



APPLES TO APPLES CORRUGATED IS MORE COST-EFFECTIVE

Corrugated shipping
containers beat RPCs in a
total system cost analysis.

Executive summary: Using data provided by a large Washington state grower, the Full Disclosuresm modeling tool was used to analyze total annual costs involved in using corrugated vs. returnable plastic containers (RPCs) to ship 28 million pounds of apples 2,000 miles.

- Corrugated demonstrates an annual cost advantage of \$267,000 vs. RPCs. The annual cost advantage for corrugated would be \$535,000 if the RPCs were purchased and their initial cost amortized over their useful life.
- RPCs require backhauling to return from the retailer to the next point of use. During the backhaul leg of the trip, RPCs incur \$472,000 in costs for shipping, handling, washing and storage. These costs are avoided altogether by using corrugated since it requires no backshipping.
- In this case scenario, it appears the RPC pooler is subsidizing the retailer's and grower's cost increases for using RPCs and is losing significant money. If this is true, this analysis raises the obvious question—how long can RPC suppliers continue such a practice at a loss?

Shipping apples in corrugated costs less.

Grocery retailers are looking to improve profits by reducing costs throughout the entire distribution channel. Transportation packaging, where long-established corrugated is being challenged by RPCs, is one area that retailers scrutinize for possible cost savings.

Until recently, not much real-world data was available. But that has changed with the availability of this in-depth, case scenario analysis using the Full Disclosure modeling tool, which makes it possible to study the impact of multiple cost drivers on different container choices.

Full Disclosure was used in early 2003 to perform a direct cost comparison between using corrugated containers and RPCs. Actual cost factors were provided by a major Washington apple grower that currently uses both forms of transport packaging.

This analysis showed that, in this scenario, the corrugated solution realized a cost advantage of \$267,000 vs. unamortized RPCs and \$535,000 vs. RPCs if their initial costs were amortized.

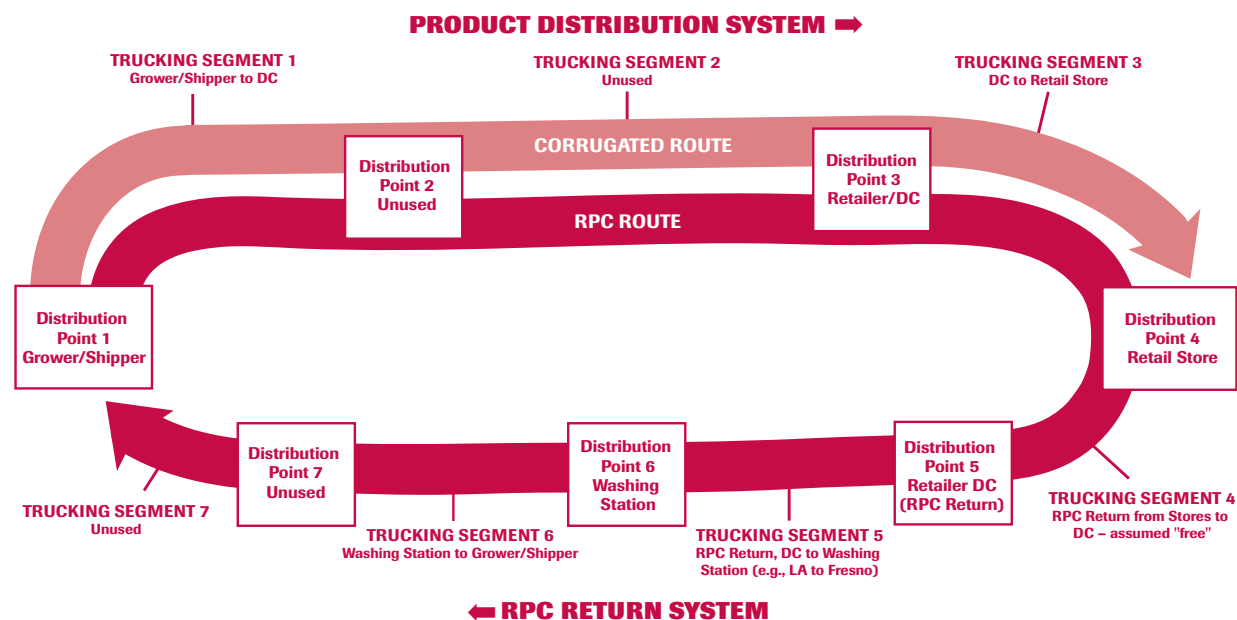
Washington state apples scenario.

