AdeptGroup

ENGINEERING EXCELLENCE

PACKAGING OPTIMIZATION:
Approaches and Considerations for Maximizing Value

Introduction

While there have been many advances in packaging materials, design preferences and sustainability opportunities over the years, identifying and implementing opportunities to reduce costs is an evergreen priority for any packaging team.

From material and design choices for primary, secondary and tertiary packaging to process improvements that drive efficiency and optimizations in the supply chain, there are many approaches brands can take to optimize costs while meeting the unique needs of their product and its distribution environment.

This white paper will cover a diverse range of both customer-facing and behind-the-scenes cost optimization opportunities for packaging teams, along with considerations for evaluating the options to decide which approach(es) will work best for a company's unique packaging needs.

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Outlining Criteria

Understanding Packaging Requirements

When launching a new product or redesigning packaging for an existing product, there are many factors to consider when balancing costs with the package's primary job – providing sufficient protection.

Before making any major decisions that affect packaging, a helpful first step is to create a matrix outlining the product's protection criteria. This matrix should include all vital protection considerations, including product, processing, distribution, retailer and user requirements.

A list of product requirements can include a broad range of factors that influence packaging decisions. From an aesthetic perspective, this includes marketing and branding requirements such as colors, logos and other design considerations, as well as more structural considerations like a need for a window panel. Labeling requirements should also be thoroughly defined at the outset of a packaging project.

From a structural perspective, it is important to define any special protection requirements for products that are sensitive to environmental factors such as humidity, sunlight, temperature variations and oxygen. Knowing the product's weight will also help determine requirements for the thickness and strength of corrugate and other materials. For liquids, the product's viscosity may call for a wide or narrow mouth opening. Closure requirements such as reseal capability, easy-open features, child resistance and venting are also important product requirements that will inform structural decisions.

Products in the strictly regulated life sciences and food & beverage industries may come with additional requirements such as sterilization and the need to source packaging from a facility qualified for pharmaceutical and food-grade products. Other highly regulated products, such as those that contain hazardous materials, also come with a long list of packaging requirements that are important to understand at the outset of any packaging project.

Process requirements include factors that influence the automated or manual processes of packaging the product, including primary, secondary and tertiary packaging. Knowing which parts of the packaging process can be automated and which, if any, require manual labor are important factors for optimizing costs. Determining how many units of product should be included in each master shipper and calculating the gross weight will provide important information about shipping costs and limits for the weight of the primary and secondary packaging.

A list of distribution requirements should account for packaging qualities needed to protect the product throughout the entire distribution environment from the manufacturing facility to the end user. An important part of that process is the distribution channel, i.e. brick and mortar retail vs. e-commerce. E-commerce packaging generally needs to be more robust to endure the additional touchpoints and unpredictable hazards that come with the single-parcel distribution environment, but there may be opportunities for savings on aesthetic factors because shelf appeal is not a major concern.

Understanding Packaging Requirements Cont.

Many of the other distribution requirements can be determined by mapping the entire distribution environment and considering the conditions the package and product may experience. Variables such as the range of temperatures and variations in air pressure a package may experience provide important information about how the package will need to perform to protect the product. During stages of distribution where products and packaging are part of a unitized load, stacking strength and packaging headspace needs are important considerations, and understanding stacking height and package weight provides important information to determine those requirements.

For products intended for brick and mortar retail, additional needs can be determined by reviewing retailer requirements. Factors such as packaging length, width and depth can be impacted by retailer requirements, and products that will be sold in club stores are subject to additional requirements determined by the individual retailer.

A thorough understanding of packaging requirements provides an important framework for making packaging decisions that reduce costs without sacrificing quality and product protection.

Valuable Tool

The Value of a Packaging Audit

A packaging audit can be a valuable tool for both well-established companies and startups.

The saying “you don’t know what you don’t know” holds true in packaging, not just for materials, design and processes, but also for the supply chain.

While a single packaging audit can yield valuable insights, conducting regular audits helps to ensure packaging keeps up with trends in consumer preference and advances in technology that drive cost savings and provide a competitive edge in the marketplace. A thorough packaging audit evaluates not only the brand’s packaging and processes but also its competitors and other similar items in the market. Looking at a brand’s products alongside gathered samples of competitive products indicates the condition of the packaging after shipping and how well they display in a retail environment. It may reveal a variety of unknown factors, such as retailers not showcasing the product as it was intended to be displayed or that features like a package’s window panels are not useful due to shelf placement and lighting (or lack thereof).

Packaging teams are often able to put a plan in place quickly to address problems they know about, but the issues they don’t know about can be just as detrimental. To help discover these types of issues, it can be good to have a third party conduct a packaging audit. In-house teams can develop blinders to certain aspects of packaging, as they are too close to the process or may be vested in certain equipment or vendors. An outside perspective can help to break through those blind spots and identify a more cost-effective or efficient solution.

