NAFLIC

National Association For Leisure Industry Certification

Standards & Related Documents Committee

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183. Bolt Tightening Torques

We are aware of a number of cases of bolt failure as a result of overtightening. This can follow from the application of the wrong torque, or from use of an inappropraite tool.

In many amusement ride connections the designer specifies tightening torques to gain certain advantages. Many bolted joints, if correctly tightened, can rely upon clamping security and the bolts will be protected from significant fatigue stress fluctuations. Avoiding bolt fatigue is clearly a benefit but, to guarantee it, it is necessary to check the maintenance of the correct torque at appropriate frequencies.

Many people will not realise that design values of tightening torques are normally based on pretensioning the bolt up to 90% of its yield stress (or of its 0.2% proof stress). This means that, if the correct bolt torque is exceeded by more than say 11%, permanent yielding can occur without achieving any improved tightness. There is clearly little margin for error and, if overtightening is continued or repeated on subsequent occasions, the bolt yield can become bolt failure, which might happen in service.

For these reasons, it is important that only the correct torque wrench, correctly set, is used. Otherwise, permanent damage is risked with potential dire consequences.

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