

Beverage Can Makers Crush the Competition

Plantwide Measures Drive Peak Performance in Manufacturing



In an industry that makes over one-hundred billion cans every year, productivity has always been a priority. But with soft drink growth slowing down, packaged beer consumption in a decline, and the demand for alternate containers growing, a beverage can maker must continue to drive costs down in order to stay profitable.

Today, that means monitoring every aspect of a plant's performance and eliminating waste and downtime wherever it occurs. Control-level solutions and legacy systems, the norm in most plants, just can't deliver high-value production data to all levels in a company.

PlantWide Benefits:

Immediate Benefits

- Faster Response to Downtime
- Improved Efficiency
- Reduction in Spoilage
- Standard Measures of Performance

In this application note, we'll look at a typical beverage can manufacturing process and demonstrate how Acumence is used to drive plants to industry leading performance. A typical beverage can manufacturer might have dozens of plants worldwide. In most cases, a variety of custom, control-level systems are used to capture and report on results in the plant. In some cases, the data might be reported to a central database or legacy system within the plant. As a result, operators and supervisors will have a pretty good idea of how many cans are produced during each shift, how much time the equipment is down, and how much scrap is produced, but their information is typically limited. Unfortunately, this solution is a fragile combination of connected systems with limited formal support. The cost to maintain the system grows each year, and the functionality cannot keep up with the latest technological advances and operating systems.

Furthermore, the information provided, while useful, is incomplete. Most downtime occurs as a result of many short duration events. At one plant, the average downtime event was less than a minute in duration – information that was not captured with the legacy system. Finally, there were no links between the legacy system and other business systems such as their ERP and quality systems, creating discontinuities in performance reporting.

Beverage cans are made through a series of value-added forming, cleaning and printing steps, at a rate of over 2,200 cans per minute. Continuous high-speed, quality operation is essential to achieving peak performance.

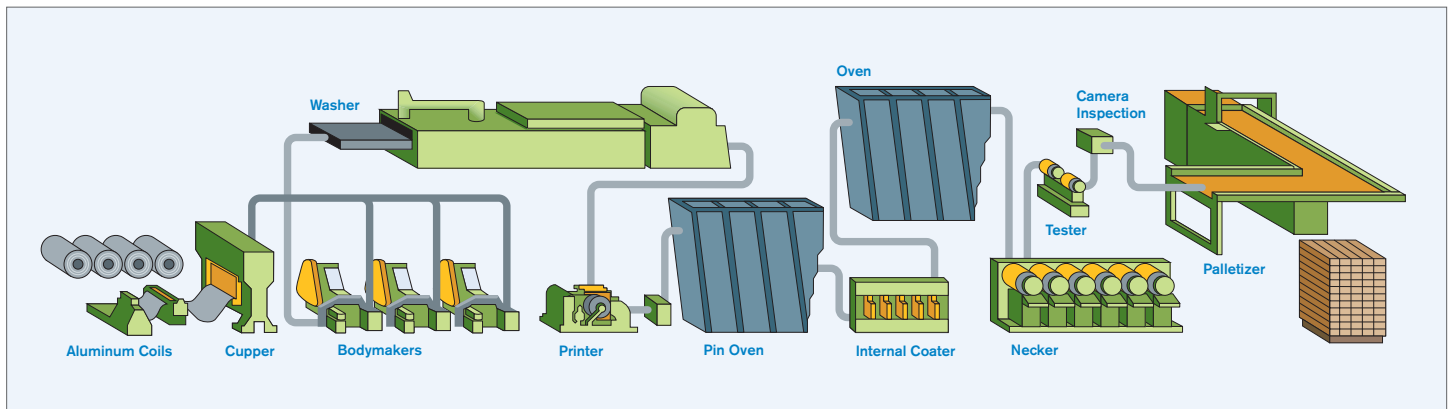


Figure 1:
Acumence drives performance improvement throughout a beverage can plant.

High Expectations

Beverage can makers wanted a system that would collect data from a wide variety of machines and machine types, and deliver it in a useful form to a wide variety of users – from machine operator, to supervisor, to plant manager, to vice president of operations. All users had their own set of visualization and analytics requirements, and each machine performed a unique role in the overall production process with a unique set of data processing and downtime tracking operations. They wanted a robust, high-performance plant measurement solution that could be easily configured for beverage can manufacturing, and could easily tie-in to other systems in the enterprise.

Acumence plant performance monitoring solutions have been implemented at dozens of plants in the industry and are typically rolled-out to the entire enterprise. In some cases, over thirty users per plant rely on the system for production and efficiency tracking, and countless users across the enterprise use it to monitor the plants and identify opportunities for improved performance.

Solution Delivers Immediate Benefits

Most beverage can plants see benefits immediately. Operators, supervisors, plant managers, and executives gain constant, real-time visibility into operations. Never before had they had access to such high-resolution data quantified at such short intervals and immediately available any time of the day or night. Users quickly adapted to the system, finding the information highly useful and actionable.

