

PERCH Design Review

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Background

- Purpose: To create a machine that will aid orchard workers in safely and efficiently pick pears and apples on an inclined surface.

Specifications

Design a machine that:

- Allows 1-2 pickers to safely pick from heights 6' to 13' off the ground
- Incorporates emergency safety features
- Propels itself on terrain that has grades as high as 25%
- Provides for stationary picking/pruning on grades up to 25%
- Moves fruit from ladder to bin without bruising
- Transports fruit bins of up to 1100 lbs
- Overall decreases current picking time

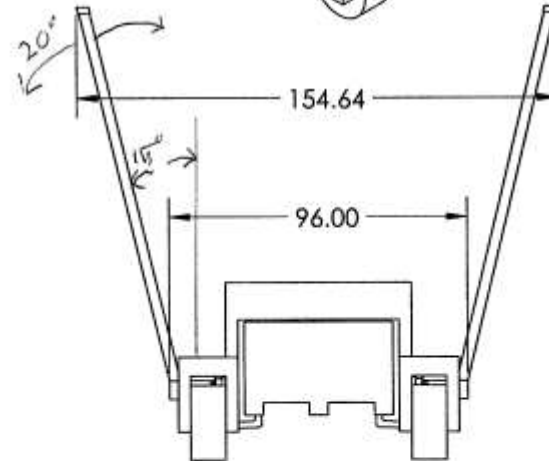
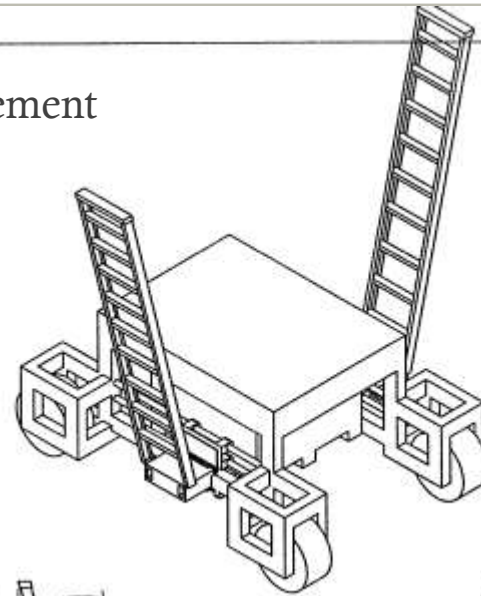
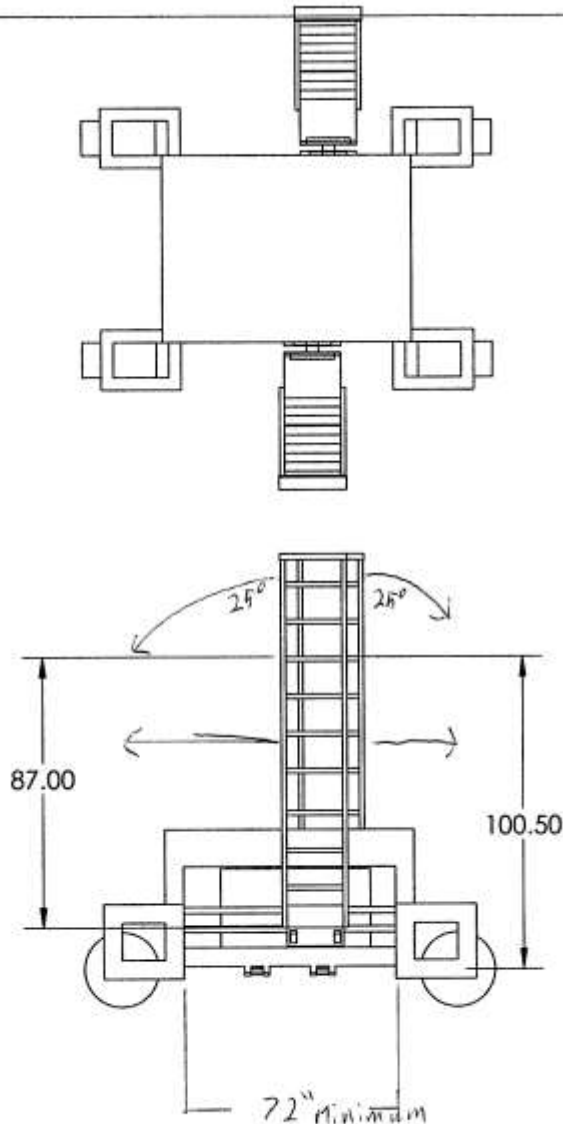
Basic Design Areas

- Worker Placement
 - Allow the worker to pick from the edge of the tree to the center of the tree
- Bin Management
 - Pick up and transport bins as they are being filled
- Fruit Transport
 - Transport fruit from the picker to the bin and then fill the bin without damaging the fruit

