

## Case Study

# Global automotive supplier migrates automation and controls to Siemens, realizing immediate savings in costs and weeks of time



### Case study at-a-glance

**Customer:** BWI Group, a manufacturer and Tier-1 supplier to the global automotive industries

**Challenge:** Add manufacturing capacity quickly and cost-effectively to fulfill large new orders

**Solution:** Deploy a wide range of Siemens automation, drives, and communications solutions

**Results:** Saving big in costs and time, plus responsive support on the BWI 4.0 journey

With roots going back to the dawn of automobile age, the BWI Group is a top-tier supplier of chassis, suspension and brake products to the automotive industry worldwide. Customers include nearly all large auto manufacturers. With headquarters in Beijing, China, the company has more than 5,000 employees, 16 technical centers and factories worldwide, and annual sales fast approaching \$1 billion.

Its rich history started in Dayton, Ohio, where Charles Kettering invented an electric car starter in 1908, eliminating the sometimes-dangerous hand-cranking motors. Kettering's Dayton Engineering Laboratories Company became known as Delco. It was eventually bought by General Motors and folded into the Delphi parts company that was spun off in 1999.

In 2009, the BWI Group acquired Delphi's suspension and brake businesses, adding those to its existing chassis business.

Like many companies around the world, the BWI Group has embraced the Industry 4.0 vision of smart factories. In fact, it launched an internal, transnational initiative called BWI 4.0 to start its journey toward realizing the benefits of smarter factories for customers as well as their bottom line.

According to Controls Engineering Supervisor Bill Taylor, "We want to take greater advantage of digitalization, such as integrated automation, digital twins, and Internet of Things, so we can make faster decisions based on real-time or near real-time data to improve our quality, efficiency, and costs, while delivering ever-more value to our customers."

## Challenge: Add manufacturing capacity quickly and cost-effectively to fulfill large new orders

Today, the BWI Group is growing fast, thanks to several large new suspension orders from U.S. customers that planned new manufacturing programs. To fulfill those orders, however, the company needed more capacity that was closer to customers in the U.S. market.

“Because our North American customers operate lean manufacturing systems, which require just-in-time inbound logistics, it made sense to build a plant closer to their Midwest U.S. factories,” says Taylor, who is based at the company’s Dayton Technical Center, but supervises machine control system designs for all of North America.

So management decided to locate the new plant in Greenfield, Indiana, 25 miles east of Indianapolis. With U.S. labor costs higher than its other North American plant, the new plant had to be highly automated and extremely efficient to minimize operating costs. And to minimize capital construction costs, Taylor’s mandate was straightforward: *Reduce machine costs by 25 percent.*

“That was a tall order for our manufacturing engineering group,” says Taylor. “The new plant would have as many as 300 machines, large and small, from as many as 100 different builders. Of course, we’d have to work with each one to drive down our costs, but we also had cut the costs of our control systems. It really forced us to rethink how we do things.”

Taylor adds that time was of the essence: “Some of the customer programs had their schedules advanced by a year, which compressed our schedules by that much, as well.”

## Solution: Deploy a wide range of Siemens automation, drives, and communications solutions

Having worked nearly 40 years in automation and controls across several different industries, Taylor had extensive experience in the solutions portfolio of a leading U.S.-based automation provider. In fact, many of its products were installed and operating at the company’s Mexico plant.

But Taylor’s allegiance to the supplier had waned after it responded poorly to a series of support issues. “When a machine or production line goes down in our plants, our delivery commitments to our customers are immediately put at risk,” he says. “If we don’t deliver when we say we will, their production can stop, potentially costing them lots of money, and that’s a huge mark against us. So, getting slow or ineffective responses to issues with their products was totally unacceptable.”

**Seeds of understanding.** Taylor decided the new plant was an opportunity to evaluate Siemens automation, controls, and connectivity solutions, with which he was somewhat familiar. Two years before, his curiosity about the future of automation and controls engineering prompted him to attend a two-day Siemens modernization workshop. He wanted to find out what advancements Siemens had and what benefits they might offer, then what it would take to migrate from his current automation supplier.

“We have Siemens PLCs and other components in our other plants in Europe and Asia, so it was a chance for me to learn more,” he says. “The workshop was led by former employees of our then-current automation supplier, so they spoke my language, knew my concerns, and helped me understand how Siemens could help me address them.”

With that basic understanding – and now with a chance to explore actually converting to Siemens – Taylor called Siemens and their local automation distributor, C&E Sales, to find out more information and discuss his options.

**Big savings surprise.** He discovered a welcome surprise, especially given his cost mandate.

**“Siemens hardware was as much as 40 percent less expensive than our other automation products supplier and software was less than half the cost,” he says. “But as much as I liked the cost savings, the engineering and technical support was just outstanding, leading us to execute a global partnership with Siemens.”**

As the Indiana plant was built out, Taylor found that support invaluable in planning automation, controls, and connectivity. Among the Siemens components selected:

- **SIMATIC S7 PLCs**, including S7-1500 and S7-1200 safety-integrated models, plus ET 200SP for distributed I/O
- **SIMATIC HMI Comfort Panels**, including TP1200 and TP1500 color touch models
- **SIMATIC IPC industrial PCs**, including IPC277, IPC477, and IPC677 models
- **SINAMICS G120 and S120 drives** for vector and servo motion-control duties
- **SCALANCE S615 managed switches** with built-in firewalls for secure yet fast, prioritized packet traffic

One feature of the SCALANCE switch that especially impressed Taylor was its high-speed, highly deterministic IRT (Isochronous Realtime) PROFINET with data exchange cycles ranging from a few hundred microseconds up to a few milliseconds. With this protocol, the switch divides the bandwidth into two intervals: one for ultra-fast, deterministic data transfer; the other is used for standard Ethernet data which are not time essential. This is extremely useful in robot applications, where motion control is critical. “Our new plant needed this kind of flexibility that’s native to the SCALANCE switch,” he says.

