Productivity Enhancement in Feeding & Airlocking using RFS Technology - a study

By

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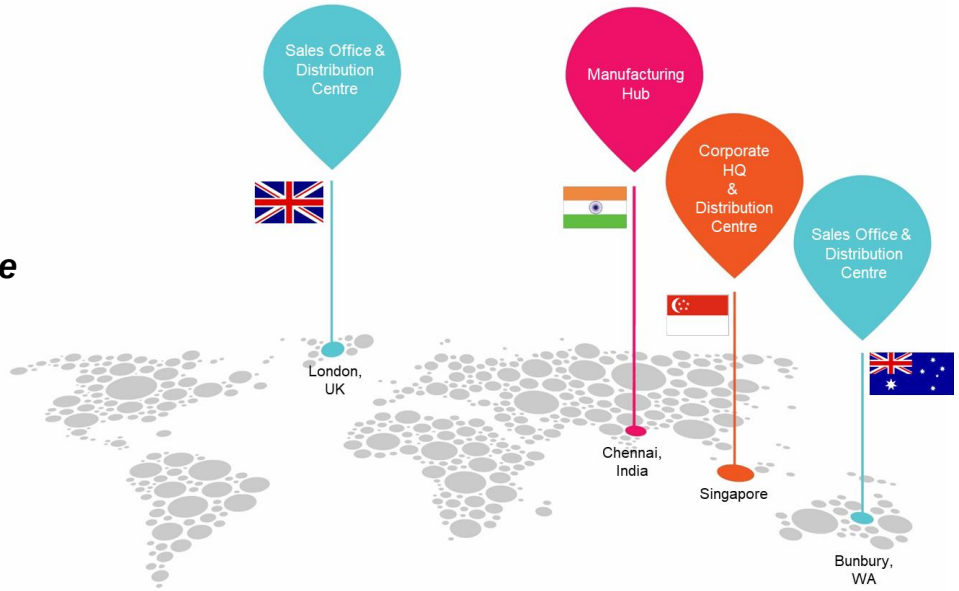
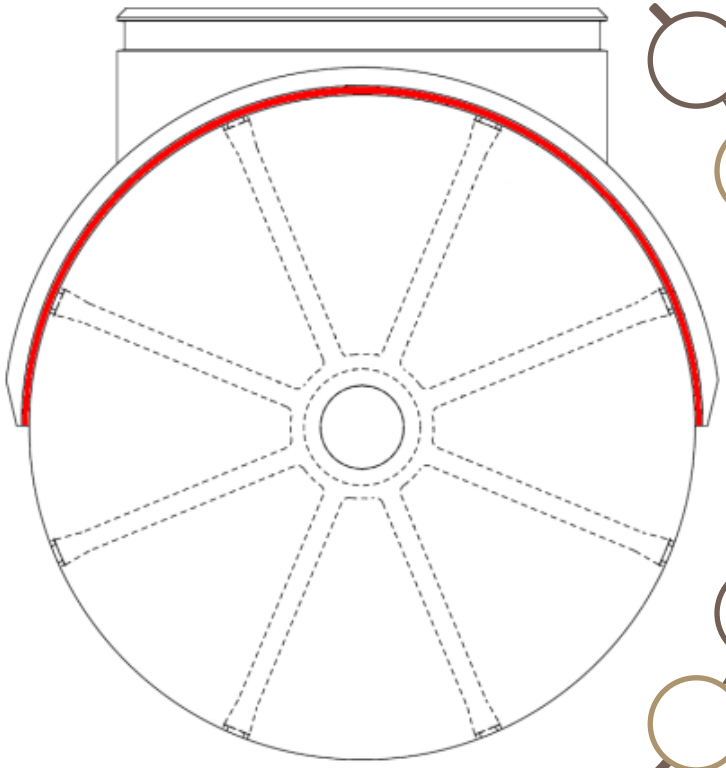


Overview



- *Feeding & Airlocking using Rotary Valve*
- Challenges in Handling Abrasives
- Causes & Effect of Wear in Valves
- Understanding Wear & Applications
- *RFS – Working Principle*
- *Wear Study & Result*
- *Labyrinth Sealing & Case Studies*

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Feeding & Airlocking

- **Rotary Valves are used in wide ranges of applications including:**
  - **Air locking: To minimize system air loss while transferring material with differing pressures;**
  - **Feeding: To transfer material between vessels with equivalent pressures;**
  - **Metering: To adjust flow of material frequently;**
  - **Isolation: To isolate vessels and control the flow of material.**

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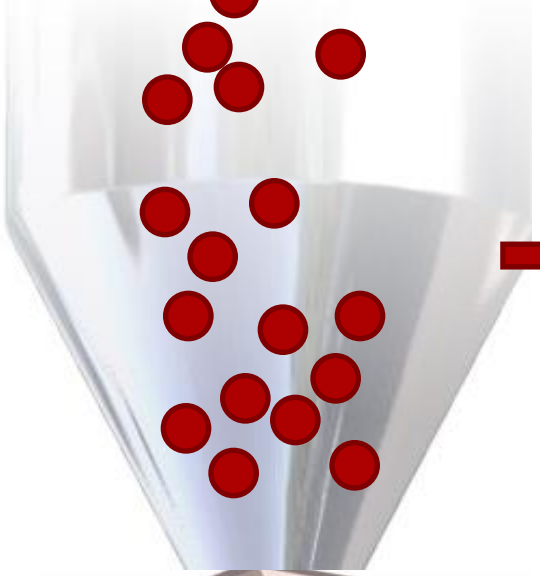
Feeding & Airlocking

