



The Economics of Shipping Case Marking

The true cost of case marking is a lot more complex than many people think. If you think it's just the cost of that label, or the cost of some ink for your ink jet printers, you are missing a lot of costs. And, if you use pre-printed cases, chances are you are missing most of the cost. Let's take a closer look at these costs.

The Case

The biggest cost of shipping cases is the case itself, and the biggest savings may be in the cost of that case. If you are already using generic brown boxes, skip this part. If you are using pre-printed cases, keep reading.

One of the biggest factors in determining the cost of a corrugated case is the quantity in which you buy them. If you buy 500 of a particular case, you will get a very different price than if you buy 20,000. The difference could be as much as 40%. Let's consider why this is so. To make cases, you have to set up the case making equipment. That amount of time is, more or less, a constant. So, you have the same setup time for 500 cases, or 50,000. That cost, whatever it is, has to be amortized over that number of cases. There is some savings if the box maker can run all of your pre-printed cases of the same size in a row. Then, the only setup cost for most of the cases is the time required to change the printing plates. But, you do have to change the plates. They have to be retrieved, put on the press, and so on. Again, that activity takes the same amount of time for a few cases or for many. Each individual case order has to be managed separately. There is a cost associated with each order – paper work, skidding, labeling those skids, and so on. The clerical and management aspects of any order are about the same no matter what the size of the order. You can see from this why box makers don't really care for short runs. It is an inconvenience for them, a hassle. It reduces the productivity of the plant. Naturally, they charge extra for the privilege of having small orders.

Let's look at an example, just to make this concept a bit more concrete. If you use pre-printed cases, you have to have a different case part number for each of your products. So, if you have 200 products, you have to stock some quantity of each different case. You do this even though you use a lot more of some of them than others. In fact, you may have parts that you produce but which ship infrequently and in small quantities, say 100 cases every 2 weeks. That's 2,600 cases a year. To get even a reasonable deal on cases, you probably buy 1,000 as a minimum order. So, you have at a minimum, a whole lot of cases on hand. But, take a look at those cases and what goes into them. In many companies, more than one product can fit into a given case size. In some factories, a lot of different products can fit into the same case size. Instead of having 1,000 of 125 different parts to store, you might have only 10 different parts to store. You might be able to buy some of them in large quantities, say 10,000, and some you would still buy in small quantities. But, you would save a lot on those you bought in large quantities, and probably free up space as well. Let's do a couple of numbers:

	Before generic	After generic
Products	125	125
Different Cases	125	25
Order level	1,000 of each	10,000 each of 5, 1,000 each of 20
Average cost per case	\$.45	\$.38 (a 15% savings)

If you use 10,000 cases a day, you will save \$175,000.00 per year on cases alone. Now consider that you probably have cut your inventory about in half and you can see more savings. Then think of how much easier it is to keep 25 parts straight as opposed to 125. Managing the inventory, ordering cases, and so on all add up to more savings still.

There is yet another big savings: printing plates. Printing plates cost money. Let's just say they average \$500.00. You have 125 of them for an investment of \$62,500. Though the plates last a long time, you will probably wind up changing about 20% of them per year. So, each year you spend \$12,500 on new printing plates. You may not see a separate line item for that cost, but the printer surely charges you for them in some way.

So, by my count, you have just saved close to \$200,000 per year by moving to generic cases. But, you probably knew that. We'll come back to how to succeed with generic cases without sacrificing quality, flexibility, or marketing impact. Those of you pre-print users who enjoyed this section should skip the next. It deals with the cost of putting marks on generic cases. Your cases are already marked.

The Mark

To put your own marks on cases, you have a couple of choices. You can put one or more labels on, or you can use some sort of ink jet printer, or you can print your cases off-line. Let's focus on the first two alternatives.

Both are printing technologies that work on-line. You put some amount of equipment on your production line and expect it to take care of marking your cases. Ink jet printers are making the marks at the time the case passes by them. Labels can either be pre-printed and then applied on-line, or they can be printed at the time they are applied with a printer-applicator. There are costs associated with either of these methods. Let's skip the equipment costs as we'll deal with these altogether later. What are the rest of the costs?

