



STAR FASTENERS

## Huck® Fasteners and Modular Construction

Around 50% of UK steel construction work incorporates portal frames. Thanks to the durability, adaptability, cost-effectiveness and low maintenance that steel frame building offer, they are an excellent choice as they are so adaptable for both commercial and domestic requirements.

The building industry together with construction methods have seen a technological revolution in recent years driven by the need to make construction faster, cheaper and safer. With the use of clever technology such as Building Information Modelling (BIM), drones and artificial intelligence (AI) architects and contractors have increasingly detailed information at their fingertips.

Images and precise measurements of a site taken by drones can be used to create detailed graphics and full-colour digital models / 3D site maps. AI algorithms are able to analyse data from a wide range of sources, including building plans, weather patterns, and traffic data, to make predictions about how a building will perform in the 'real' world. This has enabled architects to design buildings that are more energy-efficient, resilient, and sustainable as well as manage information on construction projects throughout their life cycle, right through to disposal.

The creation of geometric models as part of this process has allowed buildings to be conceived collaboratively and tested virtually before they are built. These detailed virtual models make it possible to live and breathe the construction and operation of a building before the production has even started.

Modern volumetric modular off-site construction continues to develop at a fast pace; consisting of two distinct industry segments, re-locatable modular and permanent modular - both are built off-site in controlled environments to high standards. Often manufactured as a series of structural units, stacking and / or adjoining factory-finished modules - these then make up the finished combined structure of a building once assembled on-site.

**Re-locatable modular** - temporary modular buildings are ideal for situations that demand quick construction, they must also be

lasting enough for future relocation and repurposing. Examples include, temporary classrooms, Sanitary and WC cabins, communication pods, show rooms, job / site trailers and glamping pods.

### Permanent modular Construction (PMC)

- are designed to remain in one location for an extended period of time. Examples include, schools / student accommodation, healthcare facilities, hotels, and restaurants.

Enhanced on-site productivity during the assembly phase ensures that the cost savings of modular builds can increase with production scale. Factory assembly based on 'template' builds means that approved designs can be reused and mass produced quickly and easily. These savings can grow rapidly, making it easy to achieve much faster output with less waste, downtime due to environmental effects, reduced labour and energy costs - all significantly lowering production / installation costs per unit.

Sustainability and identifying technology solutions that benefit the environment and manufacturing processes has become increasingly important to both consumers and businesses. With all of the new technological advances it makes sense for manufacturers to review their construction materials; fastening solutions are sometimes overlooked in this process; Huck® fasteners offer a wide range of permanent joining solutions that will both maximize factory efficiencies and offer maintenance-free, vibration-resistant joints for the full service-life of the structure.

Because Huck® fasteners offer relatively high tensile, shear and clamp properties they are suited to applications where the joints are integral to the structure. Offering a clean and safe alternative to welding and a more efficient fastening method than standard nuts and bolts, Huck® fasteners offer benefits which other fastening methods cannot, including quick and easy installation, elimination of re-checking / replacement, and ultimately cost reductions.

### HUCK® LOCKBOLTS AND STRUCTURAL BLIND FASTENERS

Huck LockBolts® and structural blind fasteners are designed to provide durable,

vibration-resistant fastening solutions, additional benefits include: -

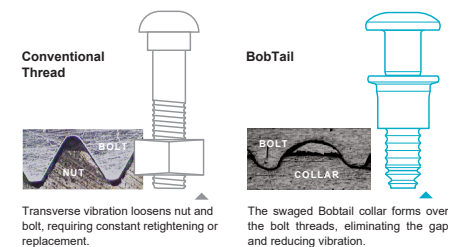
**Performance and quality** - Quality fasteners engineered to deliver optimal and consistent joint performance. Modular buildings need to withstand the vibration of rumbling down the roads on the back of a truck whilst being delivered to site, and then whatever the elements throw at them, from wind loads to corrosive substances in the air.

**Lifetime costs** - Construction projects built today need to be built to withstand the tests of time for years to come. Huck® high performance joints can deliver considerable cost savings over product lifetime.

