Wire Stitching Advantages Cheat Sheet

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Introduction

Most areas of manufacturing have had steady paces of technological innovation over the past 50 years. Material assembly and material joining is one area, however, that has not kept pace. It is one of the few segments of manufacturing that has advanced slowly, if at all, relying on just a handful of assembly techniques for decades. Luckily, new material assembly techniques have begun to crop up in recent years, giving the sector a much-needed infusion of innovation. Conventional wisdom assumes that when assembling materials there are only five fastening methods, but smart manufacturers are increasingly turning to a sixth method called wire stitching. Each method has its own pros and cons..

Source: https://www.appliancedesign.com/articles/95572-industrial-fastening-metal-stitching

Conventional five fastening methods

1. Mechanical (hardware) Assembly – Using various different types of hardware or fasteners (bolts, nuts, screws, etc.) and predrilled holes in the material to assemble multiple parts together.

2. Welding – Fusing two or more pieces of metal (similar type of metal) together to essentially become one.

3. Riveting – Inserting a small metal component and plastically deforming each end to hold the material in place.

4. Adhesive Bonding – Applying glue to material to hold pieces together.

5. Brazing – Using a filler metal that is melted to a certain temperature which will bond the two components together.

Wire Stitching Advantages

- Generally not as strong as welding or brazing for steel to steel applications.
- Limitation of material thickness. Typically materials that are thicker than 3/8 of an inch are not good candidates for stitching, but it depends on the types of material. Thick, dense materials like steel or ceramics work better for stitching if they are thinner sizes.
- Clinched end of staple can show up on the back side of materials depending on material type or wire used.
- Joints cannot be easily disassembled.

Wire Stitching Advantages

- Easy to stitch metallic materials (similar and dissimilar) that are not readily welded.
- Efficient joining of metallic to non-metallic materials, great for reducing weight of metal assemblies.
- Requires no time-consuming preparation, such as pre-punching, drilling, tapping, critical hole alignment for riveting, or cleaning work (before or after) as with welding and adhesives.
- Lends itself well to automation. Stitching heads can be mounted to robot arms or other automation fixtures and tools to enable stitching in any location or in multiple locations.
- Quickly and accurately vary the length of the wire draw of the stitching head to adjust for different thickness of work.
- Configure to “stab stitch” or staple with no back clinch that allows for stitching even when there is no room to get behind the substrate.
- Can attach round or odd shaped parts to flat materials tightly.
- High shear and tensile strength.
- Not sensitive to heat or cold.
- Extremely low cost process that can be done at high speed and with minimal operator training.
- Can use stainless steel wire when corrosion resistance is required.
- High resistance to joint fatigue and vibration. The tight joint, produced by wire making its own hole and effective clinching action (plastic deformation of the staple) restricts movement of parts and leads to extremely long joint life.
- Requires only visual inspection to determine if the materials are fastened properly.
- Does not require material temperature be elevated, keeps shape and material stable throughout the manufacturing process.
- Extremely short cycle time, as low as one cycle per three seconds.
- Variable sizes of staples (crown sizes).
- A wide range of commercially available wire to be used on the stitching machine.
- No backing material needed during assembly process.
- Stitcher does not negatively affect the surrounding material including paint and other aesthetic details.