

Senior Capstone Design

Project: **Goat Stanchions for Commercial Milking**

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Team: **Billy Goats Gruff**

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Design Validation Plan & Results (DVP&R)

Requirement	Test	Test Subject	Target Date	Result	Recommendation
The total system shall weigh no more than 400 lbs.	Use solidworks material properties to get estimated weight.	Solid Model	7/21/19	Solidworks showed just under 600lbs.	This is okay because we changed all the material to steel so we knew it was going to be heavier.
The ramps shall weigh no more than 45 lbs.	Use solidworks material properties to get estimated weight.	Solid Model	7/21/19	Solidworks showed weight at 65lbs	Added weight due to using steel. Radiused edges and went with 1-1/4" tubing to reduce weight.
Scaled modules shall connect as full scale modules connect.	Attempt to connect scaled prototype modules together.	Scaled prototype.	10/15/19	Scale model was assembled using differet connection methods to save time in assembly	Second scale model will be made as close to full scale model as possible.
Scaled prototype doors shall connect and function to allow model goats to enter and access food trays.	Film model goat entering doors and accessing food treys	Scaled prototype.	10/15/19	Scale model doors work exactly as full scale was designed.	Keep this design element.
Scaled stands shall hold modules up double the scaled weight of two goats.	Apply weight to scaled stand and observe	Scaled prototype.	10/15/19	Scaled model stand held both stanchions.	Additional weight test pending.
Scaled feed gates should open and allow model goats to exit stanchion	Film model goat exiting prototype after manually raising scaled feed gates.	Scaled prototype.	10/15/19	Feed gate opened as designed but not all the way because of mis-scaled bolts	Second scale model will be made as close to full scale model as possible.
Scaled prototype should be able to be packaged to scaled version of stanchion packaging.	Package the scaled prototype.	Scaled prototype.	10/15/19	Packaging doesn't follow the same as some pieces are welded instead of bolted	Second scale model will be made as close to full scale model as possible.
Weighted scaled stands shall have less than 1/8 in deflection on a horizontal plane	Position dial indicators on two opposing planes and observe deflection.	Scaled prototype.	11/15/19		
Flooring material shall not exceed forces provided by the goats.	Model force concentrations in Abaqus.	Solid Model	11/15/19		
Solid model annimation should replicate desired goat stanchion process.	Use solidworks motion annimation to simulate goat stanchion process.	Solid Model	11/15/19.		
Scaled prototype should be able to be assembled by consumers given same assembly instructions.	Provide peers with disassembled scaled prototype and instruction package.	Scaled prototype and instruction package.	11/22/19		
Cost of manufacturing shall be below \$2500	Use solidworks mass properties to estimate cost at \$2 per pound	Solid Model	10/1/19.	Based on \$2.50 per pound cost comes in at \$1500.	No action needed as way under budget

Team Scaled prototype testing