



# Flour City District Walker, MN

Bob Ricklefs  
Great Western Mfg.

# Great Western

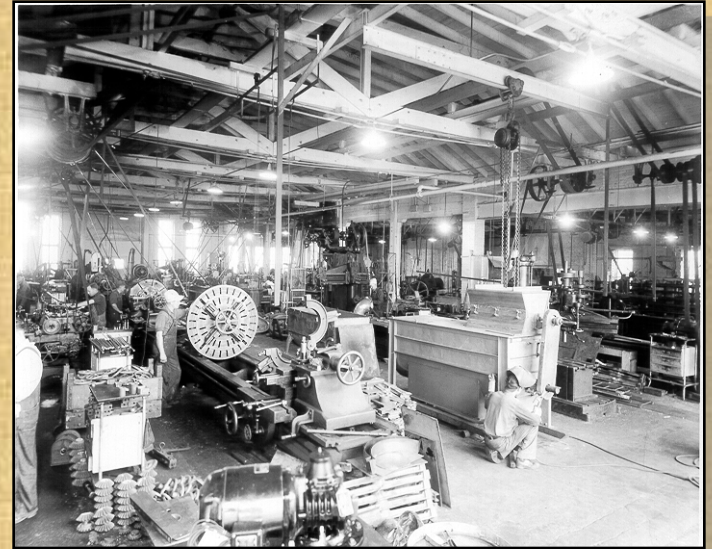
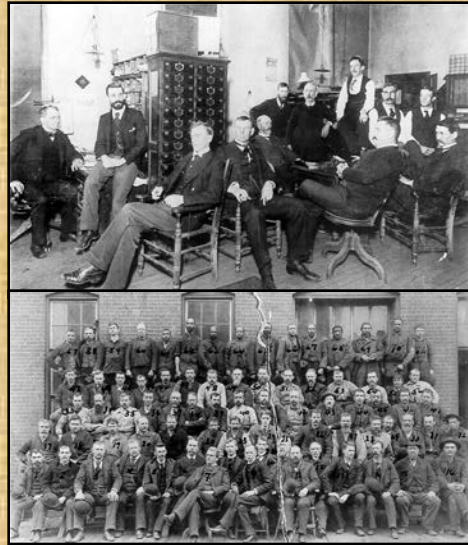
Began in 1858 as a foundry & machine shop



**Great Western Stove Company**

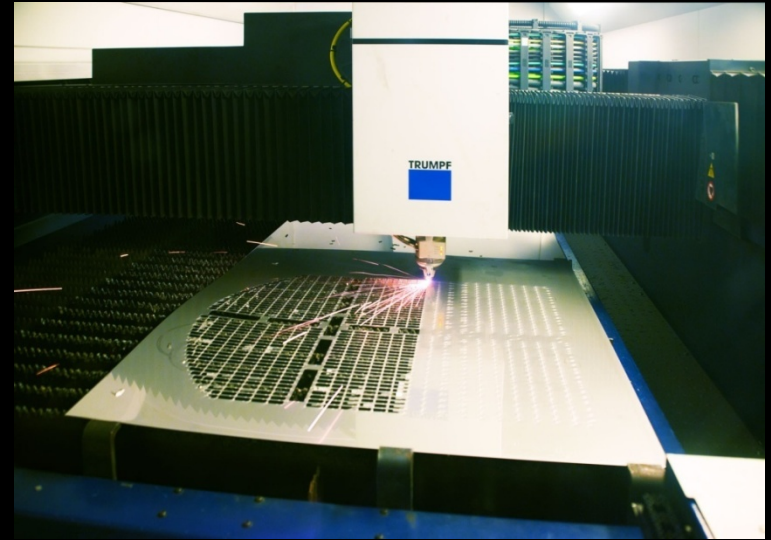
**Great Western Foundry and Mill Machinery Works**

# Great Western



# Great Western today...





# Applications

- Cereal Processing
- Mix Plants
- Bakeries
- Spice Industry
- Confectionery
- Dried Dairy Products
- Pet Foods
- Plastics
- Chemicals
- Minerals





# **Sifter & Troubleshooting Frequently Asked Questions**

- 1. Mechanical issues**
- 2. Flow, capacity & process questions**

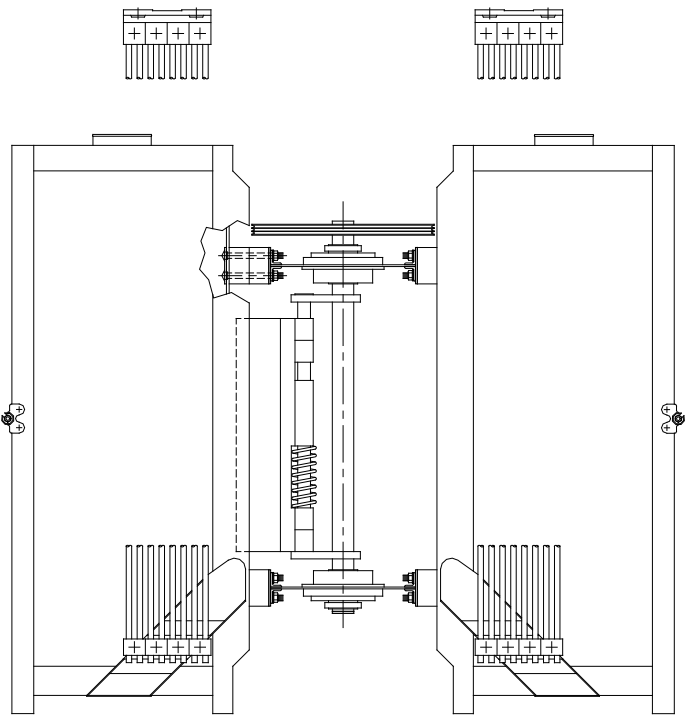
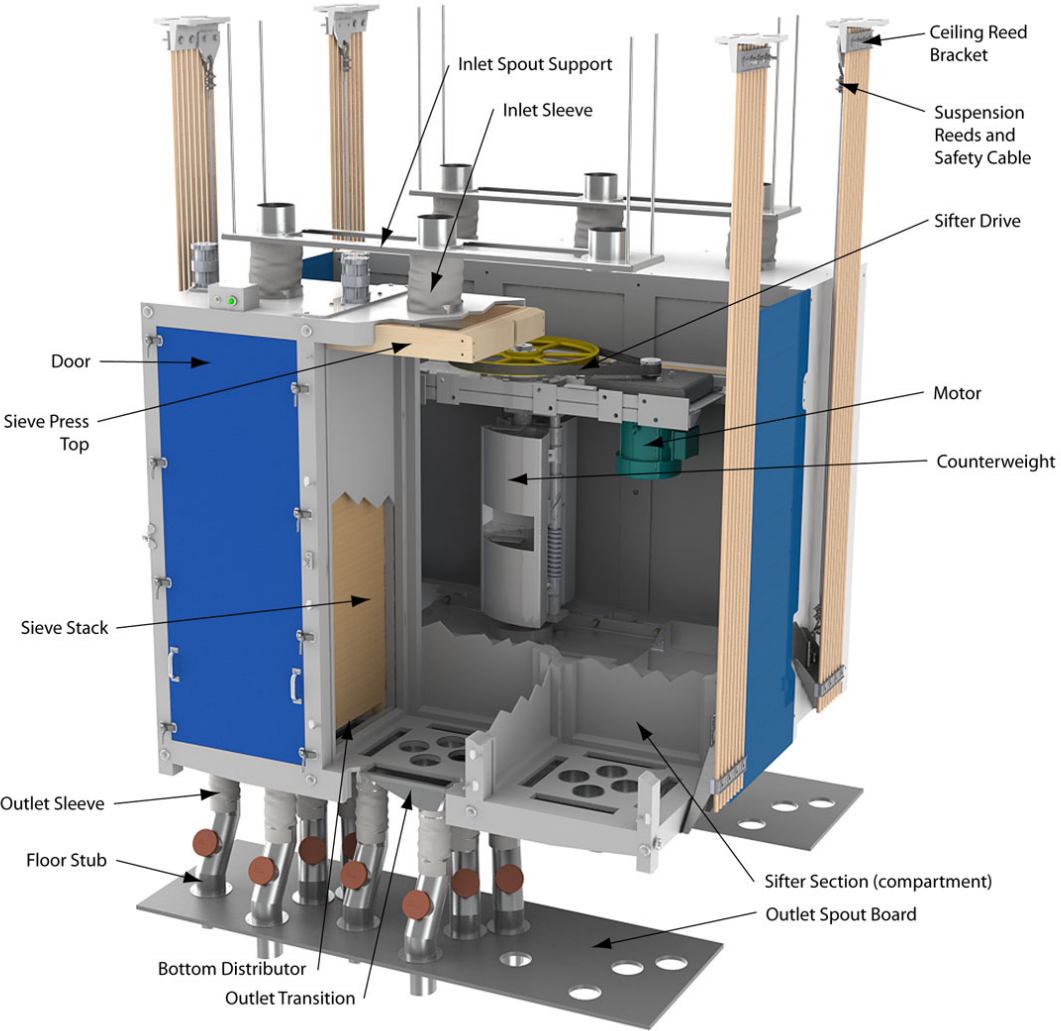


