

Senior Design Job Ticket

This is a joint project with ME and ENVE students.

Sponsoring Company: Sweet Acre Farm

Project Title: Compost/Mulch Spreader

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Project Focus: Mechanical design, fabrication, very hands on

The Engineering Challenge: Sweet Acre Farm is a low/no-till farm and has been improving related growing practices over the last 6 years. There are a few bottlenecks to the bed preparation process in the no-till system, the most taxing & expensive of which is topping the new bed with finished compost and mulching the paths with wood chips (see figure 1). For direct seeded crops like salad and carrots, the approx. 2" layer of compost is critical to suppress weeds and create a clean germination surface for the crop. The wood chips suppress path weeds and hold the bed's compost layer in place so it doesn't wash out in rain.



Figure 1 Bed Prep

Currently, compost is brought to the area by truck and then human power moves wheelbarrows of the compost down the 100-ft bed, dumping and spreading the piles with a metal rake. The chips are placed in the paths using 5-gallon buckets. Composting and chipping one bed takes about 2 hours (\$31.38 labor cost at min. wage). There are approximately 110 beds on the farm, and many are double cropped during a season.

Modifying a small manure spreader to shoot a fine quantity of compost or chip out the back and down at the ground would save an incredible amount of staff time and money, as well as our backs over the long term. The Farm would plan to buy the right size manure spreader to fit their Ford 1600 tractor, and then work with the UConn students to design the retrofit

Description of Problem/Project:

The objective of this project is to design and fabricate necessary modifications to a manure spreader using the Ford 1600 tractor PTO (power take off) to enable placement of compost and mulch in the beds.

Expected Deliverables/Approach:

Understand all project requirements and the bed configurations(s).

With the sponsor, select a size of manure spreader consistent with bed and tractor configuration.

Identify candidate methods and designs for distribution of compost and mulch.

Conduct subcomponent tests using mulch and compost to evaluate performance of candidate design concepts.

Select the best concept based on disposition rate, flow potential etc...

Design and fabricate components of best design and incorporate into the manure spreader.

Conduct tests to measure distribution performance in terms of flow rate and uniformity of coverage.

Modify the design, if necessary, based on testing.

Provide all CAD models, analysis and test results, interim and final reports.

- **Is there a specific software package required for the projects?** Y ___ N X

Which package (name/version) _____

- **U.S. Citizen/Person (green card) Required?** Y____ N_X__
- **Will Export Controlled data be used in project (EAR/ITAR)** Y____N_X__
- **NDA/IP Agreements required?** Y_X__ N__
- **Other considerations:**