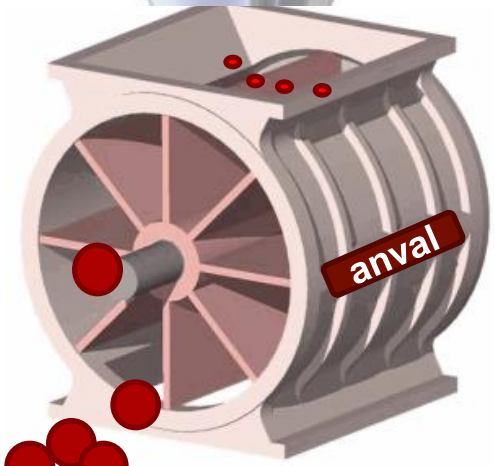


Vacuum Pressure
Pv

SOLID MATERIAL PARTICLE

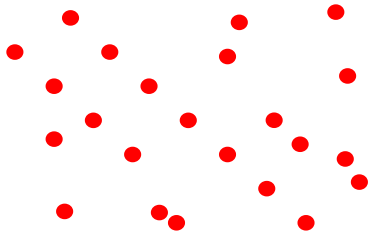
AIR PARTICLE

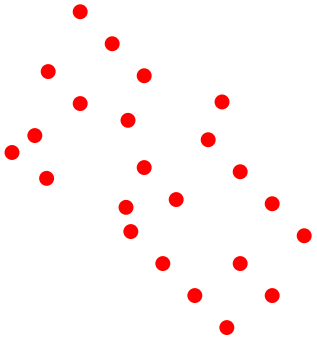
Rotary Airlock



Pa > Pv

Atmospheric pressure
Pa





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Challenges in Handling Abrasives

- Handling Abrasives is the real challenge in Bulk Material Handling;
- The situation worsens when High Pressure & High Temp. co-exists;
- Conventional Rotary Valves are often destroys itself within few months of operation;
- Wear in conjunction with pressure are often underestimated which triggers need for an alternative solution;
- Study on Wear Resistances endorses RFS Technology.

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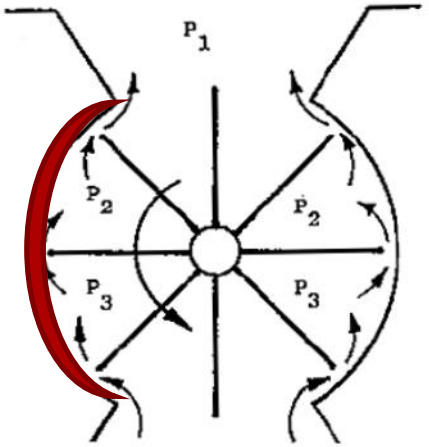
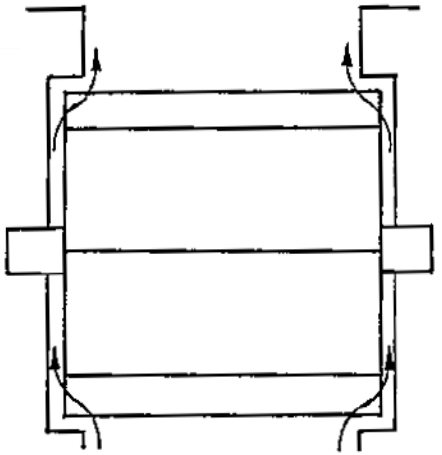
Causes & Effect of Wear in Valves

- Abrasiveness of Material
- Air Leakage
  - Clearance Leakage
  - End Leakage
  - Through Shaft Seal
  - Return Leakage



Clearance Leakage


End Leakage

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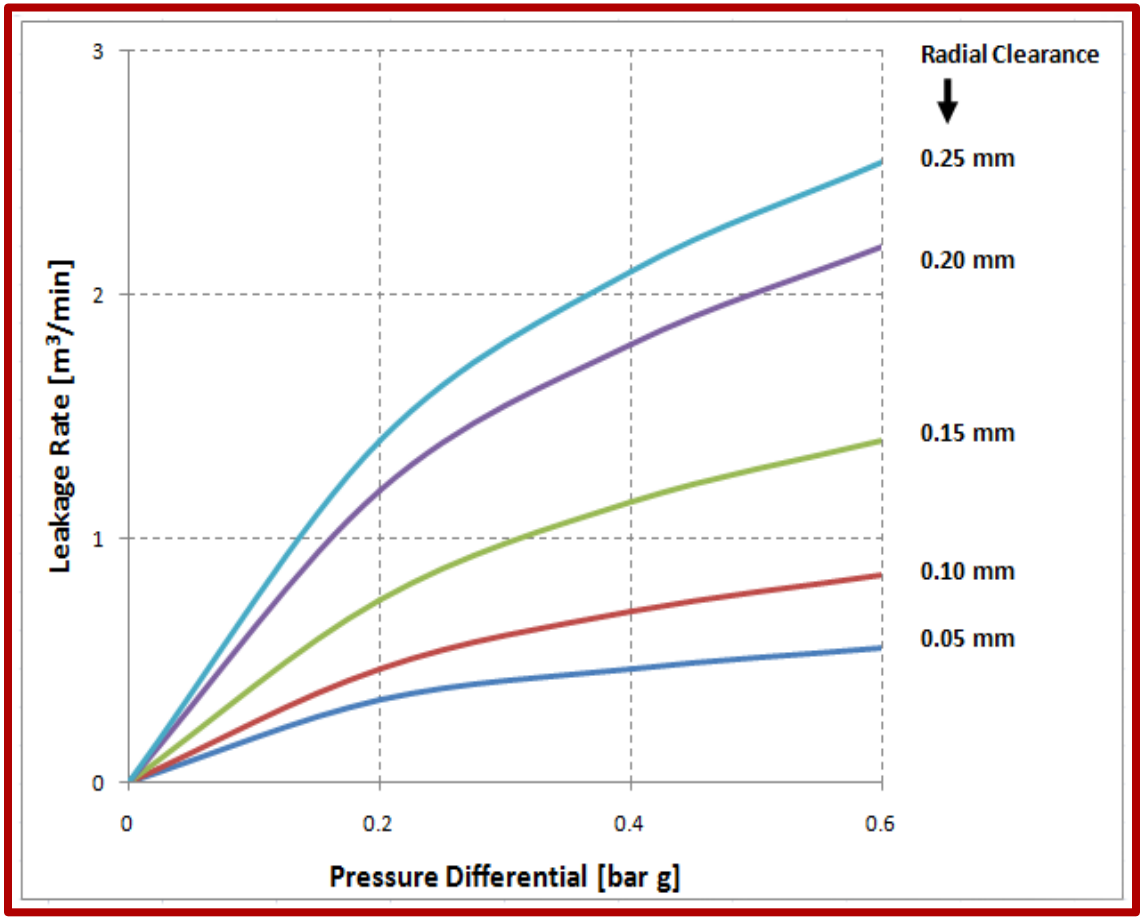
Causes & Effect of Wear in Valves



"One of the main problems with air leakage is that high leakage velocities accelerate the wear of components and increase clearances within the valve, which in-turn causes more air-leakage."