# Mechanical Issues

1. HS Free-Swinging Sifters
2. Tru-Balance Sifters

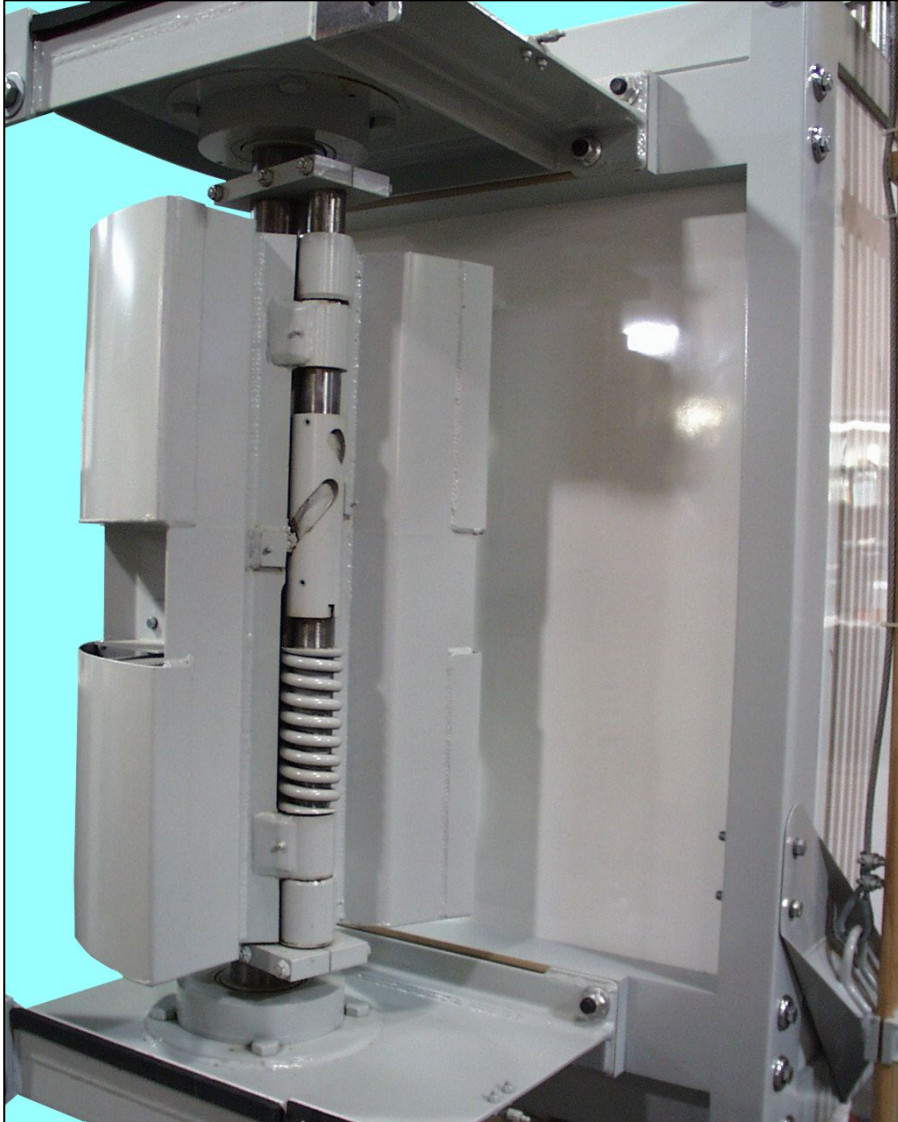


# HS Sifter Drive



- Counterweight mounted on shaft & eccentric to the main shaft
- Rotating the weight creates a centrifugal force... the sifter body counteracts this force

# HS Drive Parts

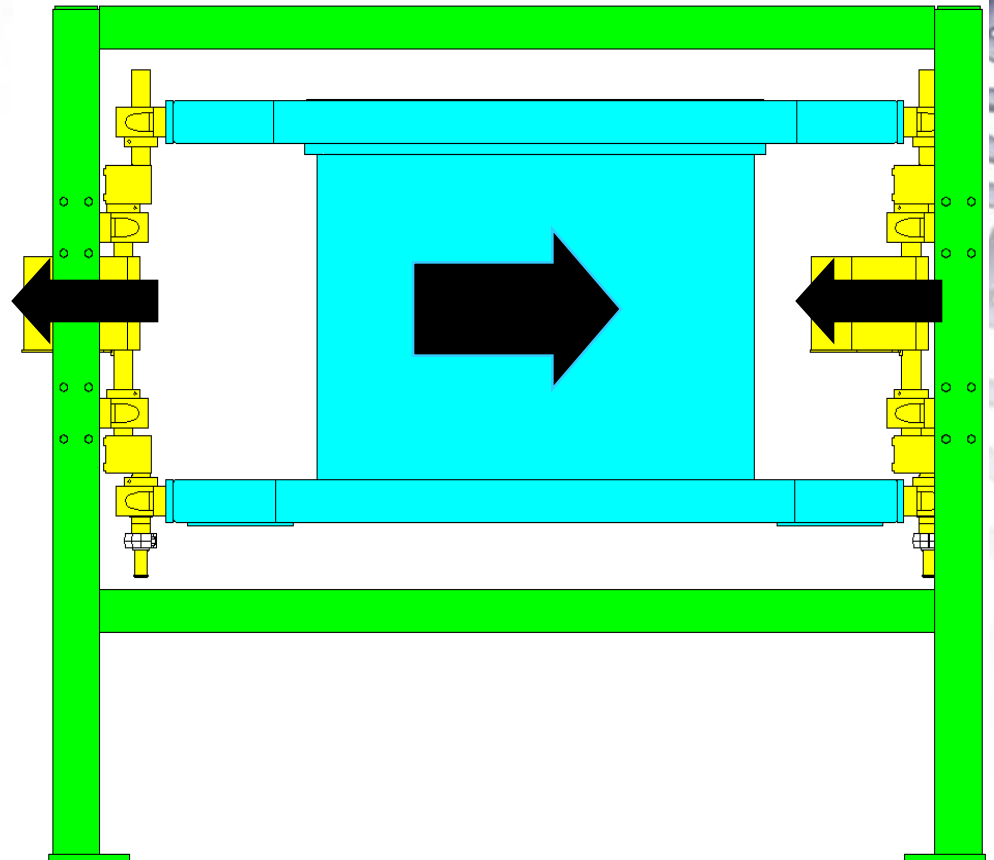


- Bridgetrees
- Bearings & main shaft
- Throw blocks
- Bucket shaft
- Spiral
- Weight buckets
- Pawls
- Compression spring



