Why?

- Obstacles effect planter row units
- Uniform seeding depth is lost
- Pneumatic downforce systems are unable to respond quickly
- Results in:
  - Uneven emergence
  - Low yield
- Proposed solution:
  - An automotive style shock
- Goal:
  - Return planter to a “settled” position quicker
- This is ideal for midsize farmers
  - Aftermarket Add-on
  - Use existing planter

Economic Analysis

- Over 1000 acres our system costs $4.04/acre on a 16 row planter.
  - Only need 0.6 bu/ac to break even
- Shows promise to be an economic solution to farmers.

Team

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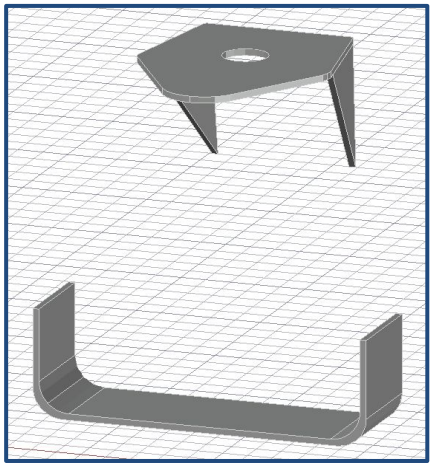
INC-1 Planter Row Unit Bounce Suppression

An economic option for farmers desiring uniform seeding depth without costly upgrades.



How?

- Top & bottom brackets designed
  - Fit around pneumatic airbag
  - Mount to four-bar linkage
- Shock to absorb bounce without providing additional downforce

Testing Plan

- Test track on smooth concrete
- Two set obstacles
- Testing was repeatable
- Variables were:
  - 4.14 mph & 5.18 mph
  - 180, 250, 300 lbs Downforce
  - Shock or No Shock

Results

- On average, planter settled:
  - 0.256 Sec. faster at 4.14 mph
  - 0.288 Sec. faster at 5.18 mph
- Reductions in settling time up to:
  - 52% at 4.14 mph
  - 62% at 5.18 mph

These results prove the goal of the project in reducing bounce in the row unit. The shock was most effective at lower psi tests, but still provided consistent settling times across the different downforce pressures.

Table 2: 250 lbs down force at 4.14 mph

Tests 3.2 & 4.2

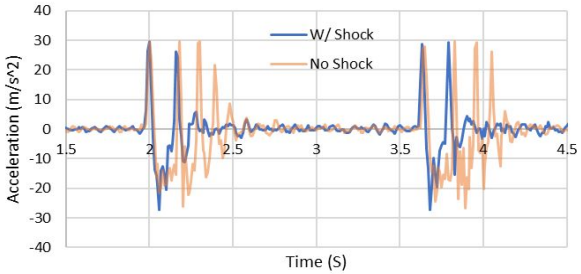


Table 3: 250 lbs down force at 5.18 mph

Tests 5.2 & 6.2

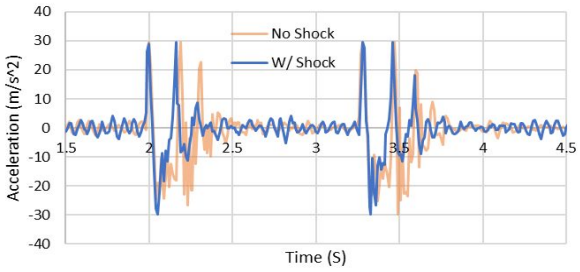
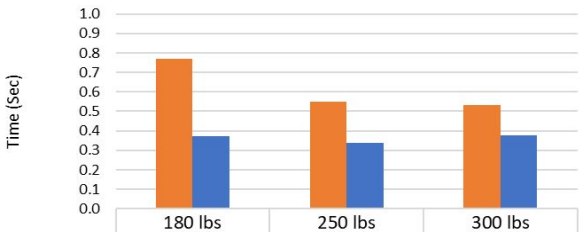


Table 4: Average Settling Time at 4.14 mph

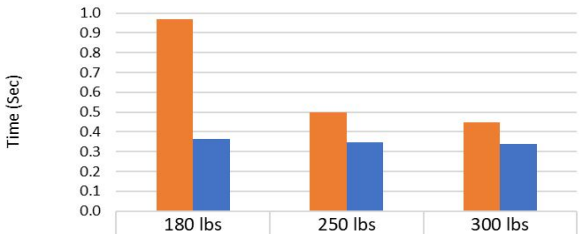
(Settled Range = 4 to -4)



	180 lbs	250 lbs	300 lbs
No Shock	0.770	0.550	0.531
W/ Shock	0.372	0.338	0.375

Table 5: Average Settling Times at 5.18 mph

(Settled Time = 4 to -4)



	180 lbs	250 lbs	300 lbs
No Shock	0.970	0.499	0.447
W/ Shock	0.365	0.348	0.339