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At the recent 2012 Maintenance and Reliability Technology Summit (MARTS), Applied Technology Publications (ATP), parent company of both Maintenance Technology and Lubrication Management & Technology magazines, put a spotlight on the winners of its "2011 Maintenance & Reliability Innovator of the Year Award." In this launch of what will be an annual competition, readers were asked to submit their innovative gizmos, devices, gadgets, processes, procedures and use of third-party resources for improving maintenance.

The entries gave the judging panel a suitably difficult time. Submissions were judged on three key elements that describe the essence of innovation in maintenance: practicality, simplicity and impact. The 2011 Grand Prize went to a team submission by Chuck Reames, of Shaw Group Maintenance, Inc., and Chris Labat, of LOOP, LLC, both of Baton Rouge, LA. Their entry was the Stem Nut Analysis Protractor—*SNAP, for short*—a device that provides a visual indicator for thread wear on valve stems. It's practical. It's simple. It can have great impact from a time and resource perspective on how facilities deal with valve-stem thread wear.

The innovative SNAP tool was devised to reduce the time and resources needed to deal with valv

The idea for the winning device originated during Chuck's nuclear-industry experience in the 1990s. He says his current work with Shaw's industrial maintenance engineering team in petrochemical and pipeline terminal operations in the Baton Rouge area led him to reflect on an earlier idea he had—*a better way to identify and diagnose large process-valve operability in a visual, non-intrusive manner.*

Most process plants, as well as many mining and manufacturing operations, use automated MOVs (motor-operated valves) that incorporate large acme-threaded valve stems attached to valve gates. In them, a valve stem is run through a nut captured in place and turned by a hand-wheel or motor. This action, in turn, converts rotary motion to linear motion and opens and closes the valve gate. Over time, especially when subjected to dust, dirt and improper lubrication, the conversion of torque to thrust load produces wear on the valve stem nut.

According to Chuck, stem nut wear is a problem because it can send a false position signal to the SCADA system that controls valve movements and show a valve fully closed when it is partially open. Valves failing in the open position due to stem nut wear can lead to catastrophic consequences. In petrochemical processes, it can result in the accidental mixing of oils or oil being delivered to the wrong place.

In the past, efforts to prevent valve failure usually have been time-consuming and costly. Traditional stem nut wear inspections, for example, typically will take two workers eight hours to perform per valve assembly. This doesn't include the downtime needed to locate worn units. Chuck and Chris devised the SNAP protractor device to reduce this drain on time and resources and help simplify valve-replacement decisions.

Filed under United States patent application 13/321,798, the SNAP is termed a "Valve Stem Nut Wear Analysis Apparatus and Method" designed "to measure stem nut wear in a valve having a threaded valve stem and positioned to engage threads of a stem nut." Mounted on the stem nut, the SNAP tool rotates when the nut rotates, indicating a measurement of rotation and stem movement. As the stem nut rotates, the percent of wear is observed. In short, as the valve stem threads wear, the thread backlash between the stem threads and corresponding stem nut threads increases. The SNAP tool measures this rotational free play and visually indicates the percentage of wear on a protractor-style gauge face.

Chris Lebat, of LOOP, LLC, and Chuck Reames, of Shaw Group Maintenance, Inc., show off their

Using the SNAP tool, the valve-check process now takes one worker 30 to 45 minutes per valve. This translates into a savings of 15-plus man hours and more than seven hours downtime—*an availability savings of up to 94% over traditional check methods!* Also, in a traditional valve teardown inspection, if a valve stem nut shows any sign of wear, it's often prematurely replaced due to the time and cost of the teardown. The SNAP, though, allows a stem nut to be replaced based purely on its condition, which makes it a true CBM (condition-based-monitoring) event.

The SNAP uses a simple RAG (red, amber, green)—*i.e., traffic-light type*—indicator printed against the protractor scale. This depicts up to 30% as acceptable wear, 31% to 50% marginal wear and over 50% as unacceptable wear requiring a maintenance decision. These decision points would naturally vary by industry.

Again, we congratulate Chuck and Chris FTW and invite you to follow in their innovator footsteps. Tell us about any innovative gizmo, device, gadget, process, procedure or use of

third-party resources you have come up with and successfully used to make your job easier. Share your ideas with us by participating in the "2012 Maintenance & Reliability Innovator of the Year Award" program. Entries will be accepted from June 1 – December 31, 2012. The Grand Prize winner and three runners-up will be announced in early 2013. (Go to www.reliabilityinnovator.com to download your submission form.) We look forward to hearing from all you "Innovators" out there. **MT**

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