



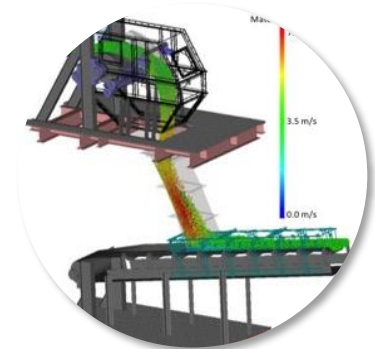
JENIKE®
& J O H A N S O N
S C I E N C E E N G I N E E R I N G D E S I G N

Gasification of feedstocks: Reliably Feeding Biomass and MSW

Dr. Jayant Khambekar
Senior Consultant

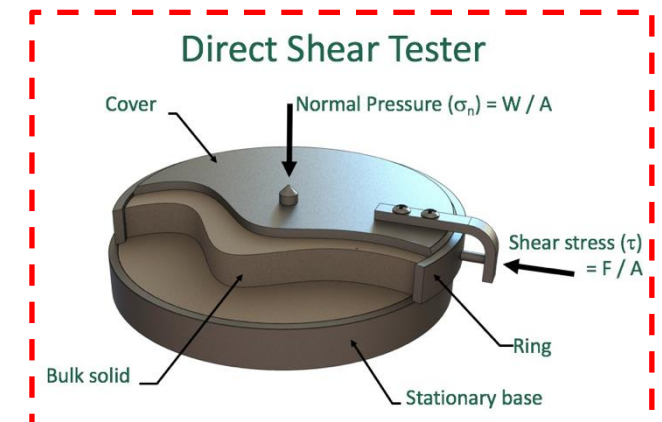
About Us: Jenike & Johanson

- We are a technology company with expertise in bulk solids flow.
- We provide engineered solutions to various challenging bulk solids handling applications, using a science-based approach.
- Founded by Dr. Jenike, we have been in business for more than 55 years.



About Us: Jenike & Johanson

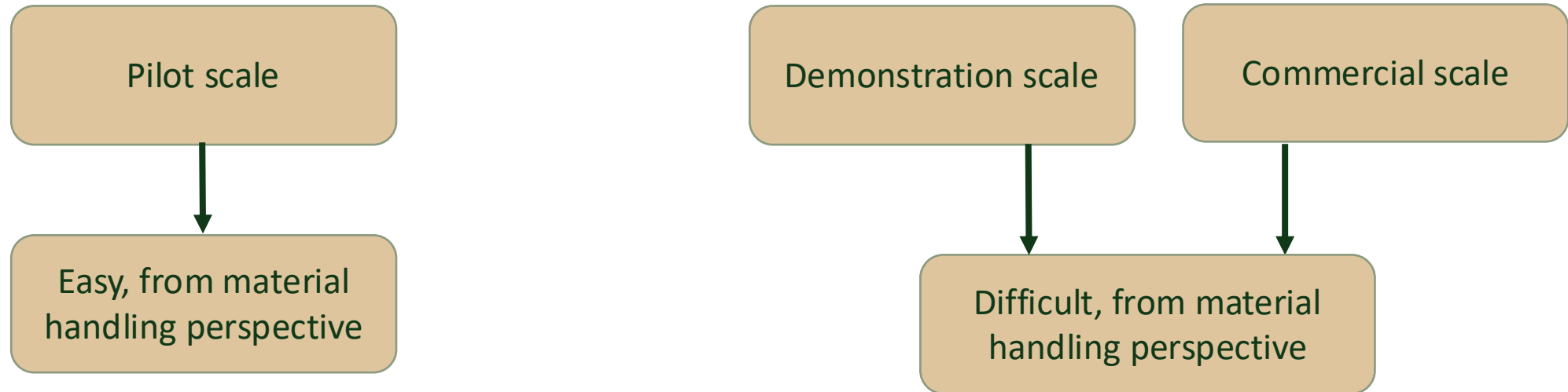
- In 1950s, Dr. Jenike studied problems like arching/bridging and ratholing of bulk materials. He developed techniques on how to solve these problems.
- Dr. Jenike formulated mass flow theory for flow of bulk materials through hoppers.
- Dr. Jenike invented the famous Jenike Shear Tester, and developed ASTM standards on shear-testing of bulk materials. These tests are now used worldwide to characterize bulk material flow.
- For his contributions, Dr. Jenike is widely considered as the father of bulk material flow theory.



