Charcoal Briquettes

Mockup Review

2.009 Blue Team A

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Key Challenges

- Loading
  - Hopper design
  - Position of feedscrew
- Output nozzle
  - Length
  - Diameter

Emulating Bagasse, 1

- Raw bagasse not yet available (harvesting now)
- Instead, crushed charcoal briquettes to emulate carbonized bagasse

Emulating Bagasse, 2

- Crushed charcoal then sifted to remove larger pieces

Mixing

- Crushed/sifted charcoal mixed with tapioca binder to form extrudable mixture

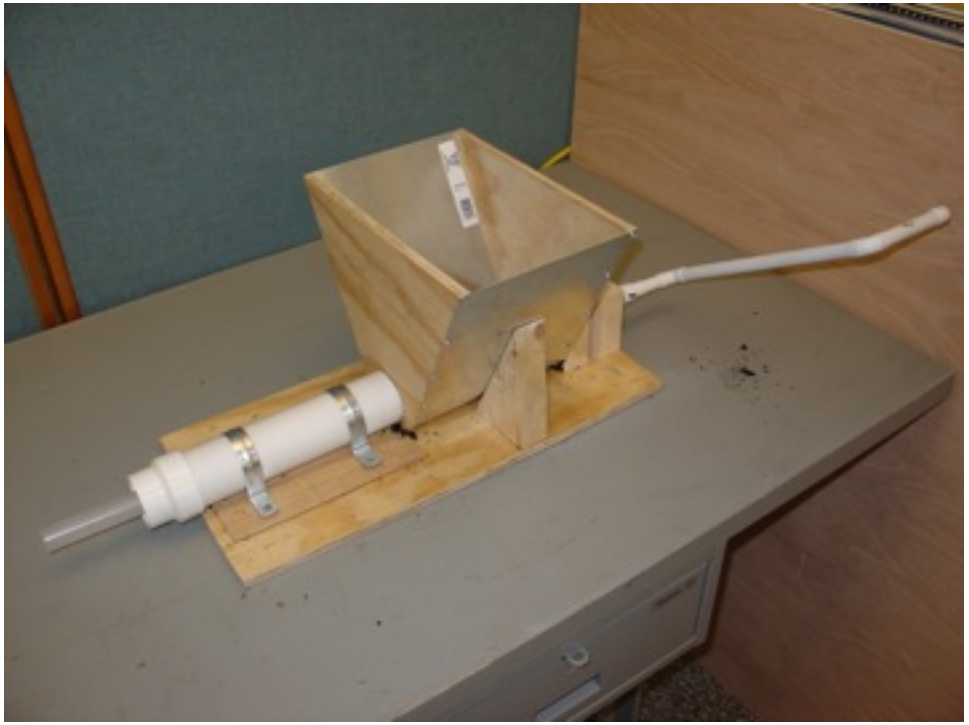
Extrusion with Meat Grinder

- Used 3/4” diameter output nozzle
- Good briquettes, but poor loading from hopper

Benefits of Extrusion

- Average density of 0.95 g/mL (extruded), compared to 0.48 g/mL (hand-formed)

Concept Mockup



- Utilizes 2” OD earth auger bit
- Designed to test configuration of hopper

Improved Hopper Design

- Feedscrew loads from all directions, not just from above
- Continuous feed without additional input

Playing with Nozzles

- First used short barrel (2” diameter) that tapered to a 3/4” diameter nozzle
  - Generated large thrust forces
  - Too much for our thrust bearing
- Then used longer barrel without any taper (2” diameter)
  - Produced fairly good briquettes

Conclusions / Further Work

- Meat grinder proved viability of extrusion, revealed issue with loading
- Concept mockup validated an improved hopper/feedscrew interface
- Further work needed to improve thrust bearing, optimize nozzle