Having a fresh set of eyes look through each phase of a packaging process can have a significant impact on the bottom line. Some areas that may seem to be working well can benefit from removing inefficiencies that are difficult to identify, such as unnecessary movements in the packaging process or adjustments to design that help packaging reach store shelves with less damage and a better appearance.

An output of a packaging audit is a list of action items that can enhance sustainability scores, reduce product damage, increase production throughput or optimize packaging costs. With this list in hand, a packaging team can prioritize tasks by impact potential, complexity or time required to make the change and move quickly to identify the adjustments to make first. This detailed list of priority tasks and their potential for optimizing packaging costs can be a useful tool for securing buy in from decision makers in other parts of the organization.

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Reduce Costs

Balancing Product Protection with Cost

With clear guidelines – informed by the matrix of packaging requirements – in place, packaging engineers can move forward with identifying opportunities to reduce costs without sacrificing quality.

Nearly every packaging decision comes with tradeoffs, and optimizing packaging requires a careful balance to minimize costs without falling short of the requirements that ensure the product is adequately protected and processes enable repeatable, high-quality results.

Some of the easiest cost reduction strategies to identify come from examination of packaging configuration. Maximizing the product-to-package ratio and minimizing headspace, sometimes referred to as rightsizing, helps maximize the count per master shipper and unitized load. This, in turn, optimizes the space required for warehousing and distribution, reducing per-unit costs for both.

If using corrugated cases, consider the type of structural design, (RSC, FOL, CSSC, auto-bottom, wrap-around case, display case, retail-ready packaging, etc.). If cutouts or perforated areas are not warranted, using something like a simple RSC can be very cost effective as no special tooling is required to produce the structure (only print plates, if print is required) and they can be produced at very high rates of speed. Using natural kraft vs. white top can minimize costs as well.

Leighweighting, like rightsizing, can be a clear path to reducing unnecessary packaging. For instance, replacing a more traditional board grade for corrugated boxes or sidewall thickness for plastic drums with the lightest or thinnest packaging material that will still ensure adequate product protection throughout distribution can be a great path to reduced costs. This can lead to less expensive packaging components and save on warehousing and transportation.

There are certain design requirements to consider when choosing lighter or thinner packaging components. For instance, on steel drums, one may opt to select a design that incorporates rolling hoops, which reinforce the strength of the container and increase rigidity. Another example is using a gasket material that still provides the level of protection and chemical compatibility required, but may be less expensive than a different material, such as Viton vs. Teflon.

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Reduce Costs

Balancing Product Protection with Cost Cont.

When it comes to corrugated boxes, a heavy product that requires extra stacking strength may benefit from using a mandrel-formed case that has additional vertical edges (mitered corners) rather than increasing the board combination to meet the needs of the product and distribution environment. Mandrel-formed cases have fewer damaged fibers, providing additional strength with the added benefit of having blanks that are flatter and can ship and warehouse more efficiently and cost effectively compared to the more traditional knock down cases (KD), which have a glue joint already intact. Mitered corners provide additional stacking strength when compared to a more traditional box with the same board grade.

Optimizing dunnage use is not quite the same as lightweighting a package, but it provides similar benefits. A traditional method for minimizing dunnage costs is to minimize headspace and develop a package that better fits the product, reducing or perhaps eliminating the need for dunnage. For some packages, replacing air pillows with much slimmer corrugated pads can provide similar benefits. These approaches can greatly reduce the package's size, minimizing the warehousing and transportation costs while providing better protection.

Different Needs

Packaging for Retail vs. E-Commerce

It is common for many brands and their retailers to sell products through both the brick and mortar (retail) and e-commerce distribution channels.

When it comes to packaging, there is a tremendous difference between the needs of those two distribution channels, and understanding their differences can reveal several opportunities to optimize costs.

The e-commerce distribution channel includes many additional touch points compared to retail. Potential hazards in the e-commerce channel can be challenging to anticipate due to variables in those additional touch points, as packages are loaded and unloaded at various locations and travel on lengthy conveyor systems with multiple drops, chutes, slides and belt conveyors. Packages may move up and down inclines and around sharp corners and be handled by humans and automated systems. Products may be unpacked from master packs, loaded into inventory, removed from inventory, sent through sorters and dropped into bulk bins with other products falling on top of or sliding into them. Also, since e-commerce products ship as single saleable units, they may be combined with other types of products within the final master shipper as part of a larger order for the end customer.

