

Colonel Corn: Developing a Maize Seed Singulation For Use in a Robotic Planter



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Abstract

The goal of this research is to build a robotic planter that can plant genetically different maize lines in a field. To do this, seed packed in packets must be singulated so that the kernels are planted with defined, consistent spacing and that all the seed in a packet is planted. The goal is to plant at least 95% of the seed in each packet in its row at a specified spacing with no carry-over of seed from row to row.

To improve the efficiency of singulation, I am experimenting with a different singulation designs. To establish design parameters, I am now measuring the angle of repose of the different inbred maize lines the laboratory uses. I am also experimenting with different metering disk prototypes



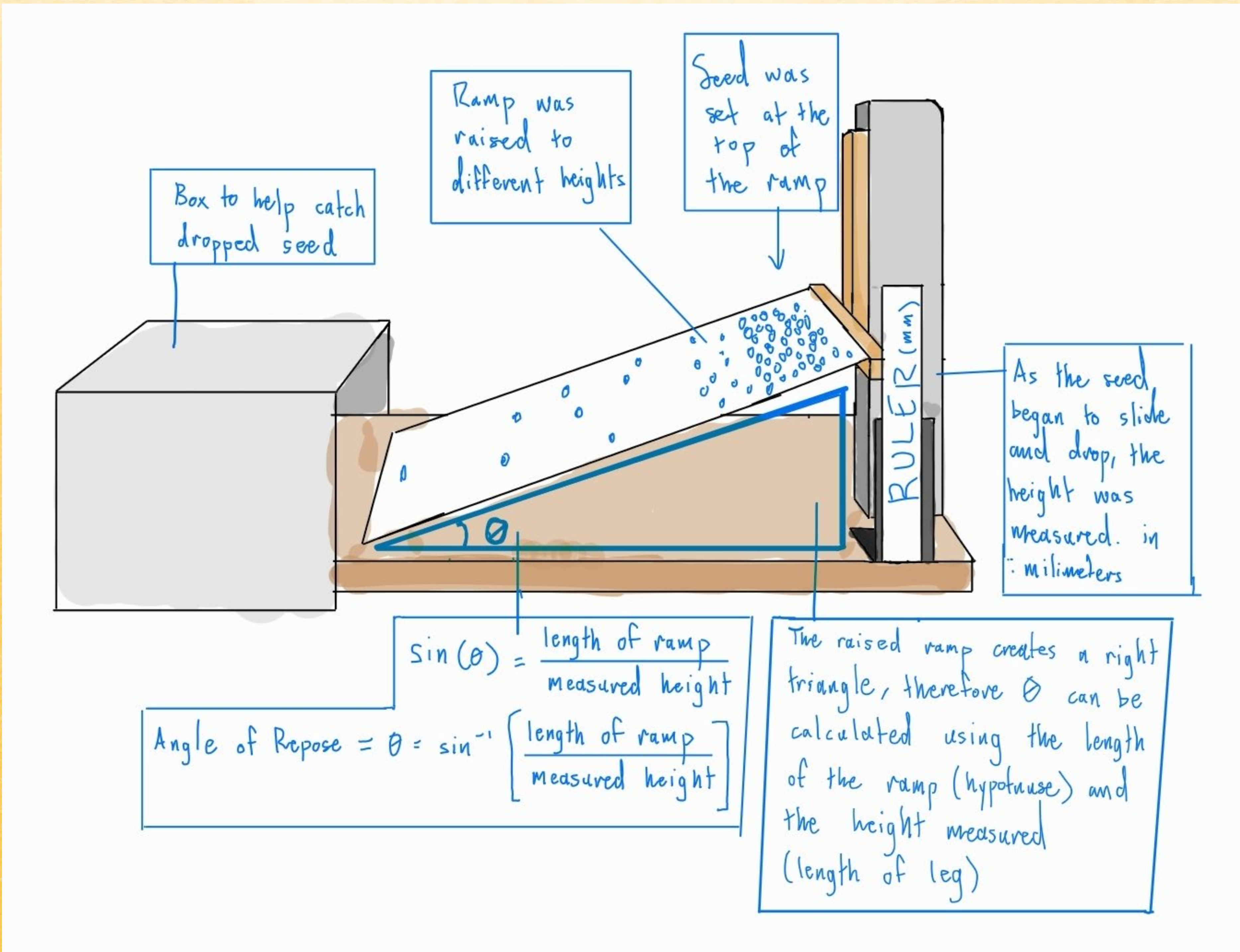
A robotic planter built by a previous capstone group. The planter was unsuccessful as it jammed frequently and was difficult to maneuver.



Currently, planting is done by hand using a hand planter which plants every kernel in every packet. This is inefficient and can be taxing on the body.



Angle of Repose Experiment Setup



Angle of Repose Diagram



Attempts were made to modify the commercial Jang planter to make it more practical and effective, but they were unsuccessful

Results & Conclusion

Type of Seed	Trial 1	Trial 2	Trial 3	Average Angle of Repose (degrees)
B73 B	21.60	21.39	20.67	21.22
M14 M	18.20	17.87	18.80	18.29
W23 W	19.89	20.86	19.89	20.21
MOZOW	21.18	20.24	19.51	20.31

- The angle of three events was measured and the average among them was taken.
- The results will be used to determine design parameters for the robotic planter.

Future Work

- Build and experiment with metering disk and planter prototypes to see how effectively they singulate various maize lines.
- Experiment with planter out in the field to see how it handles outdoor conditions.