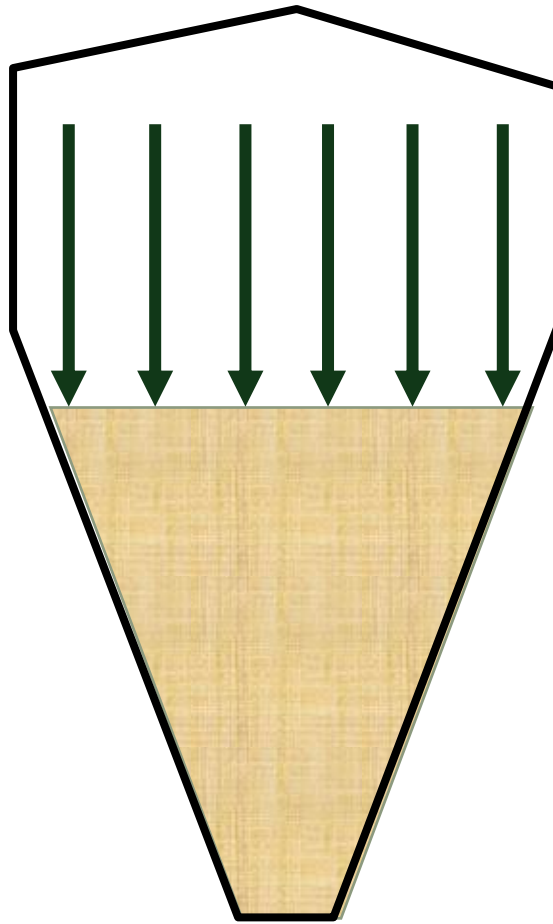
Cellulosic Biofuels Industry – Current Status