Apples are the state of Washington's largest agricultural product. In 2002, an estimated 3.6 billion pounds of apples were shipped from the state, using approximately 85.7 million shipping containers. The

Full Disclosure case scenario is based on cost factors experienced by one of the largest apple growers in Washington's prolific Wenatchee Valley. This grower ships its prized apples all over the United States and to 30 countries worldwide.

In this study, it was assumed that 24 million pounds of apples would be shipped annually over a distance of 2,000 miles to the distribution center and then to retail stores. (This approximates the distance from Yakima, Washington to Chicago,

Illinois.) These prime-quality apples are first hand-picked and transported to a facility where they are cleaned and sorted, packed into containers (either 40-lb.-capacity CCF or RPCs), loaded onto standard pallets (fitting seven layers of five RPCs each, or eight layers of five corrugated containers each) and placed in 48-foot refrigerated trailers. The truck hauling RPCs cubes out at 26 pallets, or 910 containers; the truck hauling corrugated weighs out at 25 pallets, or 1,000 containers. The semi-trailer trucks then transport the apples to



distribution centers where pallet loads of apples are reconfigured for retail, loaded onto delivery trucks and distributed to retail outlets.

Once at the retail stores, pallets are unloaded from the trailers and the apples are set up for retail presentation. Empty corrugated containers are broken down and compacted for recycling. Empty RPCs continue on a long journey back to the grower.

During this backhaul leg, the RPCs are first returned to the distribution center where they are sorted according to size and condition. Next they are shipped to a special depot where they are washed, sanitized, refurbished and then sent to a warehouse for storage. They are ultimately shipped back to the grower on an as-needed basis.

The grower estimates that it takes about 120 days to complete this odyssey, since the apples may spend considerable time in cold storage. Therefore, an RPC can complete about three cycles (or turns) per year.

COST FACTOR	CORRUGATED	RPCs	VARIANCE
Annual Container Cost	\$700,000	\$217,000 (annual replacement)	(\$483,000)
Variable Packaging Costs	\$420,000	\$420,000	\$0
Trucking Costs	\$2,605,000	\$3,050,000	\$445,000
Handling Costs	\$36,000	\$305,000	\$269,000
Disposal Cost (recycling value)	(\$38,000)	(\$2,000)	\$36,000
Inventory Value	\$9,722	NA	NA
Inventory Interest Cost	\$583	\$0	(\$583)
RPC Initial Cost	\$0	\$1,400,000	NA
RPC Amortization	\$0	\$268,000	\$268,000
Total Annual Cost	\$3,723,000	\$4,258,000	\$535,000
Variance Without Amortization			\$267,000

Clear total cost picture.

The Full Disclosure analysis summarized above shows a total annual cost of more than \$3.7 million for corrugated vs. more than \$4.2 million for RPCs (assuming that the cost of initial RPCs in the float are amortized). In other words, total shipping costs were about 14 percent higher using RPCs.

This analysis reveals that RPCs incur higher trucking and handling costs than corrugated—\$714,000 higher. This is the result of the RPC backhaul trip requirements, handling costs at

return distribution centers, plus washing and warehousing costs. At a conservative estimate of \$.35 per container, washing alone adds \$245,000 to the annual cost of using RPCs.



