Can Highly Engineered Machines Be Outsourced?

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 Globalization has eliminated millions of manufacturing jobs and closed down many American pants. Asians began by taking the easy-to-make, high-volume, low-complexity parts, but now they would like to get a share of our machinery market.

A good example is a company I have visited in Green Bay, WI, Paper Converting Machinery Co. (PCMC). This company has been around a long time and builds complex machinery to weave, fold and print packaging. But PCMC fell on hard times in the middle of the last decade and was purchased by a St. Louis conglomerate, Barry Wehmiller.

In the next five years, Barry Wehmiller cut employment from 2,000 employees to 1,100, and the wages of those who were left. In five years, sales plunged 40 percent, but the new owners plan to slash development costs by “shifting some design work to its 160-engineer center in Chennai, India. Barry Wehmiller says the strategy already has boosted profits at some of the 32 other mid-size machinery makers it has bought. We can compete and create American jobs, vows CEO Robert Chapman. But not without offshoring.”

Well, the holding company may be able to make a profit by continuing to cut costs, but they don’t say anything about growing the sales or gaining market share. I am going to make the argument that it is very difficult to satisfy customer requirements, maintain quality or grow sales if any function of manufacturing complex machines is offshored. I plan to also make the case that outsourcing is a

quick fix to lower costs, but it doesn't work in the long run. It may be good for the shareholders for awhile, but not for the employees, suppliers, and eventually, the customers.

The *Milwaukee Journal Sentinel* did a survey of 300 companies last fall that had outsourced. "The survey (done in October) found that 55 percent of the companies were substantially dissatisfied with their outsource provider in the areas of innovation and making process improvements."

The fundamental problem with customized machines is that they are sold to customers who want them built to their individual plant specifications. The customers want to specify all of the purchased parts right down to the color code of the wiring. This means a lot of custom engineering and changes to the bill of material on every order.

The process usually begins with a request for quote (RFQ) from the customer. These RFQs often contain basic specifications and standards that come from the specific plant. Depending on the size of the customer's company, these specifications can include electrical, mechanical, hydraulic, pneumatic, programming and even painting standards that require special engineering for compliance.

Many of the plants want to buy purchase parts that can be sourced from a local distributor, so they call out specific brands and models of purchase parts that also require special engineering. And then there are occasions in which the customer wants the basic machine to be resized in terms of length, height, width, etc., or they want the entire machine made out of stainless steel, or painted by a special paint requiring OSHA or EPA approvals.

The changes can range from a few options and new purchase parts to changing half of the bill of materials. Suffice it to say, that all of these requirements require special coordination with the customer and usually a factory test so that the customer gets to inspect the machine in great detail.

If the quotation is accepted and the OEM gets the order, the customer sends out the order along with a written contract. The contract spells out special terms and guarantees quality and performance of the machine in writing. For instance, in packaging machinery, it is not uncommon for a large customer to expect a signed statement that the OEM guarantees the uptime of the machine on a production line for 98.5 percent of the time on a three-shift, seven-day week operation.

Once the order is received and the drawings are all approved, the customer may have forgotten to add a specific requirement, or change their minds and want something different. This happens by a "change order" requested by the customer,

and they expect the changes to be integrated without changing the delivery schedule.

In my opinion, it is almost impossible to achieve all of these requirements if the machine is outsourced to a foreign country. The communication required to engineer and assemble this kind of machine is an almost daily occurrence between the customer and OEM engineers. It takes a lot of engineering time to make this happen at a U.S. plant, and outsourcing the engineering to a country like India would, in my opinion, create miscommunications that would lead to mistakes in the final assembly. The people who engineer these types of machines need to be very close to the assembly of the machine on a day-to-day basis

Another problem with outsourcing these kinds of machines is that foreign countries would not have access to the many kinds of purchased parts that are demanded by the customer and would have to make substitutions, which is unacceptable. In addition, the foreign supplier may not use the same welding standards as the OEM or may have to make substitutions of the type of steel required because of shortages in their country. Any mistakes made by the foreign supplier would be unknown until the machine or parts arrive in the U.S., which jeopardizes the delivery date.

Many of these highly engineered machines, which are specially designed for the customer’s production process, must be tested with the customer’s products to make sure they are ready for shipping. It is not very practical to test a machine at the supplier’s plant in Shanghai because the customer is not going to want to bear the costs of a long-distance trip.

Customers would inevitably want the American OEM to bring the machine back and test it at the American plant. This reduces the cost for them and allows the most experienced American engineers who designed the machine to check it out and prepare it to run production. But this is an expensive test, and if problems are found on the machine, they have to be corrected at the last minute. This is expensive, drives labor costs up and may jeopardize the delivery date.

Installation and startup are the critical phases of the project. If there are any quality problems or errors caused by the foreign supplier discovered during the installation of the machine, they are going to be difficult and expensive to fix at this stage. For instance, a weldment that is found to be out of square, or a metal part that is the wrong gauge steel, and is rejected by the customer take a lot of time and money to replace.

During the installation and start-up stage, the machine is beginning to run the customer’s production, and delays cause downtime and loss of production. If the delays are in hours, the customer would understand, but if delays and repairs run into weeks or even months, the production losses add up to staggering losses, which are brought to the attention of senior managers.

The bottom line is that the responsibility for delivery, training, installation, 24-hour parts and next-day service still remain with the U.S. OEM. It is not practical for the foreign supplier's people to handle all of these services when they are 10,000 miles from the customer. Even if the customer has demanded that the OEM outsource the machine or parts for lower costs, the customer is still going to expect the same delivery, startup and other services, just as if the machine was manufactured in the U.S.

For highly engineered machinery, American customers still want the flexibility of ordering machines based on their plant standards and specifications that are very high quality and delivered on "written in stone" delivery dates that cannot be moved because of other contractors. Then once the machinery is installed, they want 24-hour parts and service, and a guarantee of 98 percent uptime

I don't see how a highly engineered machine with specifications or custom engineering can be outsourced to a foreign country (or an engineering department) without high risks for the customer and the OEM. With these kinds of machines, I would suggest that as the amount of engineering increases, the risk of mistakes and errors goes up logarithmically. At some point, the whole project becomes a crapshoot and no one would be able to predict downtime. If the problems are serious enough, the costs of fixing the machine would far exceed any savings from the outsourcing.

Michael P. Collins is the author of the book, Saving American Manufacturing*. You can find related articles on his website at www.mpcmgt.com* [1].

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