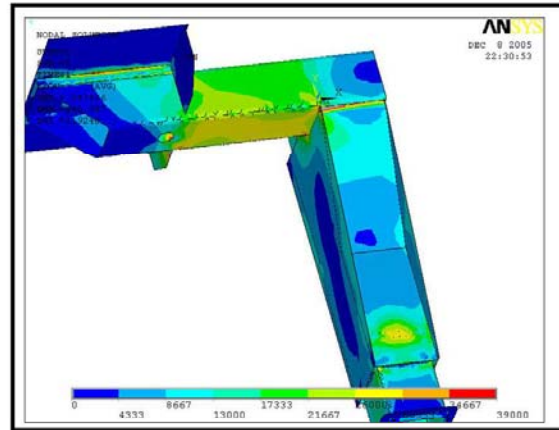
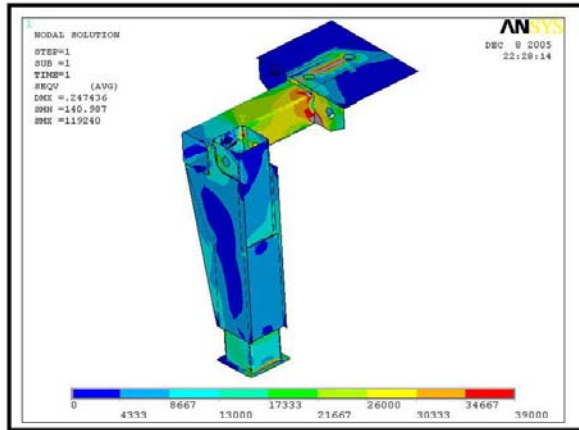
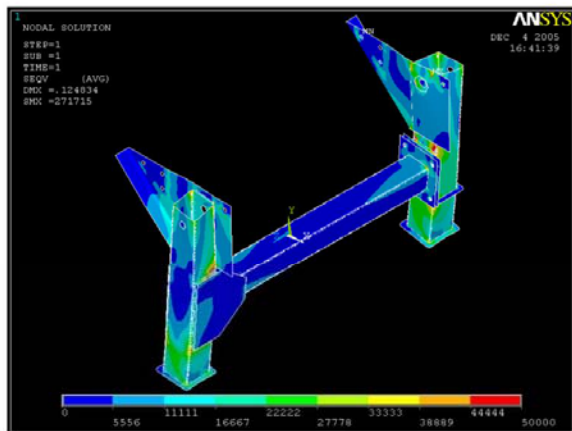


Finite Element Analysis (FEA): Front Outrigger

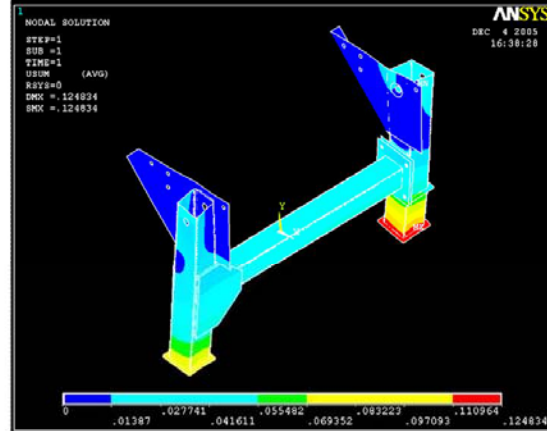


- Using FEA computational software, the team analyzed what the predicted Von Mises stresses was on each member.
- The loads that were applied to the mechanism were with for worst case loading scenario.
- The red areas in the plots are the areas of high stress where the Von Mises stress levels were above 35,000 psi.
- The ultimate stress that steel is expected to experience is around 35,000 psi.
- If the level of stress is above 35,000 psi then you can assume that the mechanism is going to fail.

Finite Element Analysis (FEA): Rear Lift System



Stress concentrations of the rear lift system



Deflection values of the rear lift system

Results: From FEA Conclusions

- One result that the team concluded was that the jacks that were designed needed to be thicker.
- If the thickness was increased in these members then the stress levels would be reduced; thus making a safer and more reliable product.
- Another idea that could be used to decrease the Von Mises stress concentrations is to use support plates or gussets to reinforce the jacks. This would make the product safer and more reliable while using the original jack design.

Gussets and Support Brackets:



These were the gussets and brackets that were applied to the rear lift gear to support the high areas of stress.

Acknowledgements:

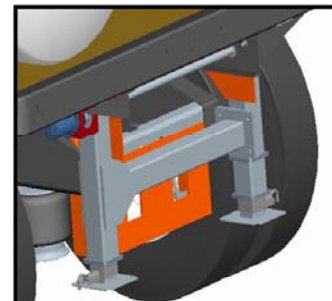
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- Dr. John H. Lumkes, Conceptual Advisor
- Dr. Klein Ileleji, Course Coordinator
- Robert A. Elpers, Elpers Farms Owner



Front view of detachable bed with anhydrous ammonia tank.



Overhead view of the front outrigger.



A rear view of the rear lift system in the retracted position.