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WHITE PAPER



THE CORRECT WAY TO TORQUE MOUNTING BOLTS

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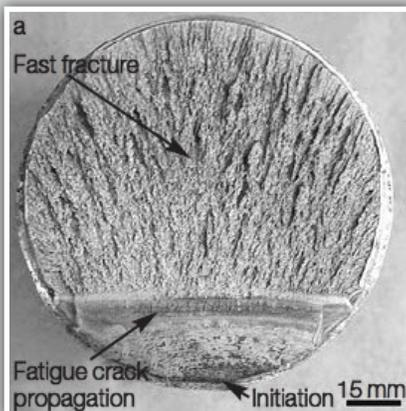


Any good mechanic will tell you that attention to detail is important when it comes to properly torquing fasteners and mounting bolts. An incorrectly torqued fastener or mounting bolt can lead to a catastrophic event, so it's imperative that the correct process be followed to the letter.

DO NOT UNDERESTIMATE THE NEED TO PROPERLY TORQUE HARDWARE

Critical safety components like couplings and bolt-on drawbar eyes rely upon properly torqued fasteners for the parts to safely reach their rated capacities. Failing to properly torque the mounting bolts can result in events such as serious accidents and need to be avoided at all cost.

TORQUE AND RESULTANT PRELOAD; WHY IS THIS SO CRITICAL?



When we torque a bolt and nut, we are causing a clamping force to develop that is created by preloading the fastener assembly. When done properly, we are putting a significant amount of preload stress into the fastener assembly that greatly increases the bolts safe load bearing capacity. The caveat here is you want just the right amount of torque to get the proper preload into the fastener. Too much torque means we overstress the bolt, which can result in failure. Conversely, under-torquing will negatively impact the bolt strength, as well. Unfortunately, many under-tightened fastener assemblies fail due to cyclic fatigue. Cyclic fatigue is a fracturing of the bolt over time. The time it takes to reach total failure varies greatly and is influenced by many factors, but eventually the bolt will fracture more and more (propagate) with continued use. Eventually, the fractured area becomes large enough that the remaining nonfractured area will catastrophically fail. The adjacent photo shows the fatigue crack propagation area and then the fast fracture region. Essentially, the fatigue crack region is where the fracture exacerbates over time, and the fast fracture area is where the bolt catastrophically fractures in half.

FACTORS THAT INFLUENCE TORQUE VALUE

There are many factors that greatly affect the torque value relevant to the preload. Plated or non-plated, lubricated or dry, locknut-style (when applicable) or washer-type are just a few of the components that will affect the amount of torque used to get to the proper preload. To emphasize how critical the example items are, some of these can affect the needed torque value by 40% or more. If you do not know all the factors and how they affect the bolt assembly you are using, then you cannot safely determine the proper torque value that is needed.

HOW TO TORQUE HARDWARE CORRECTLY



Torquing the appropriate hardware is so critical that Premier Manufacturing includes bolt kits for all its popular coupling products (see adjacent image for an example). These bolt kits provide the appropriate torque value and lube requirements to achieve rated capacities. We develop these torque values via inhouse testing. Our testing consists of tightening the bolts to known torque values while measuring the clamp force we are achieving in the bolt. This is the most accurate way to calculate the optimum torque value. Because said torque value is specific to Premier Manufacturing hardware, it is paramount that users do not apply the recommended torque to other purchased hardware. Doing so could result in catastrophic failures previously discussed.

FOLLOWING THE APPROPRIATE PROCESS

When utilizing Premier Manufacturing safety components, the installation process is critical. Torquing the fasteners and mounting bolts to the appropriate values is not only recommended, it is crucial to ensure the equipment functions properly and lasts as long as possible. To learn more about Premier's bolt kits, visit www.premier-mfg.com/product/bolt-kits-2