Reducing Resistance Welding Costs through Careful Analysis

BY NIGEL SCOTCHMER

An organized approach to cost reduction begins with establishing objectives and checklists, which then lead to a detailed analysis for implementation

Resistance welding is an inexpensive welding process, and its familiarity suggests there is nothing new to learn. Yet the mere fact that it is so common means that its costs, in aggregate, loom large and thus become targets for cost savings initiatives. So, what can be done when your cost accountants come knocking for savings?

The most important topic of conversation in many automotive plants today is how to cut costs without reducing weld quality. This article presents a framework that can be used to effectively achieve lower costs. I believe that there is a plethora of buzzwords and "get results quick" schemes available today that neither reduce overall costs nor present a realistic approach to saving money. These schemes take a useful proven concept, such as "just in time" inventory management, and simplify and corrupt the approach, causing higher ancillary costs in related cost centers. Meanwhile, the consultants exit with fat check, leaving behind upset, dedicated, and frustrated employees who are all too aware of the higher overall costs.

What Not to Do

Perhaps one of the best examples of such short-sighted and blind "cost-saving" plans is the large automotive corporation that decided that carrying a month's supply of heavy (but cheap) copper electrodes was unnecessary and that a small amount of money would be saved in interest carrying costs if only a week's supply of inventory was maintained. However, these electrodes were only made in one factory and shipped to many plants by truck. Therefore, it was decided that the supplier would hold the inventory and ship weekly. Shipping weekly meant using air freight. Thus, the average per-plant $500 cost of shipping monthly 25,000 50-cent electrodes suddenly became a $1500 per week cost for 6000 electrodes — and this cost ignored the increased shipping, delivery, NAFTA, customs, payables and payment paperwork required for each shipment. Yet the company's consultants reported annual "savings" of $937.50 per plant based upon the reduction in amount of inventory carried. They also forgot to mention the many stock-outs that suddenly caused expensive emergency shipments and even bigger headaches for the maintenance and welding engineers. This farce continued for four

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years, despite the grumblings of production and welding people.

It is precisely this type of situation that makes it necessary for welding people to have a basic knowledge of cost saving and efficiency improvement plans, so that they can effectively contribute in the planning and implementation of cost-saving plans.

The Overview Checklist

Successful cost-reduction plans involve careful planning and common sense analysis. First, an overview of the entire situation should be obtained. An overview will highlight what is known, is not known, and what needs to be done next. Making checklists and matrix boxes are ideal ways to summarize important information and provide an organized approach. There is no need to have all the answers. Finding the correct questions is usually more important and useful than the answers.

The overview is essential as it provides the framework for the subsequent detailed analysis. The overview primarily considers the following:

1. The objectives — how large the savings are to be, how they are to be measured, and where they are to be sought;

2. the timelines in which the project is to be accomplished; and

3. the resources available to be used: the equipment, tools, and welding processes used, and the changes that can be considered; and the people available to do the work — their depth of knowledge, capabilities, and interest in creating and managing change.

Each of the three items above is broken down to consider specific subtopics. For instance, what types of savings are paramount. Are they cash savings now, reduced depreciation charges, reductions of indirect overhead charges, or lower freight costs? How large a saving is sought? Is this a company or plant-wide program or is it to start on a line or an individual welding cell?

In terms of timelines, is this a multi-year project, or a one-time exercise to deal with a temporary slowdown in the market? What objective measures are to be used to gauge performance and track change? How involved is (are) the chosen measuring tool(s)?

The most difficult and time-consuming analysis concerns the resources available. The equipment in use is reviewed for its age, suitability, and flexibility. A comparison is made to the corporation's short and long-term business plans, its aims and the limitations within which it must operate. The clearer these objectives are, and the better it knows its own resources, the easier the cost-saving process is.

People are needed to execute a plan. Are they open to new ideas? Does the corporation want to consider new ideas? There are very different philosophies to managing welding in Europe, Japan, North America, and China. What are the limits for change? How old is the labor force? Many people do not want to have change at all. Do you know how other people are doing what you are doing in your industry? Do you know what they are doing in Germany and Japan? How is it different in China? Why is it different elsewhere?

Once the general plan is understood, it becomes important to break down the project into manageable subcomponents.

Tracking of Costs

To save money, you have to know what your current costs are, so that you can measure any change. Accounting is not a dark science that is hard to understand. It is merely the reporting of the accumulation of costs. However, it is interesting to note that, as a general rule, the reporting of manufacturing costs in North America is not as developed as in Germany or Japan.

In Germany, there is a developed interest in tracking costs per square meter of factory floor , by manufacturing operation, and per machine. In the plain version, costs (including indirect costs) are gathered and allocated to the factory floor based upon its area. In Japan there is interest in tracking costs per actual weld performed. In this version, costs (including indirect costs) are gathered and divided by the actual number of welds performed. Information is power; once you know what your costs are — on a timely basis — it is easier to see whether things are improving, getting worse, or staying the same.