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Causes & Effect of Wear in Valves

- Environmental Issues
- Safety Issues
- System Stoppage
- Low Productivity
- Short Life of Equipment
- High OPEX
- Low Performance

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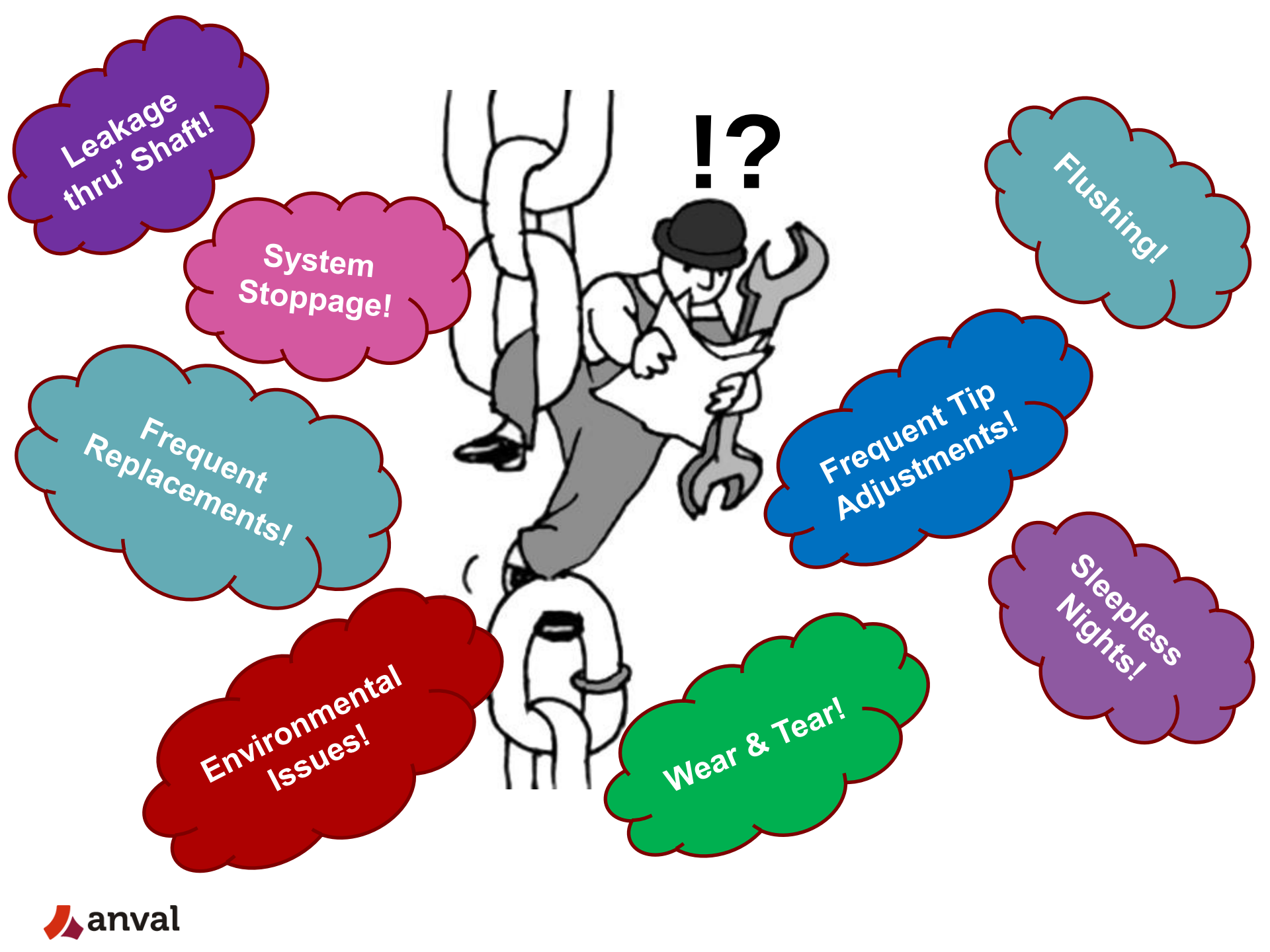
Leakage thru' Shaft!
System Stoppage!
Frequent Replacements!
Environmental Issues!
!?
Wear & Tear!
Frequent Tip Adjustments!
Flushing!
Sleepless Nights!

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ANSWERS
FINDINGS
CONCLUSIONS
RESULTS
SOLUTIONS
OUTCOMES

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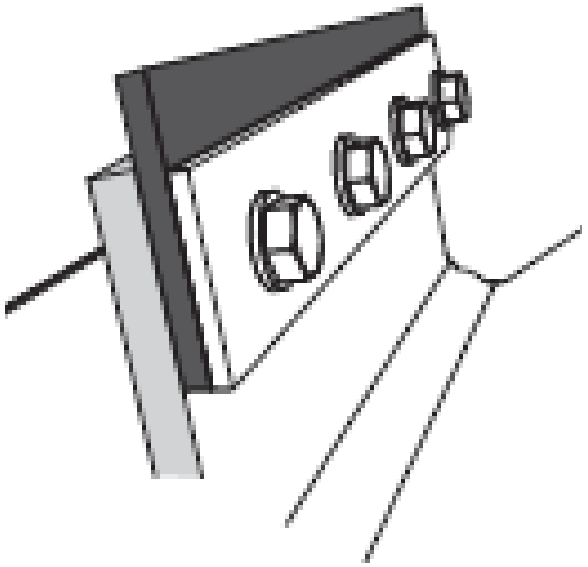
Eureka ! I got it !!

