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### Statement of Purpose

This team worked to design a John Deere adjustable corn head snout that will handle down corn that is laying on the ground and also retract linearly 150mm to better harvest standing corn, all while maintaining a simplistic design that will allow current crop flow with the least amount of parts, manual control, and minimal added weight to the corn head, improve marketability and add profitability.

### Background on Problem

- Deere currently has the longest snout on the market
- Long snouts provide issues like "plow effect"
- Long snouts push over corn plants in the next row on contours
- No adjustable snouts on the market
- The snout must linearly retract 150 mm, then, re-extend to original position



### Alternative Solutions

#### Design 1

- A Track incorporated in hinge of the snout

#### Concerns:

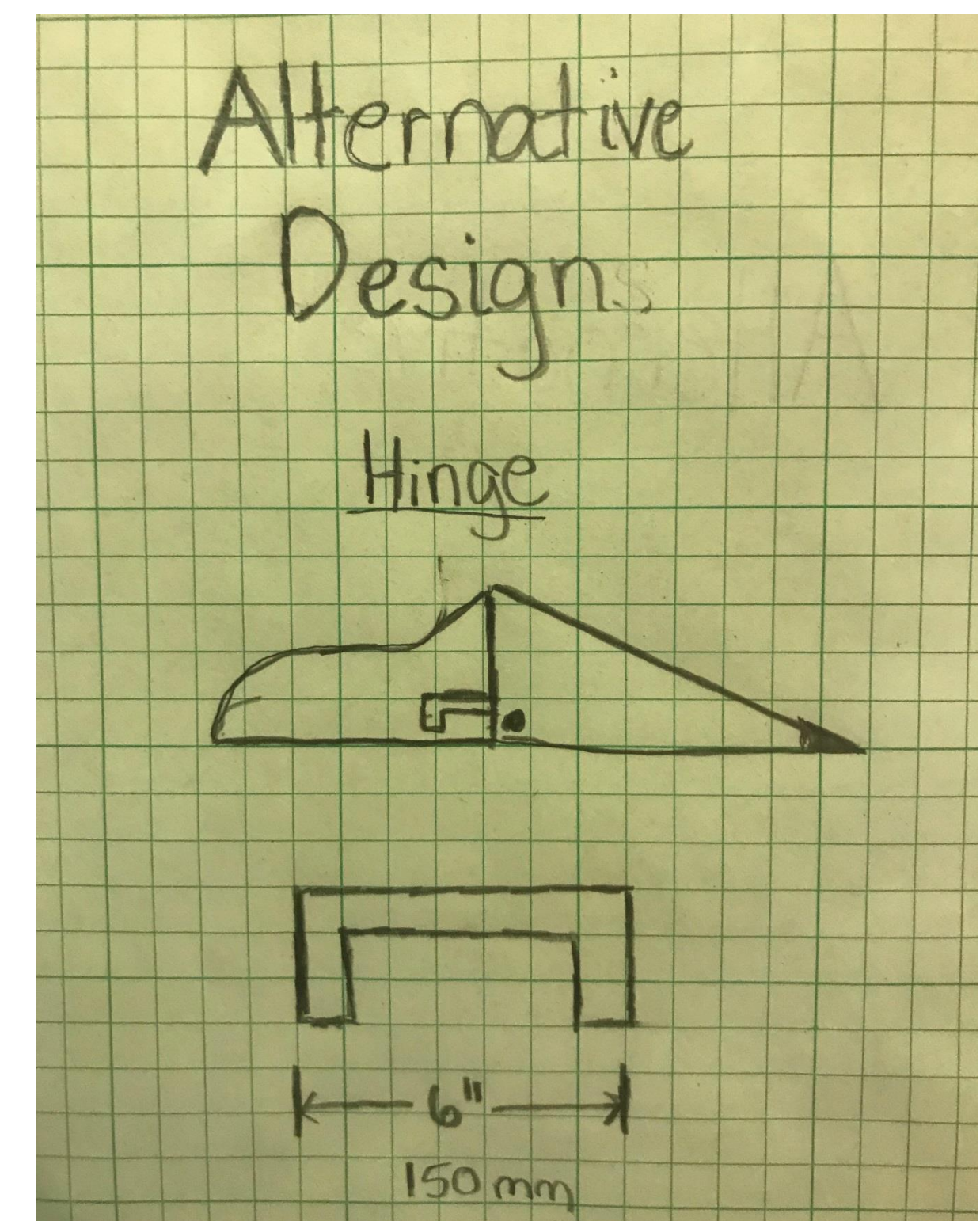
- Hinge functionality
- Design complexity
- Hinge strength after modification
- Crop residue build up in track

#### Design 2

- Two piece snout, secured by a pin

#### Concerns:

- The two pieces of plastic must be unattached
- Time consuming field adjustment
- Having pins poses an opportunity to drop the pins in the field



