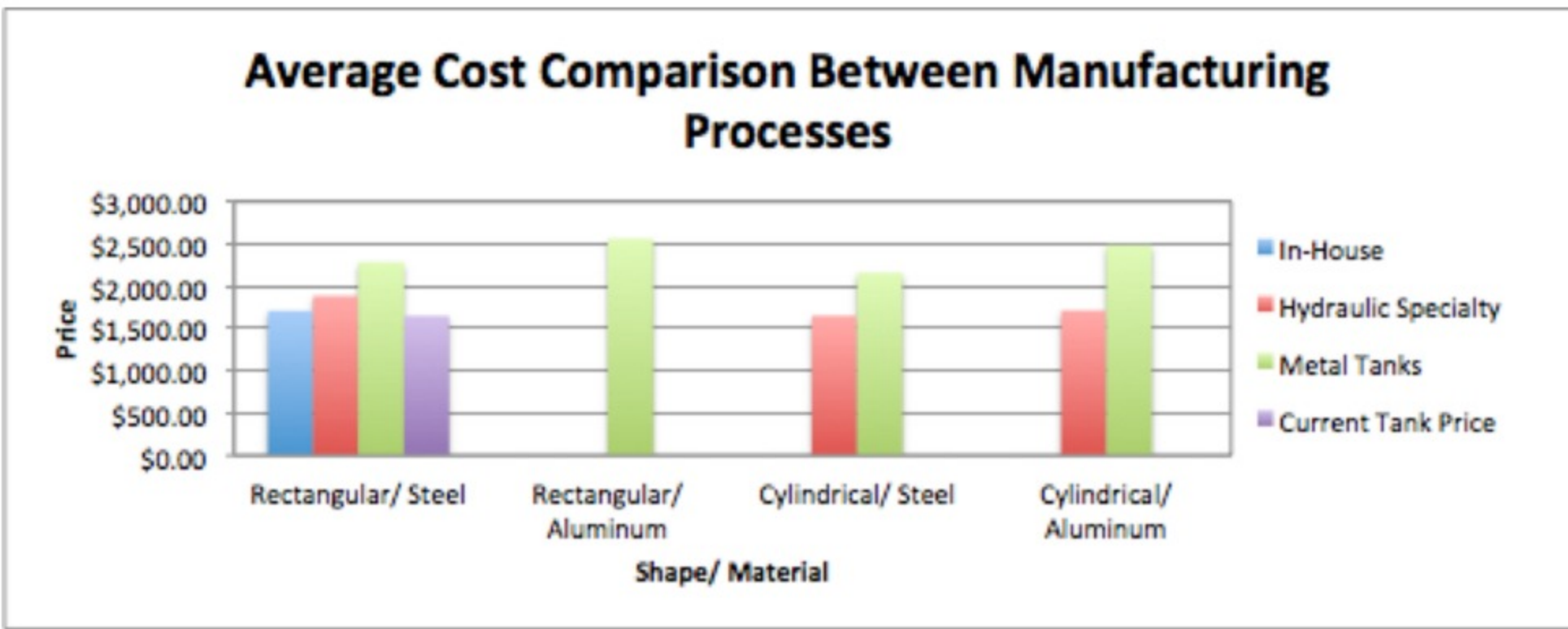


Hydraulic Tank



55 gallon Rectangular/ Steel Hydraulic Tank

Economic Analysis



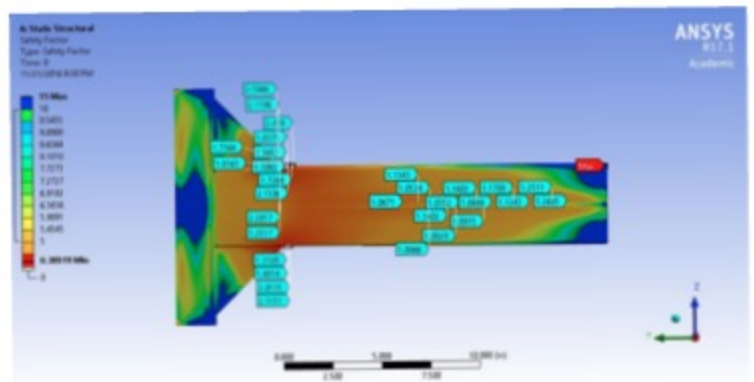
Engineering Analysis

Finite Element Analysis

- Deceleration force in X-direction: **153 lbs**
- Overall Weight of Tank in Y-direction: **300 lbs**
- Yield Strength of A572-50 steel: **46 ksi**

Welding Analysis by SolidWorks

- The current weld size of 3/16" is sufficient on each weld



Fatigue Analysis

- Fatigue factor of safety $n_f = 2.6$
- Max Load: **500 lb** & Min Load: **100 lb**
- Mean load: **300lb** & Alternating Load: **200 lb**

Computational Fluid Dynamic Analysis

- This test used data from the USDOT
- Tank is slowing down at **16.40 ft/s²**
- Shows behavior of tank stopping at **65 mph**
- **9.0%** Fluid reduction

Mision Statement

- UMD Builtrite Engineering has analyzed the multiple current hydraulic oil tanks used on the Truck Mounted Material Handlers and designed a single hydraulic oil tank and mounting bracket that will be adaptable and compatible to all four models

Opportunity Statement

- Builtrite Handlers and Attachments would like to see a universal hydraulic oil tank design that will reduce tank lead times, increase manufacturing consistency, lower average cost of purchasing tanks, and increase stock supply from vendors

Constraints

(1) A material budget of \$800 for one steel tank. (2) The size of the tank should provide an adequate oil reservoir for models: 88, 1010, 1300, and 2200 Truck Mounted Material Handlers. (3) The tank must be able to mount to truck beds with a single mounting design

Solution

- 55 gal rectangular/steel hydraulic tank which consolidates the current hydraulic oil tanks used on these models down to a single universal tank with accurate port configuration, adequate oil capacity amongst the four hydraulic systems, and to reduce the sloshing effect on the inside of the tank

Acknowledgements

