

Huck® fasteners – securing the solar industry

With a recent drive in the industry to move towards more sustainable methods of energy and power generation such as solar, fasteners are often overlooked in the design process. Here, Star Fasteners outlines its range of Huck® fasteners specifically designed to withstand the harsh environments in solar applications.

When developing solar arrays optimising the design of reliable solar racking and tracking structures for durability and reliability is paramount. Fasteners play a crucial part in the overall success of a project, frequently connecting multiple components to create a securely fastened joint, which transmits both static loads – snow, as well as dynamic loads – wind. Wind and vortices that introduce energy to the solar array at just the right frequencies can create dynamic loads that quickly overwhelm the system, causing catastrophic failure.

The sub frame, racking or tracking assemblies are important components as they provided the core structure and strength and can be subjected to the highest stresses and strains. They must survive without compromise in performance, any effect on the structural integrity can mean many hours of lost energy production and costly repairs.

Often, the most vulnerable point on a design is where there is an interface or join between components. Nuts and bolts have over centuries been used in a wide range of applications, both intricate assemblies through to mammoth installations. Bolted joints are designed to achieve a specific tension. The bolt acts as a spring to generate and retain preload in the joint. If the bolt is not stretched or elongated correctly by both the tool and the operator, targeted preload

cannot be achieved and maintained. Even when installed and checked, the installed values of a nut and bolt can vary significantly. After installation self-loosening often takes place, this is when the threaded fastener loosens by rotation as a result of repeated slippage in the joint. Wedge washers along with pre-applied high strength adhesive can often help, but these are additional components and at additional expense. Typically, a physical post installation inspection is necessary to ensure that all bolts are tightened to specification, a visual check of a nut and bolt does not ensure it is correctly torqued. On a solar farm for example, there are likely to be thousands of fasteners, so additional checks post installation would be costly and time-consuming.

To combat these issues, Star Fasteners UK Ltd, the largest UK distributor of the Huck® product range, offers alternative fastening solutions. HuckBolt®s (also known as LockBolts®) offer distinct advantages over traditional threaded fasteners for connecting permanent PV racking system joints.

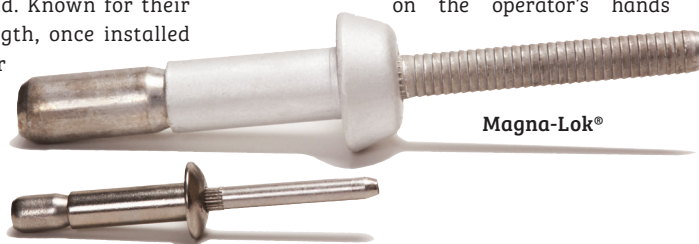
Huck® fasteners are precision engineered to deliver unmatched installation speed, fatigue life and vibration resistance, tested and proven in solar arrays around the world. Known for their shear and tensile strength, once installed HuckBolt®s deliver consistent clamp. They have been designed to

be tamper-proof for an additional measure of security for valuable PV panels.

Each HuckBolt® performs identically in terms of strength and clamping force. Other mechanical fasteners such as nuts and bolts must be installed using torque, which varies with friction. HuckBolt®s such as the Huck® BobTail®, consist of two parts – a pin and a collar – but use an entirely different installation method to nuts and bolts.

As with nuts and bolts, they can be pre-assembled by hand to 'lightly' assemble the structure, then they are finally swaged with the installation tool (driven by pneumatic, pneudraulic or battery power). During installation the clamp force is determined by the stretching of the hardened metal pin and the swaging of the collar into the pins locking grooves. Installation is quick; typically, less than two seconds per fastener, and unlike traditional LockBolts® no pin-break is required, therefore leaving no corrosion prone area of bare metal. This direct metal-to-metal contact of the collar swaged into the grooves of the pin eliminates the loosening effects of transverse vibration.

Recognising the cost associated with assembly time, BobTail®s installation is fast, smooth and shock free (no jolts on the operator's hands





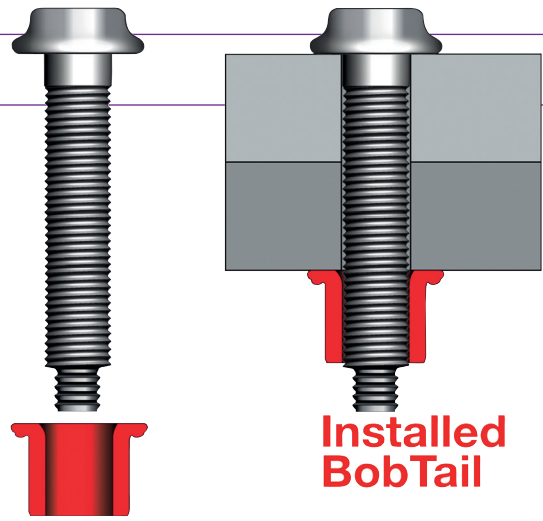
BOM® (Blind Oversized Mechanical) fastener

and arms). The time saved by utilising HuckBolt®s is significant when considering the large number of potential fastening points. It could be argued that the cost of the HuckBolt® fastener and installation tools are more than those of a nut and bolt, but when considered, the high fatigue strength of HuckBolt®s means that fewer are needed. Joint integrity is not compromised, and overheads are quickly saved in other areas. Post installation, Huck® LockBolts® only require quick visual inspection (no torque or re-torque is required), saving even more time and expense.