### Design Evaluations

Locking Mechanisms							
Factors	Material Flow	Functionality	Cost	Availability	Simplicity	Aesthetics	Score
Weight	2	2	1	2.5	2	0.5	
(1) Pin	4	5	4	5	2	2	39.5
(2) Spring Loaded	5	7	3	6	7	5	58.5
(3) Button	6	5	6	1	6	4	44.5

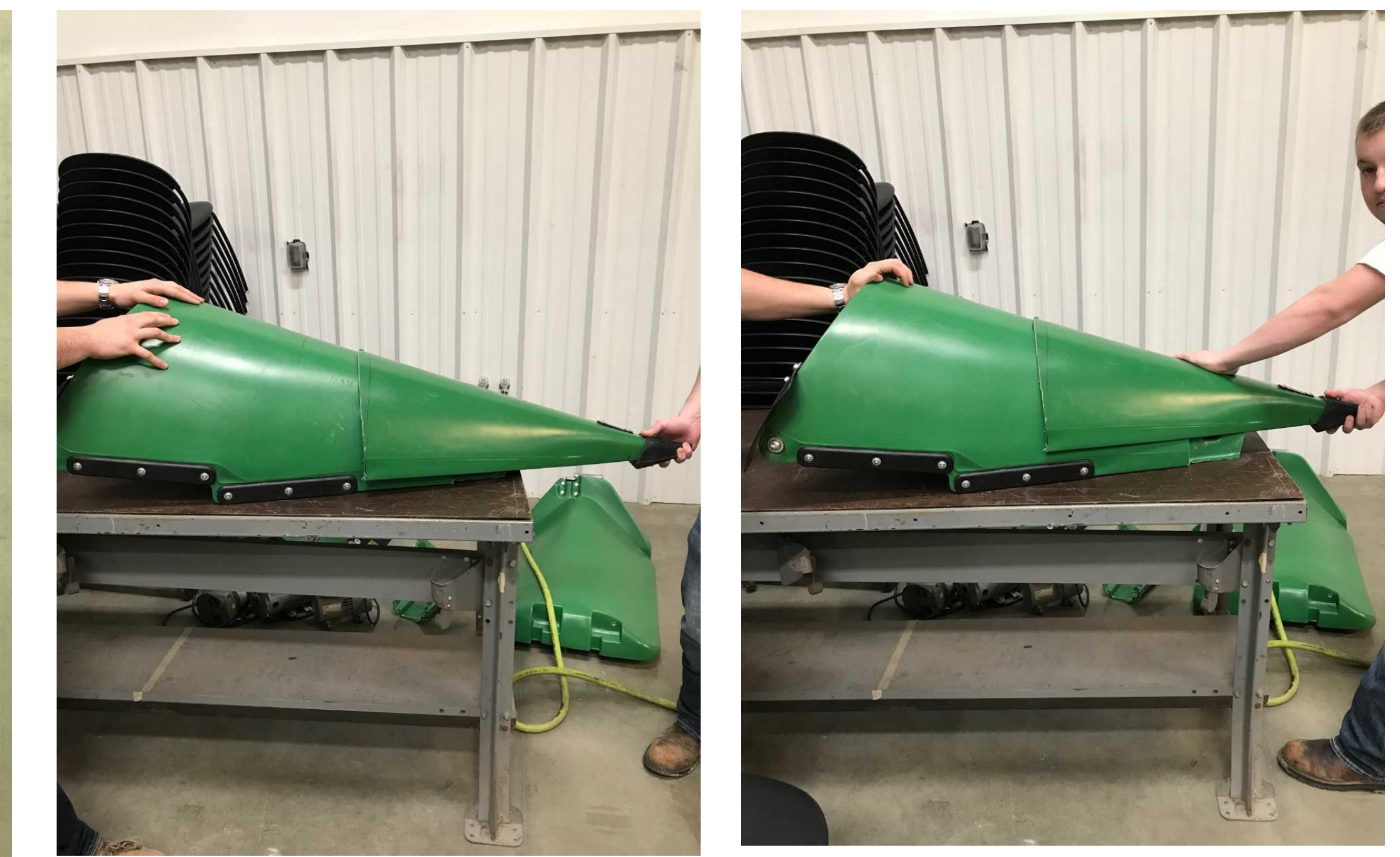
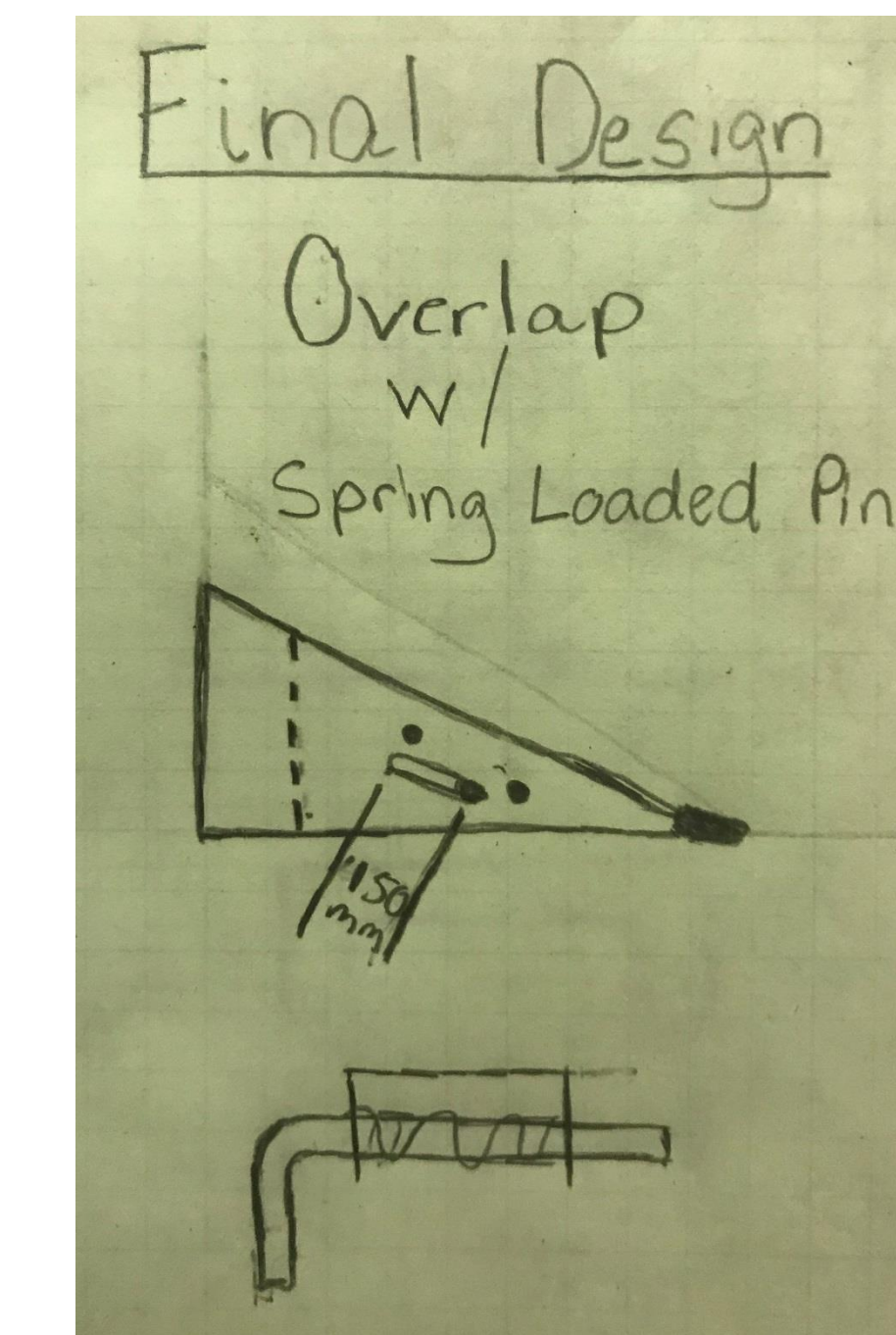
Track System							
Factors	Material Flow	Functionality	Cost	Availability	Simplicity	Aesthetics	Score
Weight	2	2	1	2.5	2	0.5	
(1) Zach's Design	5	7	7	8	5	5	63.5
(2) Jentry's Design	3	2	4	6	5	4	41
(3) Josh's Design	5	5	2	6	8	7	56.5