Labels

With labels, clearly, you have the cost of the label. You may or may not have the additional cost of thermal transfer ribbon. What do labels cost? In large quantities, plain white pressure sensitive labels are pretty cheap. Let's say you can get a blank 4" x 13" wraparound label for \$.03. If you are printing that label on-line, you will likely also need ribbon. Again, ribbon is a commodity and is pretty cheap. Let's say you can get the ribbon for that label at \$.01 each. This is probably the cheapest label you will get.

Pre-printed labels will be more expensive and require a lot of management and human intervention. You have to maintain an extensive inventory of labels, which have to be

brought out to the line and installed for each product change. They must be ordered or printed elsewhere in-house. Any failure to have labels ready to go is a fatal error requiring the line to shut down until correct labels can be obtained. In fact, supplying and managing this inventory of pre-printed labels can be as expensive as the labels themselves.

So, we have a minimum cost for a label, then, of \$.04. You are only going to put one of these on any given case, allowing you to mark two adjacent panels of that case. So, if you pack 10,000 cases per day, 250 days a year, on 6 production lines, you spend \$100,000.00 per year on labels and ribbon. The problem with labels, then, is the cost. The process is pretty simple and reasonably reliable. As you'll see later, you need to maintain the printers, and, to a lesser extent, the applicators, but the biggest cost is the labels. That is, it's the biggest cost if you apply the labels with an applicator. If they are hand applied, your biggest cost is the application of those labels. Because those costs are so high that such a method is unlikely in this scenario, we will ignore them in this presentation. But, if that's what you are doing, take the time to figure those costs out.

Ink Jet

Ink jet marking costs are somewhat more difficult to capture in the absence of an actual application. The only operating cost you have is ink. To print two sides of the box, we will need 4 heads per line, and let's imagine a total of 6 production lines. We'll print a bar code and some text on each side. Lots of calculations could be done, but let's peg that cost at \$.025 per case. (Again, that's the two opposing sides.) This time, though, there are a lot of other costs.

First, the heads will need daily attention. Ink will be wasted purging heads, even if such purging is automatic. To maintain acceptable print quality, each head should be professionally cleaned once a year, at a cost of about \$350.00 each. That's \$8,400 per year. Then, every three years, they should all be replaced, with a remanufactured head, at about \$1,500.00 each. That's another \$36,000 over the five years of our example. All of that is fairly easy to capture. What is harder to capture is the amount of attention they need to keep running well and the cost of downtime when they don't. Because of reliability considerations, most users keep several heads in inventory, adding cost. The operating cost per case of about \$.025 comes to \$62,500.00 per year. But, clearly, a number of real costs are left out of this equation because of the difficulty of accurately capturing them.

Off-line Case Printing

There is another alternative, print generic case in-house, off-line. The traditional method for doing this is some manner of flexographic printing. These presses are relatively cheap to buy, and fairly inexpensive to run, but they have a couple of fatal disadvantages. They require skilled press operators, and they require printing plates. These plates are expensive, they require cleaning and storage, they take time to make (usually a week or more), and the quality of print is usually not very good. In general, printing bar codes and complex line drawings is not practical with in-house flexography.

Off-line Digital Case Printing, from Iconotech has none of these disadvantages. The equipment is somewhat more expensive, but the operating costs are very low. The cost of the mark is between \$.01 and \$.014 per case, for two adjacent panels. This cost includes all materials as well as labor. The quality of Digital Case Printing is as good as pre-printed cases, and the bar codes are as reliable as labels. The Digital Case Printer can print everything on those two panels, not just a bar code and some text. It can distribute it over a large area. And, within large boundaries, the cost does not change materially. To cover that much of a case with Ink Jet or Labels would be prohibitive.

Factoring in ink, stencils, and labor, and figuring an average run of 500 identical cases, the cost of marking cases with this method is about \$.013 per case (two adjacent panels). For a year, at 10,000 cases per day and 250 days per year, the total operating cost would be \$32,500.

Equipment

Let's look at the three alternatives together – Print & Apply Labels, Ink Jet, and Digital Off-line Printing. Our setup is an imaginary factory with 4 production lines, a requirement for two panels to be marked on each case, and 10,000 cases per day produced. We'll further suggest that the plant works a 250-day year, and that we will follow this story for 5 years.