When only one side of the joint material is accessible, performance engineered Huck® structural blind fasteners have a solution. Each fastener is designed and engineered with a unique set of features to deliver solutions to common manufacturing challenges. These include hole filling, water resistance, wide grip ranges, welding replacement, to self-grounding fastening solutions – all offering high-speed assembly.

Two widely used Huck® blind fasteners used in the solar industries are the BOM® (Blind Oversized Mechanical) fastener, often used as a replacement for welding and the Magna-Lok® (CHFR) which has been specifically designed for solar applications. The Magna-Lok® has a unique mechanical lock that ensures the integrity of the fastener in loaded conditions and complete hole-filling properties to ensure moisture resistance.

Irrespective of whether threaded, structural blind, or HuckBolts® fasteners are chosen, the mechanical properties of the joint need to be correctly determined to ensure that there is sufficient clamp force



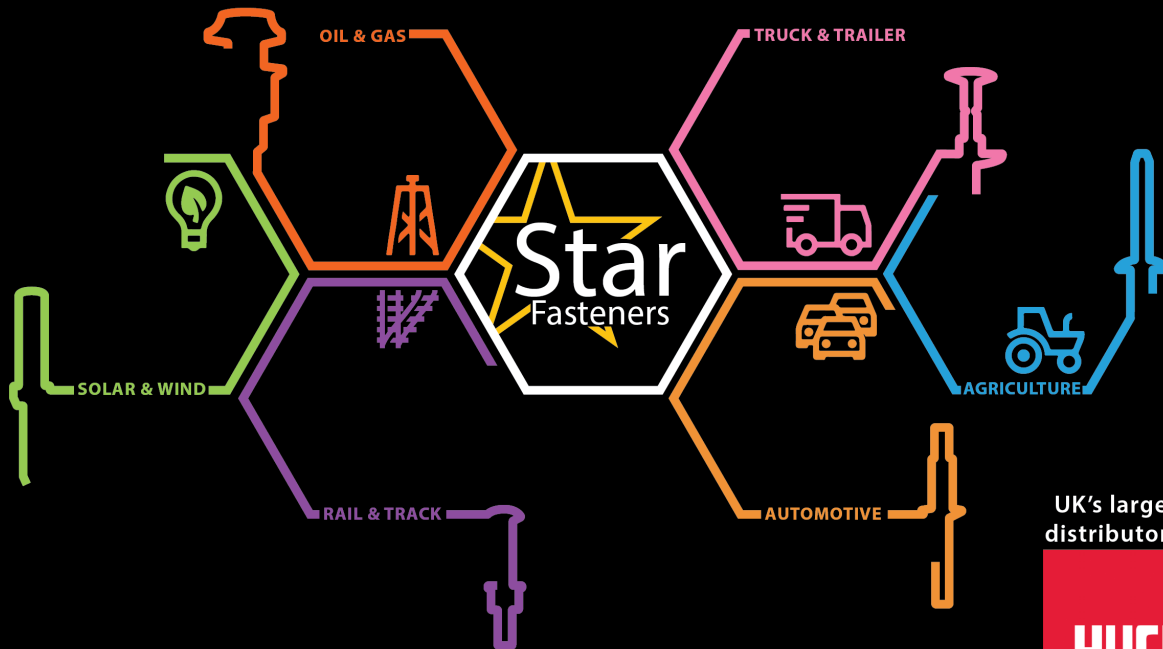
Uninstalled BobTail

Installed BobTail

present on the joint interface; that is to say, enough to resist the applied loading and prevent the joint from slipping. However, by installing HuckBolt®s and Huck® structural blind fasteners, an engineer can count on many benefits including maintenance free joints; lower lifetime cost of joint; no loosening even under extreme vibration; high speed, easy to install systems that can reduce production time by 75%; improvements to health and safety; as well as being tamper-proof.

“Love or loath them, solar panels are definitely the way forward, whether that is in the form of huge solar farms, or as part of the architectural landscape,” comments Star Fasteners. “Where space is at a premium, placing solar panels on rooftops or more visible areas such as façades is going to be a necessity. Conventional ways of fitting and fastening solar panels will be challenged, buildings of the future will be at least in part, solar architecture buildings. The future strategy of solar is dynamic, and it’s a great time to explore how Huck® fastening technology can become a component of solar design of the future.” +

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www.starfasteners.co.uk | +44 (0)1159324939 | sales@starfasteners.co.uk