

Resistance Welding — Part and Product Considerations



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“What were they thinking?” “I have no idea what to do now.” “It’s on the print, we can’t change it.” These are just a few of the reactions I hear when talking to manufacturers with production problems. Another concern is “Production is suffering, the welds are unpredictable, quality control requires that we sort and check every part.” Whew. Where to start?

Let me back up a minute. It has been my privilege and pleasure to have a career working in the metal-joining industry, specifically the resistance welding industry, and all the disciplines it involves. I have worked with a wide range of metal-joining companies, including furniture and appliance manufacturers, Tier suppliers to the automotive industry, and producers of joined assemblies ranging from six employees to thousands. One thing they all have in common is the need to produce quality parts reliably and cost effectively. Another thing they all share is sometimes it just isn’t working out that way.

Over the past three decades, I have visited many companies to help assess problems with their resistance welding machine or resistance welding cell. Unfortunately, they contact me when they are up to their armpits in bad parts, or days behind on production due to bad welds on parts. So, I am asked a litany of questions about how to improve production and to ensure a good weld, but rarely how to improve the weld condition or process. For those of you who work in these manufacturing environments, I am sure you have faced the same barrage of questions.

My experience nearly always directs me to start at the actual welded joint and move my investigation in two directions from this most basic starting point. The most obvious solutions usually present themselves in this way, and typically boil down to two related items — process and product.

Typically, I am directed to the process to try to determine what needs to be changed to produce good welds. All too frequently, however, it becomes clear that the needed change is not always due to the process, but the design of the part to be welded. Resistance welding is a cost-effective and robust process, but there are certain design criteria for the parts being joined that need to be considered. Whether it’s fastener projections too small for the mating material, a weld location that prevents a “normal-to-metal” or perpendicular weld force direction,

or spacing of welds that result in inconsistency, sometimes the design of the part or the product’s manufacturability are in need of review. Once we determine the difficulty the product itself is presenting, the challenge becomes getting an acceptable design change that improves weldability and, ultimately, the product.

In our Tier-based, vertical supply chain manufacturing systems, getting even the most obvious change to a product or part can be an arduous process. Even the most understandable and simple of corrections, like moving a spot weld location away from an adjacent edge, can require patience, persistence, and understanding. Of these three, understanding is by far the most necessary and easily provided.

Our welding industry has been built on standards and specifications, whether building bridges, bobbles, boilers, or Buicks. In the resistance welding industry, these are sometimes accepted as common knowledge or best practices, which can be so widely assumed that one automotive company published its own standards simply as “Do’s and Don’ts.” The problem becomes putting that knowledge to work in the right places, at the right time, by the right people. Product designers need to be made aware of the principles and practices for successful metal joining with resistance welding.

The Resistance Welding Manufacturing Alliance (RWMA) has built within its mission statement this very task: “Promoting the technology by educating the manufacturing community in documented processes, standards, and advancements.” As a committee of the American Welding Society (AWS), RWMA has published materials available for the intent purpose of improving the resistance welding process, and for use in the design of resistance welded products.

In addition, RWMA has a school taught by its members whose sole purpose is to impart the basic knowledge of the process. The RWMA schools will be held at FABTECH Mexico 2018 and again at FABTECH in Atlanta, Ga., later this year. It has been our experience those individuals and companies in attendance not only find a solid base for their resistance welding knowledge, but also find solutions to the production problems they had long ago learned to live with each and every day. The RWMA and its members can be contacted at rwma.org. **WI**