All of the Siemens components are part of the Siemens Totally Integration Automation (TIA) portfolio. Modularly designed, many are self-configurable, which makes them effectively plug-and-play. Many have built-in web servers for remote diagnostics. All are programmable via the user-friendly, drag-and-drop capabilities of the Siemens TIA Portal. The TIA Portal is a



common software engineering framework that can save as much as 30 percent or more of programming time, especially given its libraries of proven code.

**Extraordinary migration support.** In converting his code from his previous automation supplier to what can be used in the Siemens TIA components, Taylor found the support by Siemens and C&E Sales to be, in his words, “unheard of in this day and age.” He took a Siemens class specifically for migrating existing code, again taught by former employees of that supplier. “The instructors know both programming environments, so they could guide us in every conversion requirement,” he says. “Even more, Siemens was willing to help our machine builders with their programming issues, too.”

Taylor recalls one machine builder, who had spent the better part of a week, trying to get IRT PROFINET to work with a two-port SIMATIC S7-1500 PLC model. “When I found out his problem, I called my contact at C&E Sales, as I didn’t know anything about isochronous real time communications,” he says. “He explained it to me in just a few minutes and how to use one PLC port for the IRT and the other for regular PROFINET. I shared that with the machine builder and it worked. It took just 10 minutes. I’ve never seen anyone happier.”

### Results: Saving big in costs and time, plus responsive support on the BWI 4.0 journey

The new BWI Group plant opened with the most modern and cost-effective automation and control systems of all its plants worldwide. Not only were Siemens component and software prices much lower than Taylor’s previous supplier, features such as the PLCs’ integrated safety eliminated the need for adding safety relays throughout the plant.

“We saved about 10 percent of our overall automation and control costs by using the safety-integrated SIMATIC PLCs,”

he says. “That alone helped us avoid capital investments that we’d otherwise have to spend to ensure the safety of our production floor.”

Of course, Taylor appreciated how the size of the cost savings on Siemens components and software – plus the cost avoidance their features offer – helped him to meet his 25 percent cost-reduction goal. He also reiterated how much he values the support from both Siemens and its distributor C&E Sales every step of the way.

“I just can’t speak highly enough of the support we get,” he says. “For example, I wanted to implement the MQTT (Message Queuing Telemetry Transport) protocol on the SIMATIC PLCs. I went to the Siemens website, quickly found a white paper on the topic, and then was asked if I wanted to download the code, which I did. This saved me at least 80 hours and probably more like 160 hours had I coded it myself.”

Taylor contrasts that experience with his former supplier wanting a \$200,000 contract to access the documentation he needed to resolve PLC Support issues. “Another time, I was headed to our Poland factory where our machine builder was having problems getting IRT data from Siemens S7-1500 PLCs to display an X-Y scatterplot on the Siemens HMI TP1200,” he recalls.

“Before takeoff, I rang up my Siemens distributor contact, who pointed me to a Siemens white paper, plus links to the TIA Portal and sample code,” he says. “I forwarded those to our controls engineer in Poland. By the time I arrived many hours later, they had the configuration done except for some communication issues, which we resolved quickly with another call back to our Siemens distributor. We solved our problem with two quick phone calls, one from 4,755 miles away and both at no cost.”

**Direct support worldwide.** In Taylor's view, the key lesson he's learned is Siemens and its distributors have highly trained and specialized experts who are eager and quick to help customers no matter what the problem. "They stand 100 percent behind their products before, during, and after the sale. And they get back to us in minutes or hours, whereas our previous supplier would take days or weeks, if ever."

Moving forward, Taylor is counting on the Siemens partnership to help his company realize its BWI 4.0 vision with all new equipment standardizing on Siemens components and software, while using the TIA Portal as a common engineering framework. He's already planning on implementing that policy in the Mexico plant and expects the standardization to help reduce parts inventory costs.

**Roadmap to the cloud.** Eventually, the BWI 4.0 team expects to interconnect the company's plants and tech centers worldwide to take advantage of digital twin concepts, advanced analytics using artificial intelligence and machine learning, among other technologies.

The team knows a cloud approach is the best, most cost-effective way to achieve these capabilities, so they are seriously evaluating the cloud-based Siemens MindSphere IoT operating system as a platform of choice. "While we haven't ruled out other cloud platforms at this point," Taylor says, "we are giving serious weight in our selection criteria to the extraordinary support we've come to expect from Siemens and its long-established, global network of highly qualified distributors like C&E Sales.

***"Fact is, we don't think their support was a one-time act to win our business; we think it's truly how they do business by putting the customer first. It's clearly part of their culture."***

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