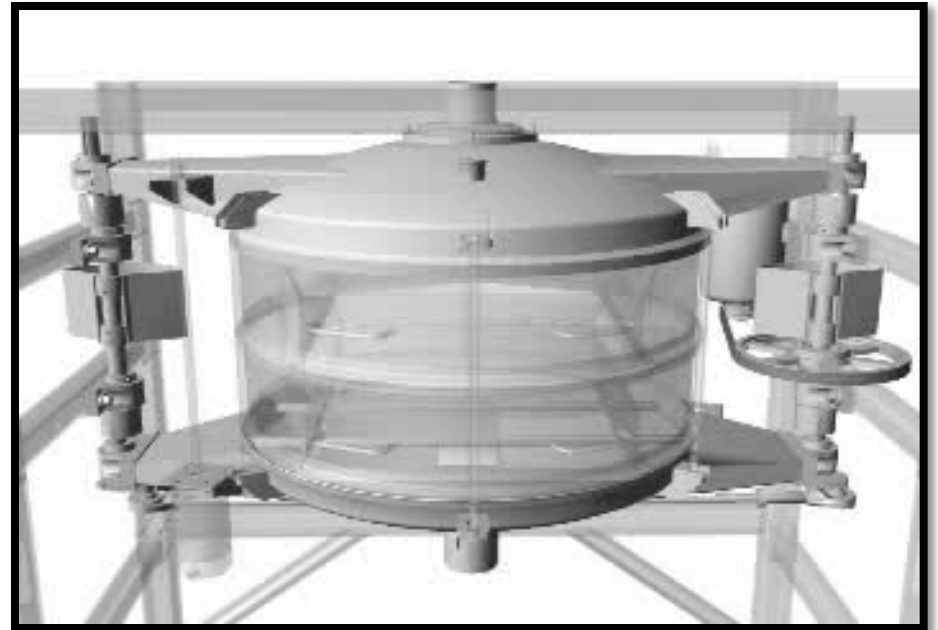
# Tru-Balance Drive Mechanism

- Precision Machined Frame
- Fixed Crankshafts
- Balanced for a given set of conditions

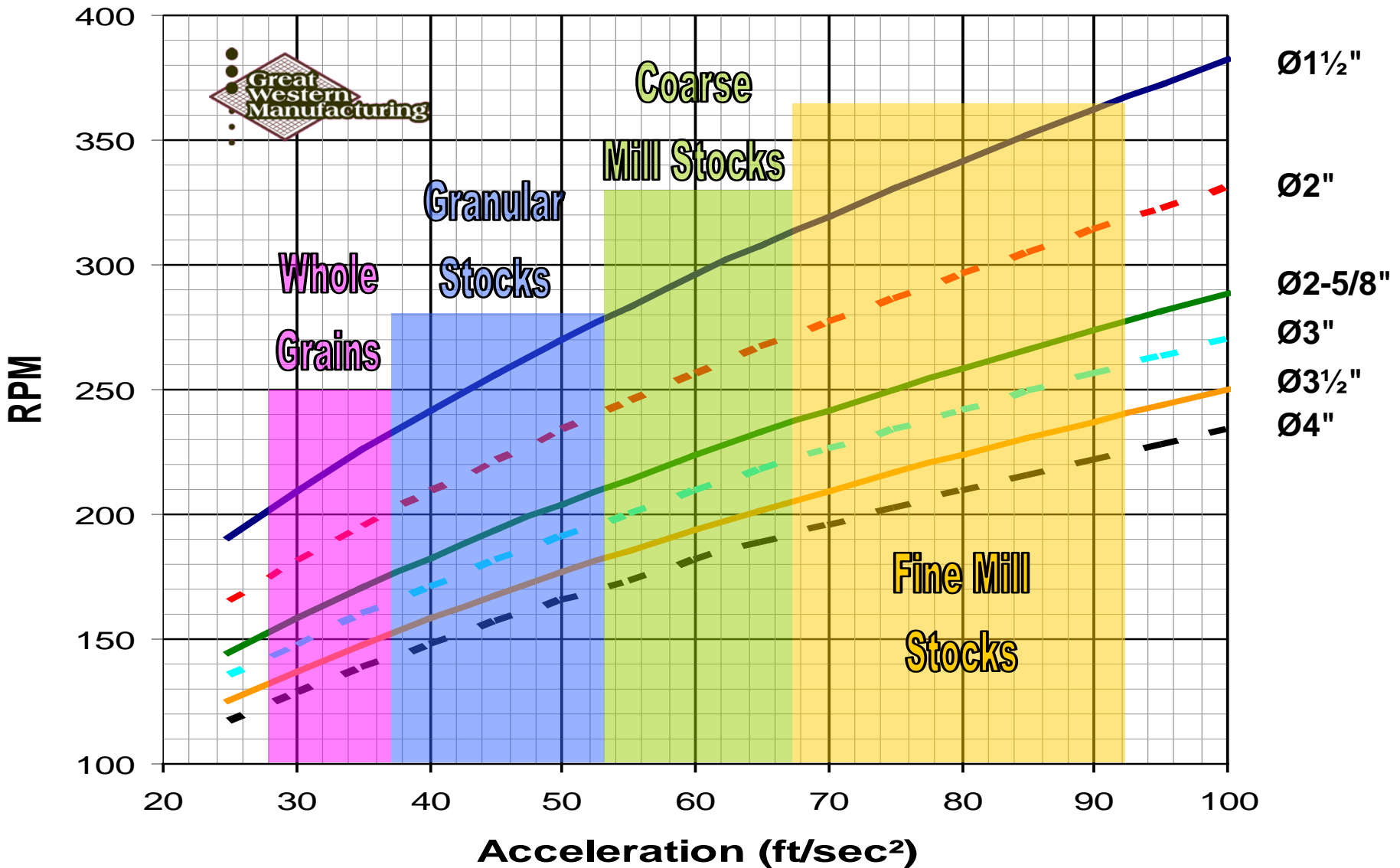


# Tru-Balance Drive Mechanism

- Power transferred to top & bottom of the sieve stack
- Top & bottom drive components stay in the sifter



# Screen Acceleration vs. RPM



Note: Attention must be given to the sifter drive mechanics for accelerations greater than 60 ft/sec<sup>2</sup>.

# HS Sifter - Common Calls

Many sifting problems are a result of changes in the **Speed / Throw** relationship.

***If we speed up the sifter, will the circle change?***

- Throw is determined only by the weight of the sifter versus the counterweight. The speed does not affect the sifter's circle.
- Excessive weight in the machine will reduce the sifter's circle. This can result in:
  - motor kicking out
  - sifter backing up (overloading)



# HS Sifter - Common Calls

Speed / Throw relationship continued...

- ***The sifter is backing up.***
  - Loose or leaking sieves can fill dead channels which will cause the sifter's throw to be reduced.
- ***The motor kicks out; is a bearing bad?***
  - A bearing will growl, smell hot, and eventually lock up. Generally the motor will not kick out.
  - If the sifter's circle is reduced, it is a less effective conveyor. This can cause the motor to kick-out.
  - If the sieves are too shallow to allow the load to flow properly, this can overload the motor.

# HS Sifter - Common Calls

***The sifter pulls the sleeves loose when it starts.***

- Sleeves that are too short or too tight will cause an erratic throw on start up.
- Make sure the weight bucket mechanism is not in a full or partially open position.

***The weight bucket is hitting the back of the sifter box.***

- Check for excessive spiral wear, shrinkage of the drive rails, loose drive bolts or damaged weight bucket.
- Requires a new counterweight assembly or shorter throw blocks
- Not a result of a bad bearing.



