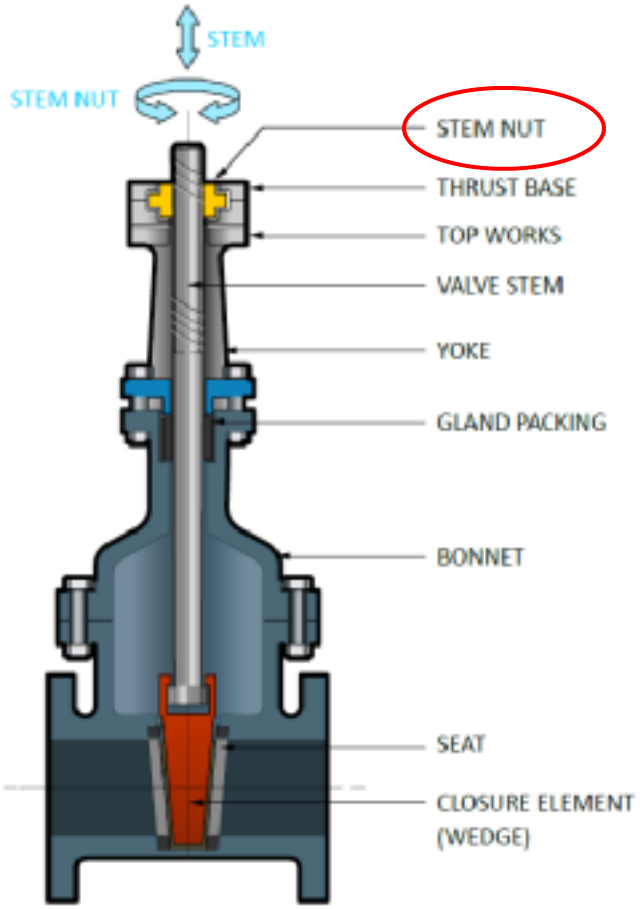
Mitigating MOV Stem Nut Failure Through Proper Maintenance and Wear Measurement

Chris Warnett

Many Critical Valves are of the Rising Stem Type which require a Stem Nut.

Where and What is a Stem Nut?

- Located in the thrust base of the actuated valve
- Converts rotary to linear motion
- Converts torque to thrust
- Maintains stem position
- Mechanically inefficient



A Typical Pipeline Facility

Pipeline and storage facilities
A failed Stem Nut here could cause a safety or commercial disaster

Causes of Stem Nut Wear

Design & Operation

- Excessive stem loads
- Excessive valve stroke-time
- Excessive valve use

Maintenance

- Insufficient lubrication
  - Hardened Grease
- Wrong Lubrication
- Contamination
  - Water
  - Particulate
  - Process product

Water Contamination

Process Product Contamination

Excessive/Hardened Grease

Even Enclosed Valve Yokes are Vulnerable

An enclosed yoke will capture;

- Process product leaking from packing
- Rain from leaking stem protector
- Lubricant from leaking actuator gearbox lower seal

The captured slurry will cause the stem lubricant to become compromised

Periodic Maintenance can Extend the Stem Nut Life. Cleaning the Stem and Stem Nut

Cleaning the Valve Stem

Applying New EP Grease

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But Stem Maintenance Gives no Data on the Stem Nut Thread Condition

Do you take an "out-of-sight, out-of-mind" approach to stem nut maintenance?

Run-to-Failure

Stem Nut Maintenance Options

- Run to Failure
- Periodic Replacement
- Periodic Removal and Inspection
- Stemnut MD Testing

All options should include periodic lubrication replacement and contamination mitigation

Run to Failure

- If the valve doesn't have redundancy, a cost associated with lost production must be considered.
- Premium-time labor charges may apply.
- If a replacement stem nut is not in the store room, lead time and threading cost for the new stem nut may be very high.

Periodic Replacement

- A threaded stem nut must be available for every MOV whether the stem nut has high wear or not.
- The valve will be out of service during replacement.
- Should require 5 to 20 man-hours.

Periodic Removal and Inspection

- When performing this method, a threaded stem nut should be available in the event high wear is found.
- The valve will be out of service during inspection.
- Should require 5 to 20 man-hours.

Consequences of Stem Nut Failure

- False Position Detection
  - Position indication is taken from the actuator worm shaft or drive sleeve
- Misdirected Process Product
  - Potential Safety, Financial, Environmental Impacts
    - Undesired Product Blending
    - Unscheduled Downtime
    - Emergency Manpower Callouts
    - Undesired Product Release

A More Scientific Approach is Needed to Measure Stem Nut Thread Wear

- A fast and easy measurement that could be performed at an annual or programmed valve maintenance check.
- Data that can be collected over time to determine the rate of Stem Nut Thread wear
- Analysis of the data to determine the necessity and timing of Stem Nut replacement.

Stemnut MD In Use on a Motorized Gate

Stemnut MD Testing Benefits

- Quick Test
  - Less Than 1 hour (usually much less)
  - Minor Disassembly
  - Minimal Downtime
- Accurate
- Enables Trending
- Eliminates Stem Nut Failure (wher

A record of measurements enables an informed decision on when to take action..

StemNut MD takes the guesswork out of valve stem nut maintenance

Questions

- Chris Warnett
  - chris@cplloydconsulting.com
- Chuck Reames
  - Chuck@stemnut.com