Current Design

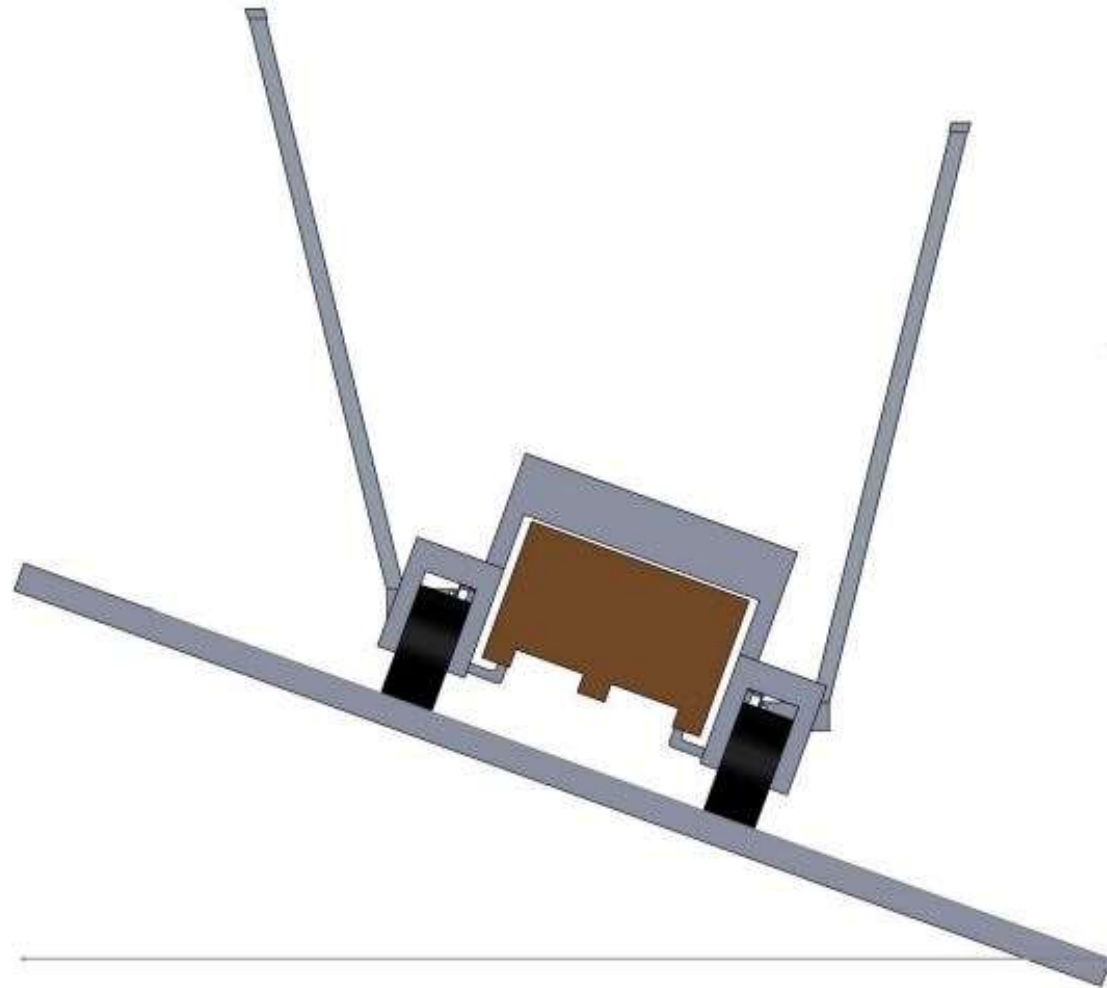
- Our design has been modeled to show some of the options for the three basic problems areas.
- Ladders on each side of the machine will accommodate 2 workers.
- Ladders are on rails to slide along the machine, and then can have the angle adjusted in 2 directions depending on slope and worker need.