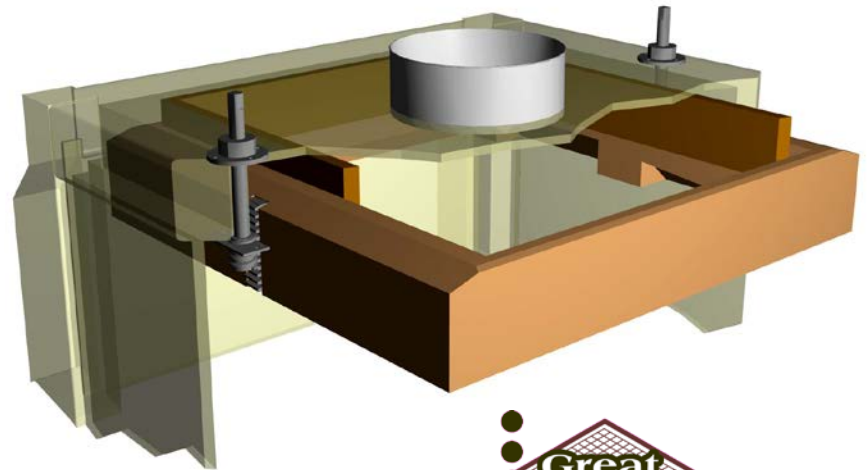
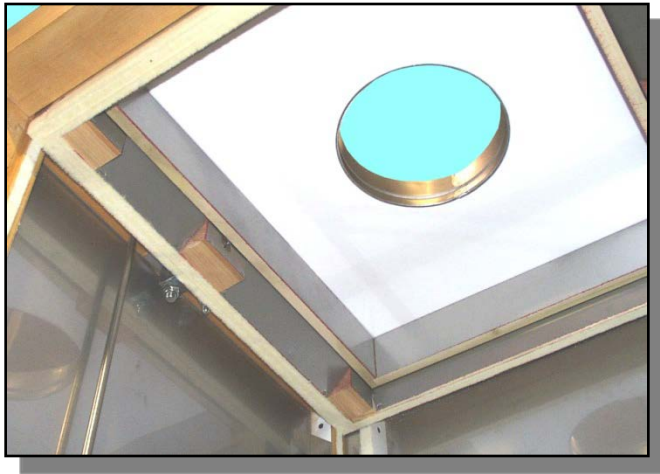


# HS Sifter - Common Calls

- ***The sifter fell down.***
  - Usually happens to new machines because the ceiling clamps weren't tightened.
  - Keep wood shrinkage in mind in plants with heat sterilization.
- ***What are the proper bolt torque values?***
  - Reed clamps, 75 ft-lbs
  - Drive bolts, 150 ft-lbs
  - Throw Block bolts, 90 ft-lbs
  - Joint bolts, 50 ft-lbs
  - Reed bracket bolts, 50 ft-lbs

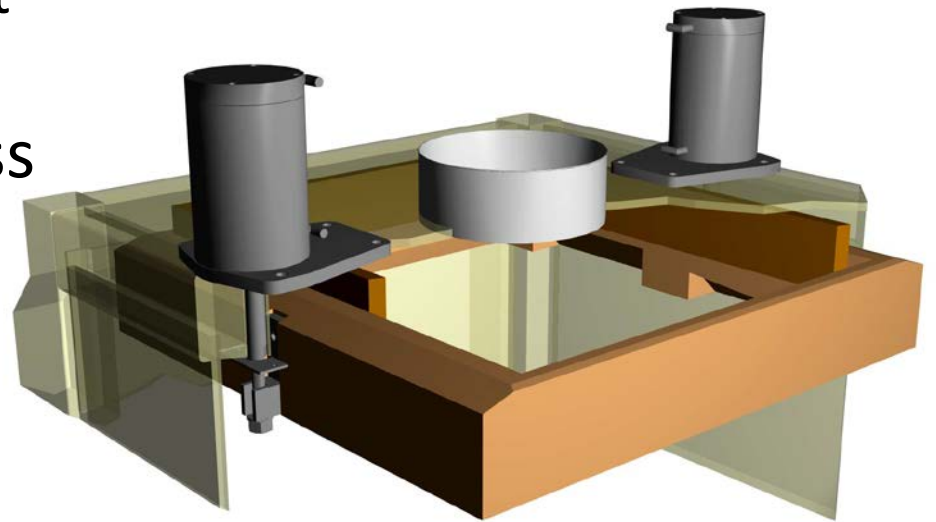
# HS Sifter - Common Calls

- ***We can't keep the sieves tight.***
  - Slippage of the sieve press results from excessive clearance between the worm gear and the rack.
  - Worn parts should be replaced but may also require shimming.
  - Consider pneumatic sieve compression.

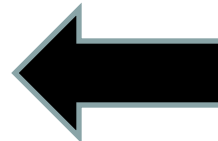
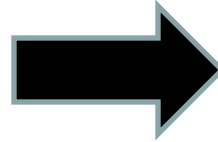
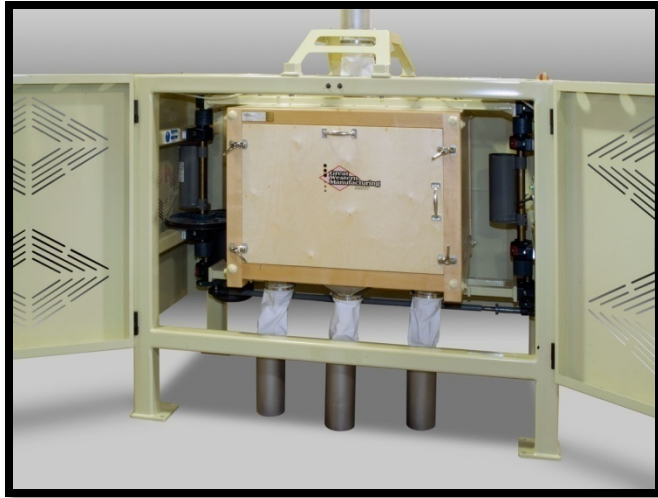


# Pneumatic Compression

- Uniform, constant compression:
  - Reduces leakage
  - Reduces sieve & gasket wear.
- Quicker & easier access



# Mechanical Issues for TB Sifters



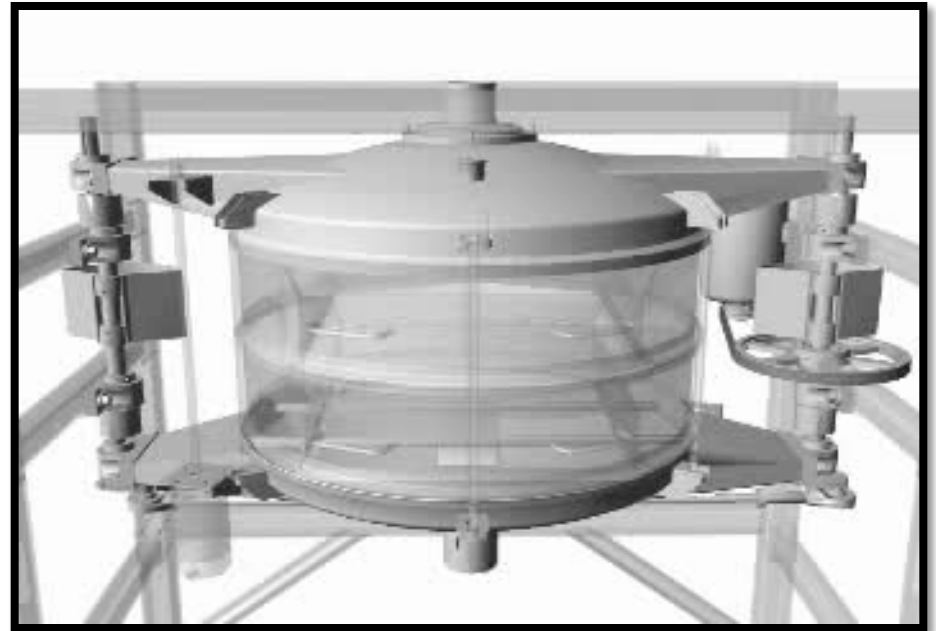
# Tru-Balance Sifter - Mechanical Issues

*What kind of problem is it?*

- *Mechanical vibration?*

*- OR -*

- *Is the frame swaying...  
out-of-balance?*



# Tru-Balance Sifter - Mechanical Issues

*Typical perceived problems when you have a mechanical vibration are:*

- *The sifter has a bad bearing.*
- *The crankshaft is bent.*

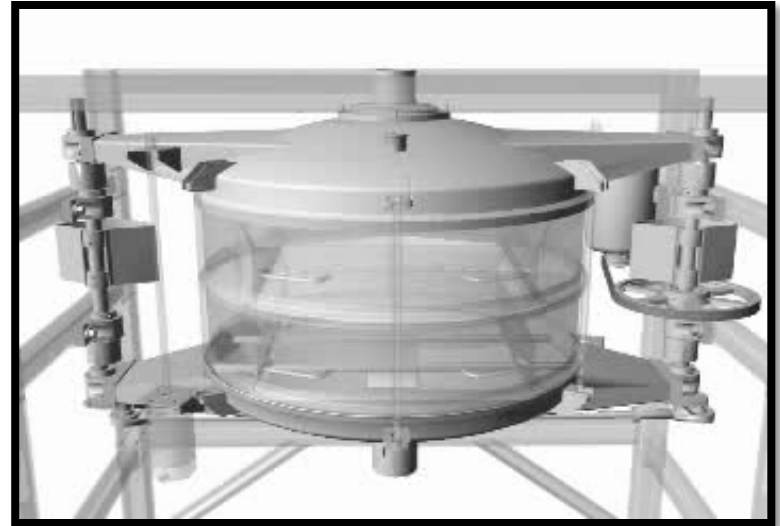
*These are seldom the problems!*

- Most problems are related to the drive frame which is a precision machine frame.
- Before re-balancing or replacing bearings, or crankshaft check...



