Quality-Control Techniques Find a Role in Shipping

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A few years ago, the shipping department at **Beaulieu of America Inc.**, a leading manufacturer of synthetic fiber, yarns and carpets, made an embarrassing admission to the company brass.

Despite the department's efforts to correct the problem, dozens of trucks loaded with yarn were being returned to shipping because of unacceptable variances in tare weight. That was costing the company hundreds of thousands of dollars, causing endless headaches redoing the orders and irritating customers expecting on-time delivery.

Beaulieu decided to seek outside expertise.

It would become one of the smartest decisions the company ever made.

The company Beaulieu turned to was QaulPro Inc. of Knoxville, Tenn.

"Using our techniques, they developed a model that allowed them to predict the average variance in tare weight at the gate," said Michael H. Canon, QualPro's general manager. "They spent $100,000 in fees to us but realized $500,000 in savings."

Carl Bouckaert, Beaulieu's president, put it more bluntly.

"If your competition is doing experimental design and you're not, then in the best-case scenario you're making less money and surviving. And in the worst-case scenario they'll be the survivor and you're going to be in the graveyard."

Strong words, and quite a recommendation for a branch of consulting — quality control — that many shipping and freight-forwarding people think relates mostly to manufacturing processes. A service business, they say, requires a different expertise.

Mr. Canon begs to differ. Besides Beaulieu, he points to **Southeast Freight Lines**, an LTL client based in Columbia, S.C., as demonstrating the relevance and value of QualPro's problem-solving methods.

"We provide a way to understand cause and effect," Mr. Canon said.

Beaulieu, based in Dalton, Ga., a town dubbed the carpet-manufacturing capital of the world, is a $1 billion privately held company with 4,500 employees and 12 locations. As a vertically integrated manufacturer of yarns and finished carpets, Beaulieu gained a competitive edge in being able to fill custom orders and get them to the customer quickly.

Then a bottleneck was discovered at its Bridgeport, Ala., plant. Some 7% of the trucks leaving the plant had to return because they exceeded the weight variance deemed acceptable to Beaulieu. That had severe consequences.

Besides having to unload, pack and do the paperwork all over again, the shipments were arriving late to the customer. The company's competitive edge was eroding because of a seemingly minor problem.

"The entire system was being confounded by a weight problem," Mr. Canon said.

The problem, however, was not minor at all. Moreover, Beaulieu was making a mistake in thinking it related only to what was going on in the shipping department. The problem concerned aspects of the manufacturing and handling process, too.

"Basically, shipping departments do a fine job," Mr. Canon said. "It's the production problems that often screw up on-time delivery."

The shipping department did everything it could to reduce that 7% figure, but nothing worked. They were stuck. QualPro sent in its consultants to help the company's managers solve the problem.

That began with a look at how nylon yarn is made. It turned out that finished yarn in the warehouse absorbs water, and therefore weight, over time. Beaulieu weighed the yarn after production. When an order came in it took those values and combined them to arrive at a weight for the bill of lading. Then, when the loaded truck got to the plant's exit gate, its tare weight was taken. That's where the discrepancy was discovered. Some shipments were as much as 1,000 pounds over the bill-of-lading weight.

QualPro used its "eight-step procedure for improving a process" to show Beaulieu how to reduce that variation to 300 pounds, plus or minus. Based on experimental design, a methodology developed by British scientists in the 1930s, the eight steps examined all the variables that go into the process of manufacturing and shipping the yarn.

In Beaulieu's case, that included the length of time the yarn spent in storage, the level of relative humidity there, whether insulation was used in yarn "cages," and where it was located in the warehouse. Beaulieu "ended up with a formula to predict how much moisture the nylon would gain" before being shipped, Mr. Canon said. For instance, yarn shipped eight days after production gained 1.5% in weight.