

AE 340 Laboratory 3, Seed Meter Testing**Finger meter and Brush Meter accuracy test**

Use the Kinze seed meter test stand with the speed, population and seed type affect seed placement accuracy.

a) Test the performance of the finger meter, for each of the four seed types, at three different speeds of 6.4, 9.6, and 12.8 km/h (4, 6, and 8 mph) and 3 different populations of 40,000 65,000 and 80,000 plants/ha (16200, 26325, 32400 plants/ac). For each run, print of the statistics for the accuracy of the meter, and the number of skips, doubles, and triples in the track. Set the meter to count 200 seeds.

In the laboratory report, provide a table of the following information for each seed type, speed and populations

- i). Number of skips, doubles, and triples in the track, normalized to 100 seeds
- ii). The estimated accuracy of the meter based on the track data. The total error may be found by the following equation.  

$$\text{Total Error} = 1 * (\# \text{ skips}/) + 1 * (\# \text{ doubles}/\text{run}) + 2 * (\# \text{ triples}/\text{run})$$

$$\text{Est. Accuracy} = (\text{Theoretical Total \# of seeds} - \text{Total Error}) / \text{Theoretical Total \# of seeds.}$$
- iii). Assume that the climatic conditions are such a corn field is capable of producing 12.5 Mg/hectare (200 bu/ac) for all three plant populations. Therefore, for a plant population of 65,000 plants/ha (26325 plants/acre), the mean yield per plant is 192.3 g/plant. Assume that a skip results in zero yield for that plant and a 10% increase in yield for the adjacent plant, a double results on 75% yield for each of the two plants, and a triple results in 30% yield for each plant. Determine the yield reduction per hectare for each of the test runs, at the different populations.
- iv). Make plots of the following information versus vacuum level
  - a) Total Error (percent basis) vs speed for each seed type and population combination (different curves).
  - b) Percent yield reduction vs speed for each seed type and population combination (different curves).
- v). Make a recommendation on what the ideal vacuum level and speed is for the most accurate planting, and comment on the sensitivity and interactions of the metering system to target population, ground speed and seed type.

b) Then, remove the finger meter from the stand and engage the brush meter. Make several runs with it at 3 speeds of 6.4, 9.6, and 12.8 km/h (4, 6, and 8 mph) and 3 different soybean populations of 247,000 310,000 and 370,000 plants/ha (100000, 125000, 150000 plants/ac). Record the necessary data as before.

- i). Make the same calculations in parts a(i)-(ii).
- ii). Make plots of the following information versus speed
  - a) Total Error (percent basis) vs speed for each population combination (different curves).
- iii). Make a recommendation on what the ideal speed is for the most accurate planting, and comment on the sensitivity and interactions of the metering system to target population, and ground speed.

c) Comment on which type of metering system you would recommend and justify your reasoning.