“Use Adjustable Tips in Rotors and/or Coat Chromium in the Bore!!”



resulting to…

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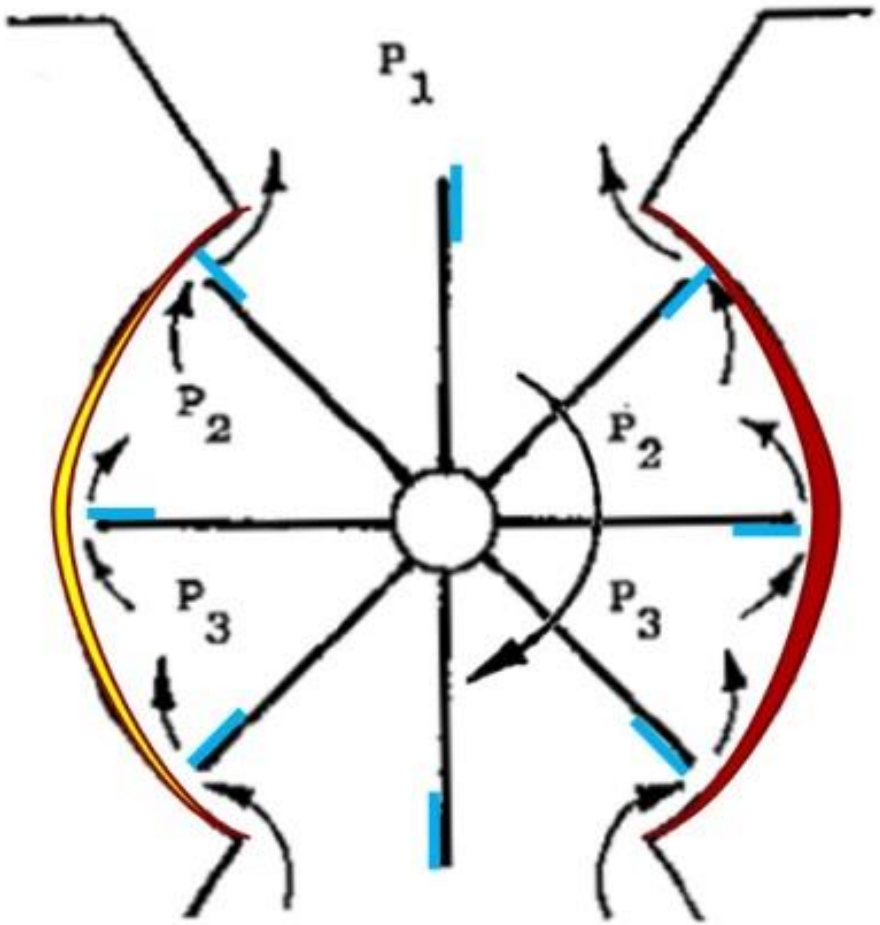
the same **issues**!!

Due to

- **Improper adjustments**
- **Hard to rotate/adjust all tips evenly**
- **Frequent Line Stoppage**
- **Valve bore becomes OVAL**
  - **Thus Flushing !**
  - **High Air Leakage !!**
  - **EXPONENTIAL Wear !!!**



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…and eventually, the valve destroy itself!

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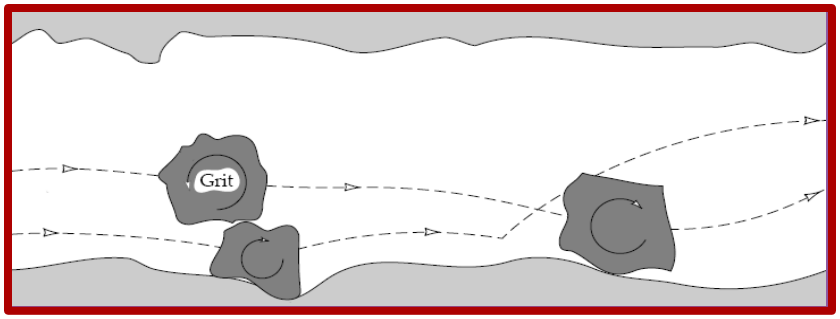
Understanding Wear & Applications