Standardized measures of performance focused attention on the true bottlenecks in a plant and empowered management to drive improvement and reward success. Operators were able to respond faster to downtime, thereby increasing run efficiencies. Supervisors were able to keep the front-end of the line balanced with the back-end, reducing WIP, waste and delays. The result was immediate improvement in throughput and a reduction of spoilage.

In addition to these immediate benefits, specific improvements throughout the process have been made possible, such as better methodologies for tracking coil quality and footage, improved decorator changeover times, and improved inventory management through integration with quality and ERP systems, to name a few.

Front-End Capabilities:

Copper

- Coil yield analysis
- Billed v.s. actual footage
- Coil gauge reduction

Bodymaker

- Cycles per toolpack reporting
- Short can tracking
- Coil quality monitoring

Washer

- Cleaning parameters
- pH, zone temperatures



Finding the Hidden Source of Downtime on a Decorator

The first step in optimizing a bottleneck is finding the source of wasted capacity. Traumatic events are memorable. Everybody hears about the event and resulting downtime, and these events get most of the attention. However, it is often the short duration but frequent downtime events that accumulate into significant sources of inefficiencies.

An example of this occurred on the decorator at one plant. A decorator is a complex machine that prints high-quality, multicolor graphics at a rate of over 2000 cans per minute. Each time the infeed track would jam, it would be up and running again in 28 seconds. The problem was that it occurred 43 times in a single shift, resulting in over 20 minutes of downtime. If this machine had been sitting idle for 20 minutes or even for a few minutes it would have been the focus of attention. But because the duration was so short each time, the downtime was hidden to management.

With Acumence running in the plant, all sources of downtime are automatically logged no matter how short in duration. A quick look at the Downtime Pareto for the decorator shows that one of the primary sources of downtime was in-feed track jams. Notice the frequency of the event, and the fact that the total duration of over 20 minutes is significant.

A quick review of other plants showed that this issue was a process-wide problem across all of the plants' decorators. The company was able to eliminate this source of downtime by revising its preventive maintenance practices, including an improved in-feed rail alignment procedure. Reducing this source of downtime recovers 20 minutes of production per shift per decorator of production.

Back-End Capabilities:

Decorator

- Faster changeovers
- Trips/mandrel tracking
- Throughput optimization

Pin Oven & IBO

- Natural gas usage reduction
- Temperature monitoring

Spray Gun

- Lacquer usage reduction

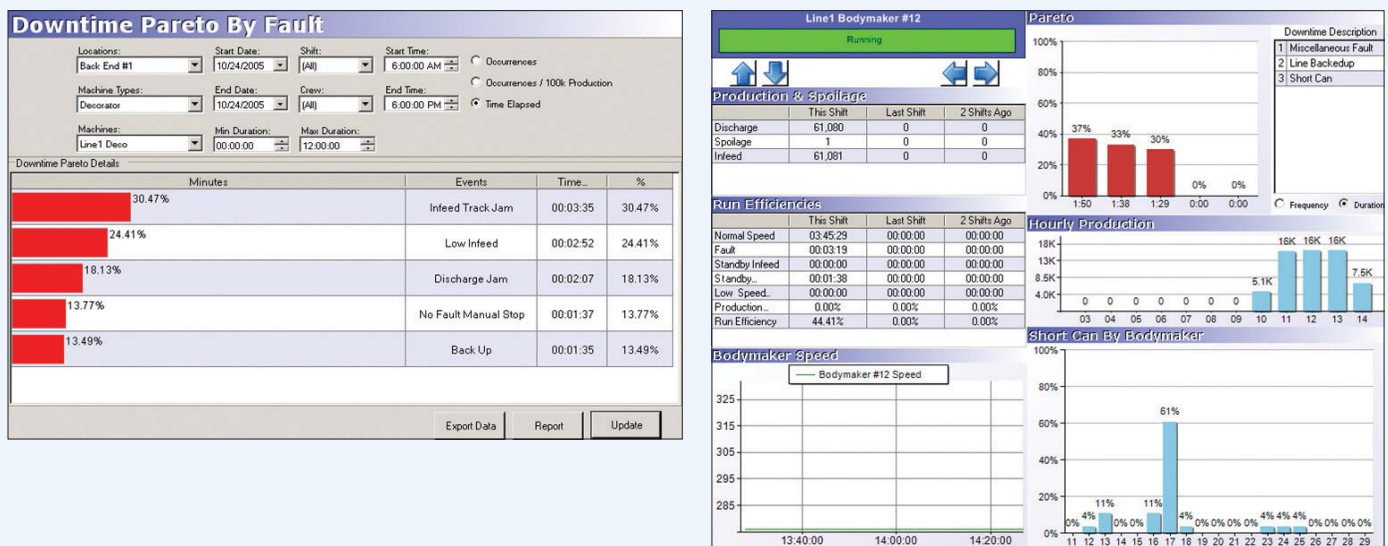
Necker

- Transfer jam/station tracking

Palletizer

- Pallets into warehouse system
- Pattern tracking

Figure 2:
Acumence Dashboards & Reports focus attention on the true bottlenecks in the plant.