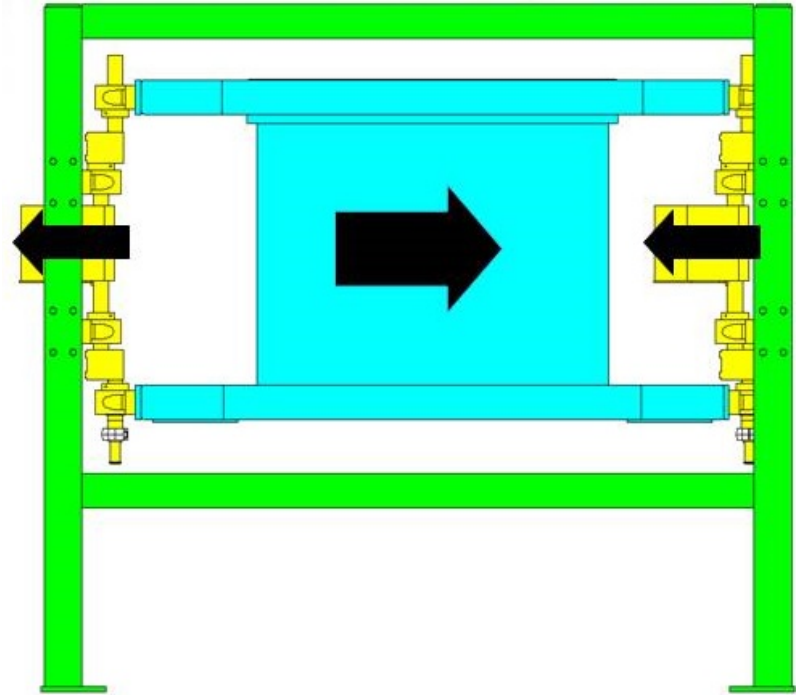
# Tru-Balance Sifters - Mechanical Issues

- The floor mounting is uneven, pulling the frame out of shape.
- The machine was run in choked condition resulting in:
  - Spring or break the bearing support arms
  - Shear off the weight bucket key
- Broken components have been re-welded.
- The tie bar system may be faulty.
- Incorrect motor installed.



# Tru-Balance Sifters – Balance Issues

- The sieves are leaking or the press top is loose... filling sifter channels.
- Original sieves aren't in the sifter.
- Are counterweight discs in the right place?





# Flow, Capacity & Process Questions

1. What capacity will my sifter handle? Or, what size sifter do I need?
2. What speed and throw should my sifter be running?
3. Should I invert the flow?
4. I have too many fines in my over's; what can I do?
5. Why is my sifter choking?



# Sample Testing and Analysis

**Allows us to determine...**

- **Can we sift the product; do we see issues?**
- **Compare operational changes**
  - Speed / throw
  - Screen change
  - Process change
- **Screen area requirements / distribution**
  - For a given load... Or, what load can the sifter handle?
  - Impact of changing load on performance.
  - Would a change to the flow help, e.g. inverted
- **Peak capacity**
- **Sieve depths**
- **Separation efficiency**

# Sifting Performance Factors

- Product characteristics
  - Particle Size
  - Particle Shape
  - Product density
  - Moisture content
  - Static Charge
  - Fat or oil content
  - Temperature



