Universal Hydraulic Tank and Mounting System

Mounting System
- Rectangular tube
- Wide Flange bolts
- Reinforced Triangles

Hydraulic Tank
- Access Plate Weldment
- 3/8" FB COUPLING
- TANK MOUNT
- TANK MOUNT

55 gallon Rectangular/Steel Hydraulic Tank

Economic Analysis

Engineering Analysis
- Average Cost Comparison Between Manufacturing Processes

Finite Element Analysis
- Deceleration force in X-direction: 153 lbs
- Overall Weight of Tank in Y-direction: 300 lbs
- Yield Strength of AISI72-50 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 = 2.6
- Max load: 500 lbs & Min Load: 100 lbs
- Mean load: 300lbs & Alternating Load: 200 lbs

Computational Fluid Dynamic Analysis
- This test used data from the USDOT
- Tank is slowing down at 16.40 ft/s^2
- Shows behavior of tank stopping at 65 mph
- 9.0% Fluid reduction

Mision Statement
- UMO Builfitite 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 4 models

Opportunity Statement
- Builfitite 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
- A material budget of $800 for one steel tank
- The size of the tank should provide an adequate oil reservoir for models 88, 1010, 1300, and 2200 Truck Mounted Material Handlers
- 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

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