Technical Paper

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THE EFFECT OF STUD MANUFACTURING ON TORQUE AND NUT FACTORS

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ABSTRACT

Nut factors can vary depending on many factors, such as lubrication type, washers, stud material type, and thread dimensions. The industry has researched most of these factors extensively, but the variation of thread quality in stud manufacturing has been noticed but not researched. The authors of this paper have extensive experience using instrumented studs and have noticed that they have a different nut factor when using the same lubricant on flanges than on a Skidmore test fixture. In the past, the reasoning was a difference between a soft and a hard joint, but the hypothesis for this paper is that different stud manufacturers have different nut factors, depending on their manufacturing tolerances. They compared their results to data gathered on a Skidmore with non-instrumented studs. The authors asked if stud manufacturers have different manufacturing tolerances and if the stud manufacturing process should be as researched as lubrication.

This paper tests three different stud manufacturers on a Skidmore and verifies their nut factor on flanges with ultrasonic bolt measurement. In total, over 1600 studs were tested. All testing was done on B7 studs with 2H nuts across five different stud sizes and flange configurations. The testing data shows a large variability in stud manufacturers, primarily the manufacturing lots.

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ASME SETTING THE STANDARD