EPS Beads



Statically Charged Particles

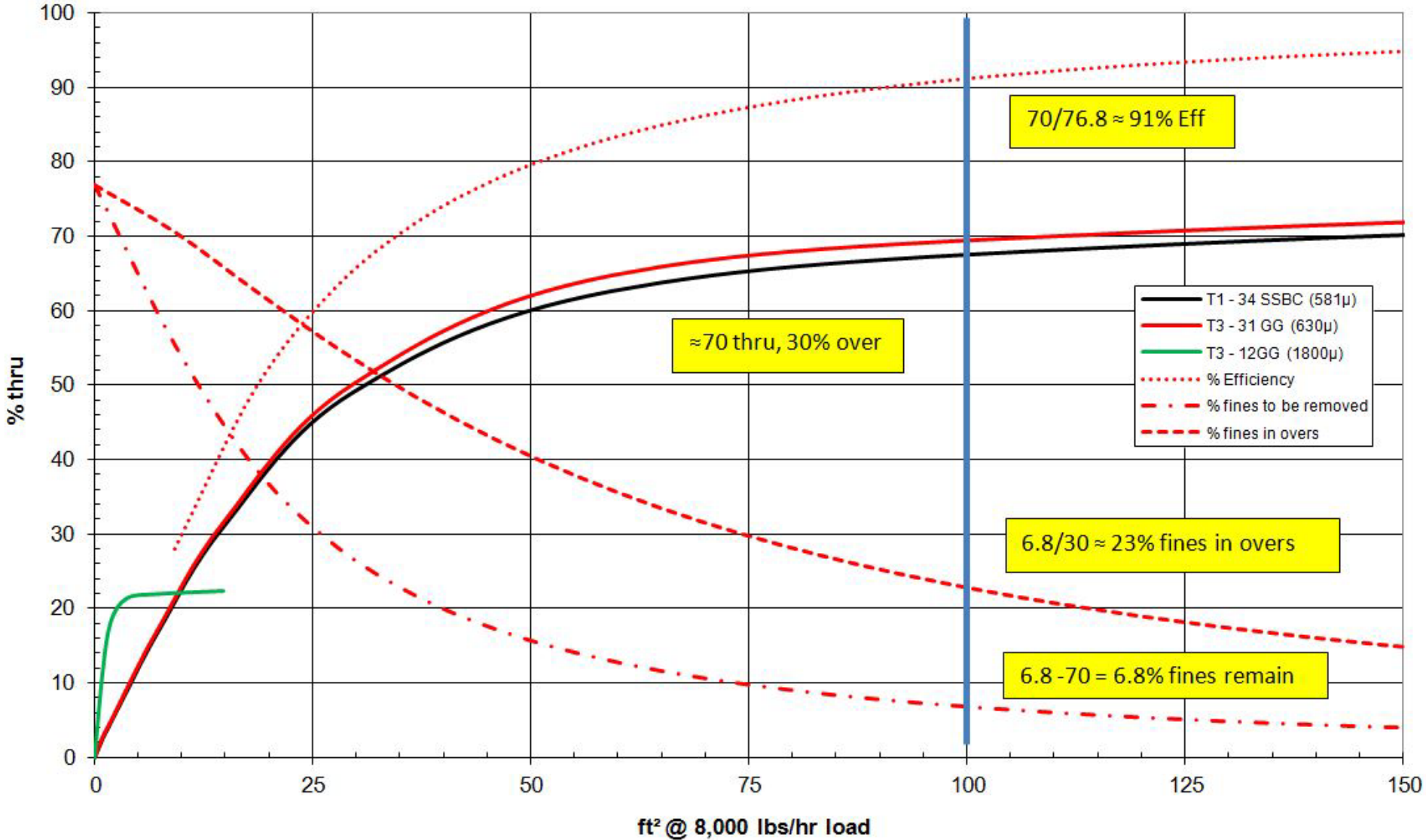


Cocoa bean hulls

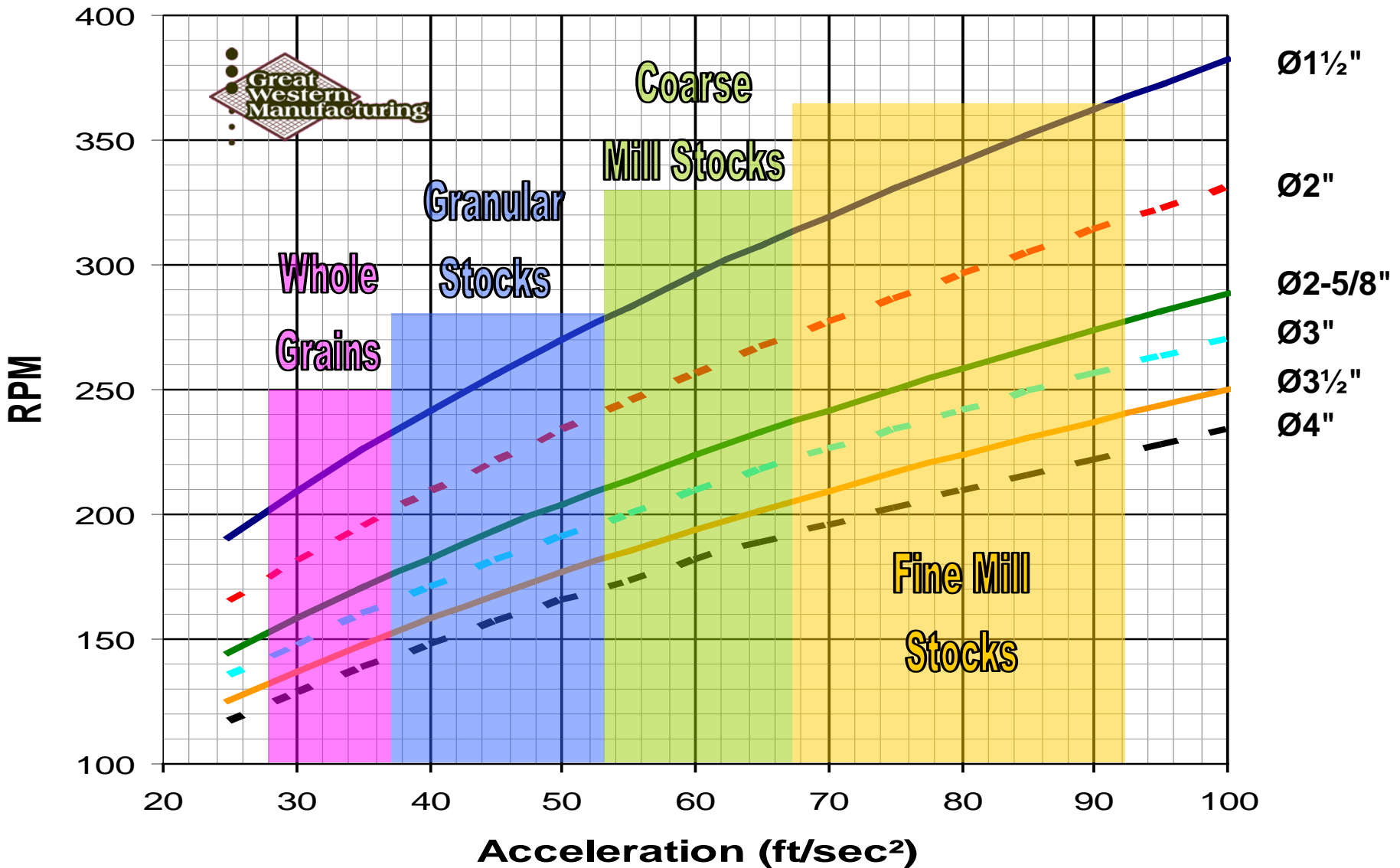


# Ground Flax 34 & 12 mesh Separation

Tested end-point = 76.6% thru  
Predicted end-point = 76.8%

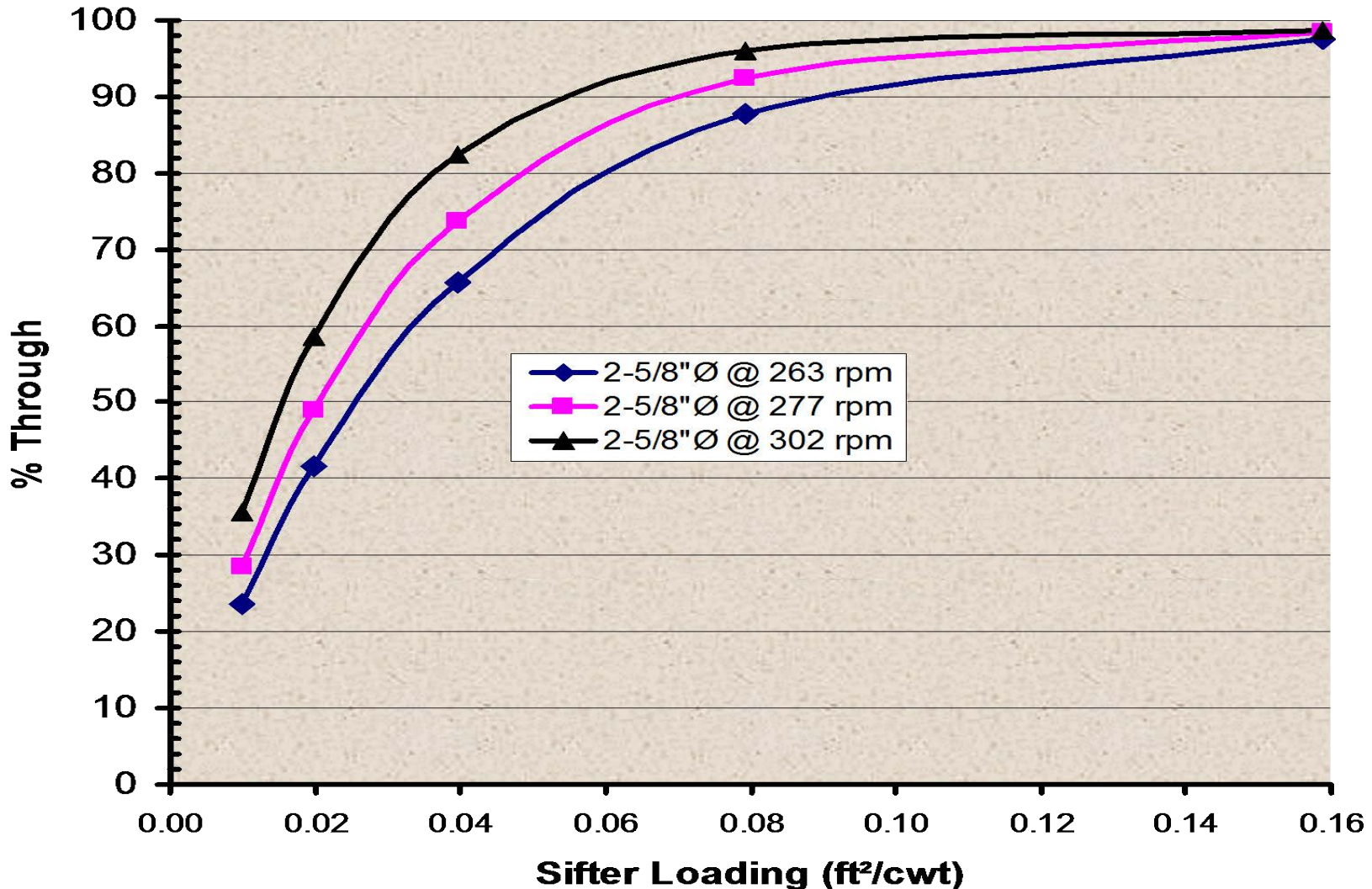


