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## Size Matters!

Part 1: Learning to Deal with the New Dim Weight Changes  
By [Bill Armstrong](#)

*Editor's Note: PARCEL has received many inquiries from readers desiring to know more about the new dimensional weight (Dim Weight) that has recently gone into effect. We sought out two industry experts, Bill Armstrong and Gordon Cooper, to clarify the impact this will have on shippers — and what shippers can do to minimize their costs.*

The recent announcements from UPS, FedEx, DHL and the USPS regarding dimensional weight-based charges seem to be in response to three basic issues — rapidly increasing fuel costs, lower density packages and more expensive routes — all of which combine to create substantial pressure on these carriers' bottom lines.

Dimensional weight charges ensure the shipper pays his or her fair share of the vehicle capacity his or her packages occupy during shipment by requiring a premium for lightweight, high-volume packages. Until recently, these low-density packages have been billed at the same levels as smaller packages of the same weight, while occupying significantly more space. It should be noted that dimensional weight requirements vary slightly for each carrier and for different classifications within each carrier's costing structures. More specific details and information are available on the individual carrier websites.

When considering the factors driving the parcel business over the last few years, perhaps the largest single influence might be the rising cost of fuel. Each trip has become considerably more expensive for carriers.

### **B2B vs. B2C**

Now consider that many shipping companies have significantly increased shipments from distribution centers directly to consumers' residences. That is one pack per delivery — a much more expensive proposition than business-to-business shipments, which typically have several packs delivered to the same receiver at the same time. Delivering single packages to unique addresses is an expensive proposition in time, fuel and labor.

One of the by-products of the trend of shipping individual products directly to consumer residences is that each order is most often placed in a corrugated container to facilitate safe shipment. These containers are typically larger than necessary to ship the specific order because making a custom shipping container for each order would be extremely inefficient and costly. Shippers, therefore, usually work with a small number of standard container sizes and fill any extra interior space with void-fill material. These low-density packages create low-density loads in the carriers' vehicles. Each type of vehicle (typically, a trailer for truck shipments) is restricted in both the volume of freight it can contain and the maximum weight it can safely and legally carry. Traditionally, the cost of shipping a package has been based primarily on the total weight of the packaged item. The carrier receives the greatest revenue possible for shipments that reach maximum weight limits.

On the other hand, if the volume of the trailer is filled before maximum weight is achieved, the carrier receives less revenue for that shipment, but the costs of transport remain the same. In these cases, the carriers' revenues and profits are lessened.

The logical thing for carriers to do is charge customers for the space a low-density package occupies — leading us to dimensional weight-based charges. For several types of UPS, FedEx and DHL shipments, if the package exceeds more than three cubic feet in volume (more than one cubic foot for USPS), the customer will have to pay shipping based on the dimensional weight of the package instead of the actual weight of the package.

Using the new dimensional weight standards adopted this year, if a package measures 2.9 cubic feet and weighs 15 pounds, the customer will pay based on weight. By increasing any dimension of the box by as little as an inch or two, the package can increase to more than three cubic feet. Once the package volume exceeds the three cubic feet threshold, the customer must pay the dimensional weight.

According to the UPS website, the dimensional weight is calculated by dividing the volume (in cubic inches) of the package by 194 (166 for standard service to Canada). A package measuring 3.2 cubic feet (5,530 cubic inches) would yield a dimensional weight of 28.8 pounds. Rounded up, the dimensional weight of this package is 29 pounds

— almost twice the cost of the 15 pound package measuring less than three cubic feet.

### **New Packaging Solutions**

These new standards should lead companies to consider new packaging solutions that take up less space in carriers' vehicles. There are numerous packaging materials that can protect shipments while occupying minimal space inside the package.

Air cellular products provide better protection using less packaging material compared to loose fill or paper. Inflatable packaging systems allow users to create air-filled cushions — reducing shipping costs due to lightweight and potentially smaller packages.

Foam-in-place systems also provide unique, high-efficiency foams with superior cushioning properties to protect products during shipment using less material. Interior packaging designs can be created for a variety of void fill, cushioning and blocking and bracing applications.

Suspension and retention packaging is another highly efficient, protective packaging alternative. Designs are based on strong, highly resilient, low-slip film that surrounds products, protecting them from shock and vibration. Suspension packaging suspends products in the airspace of the package between two layers of film, while retention packaging uses elastomeric film to safely entrap the product and hold it securely within a retention frame.

With the new dimensional weight-based pricing, companies will need to consider alternate packaging solutions focusing on greater cube efficiencies that will vary depending on the needs of individual companies and their carriers — or they will pay the price in increased shipping costs.

