HARDY
PROCESS SOLUTIONS
Measurement ▪ Automation ▪ Productivity

Reducing the Cost of Poor Quality (COPQ)

Intended Audience
- Process Engineers
- Quality Engineers
- Plant Managers

Manufacturing Area
- Packaging

Applications
- Quality Control
- Process Control
- Product Inspection

Focus
- Using Checkweighing to Reduce Overfills or Underfills in Industrial Manufacturing

"If you can't measure it, you can't improve it."

"If you can't measure it, you can't improve it." is a quote accredited to Peter Drucker, author of 39 books on modern business management. The principle not only applies to decisions made in well-appointed board rooms found in glass skyscrapers but also to the factory floor of nearly every manufacturer. Measurement is the very first step that leads to control and the ability to control often presents opportunities for improvement both in manufacturing efficiencies and product quality.

For most manufacturers, achieving optimal manufacturing efficiencies while maintaining high product quality is the goal; but often a choice is made to err on the side of overfulfilling on their promises, even if it means accepting extra costs.

While overfilling can reduce the Cost of Poor Quality (COPQ) by preventing underweight or under-count product from being delivered to customers, it comes at the cost of manufacturing efficiency. Relying on overfilling is especially common for manufacturers that do not inspect every package but instead rely on random or intermittent inspections and Statistical Process Control (SPC) to reduce the risk of shipping underweight or under-count product.

Monitoring During the Product Inspection Process

Delivering what companies promise customers in terms of quality and quantity in their packages requires close and continuous monitoring during the product inspection process; this monitoring is often done using weight data to determine how they are delivering against their promise.

100% product inspection can help bridge the gap for a manufacturer having to choose between manufacturing efficiency and lowering the cost associated with poor quality. Another consideration is the ability to meet regulatory requirements designed to protect consumers. In certain industries such as pharmaceuticals, checkweighing can help ensure that exactly the correct numbers of pills are in a container to meet FDA regulations.

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Often the investment in detection and prevention of product failures (such as underfill or under-count) is more than offset by the savings from increased manufacturing efficiencies and reduction of costs associated with product failures.

Measuring the improvement of manufacturing efficiencies is straight forward; the reduction or elimination of overfilling as a standard process to deliver what is promised to a customer directly results in the use of less raw material to guarantee delivery against that promise.

In one particular case, a manufacturer of crisps packaged products by count but sold by weight. Their promise to the customer was a container filled with 20 grams of product. However, their packaging equipment was designed to fill by count. Because there was a slight variation in the weight of each crisp, the container was filled with 22 crisps in order to mitigate the risk of an underweight container. In fact, the average weight of each crisp exceeded 1 gram. Some containers could make weight with just 19 crisps, most would make weight with 20 crisps, and a few required 21 or even 22 crisps to deliver against the manufacturer's promise of 20 grams.

The manufacturer decided upon a 100% inspection process using weight versus their existing overfill process that was derived from a SPC analysis done on individual crisp weight; the results were immediate and the cost savings significant. By installing check weighing equipment and rejecting the occasional underweight container for re-work, the company was able to fill most containers with just 20 chips; representing an immediate 10% increase in manufacturing efficiency flowing directly to the bottom line of profitability.

Measuring COPQ is not as straight forward as measuring manufacturing efficiency, as there are many intangible and unquantifiable effects of a manufacture breaking its promise to its customers by delivering underweight or under-count product.

Direct costs of poor quality can be divided into 2 categories – internal and external. Internal costs can include scrap and rework, diagnosing and troubleshooting root cause, and increases to inventory levels to compensate for poor process yields. External costs include sales returns and allowances, regulatory compliance penalties, and management of complaint handling. Direct costs are often referred to the tip of the iceberg when discussing true COPQ. Indirect costs of poor quality which are less tangible and more difficult to quantify can easily exceed direct costs of poor quality to a manufacturer – these include loss of productivity from time spent managing direct cost issues, customer dissatisfaction and ultimately damage to brand reputation.

How just 1 bracket over will

cost you $45k

Control what you measure.
Reduce give-away.

100% inspection allows closed loop control to optimize your process.

Line's product speed	50 boxes/min
Cost per bracket	$0.09
Average overfill rate	2% of boxes
Cost per minute	$0.09/min.
Cost per hour	$5.40/hour
Cost per day	$130/day
Cost per year	**$45,360**

A box of odd-form 50 pieces of metal brackets is packaged with 49 or 51 brackets. This is the annual cost of an overfill of just one piece of a low-cost commodity product. Imagine the overfill cost for higher value items, such as pharmaceuticals, machined parts, or higher cost food items. This cost is for overfills only – COPQ can cost significantly more resources when customers have been shorted a piece.

It's worth noting that COPQ increases the further from the manufacturing facility that the poor quality is discovered. Underfilled or under-count product discovered on the factory floor can usually be remedied with minimal costs; however, underfilled or under-count product discovered by a customer can cause irreputable harm to the manufacture's business. In other words, it's better to catch and correct poor quality as early in the supply chain as possible.

Use of check weighing not only assures that manufacturer's packaged products are delivered against their promise of weight or count, but it can also be used to check that the contents of a package are correct. In another case, a medical device manufacturer used weight data as a final to check ensure the package not only contained the device, but a small accessory pack and instruction pamphlet as well. The potential delivery of a medical device without its necessary attachments would have rendered the product useless and have resulted in massive poor-quality costs – both direct and indirect.

100% product inspection by check weighing is a powerful tool that manufactures can deploy to both increase operational efficiencies and reduce COPQ. Not only can inspection of product using weight data, before it leaves the manufacturing facility, reduce the costs of managing poor quality and increase overall customer satisfaction; the data can help pin-point areas of opportunity inside the manufacturing facility by identifying product manufacturing variations over time; allowing manufacturers to take action to improve process control and increase manufacturing efficiency.

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How Hardy Dynamic Checkweighing Can Help Reduce Your COPQ

Based on precision instrumentation and sensors, Hardy checkweighing systems and scales are designed to provide accurate, stable and fast Checkweighing with seamless integration into your industrial weighing system. Hardy's Series of checkweighing machinery is built using off-the shelf components, with PLC controls providing a standardized open source architecture that is flexible enough to meet both current and future control needs. Click Here to Learn More

To schedule a virtual demo, Click Here. To talk to an Application Specialist about your application Click Here. Contact us via email at hardyinfo@hardysolutions.com, call us at (858) 278-2900 or visit our website at www.hardysolutions.com.