# Screen Acceleration vs. RPM



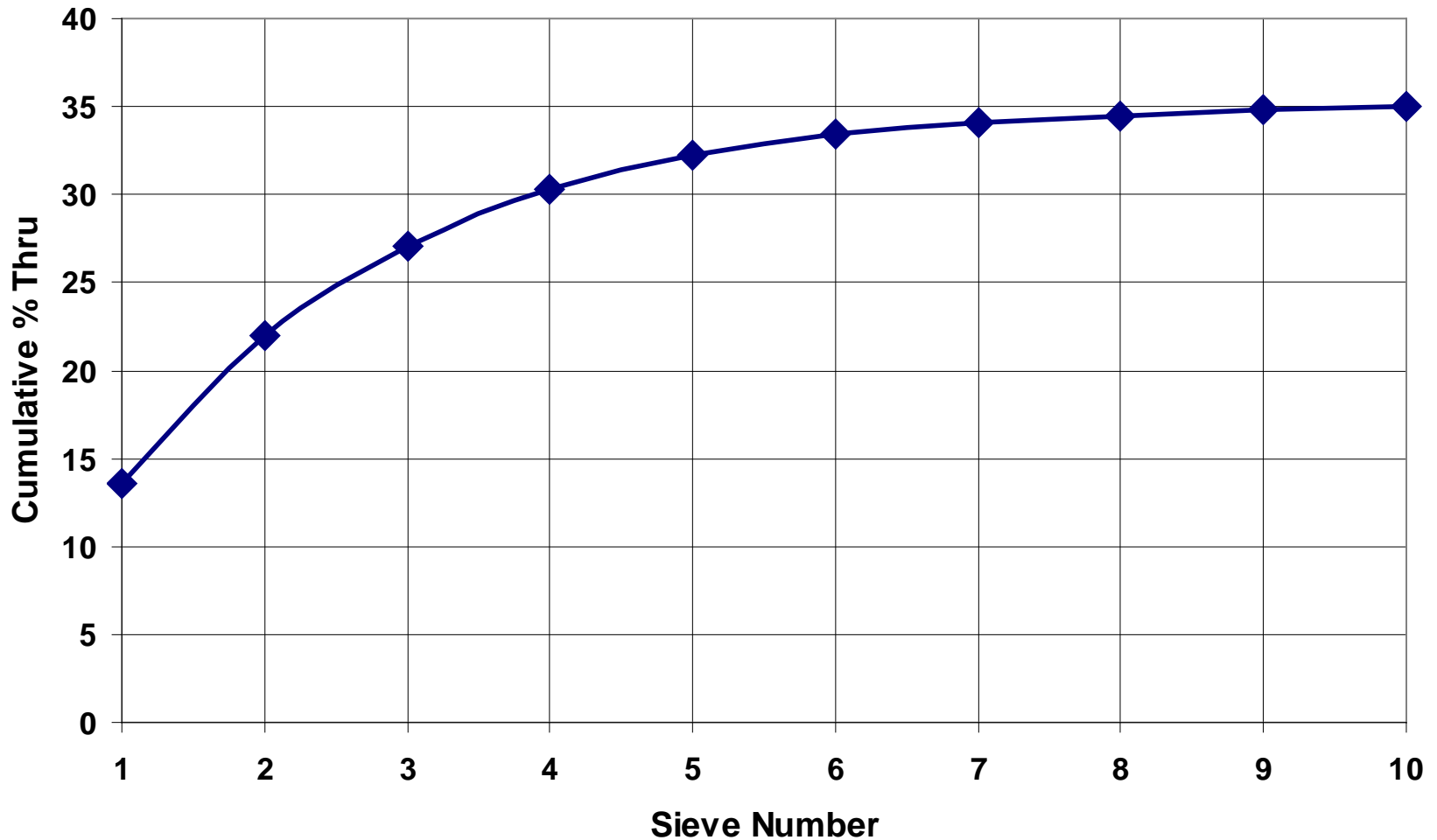
Note: Attention must be given to the sifter drive mechanics for accelerations greater than 60 ft/sec<sup>2</sup>.

# Sifting Performance - Results with changing speed.



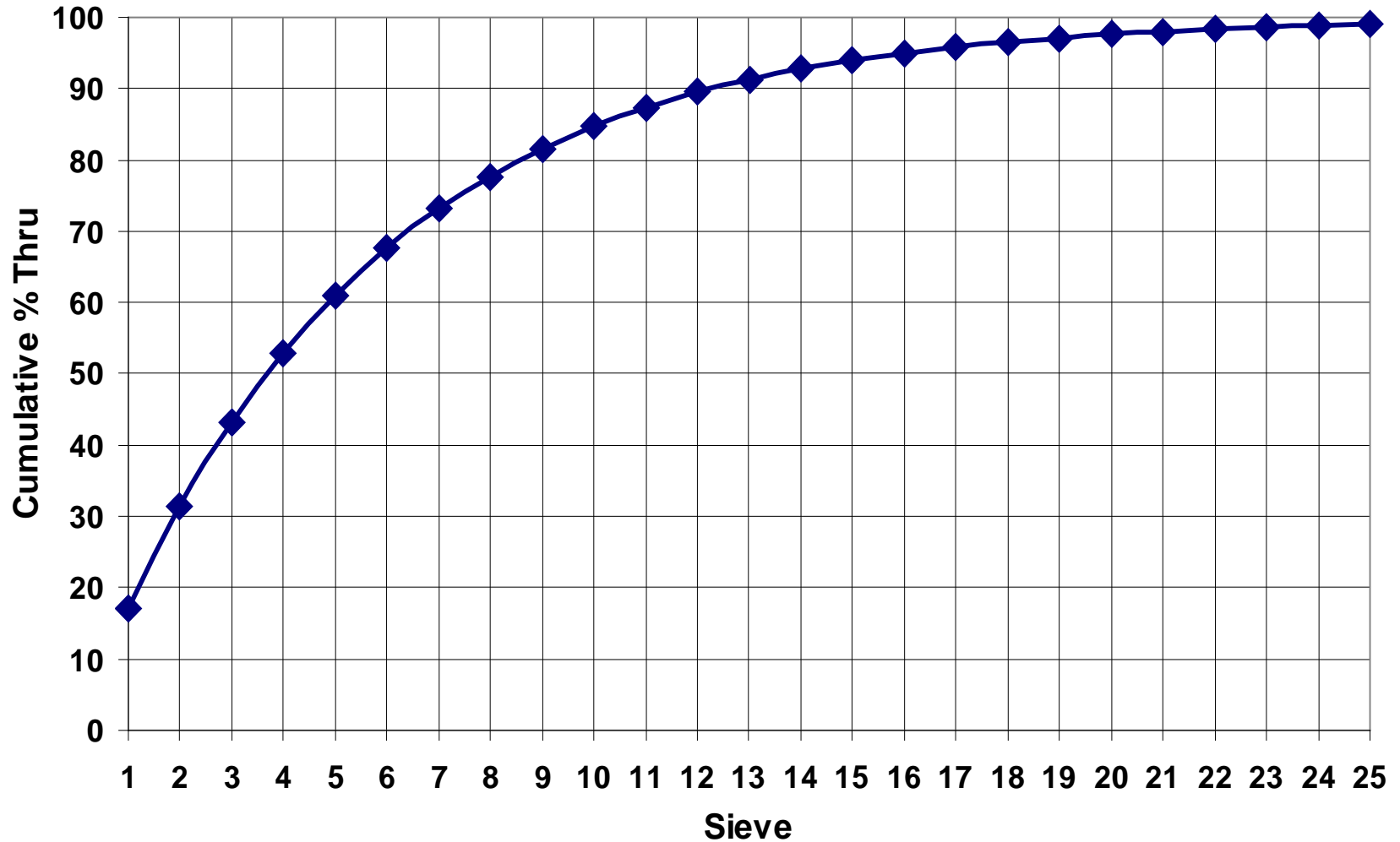
# Sifting Performance Factors - Sifting Efficiency – Benefit vs. Cost

