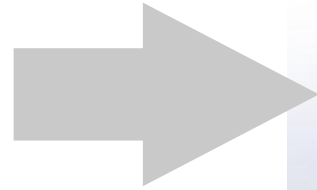


Redesign of a Tractor-trailer Sprayer Prototype



Presented by Alberta Petiafo

New Prototype



1

2

3

Tractor with 3 point hitch



Vertical Spraying



Horizontal Spraying



SPRAYER
TEAM

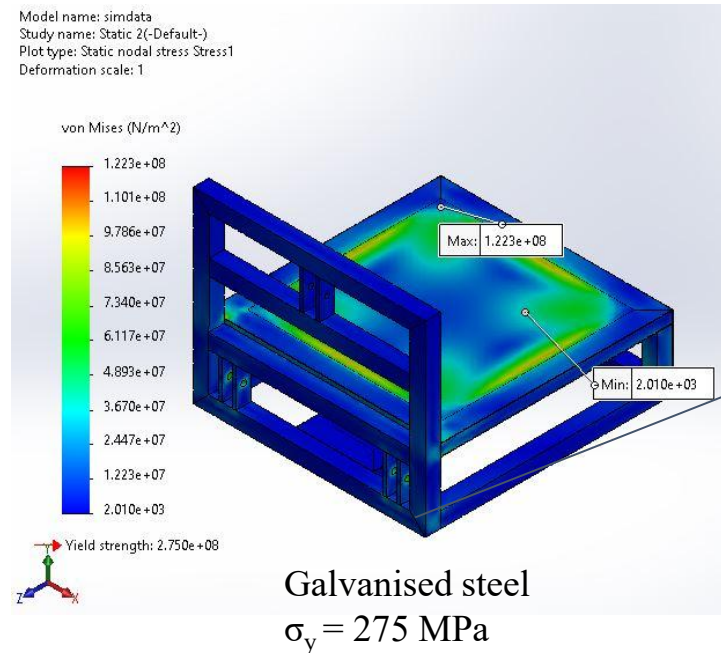
Frame Design and Simulations

Materials

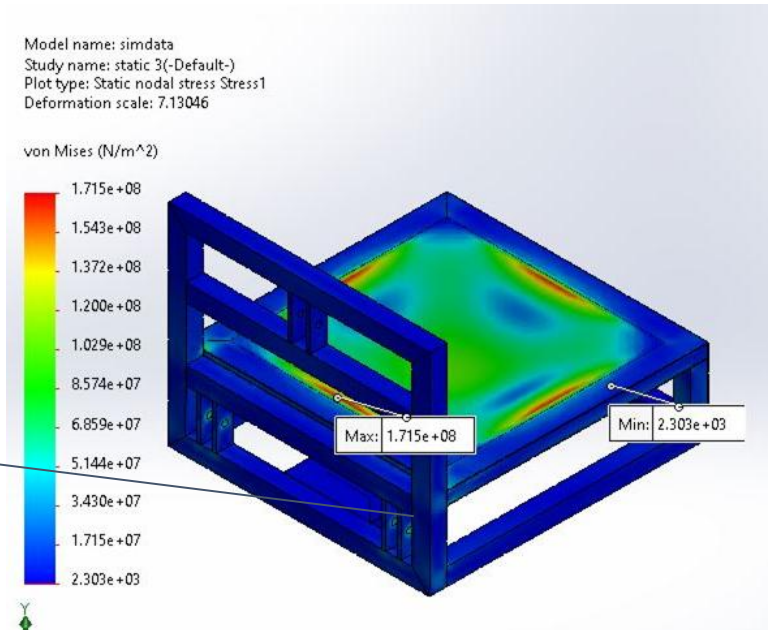
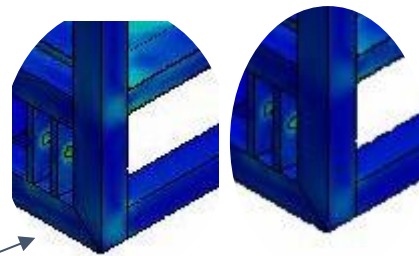
Galvanized steel (ASTM A653 CS Type B)

Mild Steel (AISI 1018)