With significantly fewer touchpoints, packaging for brick and mortar retail settings has its own separate needs. Unlike e-commerce packaging, shelf appeal is a priority for retail packaging, presenting its own set of needs. On the protection front, most retail products ship as part of a unitized load, meaning secondary and tertiary packaging can play a major supporting role in protecting the product throughout most of its distribution environment. Still, the primary packaging must have adequate stacking strength to withstand the weight of product that may be stacked on top of it. This is especially true for products intended for club store environments, where they are likely to remain stacked on a pallet while displayed in the store.

A common source of unnecessary costs is the use of common packaging across retail and e-commerce channels. Due to the major differences in shipping and handling of products distributed through retail channels and e-commerce, it often makes more sense to create a different packaging SKU for each channel. When a common SKU is used for both channels, it often incurs damage or creates additional costs for the added effort and material used to ensure the product can withstand the e-commerce distribution model.

An additional avenue to pursue cost savings for e-commerce products is the use of primary packaging that allows the product to ship without a need for secondary packaging. There are a variety of options for what is commonly referred to as “ships in own container” (SIOC) packaging, which can save on costs by eliminating unneeded materials, reducing packaging weight and trimming steps from the packaging process. In many cases, the most important characteristics of SIOC packages are strength and appropriate fit for the product inside, but there are some unconventional options as well. One example is Westrock’s Meta e boxes, which include a layer of cohesive paper adhered to the inside of a box to act like a hammock and remove the need for dunnage to fill empty space within the package.

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Cost Savings

Streamlining Packaging SKUs and Modular Approaches to Material Efficiency

Many brands are already familiar with rationalization of stock-keeping units (SKUs) as a business tool.

But they may not know they can use a similar process to find cost savings in their packaging operation.

The familiar SKU rationalization process generally involves a merchant evaluating a product's profitability to determine if they should keep it on shelves. Generating cost savings through packaging SKU rationalization is a bit different. It's a process of reducing the number of packaging SKUs by evaluating the dimensions and other characteristics of a finished package.

Packaging SKU rationalization can drive cost savings opportunities in a few different ways. It may allow a brand to consolidate its packaging material suppliers and purchase fewer structures and sizes. It may also provide an opportunity to reduce the amount of packaging material inventory the brand needs to keep on hand, improving utilization of its warehouse space. Additionally, it enables a brand to optimize asset utilization across manufacturing and packaging facilities.

The process of SKU rationalization for packaging can be helpful at any time, but it is most helpful in a situation where several packaging SKUs share similar dimensions or other specifications. This may happen when a company acquires new product lines, especially if they are similar to other products in the brand's portfolio, as well as when one company acquires another with similar products.

A less common situation in which this process may be useful is when a packaging group inherits responsibilities for packaging products that were not previously in their purview. Regardless of the reason, companies with products that require similar packaging are a good fit for this type of project. Reducing the number of packaging SKUs provides a variety of opportunities to optimize the brand's packaging spend and drive cost savings.

Regardless of the situation that prompts a brand to evaluate its packaging SKUs, many of the same opportunities to improve efficiency and drive cost savings present themselves. Brands with multiple products of similar size and protection requirements can leverage design to create common packaging components that work across multiple products.

Streamlining Packaging SKUs and Modular Approaches to Material Efficiency Cont.

The best way to identify and implement these opportunities for packaging efficiency through shared components is to think from the outside in. The outer components of a package are the most promising candidates for standardization, as they generally have the least direct contact with the product inside. Inner components such as trays may have the potential for standardization but are often not the best candidates. Because they usually have more direct contact with the product, they generally need to be structured to securely fit the product and its unique shape.

Another helpful way to think through the best solutions is to design for the largest and smallest products across the range. Designing components whose size and shape accommodate the largest product while minimizing wasted space around the smallest ensures the packaging is versatile enough for its intended purpose. Inner components such as trays or folded corrugate can be customized to accommodate the individual variations in size and shape between each product while working cohesively with the shared packaging components.

Utilizing shared packaging components across a range of products helps brands manage costs in a few ways. It helps to reduce the amount of space needed to store material inventory. It also helps brands purchase a smaller number of packaging materials in higher quantities, increasing spending power and providing leverage for negotiating prices with suppliers. This method also minimizes the amount of changeover time required when switching from one packaging SKU to another, reducing downtime and optimizing labor costs.

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Material Options

The Benefits of a Material-Agnostic Approach

With all the material options available to brands, it's important to consider all options when looking for a packaging solution that optimizes costs.

Many suppliers offer only certain materials and packaging formats, designing packaging around the limitations of their own equipment and the material(s) they produce.

An agnostic approach to materials means designing a packaging solution that is centered on the product and its distribution environment, rather than limitations of specific materials. Exploring options outside of specific suppliers' offerings opens opportunities to work with different materials and allows packaging teams to create a solution that works for the brand and its product, rather than selecting the closest fit from a limited list of material and packaging format options.

