



## White Paper - Huck® vs Time

### An Introduction

The effective use of time is a critical factor in a number of manufacturing and construction applications, and more often than not a key factor in profitability. From a manufacturing perspective, the amount of time required to complete a product or assembly directly impacts the number of these items that can be produced during a given time period. Similarly, the time required to assemble, install, or fabricate a product or system on-site can be critical to revenue generation and income.

In many cases, it is actually the joining of elements, either through welding, adhesives, or the installation of fasteners, that can significantly contribute to the time required to assemble a product or system. Correspondingly, the choice of joining methods can have a critical impact on efficiency and productivity.

Time associated with the assembly process can also be a factor with the end user. A fast turnaround of an assembly or installation can result in income being generated faster. In addition, a quality manufactured or installed product or system can cut expensive downtime, and reduce time-consuming maintenance requirements.

In this whitepaper, various joining options often used as part of manufacturing or installation processes – welding, adhesives, conventional nuts and bolts, structural blind bolts, and 2-piece lockbolts – will be addressed from a time, efficiency, and productivity perspective.



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# Howmet Fastening Systems

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### Welding

For years welding was seen as the only way to ensure the integrity of joints in demanding load-bearing or high-vibration structures. So, companies manufacturing heavy-duty equipment or fabricating/installing large, metal structures continue to employ the universally accepted process of welding joints together.

However, welding-up joints is a time-consuming process. In addition to the actual welding, there is often a significant amount of time associated with surface preparation. Time is also required for clean up of a welding area, as well. Welding also requires skilled, highly paid, technicians, and there are some industries, such as oil, gas, and alternative energy, where quality welders are often difficult to find and retain.



Another major concern with the welding process is that the heat generated can reduce the overall strength of the metals being joined, and damage critical surface coatings in the process. There are inherent challenges associated with attempting to weld together dissimilar metals or pieces of varying sizes. Welding also often requires an on-going process of inspection, and if an issue is discovered, the removal and/or rework process can be both problematic and time consuming.

Finally, with welding, there is always the issue of safety. Welding is dirty and dangerous work, with safety being a critical issue in every step of the process. While absolutely necessary, the requirement of ensuring that welding is performed in the safest manner, can also consume a significant amount of time.

### Adhesives

Just as with welding, the types of materials being joined will greatly determine the efficacy of using adhesives to create a strong bond between materials. For example, aluminum, a popular metal used in various manufacturing or fabrication applications, can be difficult to bond using an epoxy or other adhesive types.

Bonding joints using adhesives can be time consuming, as well. The pieces being joined must be completely clean and free of debris, which requires both time and effort. In addition, the wait for the joint to fully cure, while varying with each application, can eventually consume a great deal of time.

There is also the concern relating to a poorly bonded joint. A wide variety of factors can affect the quality of bonded joints, including the nature of the environment in which the materials to be joined were manufactured or stored, the temperature (as not all adhesives handle extreme heat well), production methods, surface treatments, joint design, and many others. Whatever the cause of a poorly bonded joint, there can be a considerable amount of time lost to QC procedures and reworking of joints.

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### Nuts and Bolts

There are a wide range of options available for nuts and bolts, depending on the size of the joint and the demands placed on it. In addition to conventional nuts and bolts, there are a number of locknut and lockwasher options available.



One of the main drawbacks to using nuts and bolts is the time required to install, tighten, and test them. Many nut and bolt combinations require torque for proper installation, a process which can dramatically add to assembly time. For instance, prevailing torque locknuts can require 30 seconds or more to install. In addition, other locking nut and bolt assemblies often include multiple components, and can take well over a minute to install. In addition, these torqued-on nut/bolt combinations often have to be checked as part of a QC program, adding more time to the process.

### HuckBolt® Lockbolts and Huck® Structural Blind Rivets

Over the past 30 years, HuckBolt® engineered 2-piece lockbolts and Huck® structural blind fasteners from **Howmet** Fastening Systems (HFS) have become the fastening option of choice for a number of demanding applications. Today, advanced 2-piece HuckBolt lockbolts and Huck structural blind fasteners have become the preferred joining method for a wide range of applications where welding, nuts and bolts, and other joining methods were once regularly employed.

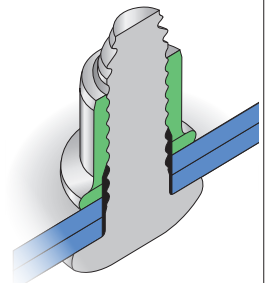
One benefit associated with this family of engineered fasteners is that no special training is required for someone to become proficient in installing them. When Huck structural blind rivets and HuckBolt lockbolts are used, there is no need to employ a team of specially trained technicians.

### 2-Piece HuckBolts®

Available in a wide range of materials and in sizes up to 1-3/8", 2-piece HuckBolt lockbolts deliver up to 5 times the overall fatigue strength of conventional nuts and bolts. In addition to providing a high level of reliable clamp performance, HuckBolts also provide a highly vibration-resistant joining option.



While the "holding power" of HuckBolts is a key characteristic, these lockbolts also offer several important time-saving features. To begin, installation of these fasteners usually requires less than 2 seconds, and special indicator notches on the base of a HuckBolt collar provide a quick visual confirmation of an accurate installation. Additionally, using these advanced fasteners saves time since they never need retightening or re-torqueing, even in the most vibration-intensive application.



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### Huck® Structural Blind Fasteners

One-piece Huck structural blind fasteners, another option offered by AFSR, are available in a variety of materials and sizes (up to 3/4"). Similar to HuckBolts, these advanced fasteners are also installed using a direct tension swaging technique. And like the installation of HuckBolts, this process provides for both a fast and secure installation. Similarly, a quick visual inspection is all that is required to confirm their proper installation, adding to the speed of assembly associated with these advanced fasteners.



### Time-Efficient, Cost-Effective Joining

Both the 2-piece HuckBolts and structural blind rivets combine unmatched speed of assembly with the ability to use lower-priced installation crews. This combination ensures that these lockbolts and blind fasteners are highly cost effective, adding a strong measure of cost control to a wide range of manufacturing or assembly applications.

### The Time Benefit for End Users

The benefits to users of machinery and fabrications assembled with Huck structural blind rivets and HuckBolt lockbolts begins with the time saved by eliminating the need to take equipment or systems off line to re-tighten or re-torque fasteners or to repair or replace failed joints. In addition, if manufacturing or installation/assembly times can be reduced and a product or system be brought on line faster, income can be generated faster. This quicker realization of income can be significant, adding to the overall value of any product, installation, or system assembled via Huck fasteners.

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# Applifast.



251 Cree Crescent, Winnipeg, MB Canada R3J 3X4  
Tel: 204 837 8361 • 1 800 563 1293  
info@applifast.com



[applifast.com](http://applifast.com)