

What is the importance of bolt tightening force measurement & loosening detection?

The identification of bolt tension is therefore of great significance for monitoring the health of existing structures. This paper reviews state-of-the-art research on bolt tightening force measurement and loosening detection, including fundamental theories, algorithms, experimental set-ups, and practical applications.

How can we detect loosening severities in in-situ bolted connections?

Loosened bolts in the lab-scale and real-scale joints are well detected with precisely-estimated loosening severities, even for a sharp perspective angle. The method also shows a high level of adaptability with low-brightness images. Therefore, the method has great potentials for autonomous monitoring of in-situ bolted connections.

1. Introduction

What are the results of detecting bolts using the Faster RCNN?

The results include (i) detecting bolts using the Faster RCNN; (ii) detecting four corners of the boundary formed by the centres of detected bolts; (iii) correcting perspective distortion; (iv) detecting bolts in the corrected image; (v) cropping detected bolts; and (vi) estimating the angle of detected bolts.

Can autonomous vision-based bolt-looseness detection be used for splice bolted connections?

This study presents a novel autonomous vision-based bolt-looseness detection method for splice bolted connections. The method is sequentially designed with a Faster regional convolutional neural network-based bolt detector, an automatic distortion corrector, an adaptive bolt-angle estimator, and a bolt-looseness classifier.

Can a bolt-loosening angle be detected with a UAV?

The method can detect a minor bolt-loosening degree of 5° and the allowable perspective angle can be up to 40° [19,21]. Moreover, the method has great potentials to integrate with a UAV for monitoring inaccessible bolted connections in the field.

How do vibration-based methods correlate with bolt clamping tightness?

Other vibration-based methods correlate the local mode frequency of bolted joints or the signature parameters from PDF or FRF analysis to bolt clamping tightness. Some pattern recognition techniques were employed to improve the identification ability of these indicators.

The tightening force of a bolt is crucial to the reliability of the joint connection. Loosening or over-tightening of a bolt may lead to connectors slipping or bolt strength failure, which are both ...

Experimental results show that this method is capable of locating the loosened bolts, as well as quantifying the degree of panel and bracket bolt loosening. Propagation of diagnostic wave Fig.4 ...

In order to evaluate the severity of bolt looseness quantitatively, a study was made about detecting bolt tightening force using structural first 5 natural frequencies and the Squared ...

Bolted joints seen in solar PV racking and module mounting lack the technological maturity exhibited in comparable industries to deliver low cost and high reliability solutions critically ...

the bolt/nut in the untightening direction (which will normally be less than the tightening torque). 3. Marked fastener method: Marking the position of the bolt/nut relative to the joint, untightening it ...

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hub, which requires tightening bolts and nuts - to obtain well distributed clamping force all over the hub. This force deals with ... on tightening and even detection of failure scenarios such as ...

Figure 9: The predictive variables T_i s at different bolt loosening cases: (a) results of bracket 1, (b) results of bracket 2, (c) results of bracket 3, and (d) results of bracket ...

Abstract: Loose bolts in PV mounts can affect the smooth operation of the system. If the loose ... seriously lead to the collapse of the bracket, so the detection of loose bolts is of great ...

10 Pcs Adjustable Solar Panel Mounting Bracket Clamp Wide Photovoltaic Support Mid Clamps Bracket for Solar Panel System pv photovoltaic mounting bracket Features: Durable: These ...

The main contributions of this article are as follows: 1) the method is the first attempt to combine piezoelectric active sensing and convolutional neural networks to monitor bolt looseness quantitatively; 2) ...

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