Worker Placement

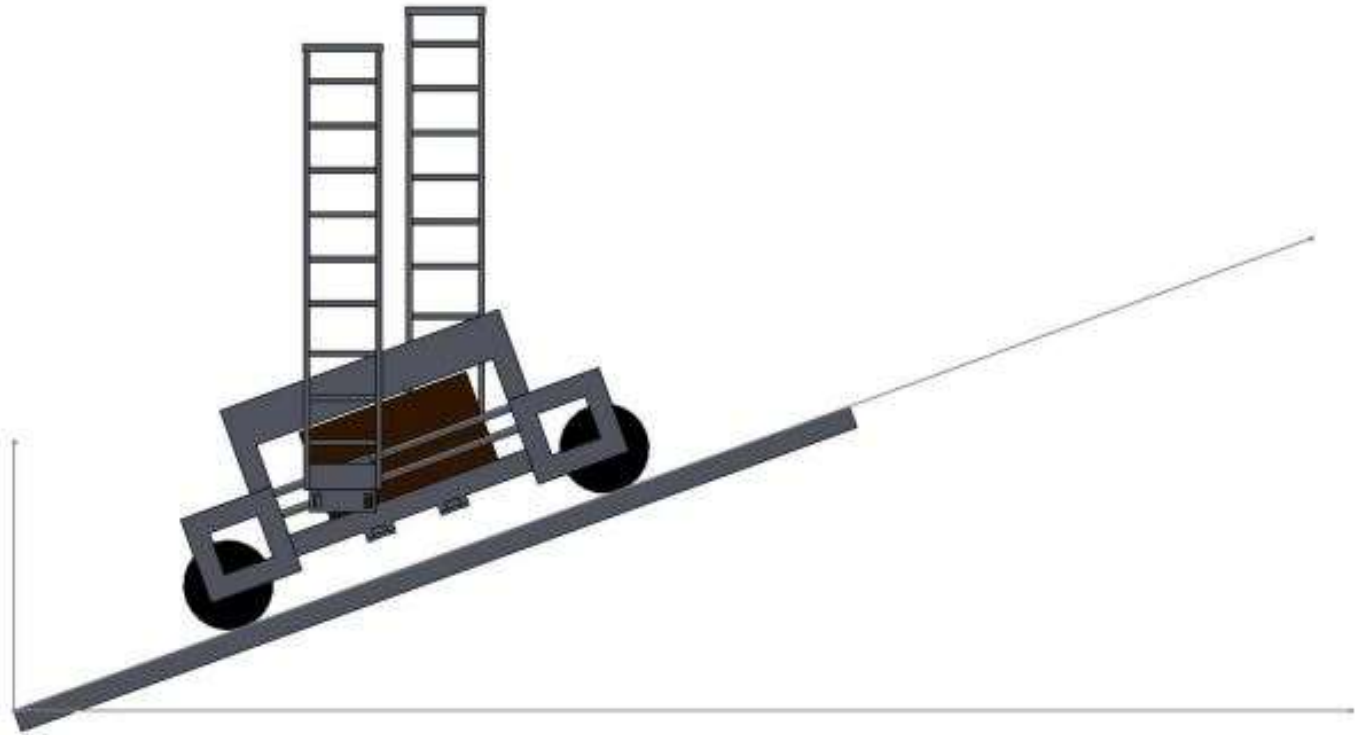


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DEFAULT TOLERANCES: LINEAR: X ± .25 X.X ± .1 X.XX ± .01 X.XXX ± .002		DESCRIPTION: CHECKED BY: XXXXXXXXXXXX