

# Maintenance Topics to Discuss

- Die Care – Procedures affecting cost per ton
- Deflectors, wipers, die clamps, shear pins, quill flange, wear ring - importance
- Die Failure Causes/Prevention - \$
- Gearbox lubrication – quick checks



# Die Care - Old die is a History Lesson

- Tramp metal – what is the impact on die?
- Has tramp metal source been identified and corrected?
- Shiny areas – Warning! Something is worn!
- Uneven face wear – It will occur again if nothing is changed (die spec, deflector or wipers)



# Die Care - Die Mounting Preparation

- Clean Clamps
- Clean Quill Flange
- Coat mating surfaces with anti-seize compound
- Check for Die clamp/Quill flange wear using gauge
- Check Die Driving Key for wear



# Die Clamps - Impact \$

- Worn clamps lead to die movement
- Die movement leads to die issues such as:
  - Die failure (breakage as die flexing leads to fatigue to failure)
  - Die hole rollover – as movement occurs, rolls will contact the die face = die wear and die rollover
- Die clamp gauge shown on next slide



# Gauge for die clamp wear





# Gauge for Quill Flange wear



# Die Clamps

- Torque to 350 Ft. Pounds (all current models with Bear Claw Clamps)
- Re-check torque on a new die after one shift or heat cycle
- Do not over tighten die clamp bolts



## Wear Ring and Die Driving Key

Check wear  
ring and die  
pilot for  
movement;

Check key  
and die  
keyway for  
signs of  
wear or  
movement

**Wear  
Ring**



**Die Driving  
Key**





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# Tramp Metal



# Tramp Metal

- Prevention is best – with feed cleaner and magnet
- Get it out! It only does harm.
- Less labor needed to get metal out when it first occurs than after metal is embedded in the holes.







Keyway shows  
hammering by the  
key



Severe die roll over

# Roll Adjust

- Clean die/rolls
- Adjust rolls counterclockwise to the die
- Adjust to skip touch or no touch
- Avoid metal to metal contact (rolls have a harder surface than the die)