- Wear
  - Abrasion
  - Erosion

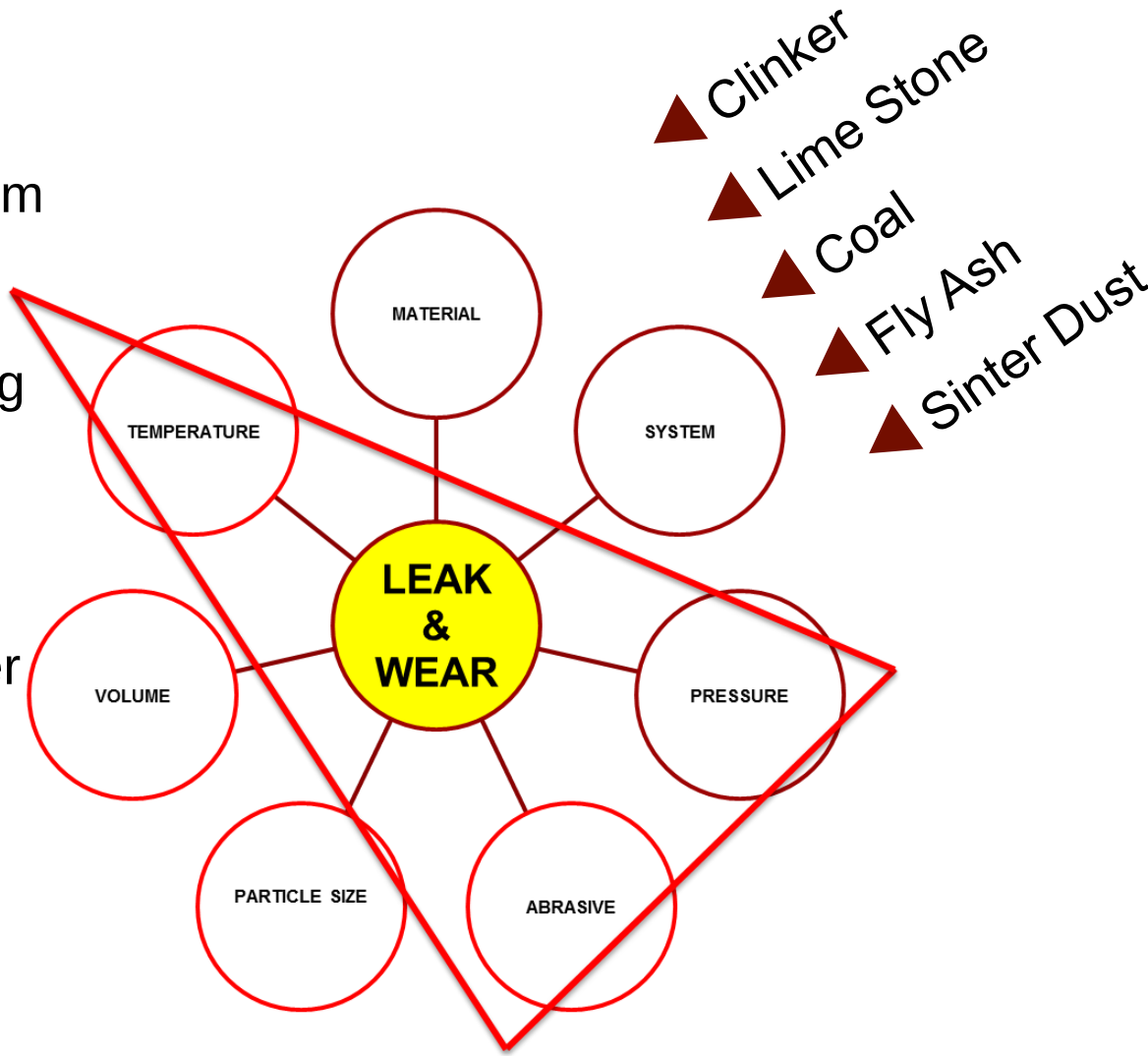


Abrasive wear caused by sliding contact of abrasive particles

Erosive wear caused by impact of particles

Understanding Wear & Applications

- Pulverized Coal Firing
- Cooler Under Grate System
- Weigh Feeding System
- FRW Rotor Weigh Feeding
- Loss in Weigh Feeding
- Fly Ash collection in MDC
- AQC Heat Recovery Boiler
- Solid Flow Metering
- Feeding to FK Pump



