

Two Easy Ways to Solve the 'Loose Bolt' Issue

One way is easy; the other is easier.

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Having coupling bolts that loosen under operation is a common issue found in many industries, including paper. This issue can potentially cause downtime due to complete decoupling of the unit or extreme vibration while operating. It is important to understand why this problem occurs, as well as to know simple and reliable methods that can eliminate this failure point.

All flexible gear couplings (example, **Image 1**) are held to the AGMA standard. One of these would be commonality of flange patterns.



Image 1 (Image courtesy of Kop-Flex® brand).

Problems

One problem that is found in application would be the variety of style and types of bolt kits (also called fastener sets) that are available for these connections. Each manufacturer provides their own bolt kit and gives a different tightening torque for each kit. Choosing a common size 3-1/2EB AGMA bolt kit, the tightening torque varies across four major brands from 175 ft-lbs to 250 ft-lbs. This can become confusing for the technician installing the coupling.

Another problem would be overuse of the flange bolts. It is usually unknown how many times the bolt has been removed, re-installed, and re-torqued. After multiple cycles, the bolt stops returning to its original length. This reduces the bolt's clamping load.

Knowing this information, you can see how a bolt and nut combo that is

properly torqued could loosen easily when in operation.

In paper machine applications, it is also common for the OEM mating rigid hubs to feature fine, threaded holes instead of the typical through holes.

The overall and shank length of the bolt would be different from the standard bolt kit. This causes most end users to resort to using a socket head cap screws, which only amplifies under-torquing the bolt. This is due to the socket head cap screw being a higher grade than normal bolt kits, and requires nearly 40% more tightening torque.

Each time the bolt is torqued, the threads inside the hub stretch along with the bolt. After many years of this repetitive cycle, the threads can no longer accept a bolt or maintain tension. It is recommended these OEM rigid hubs be replaced with a common manufacturer's standard rigid hub, which will feature through holes to accept a bolt and nut combo.

Solutions

There are solutions that will help prevent this issue. One solution would be to replace all fasteners with new ones, and insure manufacturers' proper torque specifications are followed. Another solution would be to utilize a specialty fastener (**Image 2**) that has a built-in indicator. Showing the degree of tension, the indicator gradually darkens from bright red to black as the fastener is installed and tightened (**Image 3**).

Recently, at a paper mill in Alabama that had installed these bolts, downtime was avoided when a worker visually identified loose bolts (which showed red on the indicator) on a coupling connection during



Image 2

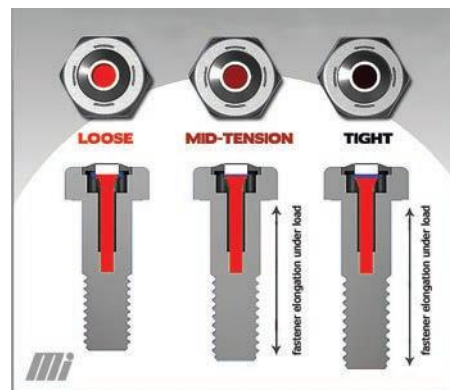


Image 3

an outage. This was due to the simple, visual method of inspecting the fasteners.

When a specialty fastener is installed, the torque value can be visually checked for tension. This torque verification system can also be implemented in other fasteners that might not be related to the couplings.

The reusability of the bolt can also be assessed, just by looking at the bolt's indicator color. If the indicator does not return to red after removal, it should be discarded and replaced with a new one.

This efficient type of solution is available in kit form, exclusively from Motion Industries as the Ultimate Coupling Bolt Kit. This kit features bolts with a reduced twelve-point head with locking nuts. There are also available spacer kits for use with an OEM-threaded hole rigid hub as discussed. These spacers simply adjust the length of the shank so that the bolt will not bottom out on the threads when going into this type hub.



A certified mechanical engineer, Frank Mathews is the branch manager of Motion Industries' Mill Services and has nine years of experience with driveshafts and their applications. For more information, visit [MotionIndustries.com/paperage](https://www.motionindustries.com/paperage) or *Mill Services' page* (<https://tinyurl.com/y4uxry9z>).