### Final Design

- Two piece snout with incorporated track

#### Benefits:

- Uses two concepts from earlier designs
- Reduces complexity of modifications
- Under 1 minute transition
- Allows crop material to flow
- Fully retracts 150 mm



### Impact and Sustainability

- Will provide competitive advantage in marketplace
- No FEA analysis required for this prototype
- Possible residue build-up in track

### Economic Analysis

- Total Cost is \$167.33
- Estimated Price is \$600
- \$12.33 in additional cost yields \$150 in revenue per snout.
- Percent Profit:  
Conventional Snout – 190%,  
Adjustable Snout - 260%

### Economic Analysis

Quantity	Part	Price
1	Pin	\$7.10
1	Spring	\$0.03
1	U Bracket	\$1.16
1	Z Bracket	\$1.69
1	Plate	\$1.61
2	Bolt	\$0.26
4	Washers	\$0.03
2	Locknut	\$0.10
1	Plastic Snout	\$75
<b>Total Raw Material Cost</b>		<b>\$87.33</b>
2	Labor	\$40
<b>Total Cost</b>		<b>\$167.33</b>

### Future Recommendations

- John Deere will manufacture a new 2 piece mold
- The design is a prototype, John Deere will need to conduct FEA and field testing
- John Deere will need to allow the farmer to adjust from the cab
- Install a rubber flap to keep material from going under the 2 pieces.

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