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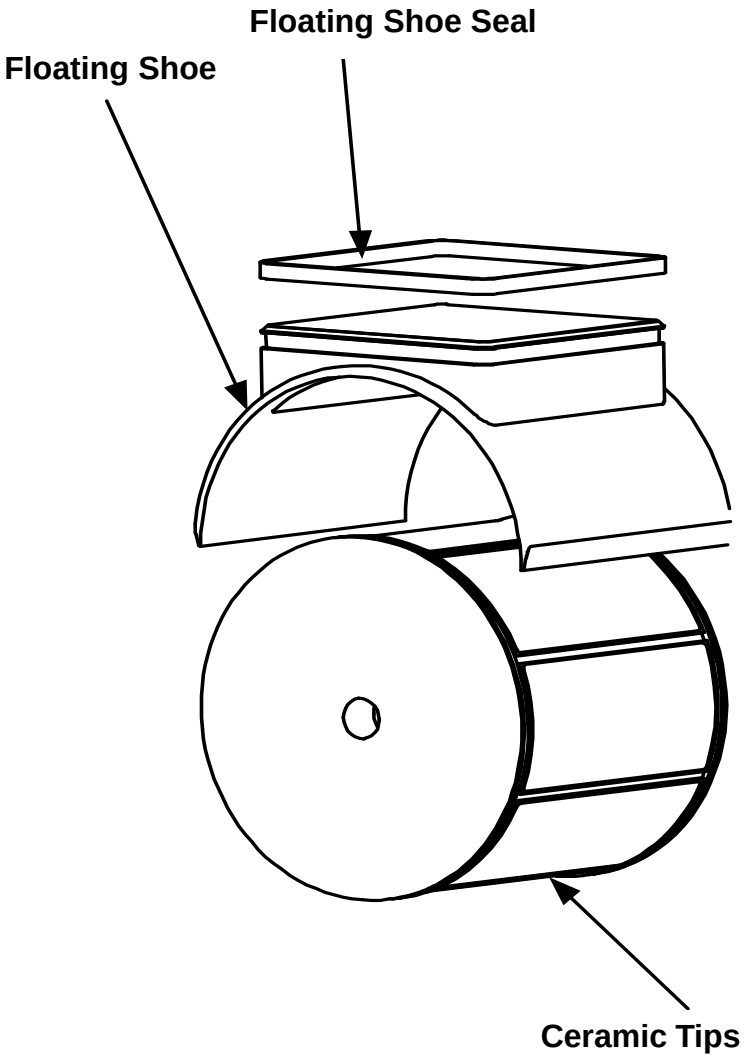
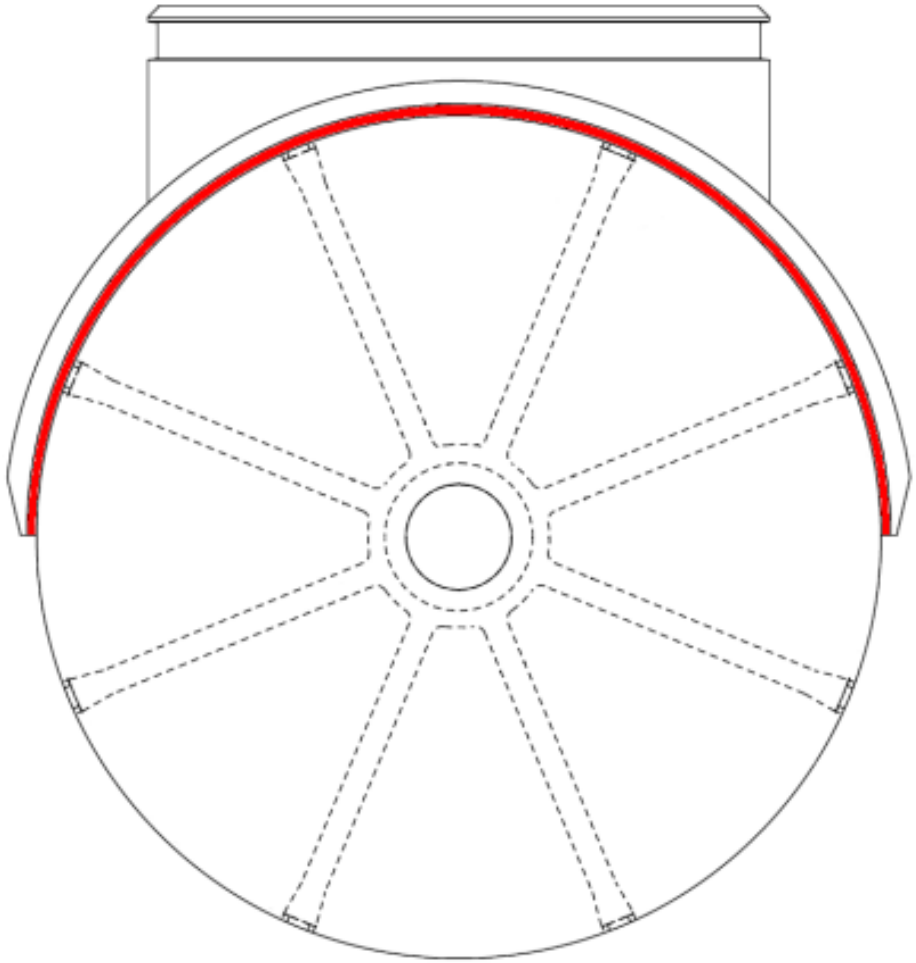
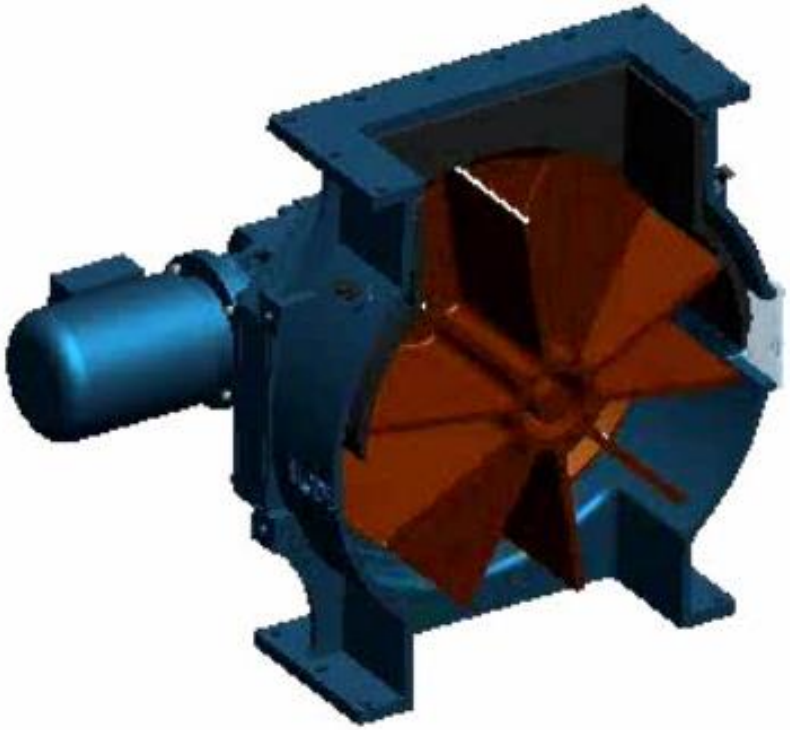
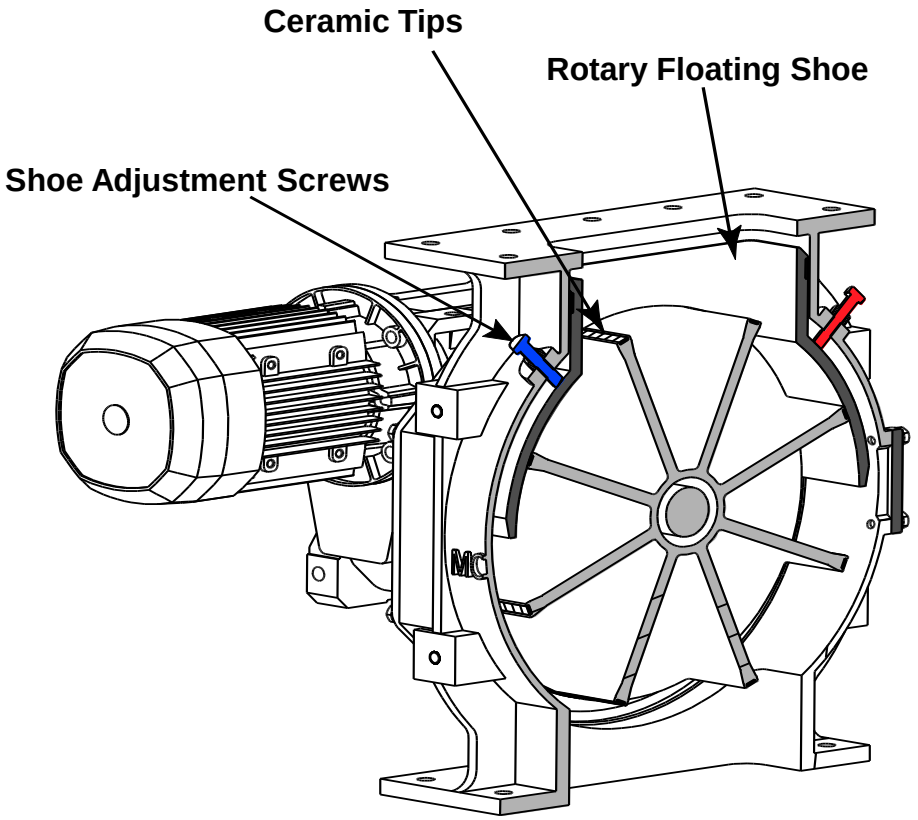
RFS – Working Principle