First Break Stock



# Sifting Performance Factors - Sifting Efficiency – Benefit vs. Cost

Patent Flour





# Process Troubleshooting

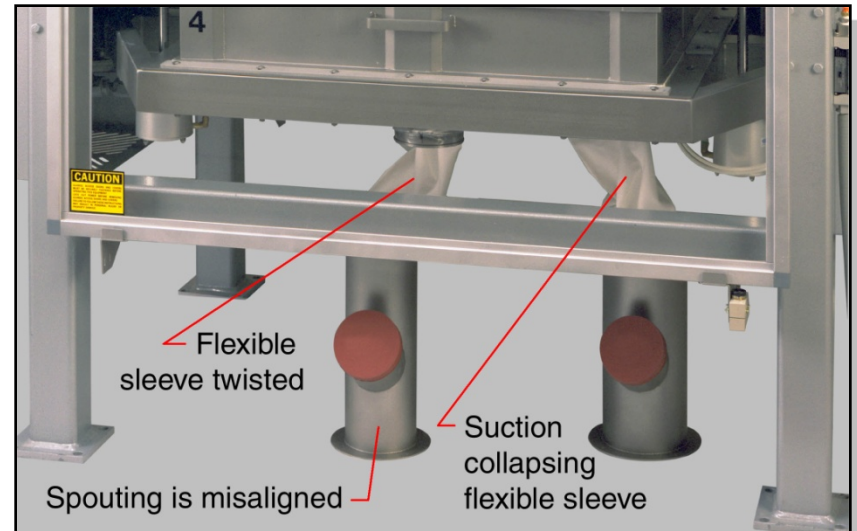
- Sifter problems?
  - Sifter Backing Up
  - Sifter Tailing Over
  - Inaccurate Separations
- Often times due to other factors ...
  - Inadequate spouting size or slope
  - Air problems
  - Grinding equipment
  - Variable load conditions



# Process Troubleshooting

## Sifter Backing Up

- Speed or throw off
  - Increase throw
- Inlet restricted
- Spouting
  - Too flat or too small
  - Misaligned
  - Socks twisted or collapsed
- Sieves
  - Installed wrong
  - Too shallow
  - Throats too small
- Tailings can full





# Space for product

2 Side  
Channel



Full  
Cloth

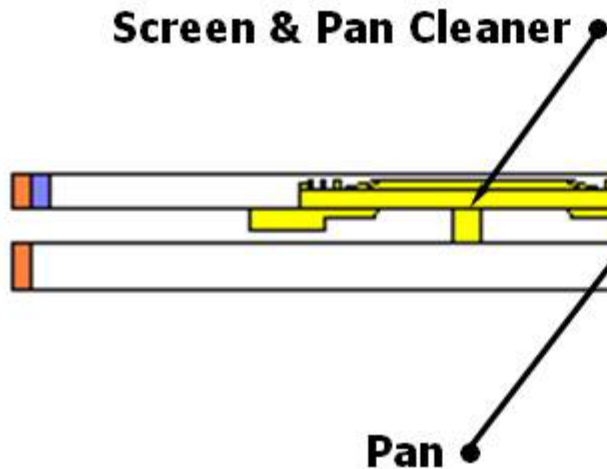


# Nova Sieve

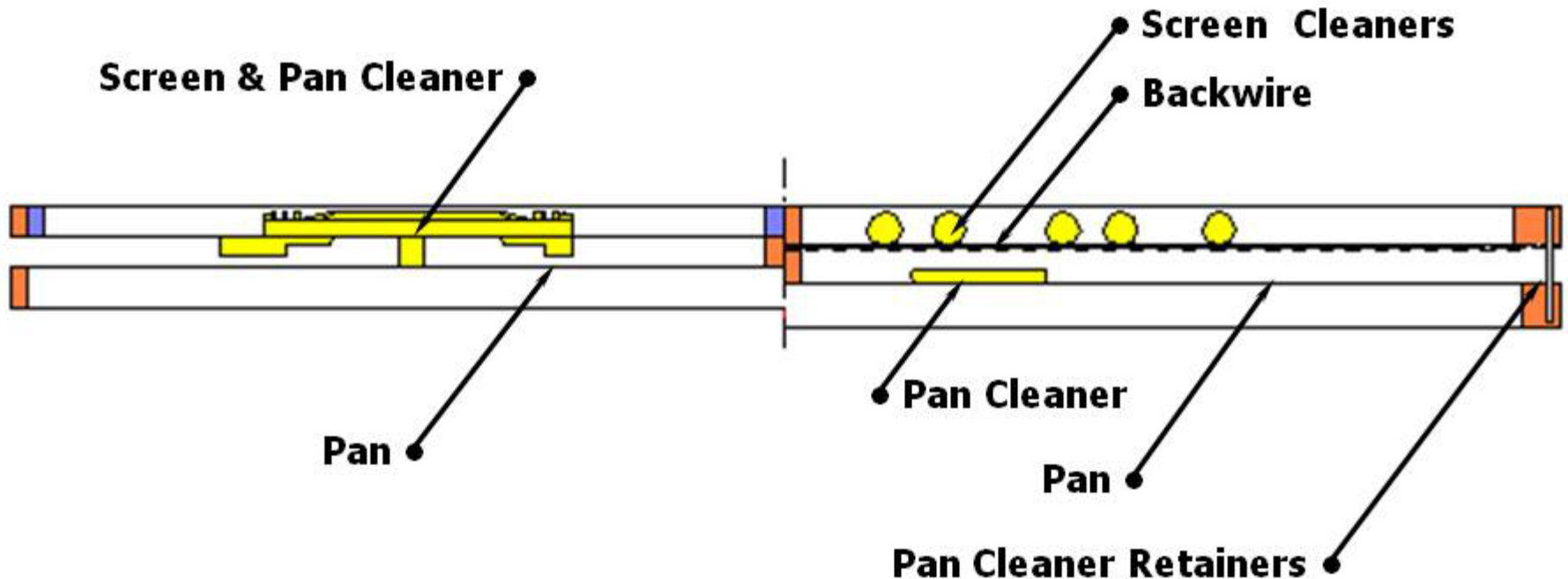
Compact sieve design provides...

- **More sieves for increased efficiency, or**
- **Deeper sieves for increased capacity.**

## NOVA Sieve



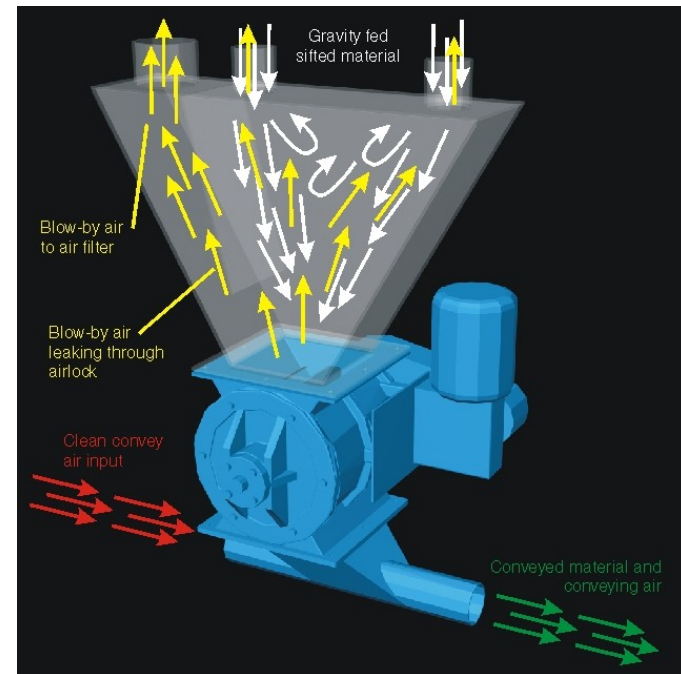
## Conventional Sieve



# Process Troubleshooting

## Sifter Tailing Over

- Speed or throw off - Increase speed
- Pneumatic backpressure
- Spouting
  - Outlets blocked
  - Too flat or too small
  - Misaligned
  - Flexible sleeves twisted or collapsed
- Sieves
  - Screens blinded, cleaner problems
  - Product issues, moisture, static,
  - Screens too loose
  - Too shallow (no pan tail-out)
  - Not enough screen area
  - Pans too flat (no cleaners)



# Process Troubleshooting

## Inaccurate Separations

- Press top leaking
- Sieves leaking
- Sieves installed incorrectly
- Broken or damaged screen
- Screens blinded
- Not enough area
- Improper mesh selection





**Thanks!**