DATE: XX/XX/XX		UNIVERSITY OF IDAHO ME DEPARTMENT	
ANGLAR: X ± 2 X.X ± 1 X.XX ± 0.30		DATE: 11/7/2013		PART #: QTY:	
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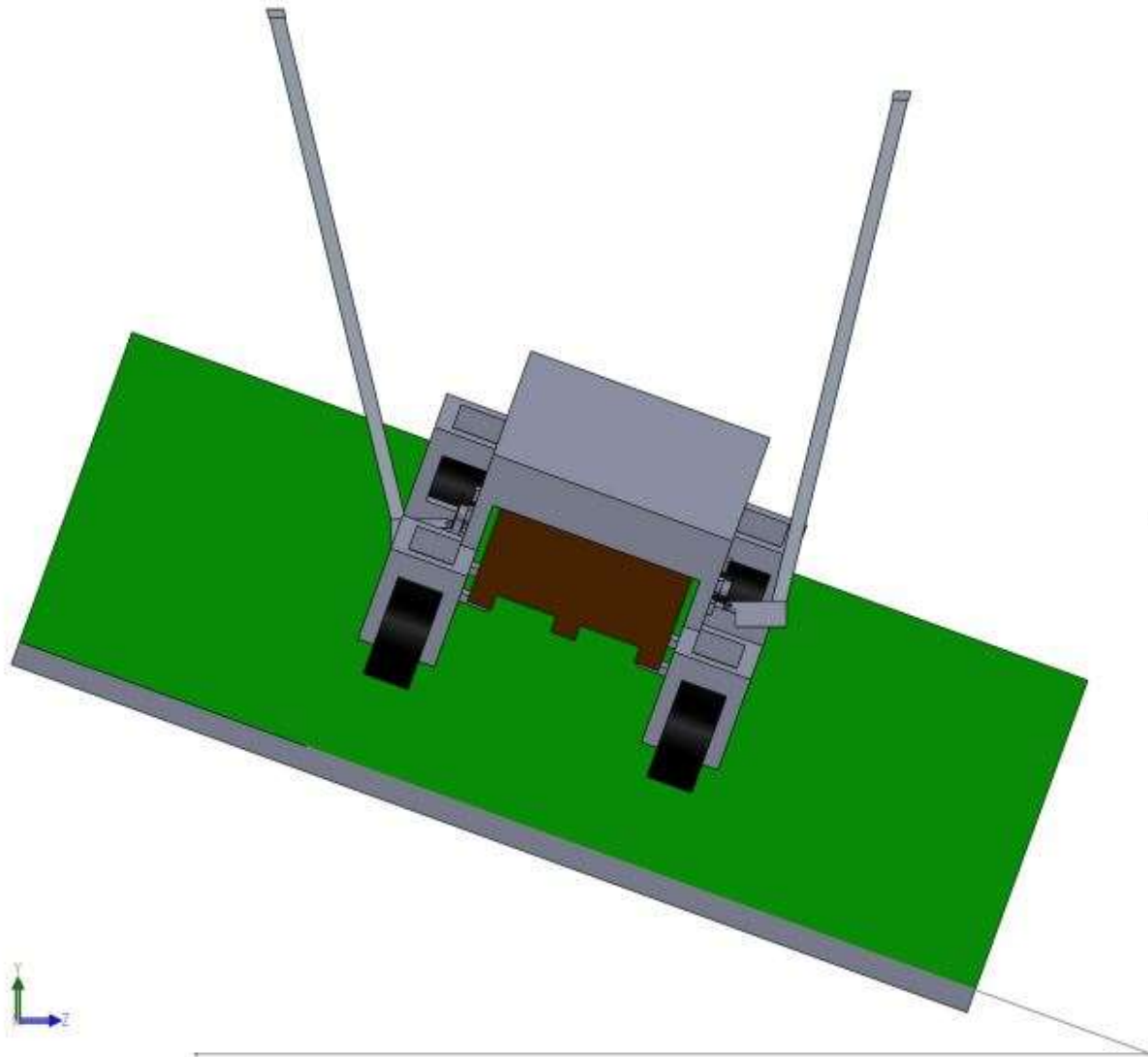
Side Hill

