

Solar Energy South Africa

Causes of loosening of photovoltaic bracket bolts



Overview

What causes loose bolts?

There are at least five causes of loose bolts, which can occur separately or in combination: Under-tightening. By definition, an under-tightened bolt is already loose and the joint does not have enough clamp force to hold the individual sections together.

How does vibration affect a bolt?

Experiments on bolted joints under vibration show that many small “transverse” movements cause the two sections of the joint to move in parallel with each other and with the bolt head or nut. These repeated movements work against the friction between the bolt and joint threads that is holding the joint together.

What happens if a bolt is loose?

Loose bolts are not just an irritating nuisance. If the joint is not quickly retightened, the application may begin to leak fluid or gas, the bolt may break, equipment may become damaged, or catastrophic accidents may occur. There are at least five causes of loose bolts, which can occur separately or in combination: Under-tightening.

What happens if a bolt is under tightened?

By definition, an under-tightened bolt is already loose and the joint does not have enough clamp force to hold the individual sections together. This can lead to sideways slippage between sections, placing unwanted shear stress on the bolt that could eventually cause it to break. Vibration.

What causes a bolt to expand?

Differential Thermal Expansion. If the material of the bolt and the joint are different, large differences in temperature due to rapid environmental changes or cycling industrial processes can cause bolt material to expand or

contract rapidly, possibly loosening the bolt. Shock.

How do you prevent loose bolts?

Because loose bolts are so common, an astonishing array of devices has been invented to prevent them from occurring. Here are five basic types of prevention methods: Washers. Washers are typically wider than the bolt head, with the additional surface area adding extra friction to the joint to maintain the clamp force.

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5 Causes of Loose Bolts - and 5 Ways to Prevent Them

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Bolted Connections in Solar Installations: Vibration

To prevent loosening caused by vibration, consider taking the following steps: The best way to clamp the joined material sufficiently that the frictional resistance exceeds any applied shear force that will occur in service. ...



Preventing Elevated Solar PV Bolted Joint Failures

Matrix Engineering Consultants (Matrix) led an evidence-based root cause investigation of an elevated solar photovoltaic structure bolted joint, which failed during a high wind event. The work aimed to identify the potential ...

Top Alternator Mounting Bolt BREAKING -- Common ...

Not too long later, the bolt probably backed out just a little, bracket (and bolt) took a

hammering and the bracket eventually broke. The bolt was bent. That was 16 years ago, so I'm going off old memory banks, but I'm ...



Solar PV Critical Fastened Joints , Sustainable Operations

Fastened joints are an assembly of components (fasteners, clips, washers, brackets) used in installing a PV system, including module attachment, racking, tracker interconnections, and attachment to underlying structures not covered ...

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