REBUILD YOUR OLD LINE

Tips for making the process efficient while you meet productivity and quality goals.

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>> Rebuilding an equipment line can seem like a daunting task, but we can provide tips to make the process more efficient while meeting productivity and quality goals.

Let's consider a scenario in which engineers must rebuild a bottling and packaging line under tough restrictions. Time is tight. Budgets are tighter. Some equipment is new, and some is dated. And the plant doesn't have much floor space (see **Figure 1**). Technology used on the line includes an Allen-Bradley® ControlLogix® L61 programmable automation controller (PAC), PowerFlex® 40 drives, a Minotaur safety relay and line reactors from Rockwell Automation. The line also includes circuit breakers, photo eyes and other hardware.

How would you approach this project? The manufacturer's goals were to:
- Increase a beverage line's bottles per minute (bpm) from 180 to 240.
- Raise the line's overall equipment effectiveness (OEE) by about 18%.
- Integrate a large, high-capacity, 175-bottle mono block filler with quarter-century-old equipment.
- Accomplish it all in space that, ideally, should be 100% to 200% larger for the line.

Hint: You know you'll have to add accumulation somewhere. Your three choices are:
1. Accumulation before filler.
2. Accumulation between filler and capper.
3. Accumulation between labeler and packer.

No. 2: Accumulation Between Filler and Capper

Using their simulation and analysis capability, Polytron and its business partner E2M found that the correct answer is accumulation between filler and capper. When accumulation was positioned between the filler and overcapper, availability increased to 97.1%, up 3.3% from the baseline.

Negligible improvements were seen when line operations were simulated with the other two options.

A 500-bottle accumulator was placed between the filler and the overcapper and provided the team with a system that could achieve the OEE
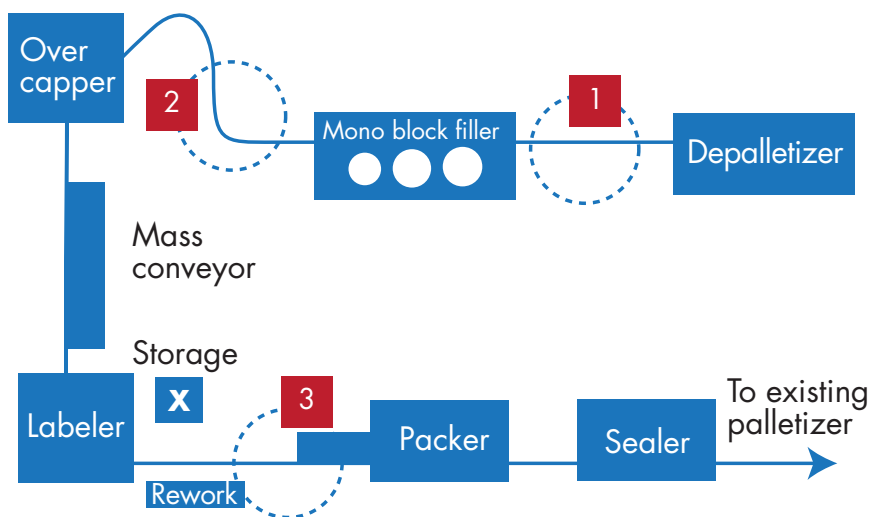
Figure 1. This bottling and packaging line needed to be rebuilt under some tough restrictions.

targets and meet the manufacturer's quality requirements (see **Figure 2**).

In addition, this accumulation helped to simplify line automation programming because the line needed no complicated algorithms to account for each circumstance.

In addition, worker stress was reduced, and management was pleased that they sailed past their OEE targets within four weeks of starting the revamped line.☐

Rockwell Automation Solution Provider Polytron, Inc., a systems integrator based in Duluth, Ga., provides electrical engineering, project management, and training services for manufacturing systems in the food, beverage, pharmaceutical, and consumer products industries.

Options Selected		Machine Availability	Failures Per Shift	No Accumulation Bottles of Accumulation	Pre-Filler Bottles of Accumulation	Post-Filler Bottles of Accumulation	Post-Labeler Bottles of Accumulation
				Actual Production: 162,126	163,176	167,772	163,020
				Theoretical: 172,800	172,800	172,800	172,800
				Availability: 93.8%	94.4%	97.1%	94.3%
(#)	(Name)	(%)	(#)	(# of Bottles)	(# of Bottles)	(# of Bottles)	# of Bottles)
1	Depal	96.00%	4.8				
2	Empty Bottle Conv	99.60%		500	1,000	500	500
3	Rinser/Filler/Capper	98.00%	7.2				
4	Full Bottle Conv/Acc	99.60%		250	250	750	250
5	Overcapper	93.00%	33.6				
6	Full Bottle Conv/Acc	99.60%		400	400	400	400
7	Labeler	92.00%	38.4				
8	Full Bottle Conv/Acc	99.60%		200	200	200	700
9	Case Packer	99.00%	1.4	6	6	6	6
Results		Sim Time: 2.00 min.				"Run" Time: 360.0 x Time	

Figure 2. This chart shows that a 500-bottle table accumulator placed between the filler and the overcapper provided the team with a system that could achieve the OEE.

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