The German standards are particularly useful in that they allow comparisons across an industry, different companies, and different welding processes, and in different locations to be easily compared. It has proved to be of great help in their transitioning of manufacturing plants out of highly automated and high labor cost Western Europe to lower-cost Eastern Europe. Such moves to Eastern Europe are illustrative of major, long-term cost-saving plans, and has been effective in that the labor force, generally speaking, is well-educated, highly motivated, and very capable of managing and reporting change.

A Case Study

One notable case was the transfer of small welded assemblies (such as hinges and brackets) from Germany to Hungary. Simpler tooling from less automation and lower labor costs reduced indirect costs by 10% and direct labor costs by 30%. Detailed and accurate accounting records allowed for the rapid scaling of production and early realization and reporting of cost savings.

In Japan, the analysis of detailed costs, and the allocation of indirect costs to individual welds per machine, or weld cell, or production line, reflects their underlying belief (well, a theoretical belief at least!) that every weld has to be a perfect weld. This is the concept of "cost per weld," where all welding costs are allocated to individual welds.

There is the famous example of a major Japanese automaker that has the same cost per weld on the similar production lines in Japan and in Western Europe. Similar detailed costs around the world would certainly suggest that costs are controlled in a format that is comparable. Innovation and originality may be stifled, but consistency has its own reward.

In North America there is a general belief that such detailed work is unnecessary and inordinately expensive; but perhaps such inattention to detail is yet another reason for the decline in our manufacturing?

For meaningful measurement of cost savings, there must be a simple yet effective method that management can use to track cost reductions. This number, or group of numbers, must be understood by the welding engineers and production people, and must track what is important to them and must be accurate and timely.

Detailed Checklists

Once the overview is appreciated, and the tools for monitoring chosen, detailed analysis must be performed. Welding design, engineering, maintenance engineering, purchasing and accounting functions are carried on independently of each other in most automotive plants. This is the case even though it has been proven that the introduction of new cars has been done faster, with fewer problems, and at less overall launch cost, when multidisciplinary teams are brought together to execute the project. The same results can be expected when teams are introduced for cost-saving initiatives in welding.

Accountants and welding engineers will never have the same perspective, and will never fully understand the other's viewpoint. The accountant wants to save money and the engineer wants to get good parts out the door, no matter what, and perhaps that is why coordination to save money doesn't always happen. Also, welding costs, especially with resistance welding, are not a glamorous subject, and the topic is easily relegated to a lower priority than its overall size and importance would suggest.

Having said that, cooperation and coordination between the welding department and accounting will allow both to learn each other's roles and deepen each other's understanding of the task — how to reduce costs. The easiest, and quickest, way this is achieved is with a series of checklists.

Suppose a single welding cell has been targeted for direct cost savings of 10% and indirect costs of 5%, to be realized within six months, using a modest capital budget of $10,000 on old equipment with a mature labor force. In the hands of diligent workers, completed checklists will provide the detailed analysis of what is discovered, what is tried, what works and what is achieved at the end of the process. In addition, documentation of the process will help on the next project.

Detailed checklists for this hypothetical robotic welding cell will cover such items as:

- description of cell, its type, manufacturer, age, and performance
- capital cost of the cell, its components, and tooling
- annual repair costs for the cell
- allocated overhead costs, with detailed breakdown (if available)
- maintenance, reliability and accuracy issues
- parts produced
- material being welded
- stack-ups
- historical production rates
- maintenance cycles/shift changes
- quality desired
- knowledge base of supervisory staff
- training of operating staff
- flexibility for innovation (change factor)
- how quality is measured
- consumables
- infrequent replacements (cables, shunts, adaptors, tip dresser blades, etc.)
- electrodes
- alloy
- geometry
- type (male, female, size, coating)
- maintenance — tip dressed, recycled, or end of life
- consumables costs
- optimization of weld cycle
- length and design of weld time
- length and design of heat
- length and design of force
- process control
- production rate
- maintenance
- quality inspection

Detailed analysis and open discussion of the completed checklists will present significant opportunities for "what if" scenarios. A change agent who is particularly knowledgeable about how others do welding will offer additional insights and possibilities for experimentation and follow-up. If new ideas are not tried, tested, and documented, then improvements will never be discovered and implemented.

Conclusion

Experience in both resistance welding and cost accounting is helpful to achieving overall, real, long-term cost savings. A full overview of the situation and a plan for execution is essential. An open mind to new initiatives and change is even more important. Persistence and determination are key for the effective recognition of opportunities for making savings. Clearly, any initiative requires the passion of a true leader who recognizes the challenges involved as well as the methods necessary to achieve them.

However, a simple, organized approach, based upon checklists and known objectives, starting from an overview and drilling down to details, will achieve greater long-term success in overall cost savings than a smaller, focused cost-saving plan that merely switches, say, from one brand of electrodes to another to get a cheaper brand, or switches from one commodity manager to another every three years.◆