# Roll Adjustment Cause & Effect

## Tight skip or no skip touch to Die

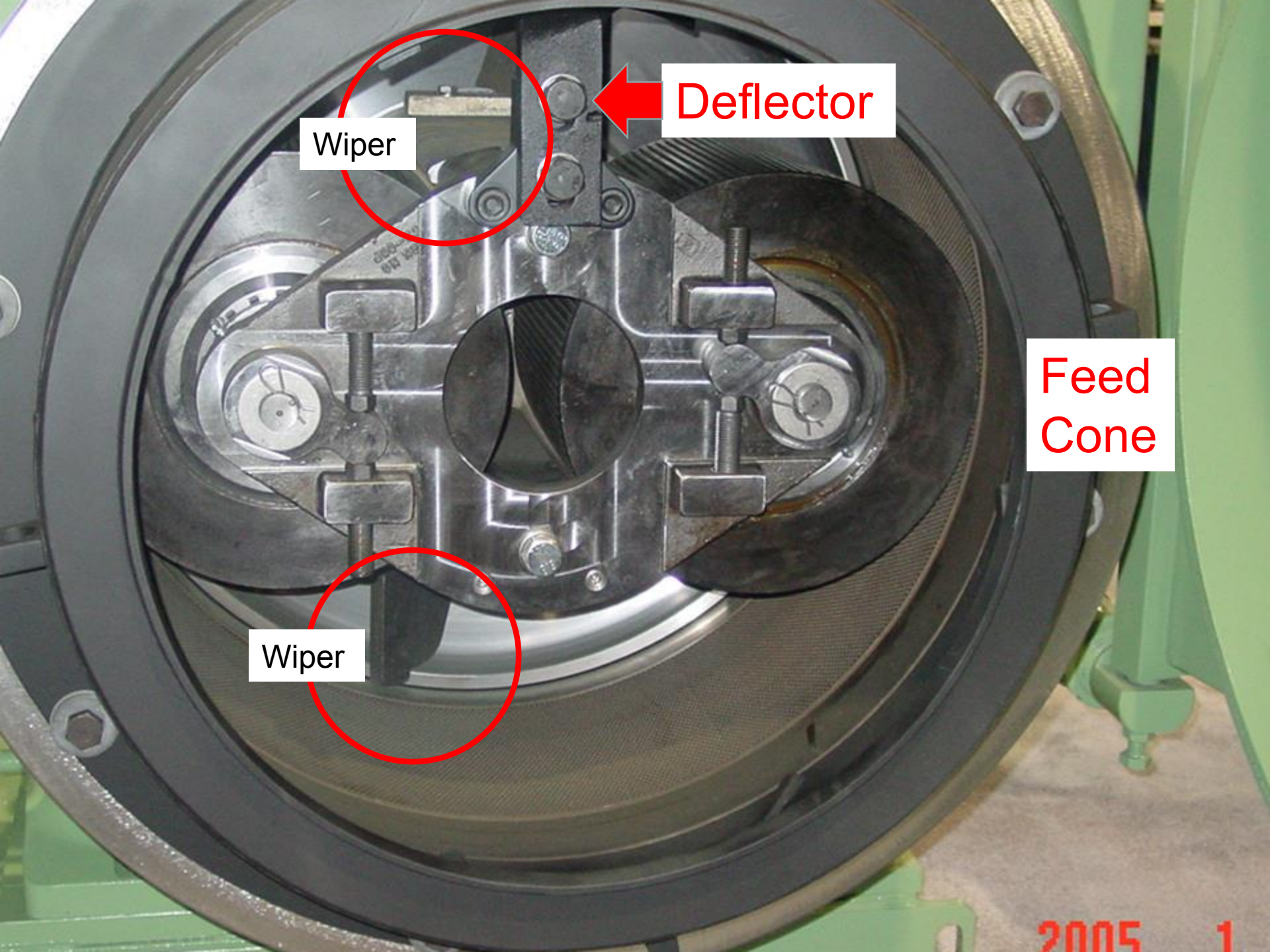
- **Less prone to plug**
- **Less operational expertise**
- Die roll over
- Die breakage
- Lower die life
- Higher die cost/ton

## Skip or no touch to Die

- More prone to roll slip
- More operational expertise
- **Less or no rollover**
- **Die breakage minimized**
- **Longer die life**
- **Lower die cost per ton**







Wiper

Deflector

Feed  
Cone

Wiper



# Wipers

- Purpose: To take feed from the rear of the die (Quill Flange) and spread it back onto die surface
- Helps keep feed out of mainshaft seal
- Close adjustment prevents build up and subsequent “chunks” coming loose
- Check for wear (should be very close to quill flange – 1/16 inch)



# Deflectors

- Purpose: To take feed off the feed cone directing it across the die face in front of the right roll
- Ideally – each roll gets equal feed resulting in even wear of rolls and smooth operation of pellet mill and pellet mill amps
- Adjust approx.  $\frac{1}{4}$  inch away from feed cone
- Replace when adjustment can not be made



# Deflector Impact \$

- When feed is spread evenly on the face of the die...
  - Die wear is optimized = longer die and roll life
  - Meal staying on the feed cone is minimized – less chance of a “chunk” of meal coming off and plugging the pellet mill



# Shear Pins

- Bushings – check for cracks when replacing shear pins. Cracked bushing will result in shear pin fatigue/failure – (unexplained shear event)
- Check that the shear pin groove or neck is in center gap between flanges. (Are keepers holding pins in place?)