RFS – Working Principle





Rotary Floating Shoe – Cross Sections

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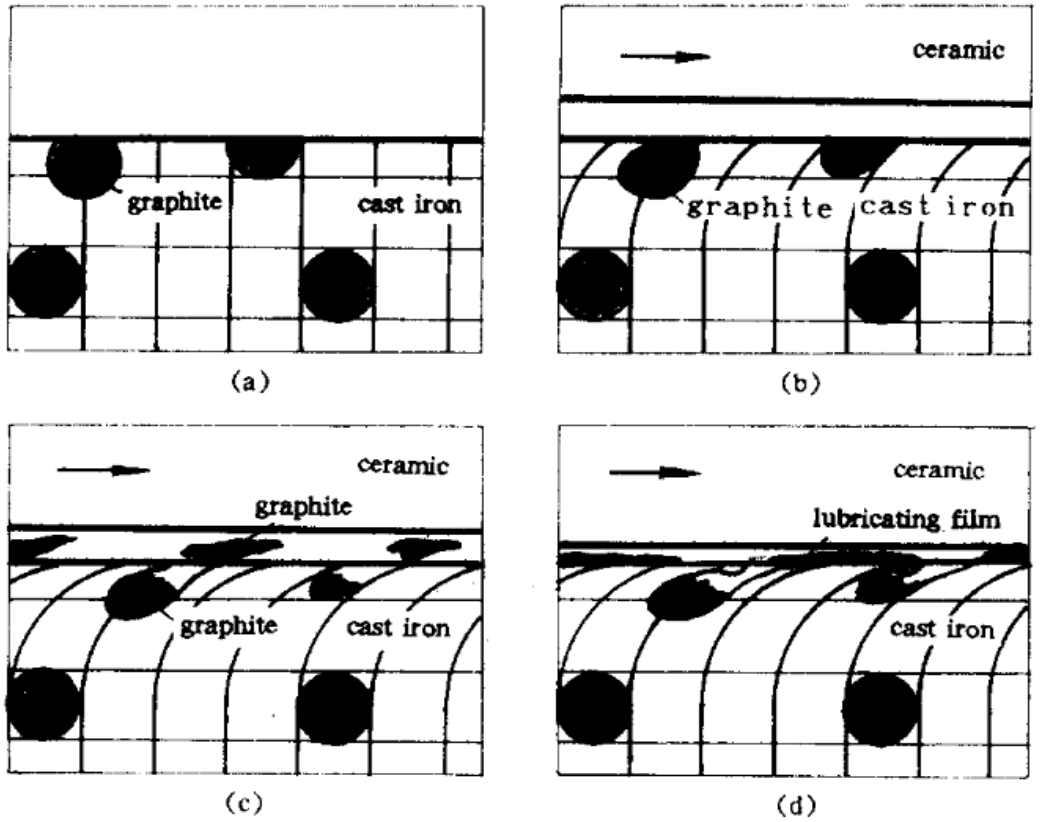
RFS – Working Principle



The formation of LUBRICATING GRAPHITE layer during sliding Contact between Spheroidal Graphite Cast Iron Iron and Ceramic Alumina.

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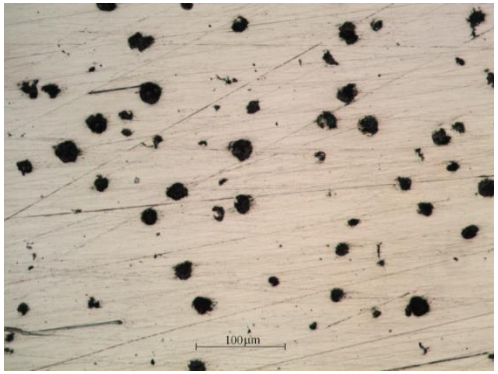
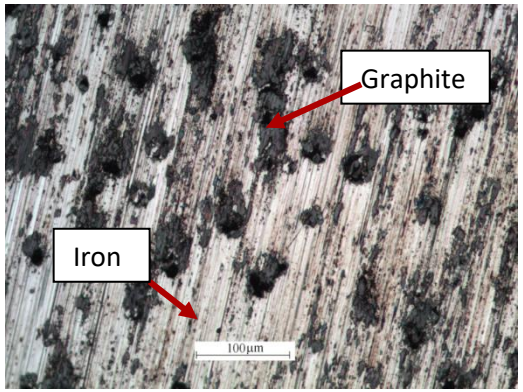
Wear Study Result