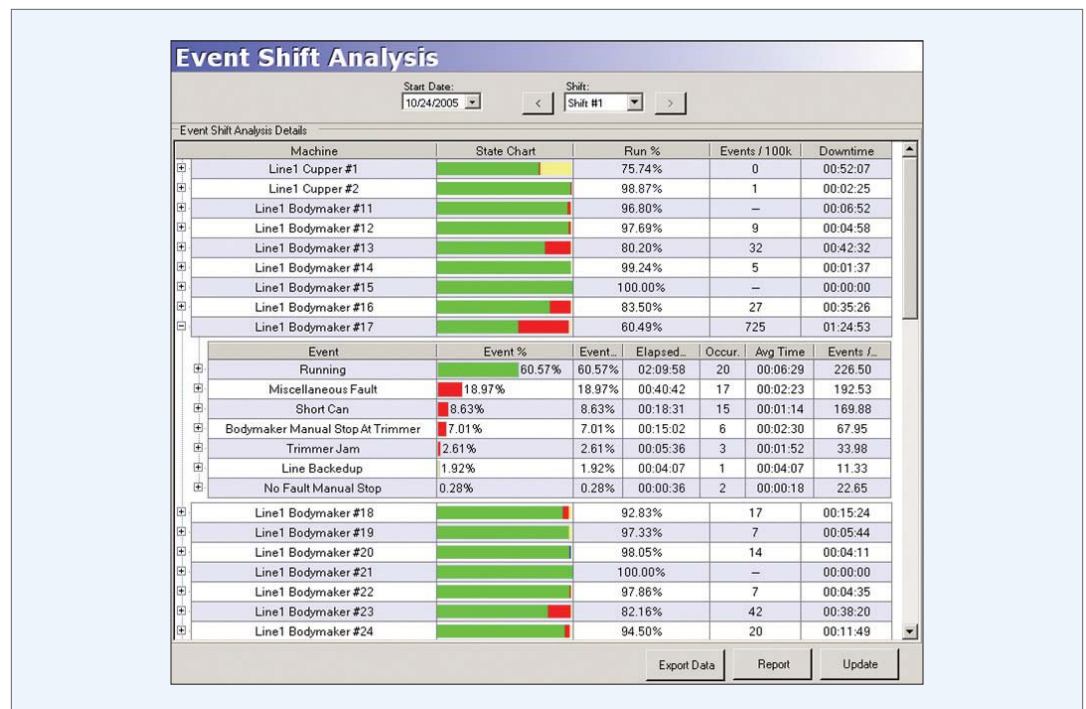
Cutting Bodymaker Scrap Increases Downstream Throughput

The front-end of a beverage can plant is made up of dozens of identical bodymakers. Keeping track of individual bodymaker performance is challenging in the thick of operations. Not only that, but because they look alike, operators and maintenance personnel have a hard time remembering exactly which machine has been causing most of the problems. As a result, a bodymaker is usually not serviced until it becomes a significant operational nuisance.

When a bodymaker starts to degrade, the result is usually a higher-than-average number of short cans a result of wear and tear on the progressive dies, and a significant cause of scrap and lost productivity if left unattended. With Acumence's high-resolution tracking, performance trends can be clearly identified before performance degrades to the point of major negative impact.

In the diagram below, production efficiency is tracked for each and every bodymaker showing exactly those bodymakers with higher-than-average scrap or downtime. Drill down and you can see that bodymaker #17 is showing an increasing frequency of short cans. With this information, the plant can prepare new tooling and service the machine before major operational impact occurs. The result is higher productivity from the bodymakers, reduction in scrap, and better production flow through the rest of the process.

Figure 3:
Acumence reports are used to drill-down and identify sources of downtime.



Lower Cost Structure Drives Profits, Competitive Advantage

Implementation of Acumence's plant performance monitoring solution in the industry has been a tremendous success. Adoption has been extremely high and users from operators to management now have access to immediate and actionable information. The solution often pays for itself in less than six months. In one instance, a plant's efficiency increased by 5% within two months of deployment resulting in an annual increase of over \$4 million in top-line revenue and almost \$800,000 in profit. For a beverage can maker with over 30 plants, that means an annual increase of over \$132 million in revenue and \$23 million in profits.

The bottom-line performance alone generates more than sufficient returns for a project like this, but what can a beverage can maker do with all of this increased productivity? Expand capacity without adding a single new machine and ultimately achieve a cost per ten thousand cans that is unmatched in the industry, resulting in a much more competitive operation that is able to win more business.