Biofuels Production

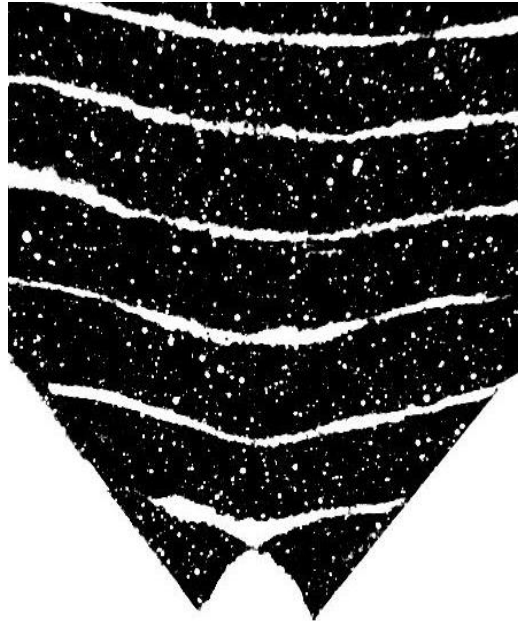


Flow Problems Feeding the Biofuel Reactor



Flow Problems in Gravity Flow Systems

- Arching

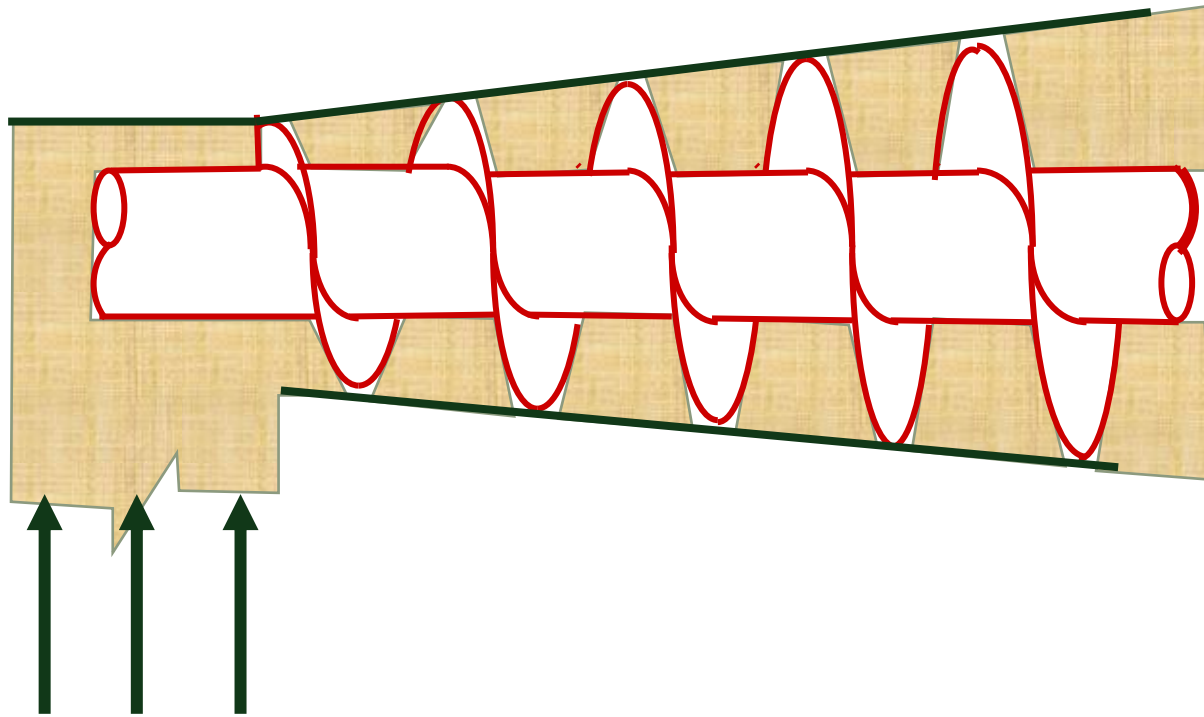


Flow Problems in Gravity Flow Systems

- Ratholing



Flow Problems Feeding the Biofuel Reactor



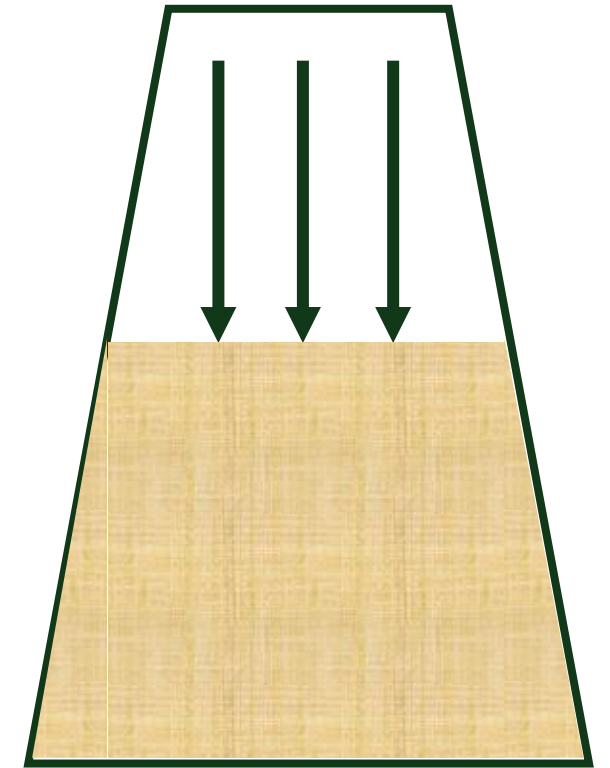
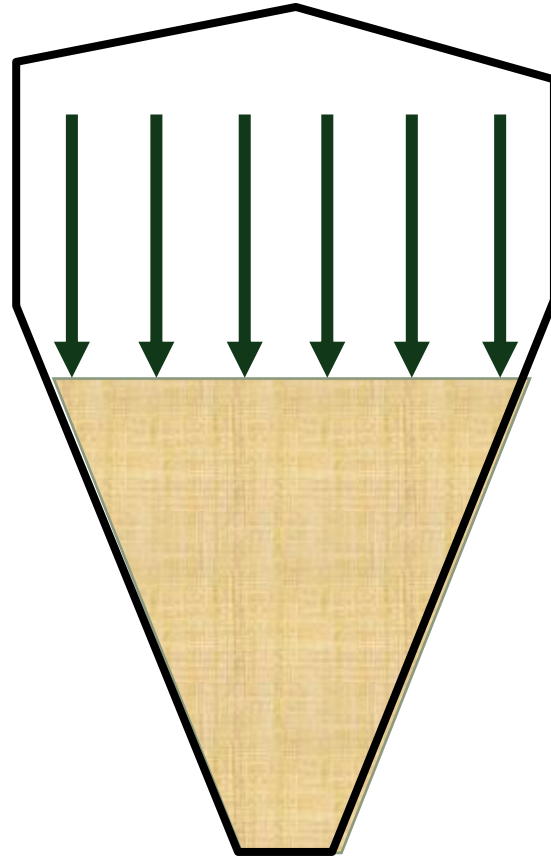
Improved Design for Feeding Biofuels Reactor