	Label Printer/Applicator	Ink Jet	Digital Case Printing
Initial capital Cost	\$20,000* x 6 lines = \$120,000 installed * Wrap-around printer/applicator	\$25,000 x 6 lines = \$150,000 + 6 flat-bed conveyors @ \$5,000 each = \$30,000 Total = \$180,000 installed	\$83,500 complete system, installed
Maintenance	Replace 6 thermal heads twice @ \$500 each = \$6,000. Clean heads weekly. \$15.00 per hour for .5 hour per week. Over 5 years = \$1,875. Total Maintenance = \$7,500	Replace all 24 ink jet heads once @ \$1,500 each = \$36,000. Clean each head annually @ \$350 per head, (24 heads x 5 years x \$350) = \$42,000. Purge all heads daily. 1 hour @ \$15.00 per hour = \$18,750. Total Maintenance = \$96,750	Change ink pad every 6 months @ \$200 per pad = \$2,000. Replace ink hoses every 6 months @ \$30 for two hoses = \$300. Labor to do above = 2 hours every 6 months @ \$15.00 per hour = \$300. Replace 5 pushers once @ \$300 = \$1,500 + 3 hours labor (\$45.00) = \$1,545.00 Total Maintenance = \$4,145
5 Yr Total	\$129,375	\$276,750	\$87,645

And now for our 5-year projection. Again, a brief table:

Print & Apply Label Cost	Ink Jet Cost	Digital Case Printing Cost
Labels: \$500,000. Equipment: \$129,375	Ink \$312,500 Equipment: \$276,750	Operating: \$162,500 Equipment: \$87,645
Total cost: \$629,375	\$589,250	\$250,145
\$.05 per case	\$.05 per case	\$.02 per case

Back to Pre-Print

Pre-print for this scenario is quite expensive. Because all of the approaches to case marking described above use generic cases, that expense doesn't vary whether you choose labels, ink jet, or Digital Case Printing. Your purchasing of cases will be the same with all of those technologies. Compared to pre-print you save about \$200,000 per year if you buy generic cases (based on the suppositions made). That's just about \$1,000,000 over five years, or about \$.08 per case in savings. So, executing a generic case program should save you about \$1,000,000 over five years. And, there are additional savings to be wrung out of a well-executed generic case program that could raise those savings to over \$.12 per case including reduced inventory carrying costs, reduced warehouse space, and so on. But, just the cost of the cases alone provides more savings than you should need to convince you to at least examine that cost.

If what you want to do with generic cases is to mark them in much the same way the box maker does, you are left with only one realistic choice – Digital Case Printing. With Digital Case Printing, you will get about the same quality that your box maker has been supplying. You will, in most cases, be able to print whatever you want on your cases, including graphics. You'll be able to do all this at a fraction of the cost of pre-printed cases. And, you will free yourself to shop your case purchasing around to further reduce the price of your cases.

Conclusion

In this example, there is a clear winner – Digital Off-line Case Printing. Other starting conditions might yield a different answer. The key is to capture as many costs as possible and analyze your own application as closely as you can. In this case, two things should stand out. First, pre-printing your cases costs a lot of money. No matter what your box maker says, you will save a great deal by moving to generic cases and being able to shop for the best price for what turns out to be a commodity – brown boxes. Second, it is often cheaper to work off-line in marking cases, in spite of the necessity of having direct labor. Equipment, materials, and/or maintenance of on-line systems can make them more expensive to run than an off-line system.

So, take the time to examine your whole case marking enterprise. Pre-printed cases are only economical if they are acquired in very large quantities – say 10,000 or more at a time. The only other reason to use pre-printed cases is if you require very high quality, multi-color printing on those cases, or, at an extreme, a glossy, laminated look. Very

high-end products might benefit from such a case. Bread dough for institutional use probably won't.

If you make the decision to go with generic cases, then you have to figure out how to mark them. If each case requires a unique mark, labels and ink jet are your only realistic solutions. If you make your product in batches, and your cases are marked in batches, Digital Off-line Case Printing is the best, cheapest, and most flexible alternative for you. In another White Paper, we'll examine the quality issues surrounding generic case marking.

We are available at any time to help you with a cost comparison of your shipping case marking based on the specifics of your operation. Please feel free to contact either our Connecticut office at 800-521-0194 or our Chicago office at 847-541-2494. Your call will be directed to an application specialist.