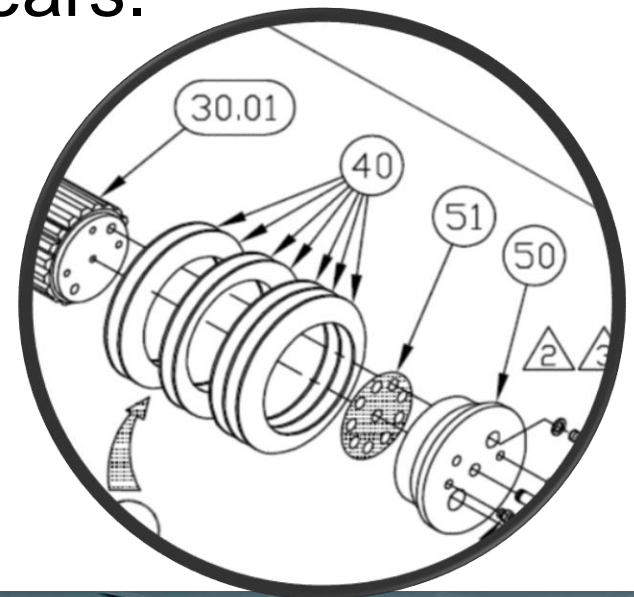


Shear Pin  
bushings coming  
out of shear pin  
housing (not  
correct)

# Belleville Washers

- Held on by the end cap – purpose is to keep pressure on the mainshaft seal

Washers (item 40) loose tension over time, replace approximately every 3 years.



# Gearbox

- Oil Temperature – 170 degrees or less
- Oil Filter – change every 2000 hours (approx every 3 months)
- Oil Level – check sight glass
- Magnet – clean during every oil change
- Bull gear/Pinion- check wear/teeth yearly or anytime unusual noise is heard



# Pellet Mill Oil

- Change every 2000 hours
- Clean Magnet
- Clean screen and sump
- Use recommended oil spec per manual





# Oil Pump/Motor

- Oil motor and pump should start 30 seconds before the pellet mill motor starts
- Oil motor and pump should run 30 minutes after the pellet mill motor shuts off



# Oil Lubrication Specifications

- Viscosity equivalent is mineral oil ISO GRADE 220 (or approximately AGMA Number 5EP) at normal operating conditions. (Metric equivalent is 12.5 to 16.3 Centi-Stokes at 100C/212F)
- Viscosity Index of 85 or better.
- Rust inhibited.
- Foam inhibited.
- Contain anti-wear additive.
- Timken OK load of 50 pounds or better (ASTM D-2782).
- High demulsibility.
- Does not attack copper or copper-bearing alloys. Pass 1A ASTM D-130 test for copper corrosion (cope strip test).
- Does not deteriorate BUNA-N, silicon rubber or fluorocarbons.
- Splash lubricated 7700 Series Pellet Mills: High oxidation stability. Must pass 1000+ hours ASTM D-943 oxidation test



# Mainshaft SEAL

- Check seal holders for wear and corrosion
- Fit half of seal into each seal holder during mainshaft assembly

Do not bump or damage seal faces

Keep seal faces clean



# The 3 Minute Pellet Mill Check

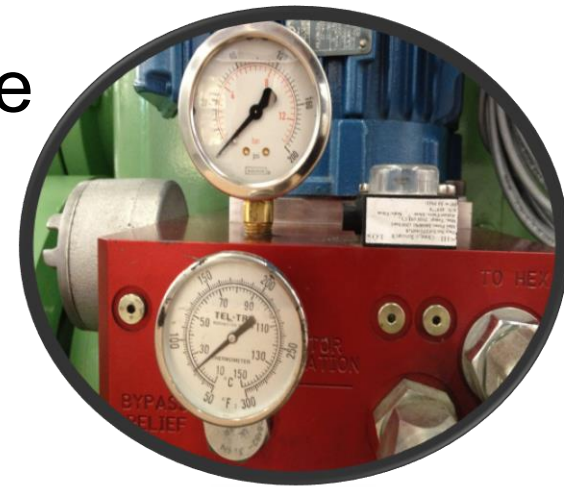
- Walk around the pellet mill once a shift
  - Check oil level
  - Check oil temperature, oil pressure and oil filter gauge



Listen for anything unusual



Look for anything unusual



Thank you