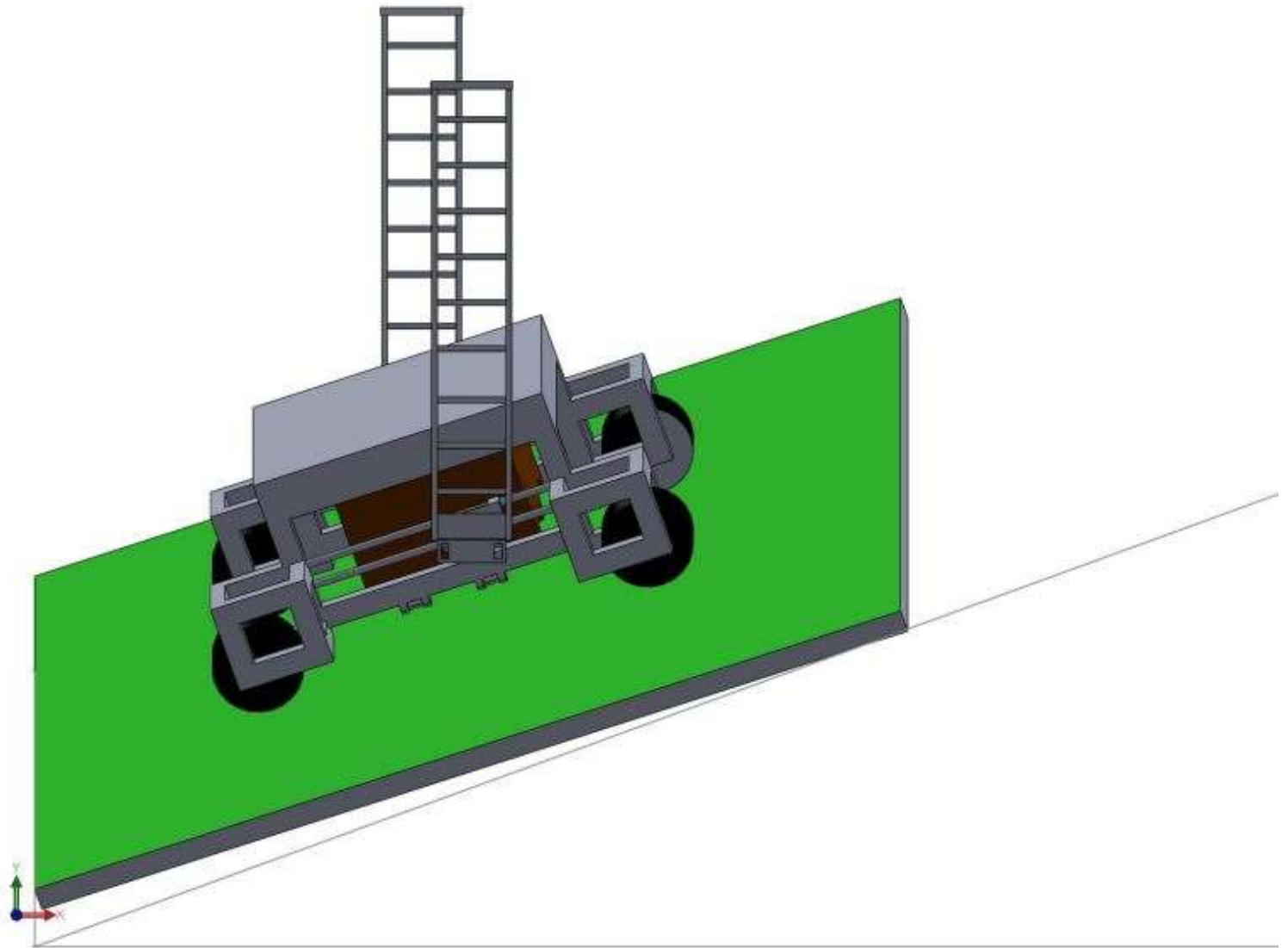


Uphill



Combination

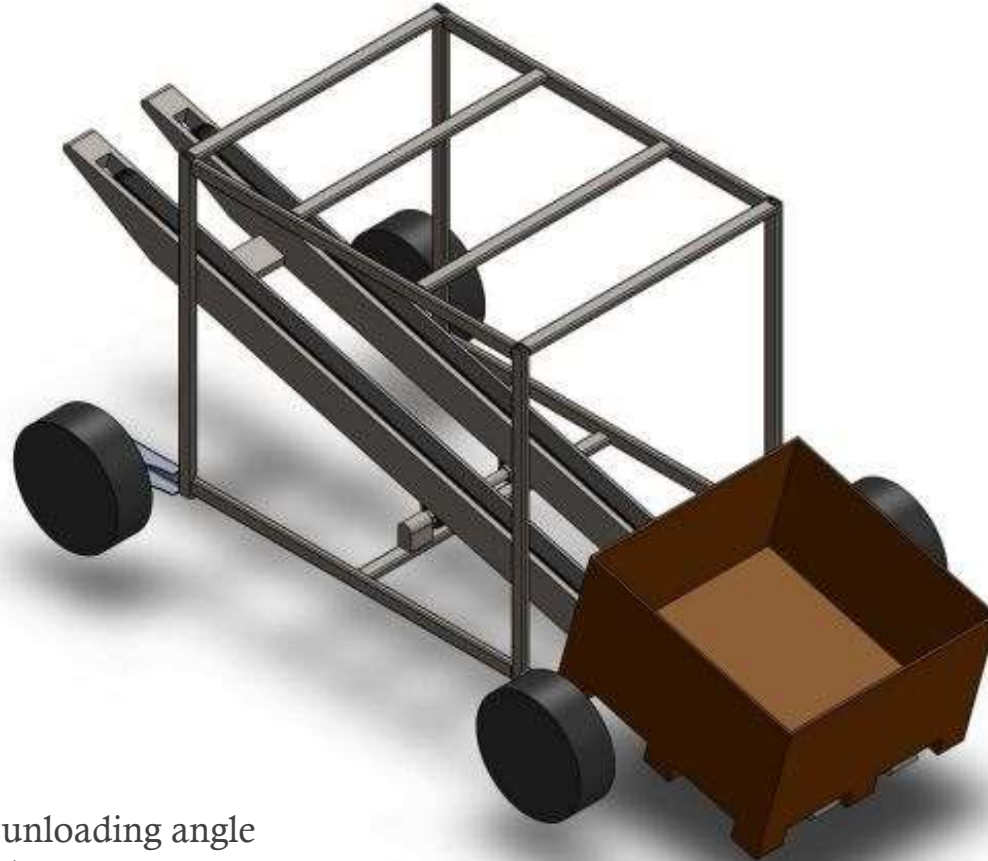




Bin Management

- Bin will be picked up and dropped off via conveyor
- Can be picked up and dropped off in line with machine

