

## An Education In Torque

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There is much more to torque than simply tightening a fastener. There are many guiding principles that technicians need to recognize to ensure fasteners are properly secured.

However, until recently there hasn't been any formalized torque training for technicians. Many techniques or "tricks of the trade" in torque have been passed down from veteran technicians in shops, or briefly touched upon in trade schools. But now, thanks to a new partnership between Snap-on Industrial and the National Coalition of Certification Centers (NC3), that's all changing. NC3 is a group of technical training centers, junior colleges and manufacturers that have combined training resources. In partnership with Snap-on Industrial, NC3 has worked with junior colleges and technical training centers across the country to offer torque certification either as part of an existing training program, or as a standalone course, to students and the incumbent workforce.

### Why Certify

Torque certification was originally developed by Snap-on Industrial to teach technicians of all disciplines about the various aspects of tensioning theory and proper torque techniques to create a high standard for maintenance and assembly work. The curriculum emphasizes the proper procedure for applying torque; the twisting motion used to attach a fastener to an anchor. The 24-hour course is divided into two sections: 1) Torque Theory (16 hours), which dives into the

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application of torque accompanied by the corresponding safety measures and 2) Hydraulic Torque (8 hours), which is an optional program.

There's certainly more to torque than just securing a fastener. A wind turbine tower, for example, has more than 600 fasteners – all of which require proper torque. If just one fastener fails due to improper torque application, the results could be devastating. That's why learning and practicing proper torque procedures is so important in repairing equipment correctly, whether you're working several hundred feet in the air or on the ground.

Lubrication, cleaning, and torque remain the cornerstones of any maintenance program that incorporates fasteners. And those three elements speak directly to safety. Lubrication directly, and exponentially, affects the amount of tension applied to a fastener. Cleaning fasteners of rust greatly reduces the amount of tension a fastener can handle. As for torque: There is a perception that applying torque to a fastener is intuitive, and anyone can do it. Well, anyone can do it, but the ability to do it properly is what makes the difference. Experienced technicians often are the toughest audience to impress because they've developed their own methods through their career. This course is formatted so that they don't just relearn the basics, but they walk away wishing they'd taken the course much earlier.

The 16-hour theory portion of the training course provides an overview of the job a fastener must perform. This part of the program covers how to identify bolt and metal grades, bolt hardness, thread pitch and lubrication, and how to apply the associated science. The second part of theory covers applications, and involves hands-on training with the proper use of tools, as well as calibration equations, making wrench adjustments and using extension tools. These activities are guided and judged by a professional instructor.

Safety — the third element of torque theory — considers the importance of knowing what a tool is meant to do and then properly using that tool. The discussion ranges from protective eyewear and clothing to working near power sources. Safety drives better procedures and a methodical, step-by-step approach to applying the right fastener to the right bolt or axis point.

The optional course offering — hydraulic torque study — is designed for large fasteners, such as those found on wind turbines and other oversized equipment. The application of hydraulic torque requires its own skill sets, including knowledge of hydraulic systems, proper fastener fitting for these specialized applications, and large fastener/equipment safety considerations.

Students taking the torque certification course will learn the basic principles behind torque and follow a logical process when working with torque. For example, they'll learn to recognize the kind of fastener being used and the best procedures to apply torque – e.g., determining the torque value and how to apply the precise pressure on each bolt so that a strong clamping force is achieved. The correct process may require that each fastener be torqued, in steps, two or three times before it reaches maximum load. But in critical applications applying torque to a given fastener may require five repetitions to achieve the final torque value.

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The program allows students to work with common equipment they'll be using on the job site. The advantage to employers is having a skilled workforce that can get the job done right the first time with less on-the-job training. For the technicians, receiving third party certification on torque gives them a leg up on the competition and can make them a more polished, skilled candidate for a job.

### **Summary**

The bottom line is that anybody can apply torque to a fastener, just as anyone can use a ratchet. But the difference is the specific knowledge and training required for certification. Technicians completing the torque certification course show their desire to take their skill and motivation to the next level to fully understand the intricacies of torque. And being certified in torque gives technicians training that will pay down the road in higher equipment uptime and reduced maintenance.

### **About NC3**

*The National Coalition of Certification Centers represents the connection between America's technical training and education institutions and private industry. NC3 and its 25 member institutions have built curriculum and certification programs for diverse industries that include transportation, aviation and energy. The NC3 goal is to develop and implement sustainable training that's recognized across the scope of industry for its high quality and uniform application. NC3 is based in Kenosha, WI.*

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