Weight of water tank=1000 kg



Critical areas

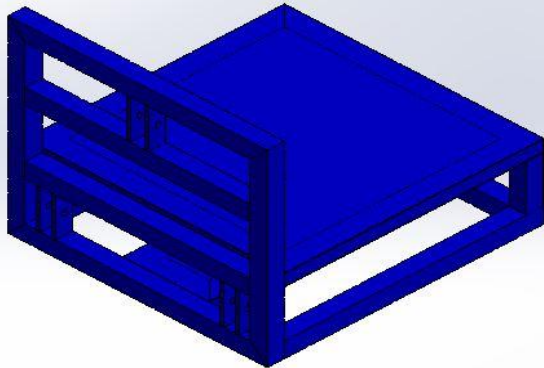
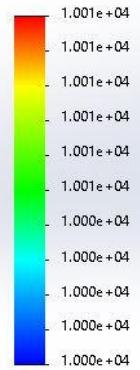


The simulation was conducted with SN curve of the core material of the galvanized steel without considering the effects of coating integrity or hydrogen embrittlement.

Fatigue Analysis of Materials

Model name: simdata
Study name: Fatigue 2(-Default-)
Plot type: Fatigue(Damage) Results1

Damage Percentage

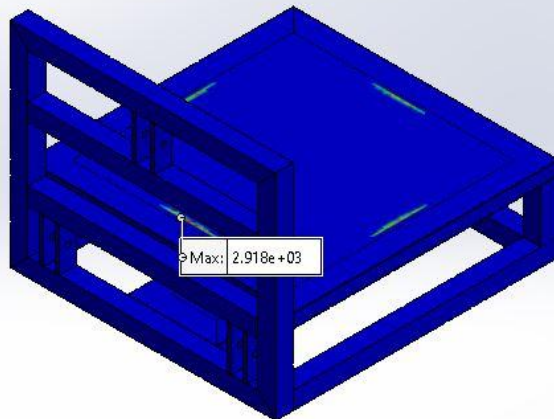
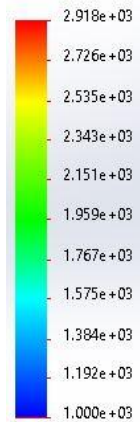


Galvanised Steel



Model name: simdata
Study name: Fatigue 1(-Default-)
Plot type: Fatigue(Damage) Results1
Global value: 1,000 to 2,918.25

Damage Percentage



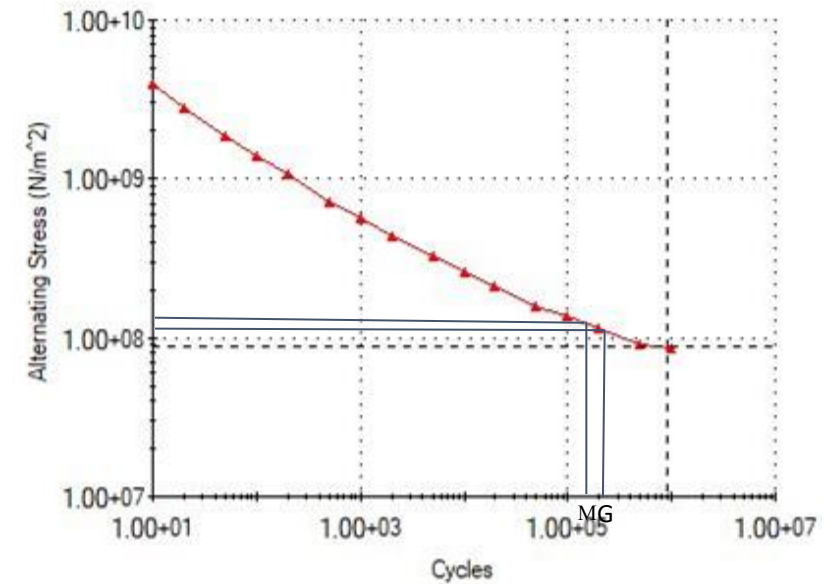
Mild Steel



Max Stress=122 MPa
Cycles= 3×10^5
Strength/weight ratio = 724.4 Pa/kg

Max Stress = 171 MPa
Cycle = 2×10^5
Strength/weight ratio = 972.68 Pa/kg

Curve-1(R=0)



S-N Curve for plain carbon steel

Conclusion

Coating and Welding Integrity

Environmental Factors (Zn Reaction during corrosion)

Hydrogen Embrittlement

Strength to Weight Ratio

Recommendation

Further experiments need to be made to obtain a better SN curve on the fatigue behavioral

Sprayer height adjustability to different angles