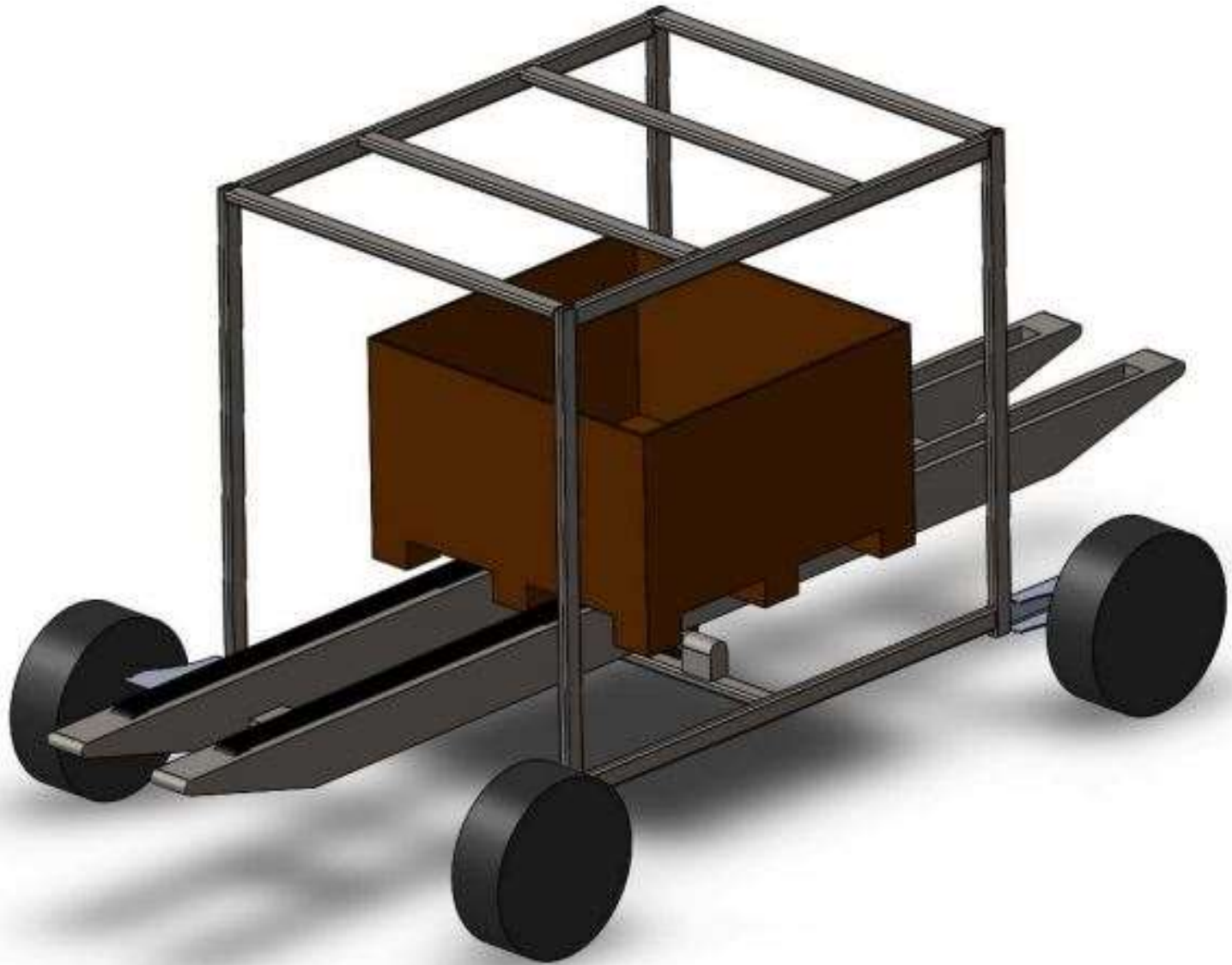
Loading Bin

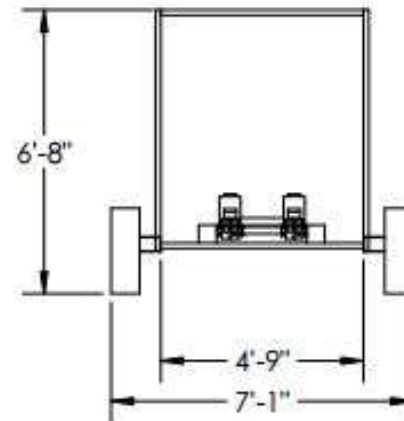
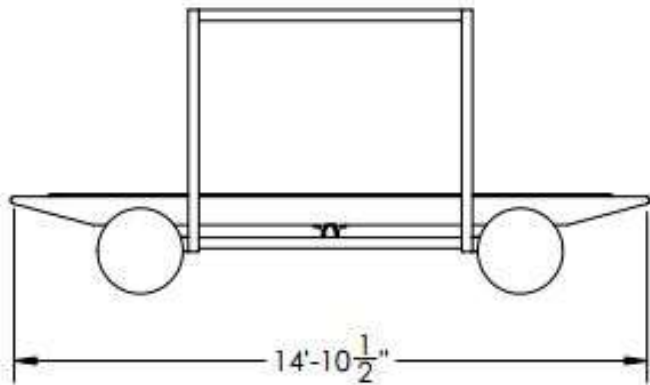
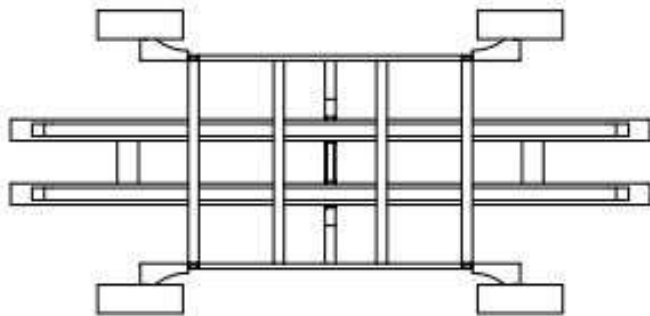


