

# Packaging Overfill Costs Case Study



## Minimizing Overfilling Costs

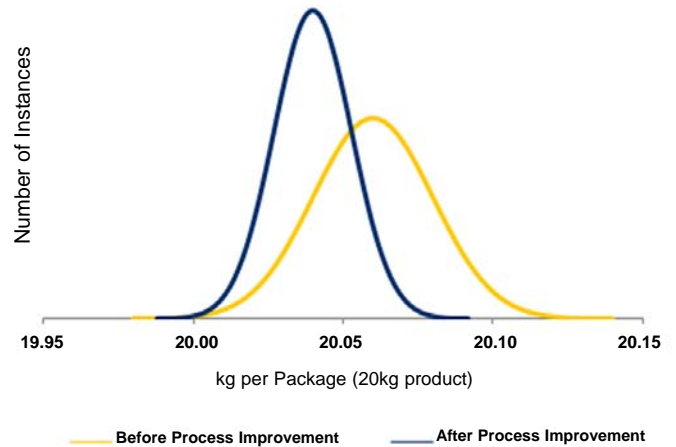
Intentionally overfilling pet food product is one of the most manageable costs in the pet food industry today. Overfilling is a common strategy used to adhere to strict regulatory requirements that require labeling to “accurately reflect the actual contents of the package.” But in an environment of heightened competition, shrinking margins, and escalating input costs, minimizing excess product can translate into material cost savings.

In an automated packaging environment, minimizing overfill requires a three step approach: collecting packaging data, analyzing the data, and using the analysis to recalibrate the process.

The first step in this process is data integration with packaging filler machines. Seamless data collection can be a daunting task when dealing with the varying communication standards on numerous pieces of packaging equipment. Communication standards can range from OPC via ethernet, Serial communication via ethernet serial servers, Parsons PENET using ethernet and direct TCP/IP ethernet communication. The second step, data analysis, is a twofold process: real-time monitoring and historical trending observations. Packaging operators can view statistical variations in real time at the point of packaging and make re-calibration decisions on the fly. Additionally, historical packaging reporting can be viewed at a shift, day, week, or month level. Both real time and historical data analysis have the same goal, utilizing the data to make packaging re-calibration decisions to increase the efficiency of the process.

The desired outcome of this three step approach is to decrease package variability and the targeted overfill ratio. The chart below illustrates this concept. It shows two packaging runs for a 20kg dry dog food bag. Before the three stage approach was implemented, the targeted overfill percent needed to be at .03% because there was no real-time monitoring or control. This resulted in higher variability. Packaging variability decreased when data collection, analysis, and re-calibration were implemented. The target was subsequently lowered to a .01% overfill ratio while still maintaining regulatory compliance and meeting customer expectations of fairness in product packaging.

Unlike many Statistical Process Control software packages which simply monitor variation, this approach allows for rule based control for real-time process adjustments. Automated process re-calibration instructions can be sent to the filler equipment or packaging can be stopped when packaging variation falls outside of user defined rules.



## Justifying the Investment

Now more than ever, process improvements need to be cost justified before the purchasing decision is ever made. Investments should not be made if cost savings cannot be measured up front.

Continuing with the above example (Figure 1), again assume that your average overfill amount is currently 0.3% (or 0.3kg on a 10kg bag). If annual production is 100,000,000 kilograms of pet food, the resulting annual overfill “loss” is 300,000kg. Using input costs of \$0.50 per kg, the total overfill loss is \$150,000 on an annual basis. Making the process improvements and moving to a 0.1% overfill percentage, the overage shrinks to 100,000lb or \$50,000 in overfill, a savings of \$100,000. The table below lists some assumptions to quantify yearly cost savings.

		Yearly Cost Savings			
		25,000,000 kg	50,000,000 kg	100,000,000 kg	150,000,000 kg
Input Costs	\$0.50	\$25,000	\$50,000	\$100,000	\$150,000
	\$0.75	\$37,500	\$75,000	\$150,000	\$225,000
	\$1.00	\$50,000	\$100,000	\$200,000	\$300,000

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While calculating yearly cost saving is a useful metric, the true economic value to a company should be measured in terms of the net present value of the yearly savings. In the example below, five years of cost savings are discounted to present value. This is calculated as follows:

$$\text{Net Present Value} = \text{Sum } (F_n / [(1 + i)^n])$$

Assumptions:

$F$  = Annual Cost Savings

$i$  = Cost of capital /Discount Rate (assumption 10.0%)

$n$  = Time period (Year 1 - Year 5)

Net Present Value of Yearly Cost Savings (5 yrs)

	25,000,000 kg	50,000,000 kg	100,000,000 kg	150,000,000 kg
Input Costs \$0.50	\$94,770	\$189,539	\$379,079	\$568,618
\$0.75	\$142,155	\$284,309	\$568,618	\$852,927
\$1.00	\$189,539	\$379,079	\$758,157	\$1,137,236

## The bottom line

In today's hypercompetitive pet food market, minimizing overfill cost is critical to maintaining a sustainable competitive advantage. Implementing a data collection, data analysis, and process re-calibration approach on your packaging lines can have a significant impact on your company's bottom line.

**For more information...**

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