Because a material-agnostic approach to packaging development is not tied to the interests of a specific supplier, it opens more avenues to prioritize brand and product needs while pursuing the best total landed cost.

Pallet Pattern Efficiency and Pallets vs. Slipsheets

Optimizing product distribution is an easily overlooked, but often powerful source of savings.

Transportation of finished goods is a significant contributor to the cost of goods sold and careful examination of pallet arrangements can reveal easy opportunities for major reductions in transportation costs.

Pallet pattern efficiency is closely tied to the concept of rightsizing. In many cases, a package designed to fit the product without wasted space will also help maximize the amount of product that fits on a pallet, but ensuring pallet efficiency means going a step further. Optimizing pallet configurations calls for exploration of alternative packaging materials and packaging designs that also maximize the amount of product that will fit on a pallet. Successful pallet pattern optimization allows brands to save on transportation and fuel costs by reducing the number of trucks required to transport the same amount of product, all without directly impacting consumers.

There are several key concepts to keep in mind for optimizing pallet configuration. It's important to identify the appropriate amount of product overhang (product extending beyond the edges of the pallet) or underhang (pallet extending beyond the edges of the stacked product) to minimize damage and provide stable loads throughout distribution. For many products, it is ideal to leave little to no underhang to fully take advantage of the available space on the pallet. In addition to consideration for the width and depth of the palletized load, it's also important to maximize the pallet height while still staying within limits of storage space within warehouses, trucks and shipping containers. Double stacking unitized loads in trailers/shipping containers is another good way to save on costs in situations where factors such as product weight enable it.

A separate way to save on the costs of shipping unitized loads is to switch from pallets to slip sheets. Pallets are generally made of wood, a commodity with a volatile price that has increased considerably in the last 10 years. The cost of a wood pallet can be 2-5 times more expensive than it was just a decade ago.

Slip sheets are typically made of lightweight fiberboard, averaging no more than a few dollars per unit load. Their use also eliminates the cost of tracking, recovery, repair and/or disposal for wood pallets. The tare weight of a slip sheet is typically 2-3 pounds, a small fraction of the weight of a wood pallet, which is typically in the 30-50 pound range. A slip sheet's footprint can be identical to that of a pallet, but the space it occupies under a unit load is insignificant compared to the 10 percent or more taken up by a typical pallet. This allows for additional stacking height and increases the opportunities to double stack loads. Put in practical terms, the amount of product that would typically require 100 trailers may only require 90 trailers to ship when using slip sheets, which saves time and fuel costs.

Enhance Sustainability

Approaches that Reduce Costs While Improving Sustainability

While the focus of this white paper has been on optimizing packaging for cost savings, many of the approaches covered in previous sections double as opportunities to enhance sustainability, making them extremely valuable to packaging teams in a time when consumers often favor brands they perceive to prioritize sustainable practices.

Rightsizing reduces material use, impacting both the environmental impact of material extraction and the amount of packaging waste sent to the recycling and waste streams. Reducing material use generally results in smaller packages, which means more product in each shipment and less weight in each palletized load, both of which have a positive impact on fuel consumption and the greenhouse gas emissions associated with shipping. The same can be said for pallet pattern optimization, which prioritizes getting more product into each unitized load used for shipping.

Optimizing packaging to balance cost with adequate product protection should minimize product damage and the need for reverse logistics and waste associated with damaged products. Optimizing packaging to minimize dunnage use lessens the environmental impact of material extraction and the amount of material sent to waste and recycling streams.

Taking a material-agnostic approach to packaging development provides brands with opportunities to prioritize sustainability factors such as recyclability and may open additional opportunities to use post-consumer recycled (PCR) materials.

For brands that are able, switching from pallets to slip sheets creates opportunities to recycle used materials and minimize waste sent to landfills. It also has a positive impact on previously mentioned factors such as the amount of product that fits in each shipment and the per-unit weight of each shipment, both of which reduce fuel consumption and greenhouse gas emissions during shipping.

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Contact Us

Lean on the Experts

Opportunities to optimize packaging for cost savings can be found in every stage of the packaging process and can be unique to each product.

Thoroughly identifying these cost-saving opportunities to ensure an optimal packaging spend requires experience and skill at recognizing inefficiencies in each stage of the packaging process. In-house packaging teams consumed by the many day-to-day priorities associated with keeping packaging lines running smoothly and ensuring quality may not have the time needed to evaluate their operation and recognize changes that can drive cost savings.

This is an area where Adept Group's skilled team can be a valuable asset. We have experts in more than 60 specialized packaging disciplines, including packaging optimization for cost savings, and we have valuable experience helping brands like yours reduce packaging costs. If you'd like to discuss the ways we can help you reduce your packaging spend without sacrificing product protection and your consumers' experience with your brand, **get in touch**.