- Maximum unloading angle of bin is 37 degrees
- Guides to direct bin through machine



Secured Bin Location





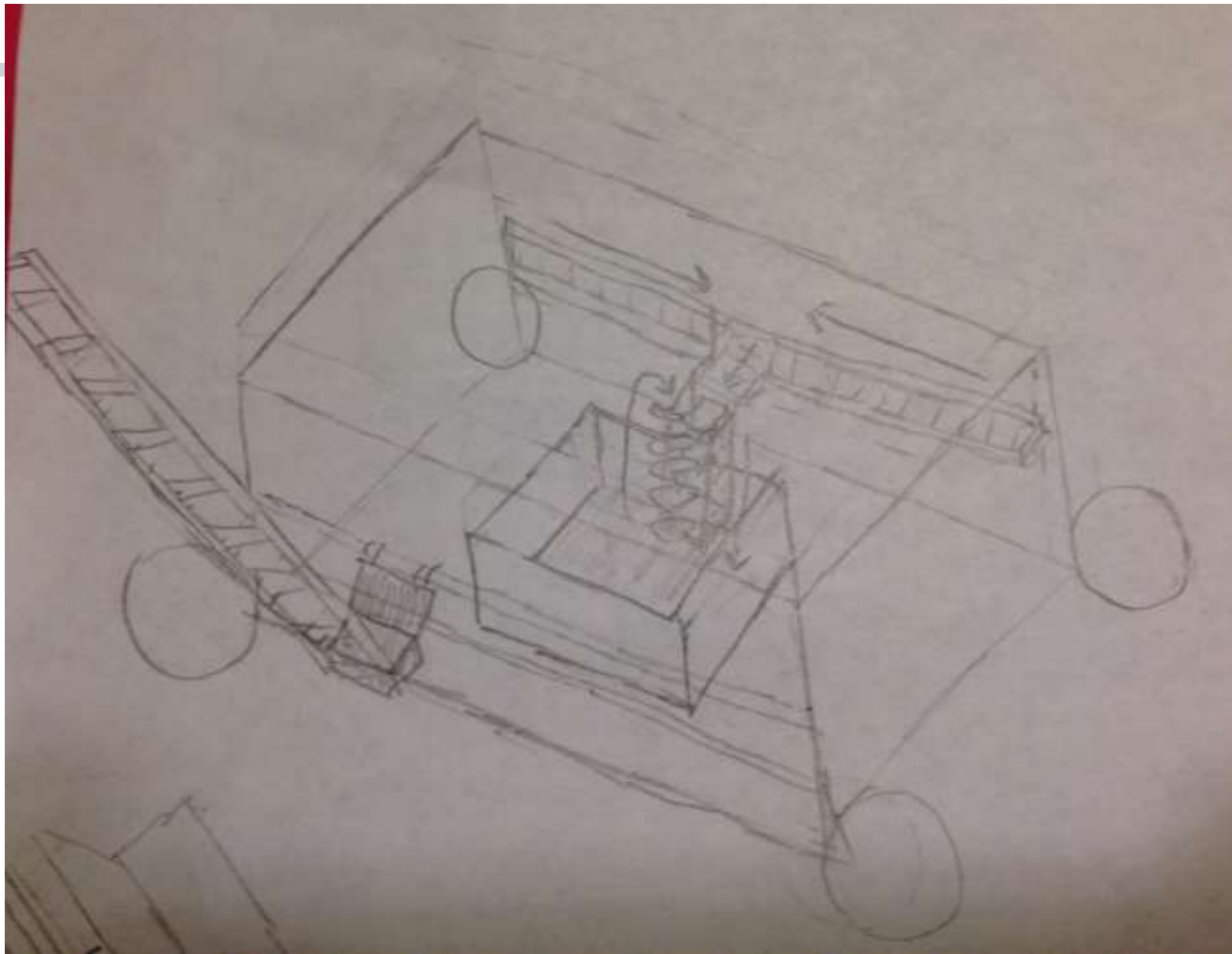
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DEFAULT TOLERANCES: LINEAR: X ±.25 X.X ±.1 X.XX ±.01 X.XXX ±.002		ANGLUAR: X ± 2 X.X ± 1 X.XX ± 0.30		MATERIAL:	
DESCRIPTION: Rin Runner		DRAWN BY: Perch		DATE: 11/11/13	
14		CHECKED BY:		DATE: 11/11/2013	
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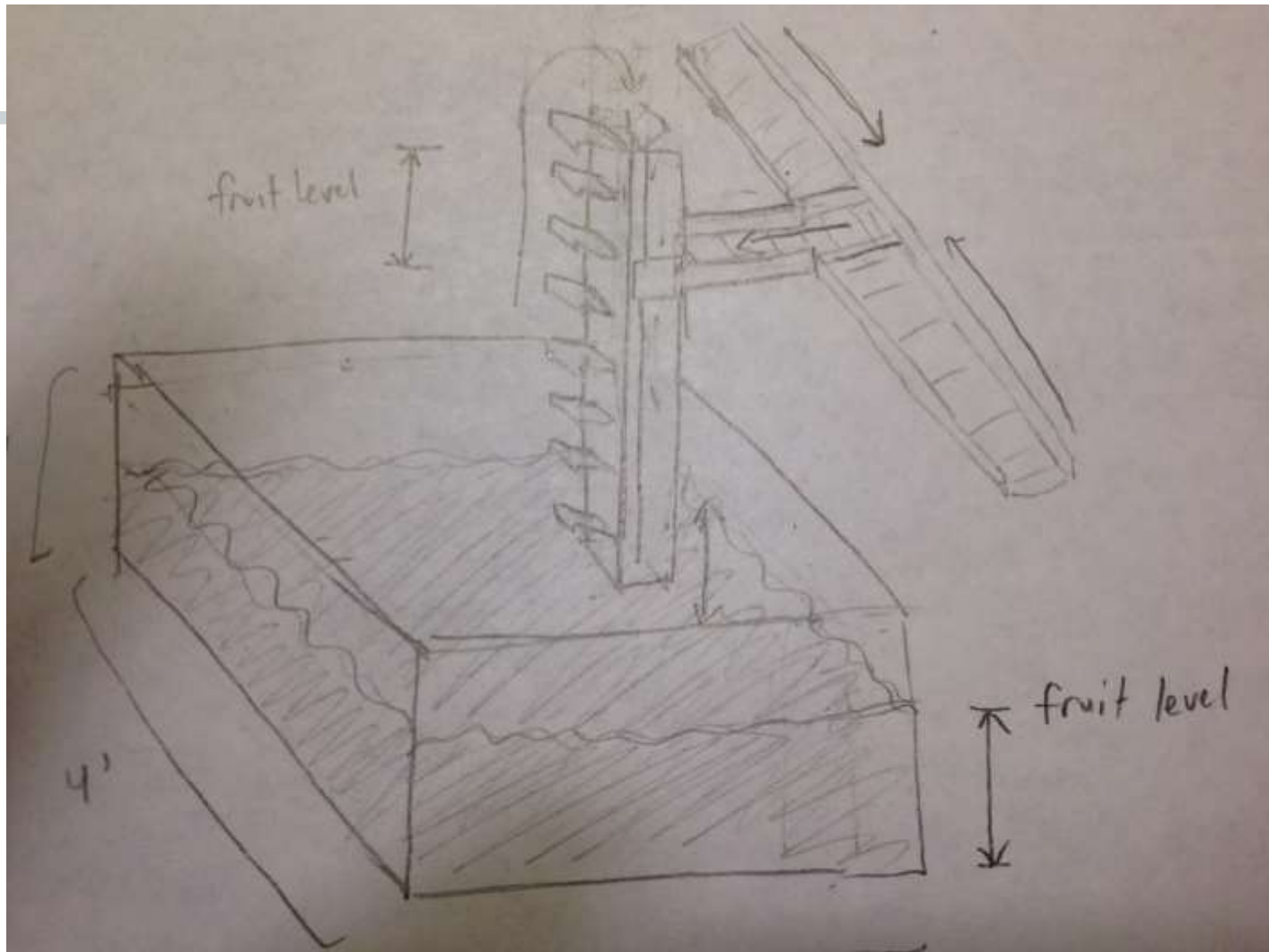
Fruit Transport

- Conveyor Belts next to ladder for workers to place fruit on.
 - Cleats to prevent fruit rolling
- Fan-like distribution of fruit into bin evenly and softly
 - A sensor would raise the fan as the bin fills









Future Plans

- Safety
 - Ladder Harnesses
 - Emergency stops
- Prototype: Frame, ladder, bin management next semester (not self propelled)
- 3-D Models solutions
 - Self propulsion, steering
 - Fruit transport decision
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If time and budget allow, we will implement a self propelling component so that the PERCH will not need outside assistance.



Questions & Comments