When Karen Clarke, vice president of WJM Marketing, shipped trade show graphics from the company's Cortland, Ohio office to a client in Indiana, she thought she had all the bases covered. She submitted the requested payment based upon the shipment's weight, just as she had always done. One month later, Clarke received an adjusted invoice from the carrier for an additional \$50 payment on an expense WJM had already invoiced its client. When questioned, the carrier confirmed that the scale weight was accurate but determined that the invoicing should be based on cubic measurements — width, length and height of the package when it was shipped. Reluctantly, Clarke decided that WJM would absorb the extra cost rather than pass the additional billing along to its client and possibly jeopardize a good business relationship.

Clarke was just welcomed into the brave, new and sometimes puzzling world of dimensional weight — or, as it is commonly referred to in the shipping industry, Dim Weight.

For shippers, 2007 is painfully becoming the year of Dim Weight awareness. Carriers have long been frustrated about large lightweight items that occupy a lot of cargo space but return a small amount of revenue. After also factoring in the resulting less space for the more lucrative dense packages, it was not surprising that all the carriers embraced dimensional weight technology as soon as it became economically feasible.

### **New Year, New Standards**

UPS initiated Dim Weight in January for all shipments, and other major carriers are following suit. One of the most notable players is the U.S. Postal Service, which will implement dimensional weighing for its Priority Mail this spring, as the PRC and BOG recently approved the change.

"Today, prices for large, lightweight items do not adequately reflect our transportation costs, and heavier weight items are overpriced," explains Dave Partenheimer, a spokesperson for USPS. Partenheimer estimated the additional costs to the Postal Service Priority Mail delivery at "\$125 million per year, or about \$6.60 per piece" due to weight-based charges for lighter, large-sized packages as opposed to Dim Weight, which "corrects this situation," Partenheimer says.

### **The Mathematics of Dim Weight**

Dim Weight begins with the calculation of the shipment's volume (cubic size). The length, height and width of each package must be measured, with most carriers rounding up each measurement to the nearest whole inch. Multiply length by height by width to determine the shipment volume in inches cubed.

To determine the dimensional weight, it is important that the shipper obtain the dimensioning factor (Dim Factor) that is going to be used by a particular carrier. Carriers that require dimensional weight charges will make a decision based on a parcel's minimum weight that they will allow for the volume that it occupies. This number, usually

published on carrier websites, is known as the Dim Factor. For example, the shipper would take a Dim Factor of 194 (a popular Dim Factor with large carriers) and use it to divide the volume calculation. Therefore, the Dim Weight equation is  $L \times H \times W / 94$

The shipper now has two weights, the actual scale weight and the calculated Dim Weight. The carriers will base their charges on the higher figure, and, for the lighter and bulkier items, it is usually Dim Weight.

It looks simple enough, but it isn't. The variable is accuracy of measurement, particularly of a lighter and larger-sized package. When faced with different Dim Factors and application rules from the various carriers, selecting a cost-effective carrier and determining the actual charges can be a formidable task for most shippers. Those shippers who ignore the new reality of Dim Weight face an ever-increasing stream of supplemental charges from their carriers, usually sent to the shipper long after the package's arrival. Then comes the dilemma of passing on that additional charge to the customer or absorbing it, as Karen Clarke did.

"It's not something we can afford to keep doing," she comments, a sentiment shared by an increasing number of concerned executives. Her apprehension is understandable when you analyze the impact of Dim Weight to scale weight. For example, consider a 36" x 18" x 18" box that was charged at a scale weight of 30 pounds. Under the above Dim Weight formula, the same package will be charged as 61 pounds. Now factor the destination and an additional fuel surcharge. The shipper could face a price hike of nearly 75%.

That's why accuracy is paramount in calculating Dim Weight. Shippers are looking to technology to eliminate human error, avoid customer relations issues and maintain, if not improve, profit margin. It's safe to assume that Dim Weight considerations are the death knell for educated guesses and the old reliable tape measure. Costs and penalties are too prohibitive to rely on "guesstimates."

### **Technological Alternatives**

Technology has rapidly responded with several scanning and Dim Weight systems on the market, ranging from simple stationary devices to ceiling-mounted laser scanning devices. The systems that rely on lasers tend to be significantly more expensive, with some overhead automated cubic scanners costing \$100,000 or more. Predictably, most of the laser-based systems require higher costs for setups and ongoing maintenance due to sophisticated moving laser parts. On the plus side, they are quite accurate and have a higher throughput of thousands of boxes an hour, ideal for high-volume carrier systems. Laser Dim Weight systems have also been used to measure large packages (up to nine feet) or palletized shipments.

### **A Fact of Life**

As we have seen, Dim Weight is not going away, and neither will those resulting incremental charges and financial penalties due to inaccurate shipping techniques. The new burden of dimensioning accuracy has been placed on the shipping departments because while commercial carriers publish Dim Factors on their websites, few are providing anything more than a few rules and mathematical equations to assist shippers in determining their billing rates.

Considering the large scale and cost-sensitive operation that Dim Weight has become, use that tape measure at your peril.

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