### As new construction methods emerge the range of fasteners must keep pace.

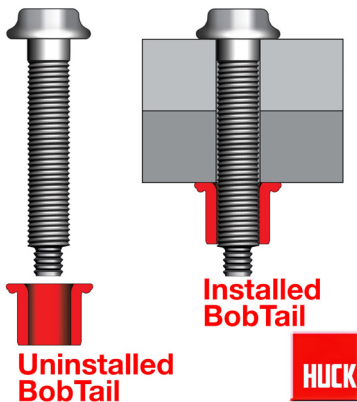
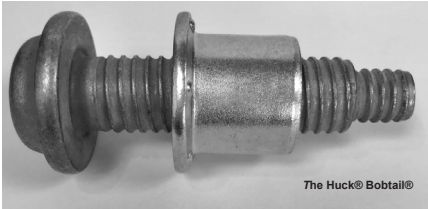
Hucks® DIBt approved range of grade 10.9 LockBolts offer maintenance-free vibration-resistant joints for the full-service life of the joint. Other benefits include fast and easy installation, and an installed dynamic performance providing up to five times greater fatigue life than conventional HV\* bolts. (\*The 'HV' mark comes from the German term 'Hochfest Vorgespannt'. This refers to a HV preloaded bolt, applied in a bolt/nut/washer assembly according to the EN 14399/4-6 standard. These bolt connections are used in preloaded steel constructions).

### Decreased Maintenance, Virtually Vibration Proof



### The Huck® BobTail® 2-piece LockBolt - Consistent, high clamp force

When installed 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.



BobTail® consist of two parts – a pin and a collar, but uses an entirely different installation method to nuts and bolts. As with nuts and bolts, BobTail® can be pre-assembled by hand to 'lightly' assemble the structure, they are then 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 and unlike traditional LockBolts® no pin-break is required, BobTails® pintail-less design means reduced noise, no waste, and improved corrosion resistance. This direct metal-to-metal contact of the collar swaged into the grooves of the pin eliminates the loosening effects of transverse vibration.

**BobTail® can be installed in as little as two seconds.**

When the installation tool is applied and the tool is activated, the action of the puller engaging onto the pin, together with the anvil swaging the collar completes the installation. The swage and eject sequence are programmed to complete the cycle without any additional installer input. The process ensures excellent gap closing capability.

**HUCK BOBTAIL® LOCKBOLTS DIBT (DEUTSCHES INSTITUT FÜR BAUTECHNIK)**

BobTail® technical approval has been extended by 5 years. The approval gives BobTail® Lockbolts the verification of 'static load-bearing capacity and fatigue strength' in the context of Eurocode 3 for applications in construction. The extension of the approval means BobTail® Lockbolts

can be used in areas regulated by the building authorities as a replacement for non-preloaded structural bolting assemblies (acc. to EN 15048) or high-strength structural bolting assemblies for preloading (acc. to EN 14399). The values published can also be used in many other applications, including rail, commercial vehicles (chassis), lattice towers or wind turbines.

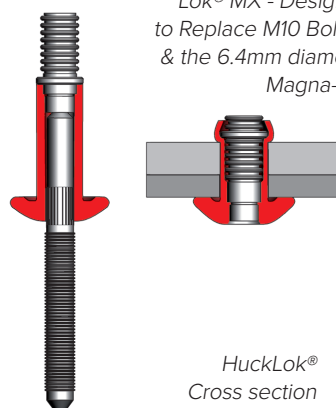
In addition to the load-bearing capacities, which are superior to that of a threaded bolt, BobTail® offers other advantages, such as the low scatter when applying the preload force, the non-detachable connection, vibration resistance and high fatigue strength. BobTail® Lockbolts are also characterized by the fact that they are mechanically maintenance-free (no re-tightening required) and are easy, quick and quiet to install.

The extent to which the regulations can be applied outside of Germany or in other areas of application must be clarified on a case-by-case basis with the regulatory authority or a certifier in the country in which the construction is to be undertaken."

**HUCK® STRUCTURAL BLIND FASTENERS**



Above, Huck® Magna-Lok® MX - Designed to Replace M10 Bolting & the 6.4mm diameter Magna-Lok



HuckLok® Cross section

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



Two types of Huck® blind fasteners that are widely used in modular construction are the HuckLok® (6.4mm diameter) and the Magna-Lok® (9.5mm and also 12.7mm diameters) as well as the Magna-Lok MX, which has been specifically designed to Replace M10 Bolting. Both of these products have a unique mechanical lock that ensures the integrity of the fastener in loaded conditions, and complete hole-filling properties to ensure moisture resistance.

Modular construction is not a new concept. Today's volumetric modular off-site construction is a far cry from the pre-fab buildings of the nineteen forties / fifties.

They have undergone a series of innovative improvements and have attracted significant investment. Modern construction methods are shaping the way we work and live and will help us to meet the needs of the twenty-first century in terms of sustainability and efficiency.

By installing HuckBolts® and Huck® structural blind fasteners, an engineer can count on many benefits including maintenance free joints; lower lifetime cost of joint; will not loosen 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.

Star Fasteners engineering support services enhance customers experience – we can assist with design, development and testing right through to choosing installation tooling, correct fastener installation and process optimisation.

Huck® fasteners can deliver modular build projects more efficiently and effectively with high-quality, dependable, fastening solutions.