



# Debaling Agricultural Materials

UI-Debalers

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## Previous Plans



Above: Hustler Chainless Xr1500

Left: HayBuster H-1030



## Reasons behind our changes

- Hammer Mills
  - Creates a great deal of fines
- Hustler Chainless
  - Poor output feed (inconsistent flow rate)
    - The material appears to bunch up and then fall out
  - Requires operator to manage output

# Asked questions from client

1. How large is the gap where material is pulled through?
  - a. The space between the infeed and debaling mechanism will be adjustable for prototype
2. What happens at the end of the bale?
  - a. This part of the design is not finished. We are working on a design for an infeed conveyor and then a set of forks to push each bale into the debaler
3. What is the chain spacing on the bale face?
  - a. Prototype - 2 chains will be used on the outside of the bale.
  - b. Full scale - 3+ chains, spacing determined after prototype is complete
4. Are the teeth in line or staggered?
  - a. We planned to have teeth staggered in a chevron shape
5. Tooth geometry
  - a. We are looking into bolt on stump grinding teeth as an option. This offers easy replacement and a hardened ware surface.





## Asked questions from client (continued)

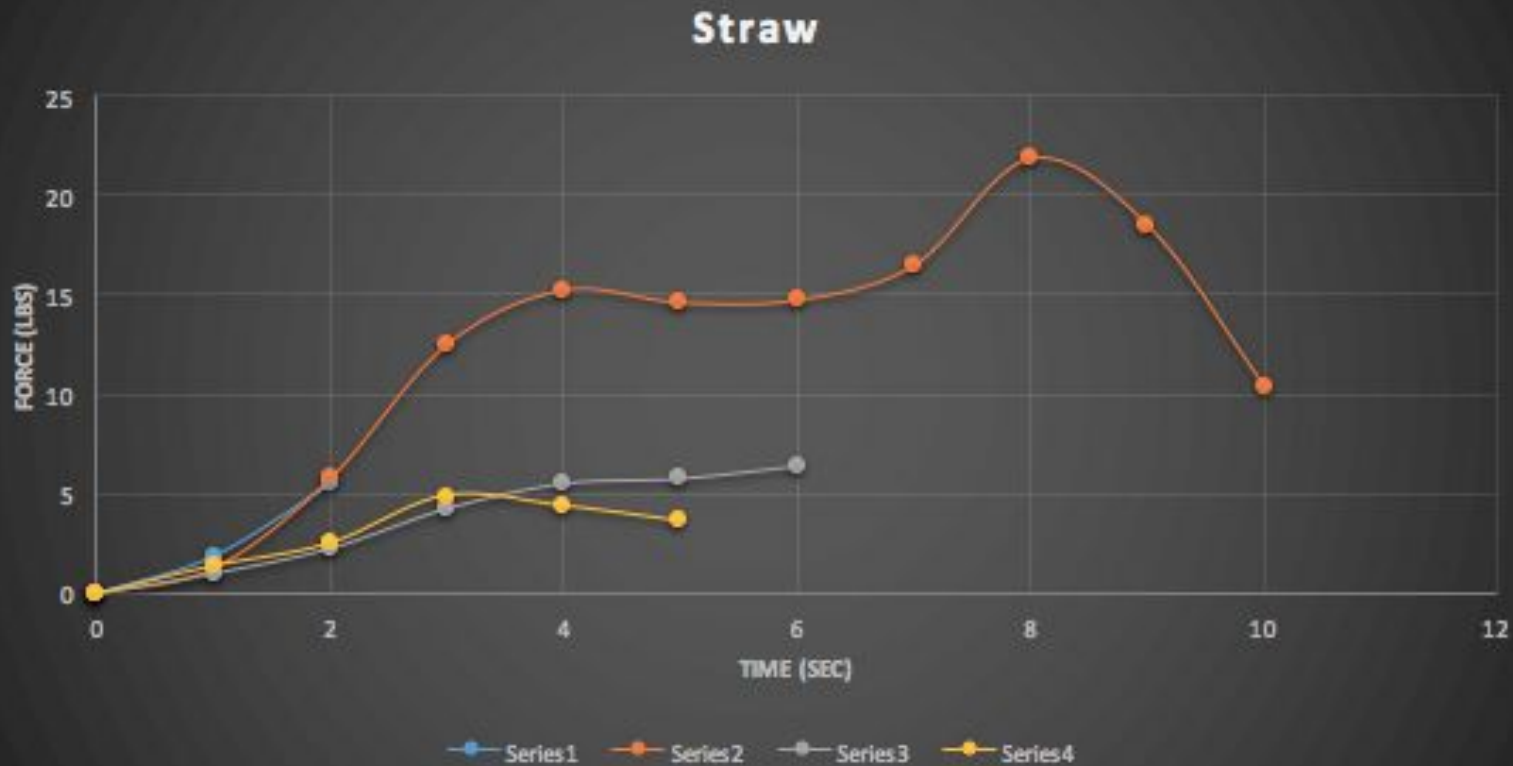
1. Is the bottom sprocket below the baseline of the bale?
  - a. The sprocket is below the base of the bale, the radius of the pulley at the minimum
2. Is the backing support for the chain on the bale line or does it flex against the bale?
  - a. The cross bars will be supported by low friction wear material.
3. How hard to drive the bale face against the chain?
  - a. From our testing with the bale not very hard, however we will need more testing to quantify the force necessary
4. Does the driving downward actually reduce the fines produced?
  - a. We are not sure yet, our thoughts were that driving downward would minimize the the material buildup shown with the Hustler debaler. To address flake transitions we were considering driving the chains at an angle to the bale.
5. Is the material likely to wrap around the chain and carry around the mechanism?
  - a. We don't know for sure.