**Is a reliable
solution
possible ?**

Feeding High Pressure Biofuels Reactor

**Jenike's
novel
approach**



Diverging pressurization chamber

Novel Solution: Jen-Zero™



Feeding High Pressure Biofuels Reactor

**Jenike's
novel
approach**

**Patented
technology**



Novel Solution: Jen-Zero™

Jen-Zero video: <https://www.youtube.com/watch?v=Wlx7z7n5sB4>

Benefits of Jen-Zero™

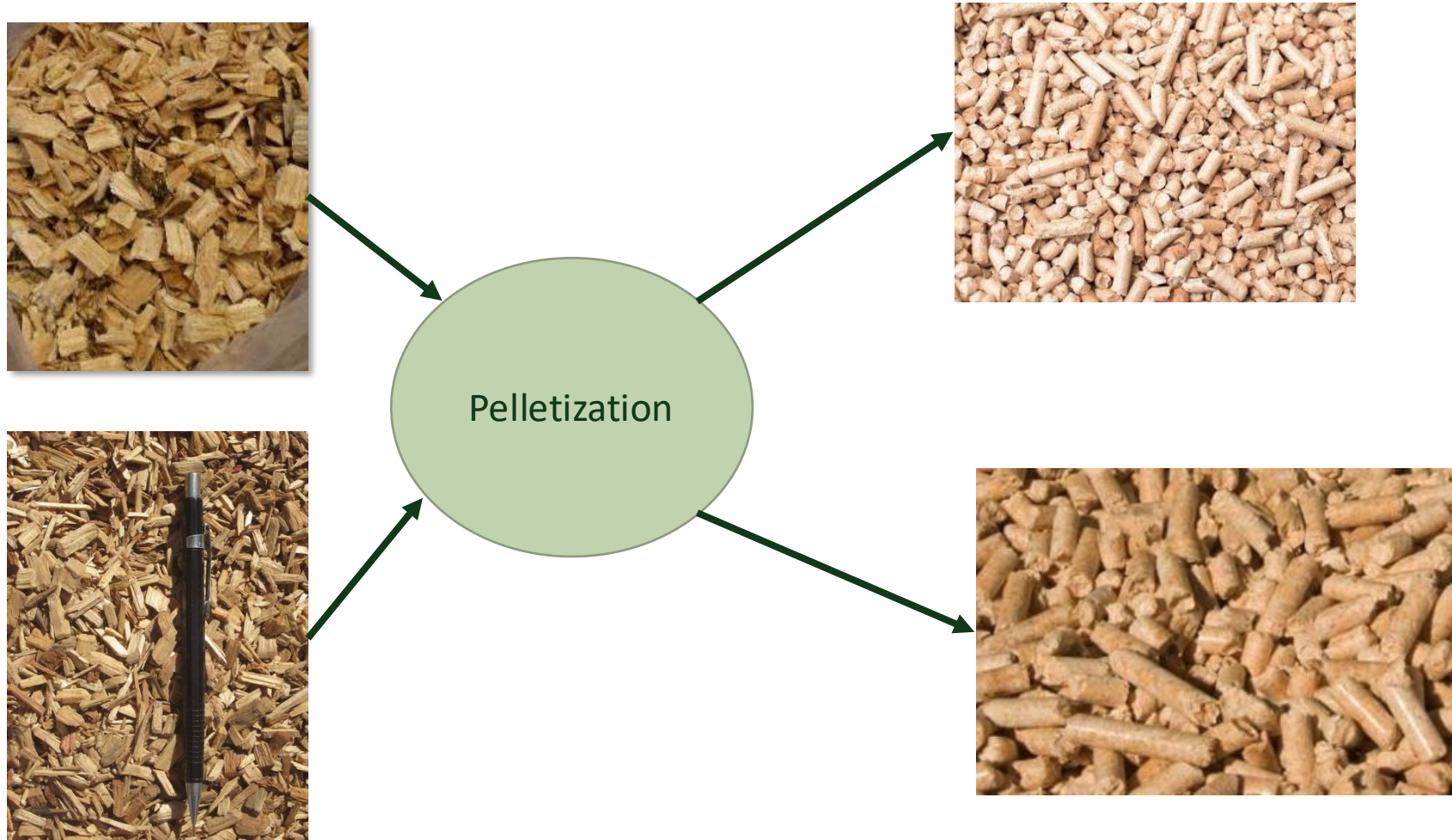
Reliable flow



Minimal Pre-treatment



Minimal Pre-treatment



Conclusions

- Feeding biomass and MSW feedstocks to a high pressure biofuel reactor is one of the most challenging areas in achieving reliability and consistency in advanced biofuels production.
- Jenike & Johanson has launched a patented technology, Jen-Zero™, specifically for this purpose.
- This technology is based on Jenike & Johanson's decades long experience in material handling and lock hopper design.

Questions ??

Stop by at our Booth to collect mass flow models