OVERALL SUMMARY OF RPC RENTAL COSTS VS. CORRUGATED

Washington Apples - 40# Eurobox

Cost Owner	Full Disclosure Model			Rental Costs		Total RPC Rental Cost	RPC Rental vs. Corrugated
	Corrugated	RPC	Variance	Fee	Other		
	(1)	(2)	(3)=(2)-(1)	(4)	(5)	(6)=(2)+(4)+(5)	(7)=(6)-(1)
Pool Operator	\$0	\$942,586	\$942,586	(\$785,167)	\$56,000	\$213,419	\$213,419
Major Retailer	\$2,595,449	\$2,887,468	\$292,018	\$17,033	\$14,000	\$2,918,501	\$323,052
Northwest Orchards	\$1,127,113	\$427,778	(\$699,335)	\$768,133	\$14,000	\$1,209,911	\$82,798
Unassigned	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Grand Total	\$3,722,562	\$4,257,831	\$535,269	\$0	\$84,000	\$4,341,831	\$619,269

Who pays for what?

With corrugated shipping containers, the grower pays for the containers and labor associated with managing them. Retailers pay all handling and shipping costs but benefit from the sale of the empty corrugated containers at the end of the one-way trip (when they are recovered for recycling). This is not the way it works with RPCs.

A fair cost comparison must focus primarily on the effect that either packaging alternative has on the total system costs of distribution. If total

costs go up, no one party in the supply chain (grower, distributor or retailer) can realistically save money. As the total cost picture above demonstrates, RPCs increase total system cost even before leasing options are considered.

To make it feasible for growers to use RPCs, pool operators have leasing arrangements. The fee for the containers is frequently set at parity with comparable corrugated cases—in this example, at \$1 each. The total annual cost of leasing RPCs is \$84,000 higher than the cost of

purchasing the RPCs outright (where the grower pays for replacement, but not the initial purchase). The costs of RPC leasing programs are also allocated to the grower, shipper and pool operator in different proportions.

A study of the data using a special rental analysis module of Full Disclosure shows that, in a typical leasing arrangement, the retailer pays \$323,000 more to receive Washington apples shipped in RPCs as opposed to corrugated. So, not only are the total costs higher, but the retailer also shoulders a higher percentage of

them. Not counting \$3 million in up-front investment for specialized RPC palletizing and handling equipment, the grower pays \$83,000 more.

The balance of the cost is taken on by the pool operator for a substantial loss (\$213,000), presumably in an effort to be cost-competitive. Such economics raise the question of how long RPC providers can operate this way. In other words, what happens when the economic burden is no longer sustainable?

Conclusion.

Everyone—growers, retailers and even RPC pool operators—loses money when RPCs are used to ship Washington apples in this typical case scenario. These losses would be even higher for growers and retailers if not for the apparent RPC industry practice of subsidizing costs to gain market share. It is reasonable to assume that this practice cannot be sustained indefinitely. Growers and retailers should expect further cost increases for RPC use.

Initial arguments to justify the use of RPCs vs. corrugated were based on a supposition that RPCs were more economical because they were reusable. Full Disclosure case studies detail the impact of major cost sensitivity factors on total system; and shipping container economics now present a clear picture that corrugated containers offer the lowest-cost supply-chain solution.

In case after case, analyzed using hypothetical or actual data, the facts demonstrate that corrugated is the most economical transport packaging solution. In addition, third-party field studies repeatedly show that corrugated provides superior shipping density for greater payloads, and product protection better than or equal to RPCs, reducing costs associated with shrink.

These cost benefits, in addition to the ability to customize every corrugated structural design and graphics for in-store merchandising, make corrugated the most versatile and economical shipping container solution.



Full Disclosure was developed by the American Forest & Paper Association (AF&PA) and the Fibre Box Association (FBA). The Corrugated Common Footprint Standard was developed by the Fibre Box Association and member companies.

The Corrugated Packaging Alliance (www.corrugated.org) is a corrugated industry initiative jointly sponsored by the American Forest & Paper Association (AF&PA) (www.afandpa.org) and the Fibre Box Association (FBA) (www.fibrebox.org). Its mission is to foster growth and profitability of corrugated in applications where it can be demonstrated, based on credible and persuasive evidence, that corrugated should be the packaging material of choice; and to provide a coordinated industry focus that effectively acts on industry matters that cannot be accomplished by individual members.