# Data from Bale Force Testing



This data was taken drawing a pitch fork through a grass hay bale parallel to the strings. Then measuring the force required to pull the pitch fork with a scale over time.

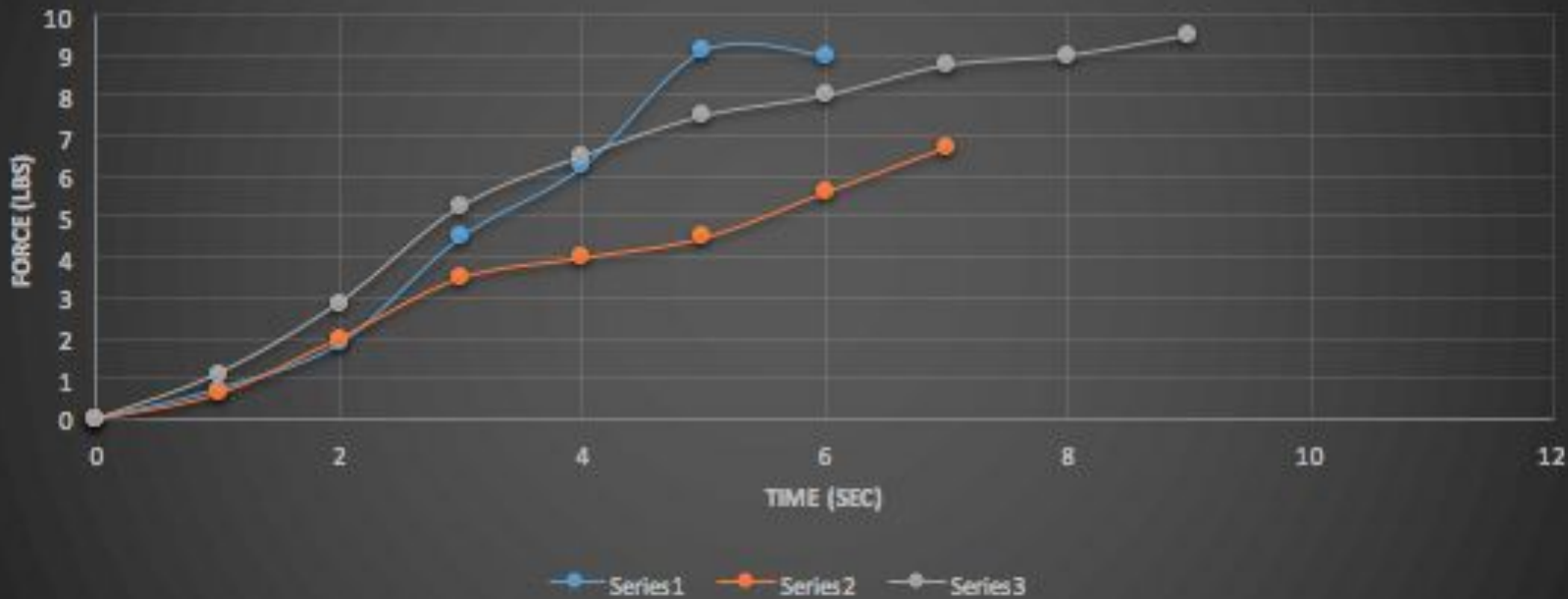
## Data From Bale Force Testing (continued)



The same procedure was repeated with a straw bale.

## Data From Bale Force Testing (continued)

Straw Parallel w/ Stands



This is the data collected when drawing the fork perpendicular to the strings of the bale.