SURFACE BEFORE WEAR TEST

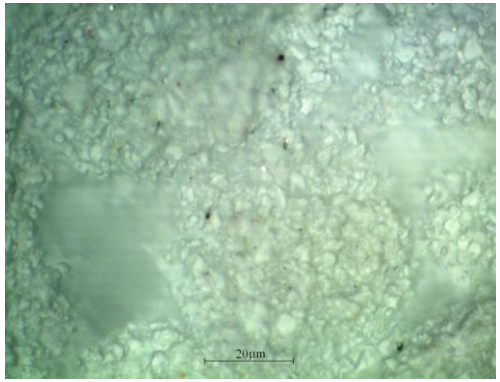
SURFACE AFTER WEAR TEST

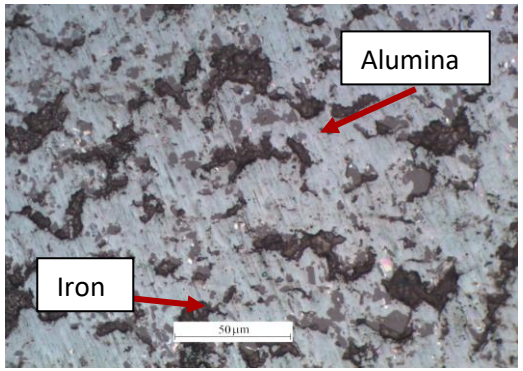
SG IRON





CERAMIC ALUMINA





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Wear Study Result

"The RFS can be used to transport even the most aggressive product and still have a lifecycle of years instead of months"

THE UNIVERSITY OF WESTERN AUSTRALIA

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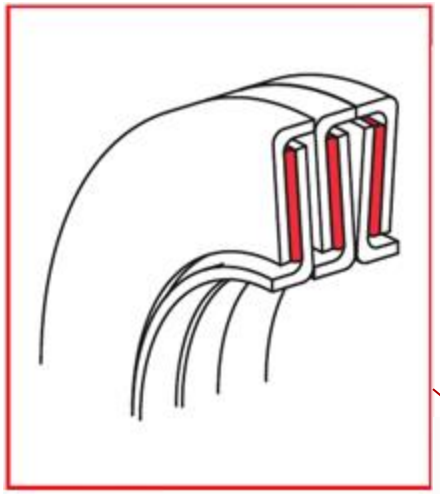
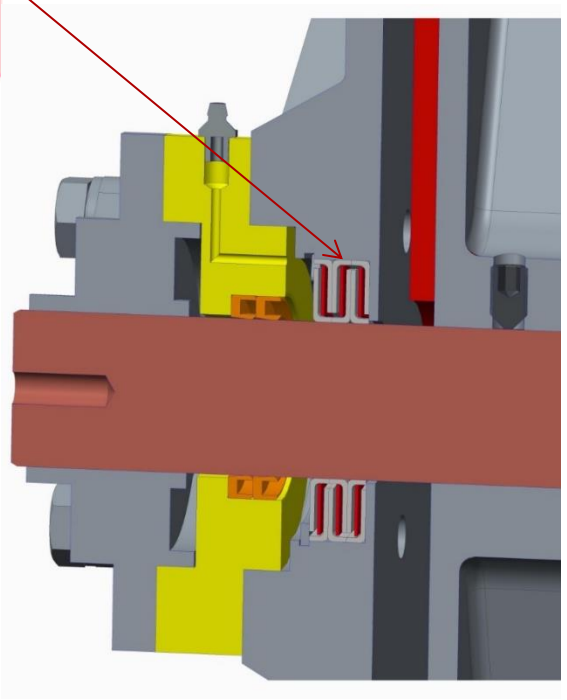
Labyrinth Sealing





SHAFT ARRANGEMENT

- **‘Labyrinth Sealing’ System;**
- **“Zig Zag” arrangement by design;**
- **Passage of particles through a variety of chambers by centrifugal motion is controlled**

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Case Studies

For 100% Sealing

For Longer Service

For High Pressure Applications

For Combating Wear & Tear

For Minimal Maintenance

For High Temperature Applications

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Case Studies

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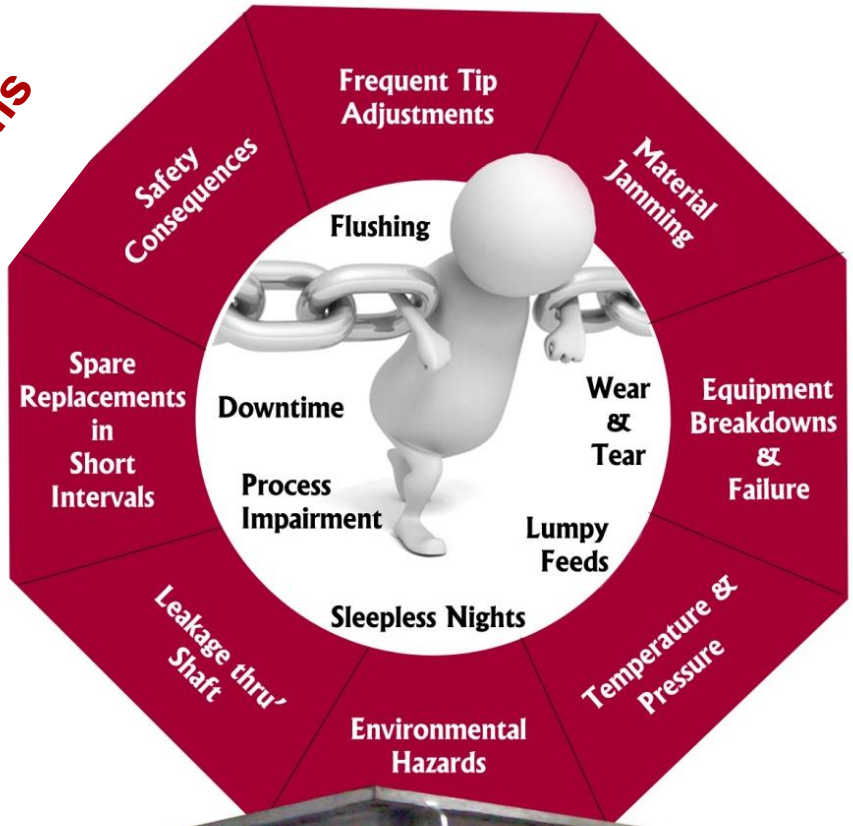
The RFS Valves…
Solution to UNRESOLVED Problems
in **Cement Applications**…



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Q & A

So, why keep plugging the dike?

to experience the RFS valve, visit us @ stall A-13

THANK YOU

write to: info@anval.net

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