



ONION CASE STUDY

SHIPPING ONIONS IN CORRUGATED SAVES 10.4 PERCENT ANNUALLY VS. SHIPPING IN RPCS

Executive Summary

Using data provided by a large Pacific Northwest onion grower, the Full Disclosuresm modeling tool was used to analyze total annual costs to use corrugated containers vs. reusable plastic containers (RPCs) to ship 40 million pounds of onions to Columbus, Ohio.

- Corrugated demonstrates an annual cost advantage of approximately \$760,000 (10.4 percent of total system costs) vs. RPCs.
- RPCs require back-hauling to return from the retailer to the next point of use. During the back-haul leg of the trip, RPCs incur over \$1 million in costs for shipping, handling, and washing. These costs are avoided altogether by using corrugated, since it does not require back-shipping.

Shipping onions in corrugated costs less.

Grocery retailers are always looking for ways to improve profits by reducing costs throughout the entire distribution channel. Transportation packaging is one area that retailers scrutinize for possible cost savings.

Real-world data to analyze the cost-effectiveness of shipping container options is available using the Full Disclosuresm modeling tool, which makes it possible to study the impact of multiple cost drivers on different container choices.

Full Disclosure was used to perform a direct cost comparison between using corrugated containers and using RPCs for shipping onions.

This analysis showed that, in this scenario, the corrugated solution realized a cost advantage of nearly \$760,000 compared to RPCs.

Onions scenario

In this study, it was assumed that 40 million pounds of onions would be shipped annually over a distance of 2,200 miles to the distribution center and then to retail stores. This approximates the distance from the Pacific Northwest to Columbus, Ohio, a distance that reflects the weighted average of shipping distances to the actual distribution centers supplied by the onion grower.



These onions are packed into containers, either corrugated or RPCs, loaded onto standard pallets and placed in 53-foot refrigerated trailers. Each pallet holds 40 RPCs or corrugated containers, and each truck holds 22 pallets (880 cases) of corrugated containers or 20.25 pallets (810 cases) of RPCs. Trucks weigh out holding 35,200 pounds of onions in corrugated or 32,400 pounds of onions in RPCs. More truckloads are required to ship the same total amount of onions in RPCs than in corrugated. The trucks then transport the onions to distribution centers where pallet loads 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 onions are set up for retail presentation. Empty corrugated containers are broken down and compacted for recycling. RPCs accumulate at stores to fill one or more trailers, which then go to a washing facility, then to another location for staging, accumulating a weighted average distance of 2,400 miles. After washing, the RPCs are shipped back to the grower/shipper as needed.

RPCs frequently impose obscure costs that are easy to overlook. In this situation, the grower/shipper experienced three such costs: additional labor at the packing shed; more collapsed pallets at the DC; and monthly administrative and “add-on” fees. RPCs arrive wet at the grower/shipper location throughout the year, requiring additional labor to wipe down the containers before feeding them to the filling line. When shipped over long distances, RPCs consistently resulted in more collapsed pallets at the DC than corrugated. Finally, the grower/shipper found that he incurred additional administrative costs and fees each month. These costs added up to about 13.5 cents per case in higher costs. Full Disclosure captures this additional cost as “operating impacts.”

Clear total cost picture

Corrugated Containers		Reusable Plastic Containers		Variance
<u>Annual Container Cost:</u>	1,109,000 \$	<u>Annual Replenishment Cost:</u>	63,690 \$	-1,045,310 \$
<u>Annual Label Cost:</u>	10,000 \$	<u>Annual Label Cost:</u>	16,600 \$	6,600 \$
<u>CC Trucking Costs:</u>	6,234,236 \$	<u>RPC Trucking Costs:</u>	7,626,025 \$	1,391,789 \$
<i>Total trucking costs include trucking and any standing costs at unloading and loading.</i>		<i>Total trucking costs include trucking and any standing costs at unloading and loading.</i>		
<u>CC Handling Costs:</u>	43,129 \$	<u>RPC Handling Costs:</u>	149,043 \$	105,914 \$
<i>Total handling costs include unloading, handling, and loading.</i>		<i>Total handling costs include unloading, handling, and loading.</i>		
<u>CC Operating Impacts:</u>	0 \$	<u>RPC Operating Impacts:</u>	159,500 \$	159,500 \$
<i>Operating impacts are detailed at various distribution points.</i>		<i>Operating impacts are detailed at various distribution points.</i>		
<u>Disposal Cost (or Recycling Value):</u>	-99,700 \$	<u>Disposal Cost (or Recycling Value):</u>	-43,036 \$	56,664 \$
CC Inventory Value:	30,806 \$			
<u>CC Inventory Interest Cost:</u>	2,464 \$			-2,464 \$
Annual CC Cost:	7,299,130 \$	RPC Initial Cost:	416,667 \$	
		<u>RPC Annual Amortization:</u>	84,265 \$	84,265 \$
		Annual RPC Cost:	8,056,087 \$	756,957 \$
			Variance without RPC Amortization:	672,693 \$

Figure 1

The Full Disclosure analysis summarized above shows a total annual cost of \$7.3 million for corrugated vs. \$8.06 million for RPCs, assuming that the cost of initial RPCs in the float is amortized. In other words, total packaging, shipping and handling costs were 10.4 percent higher using RPCs.

This analysis reveals that RPCs incur \$1.5 million higher trucking and handling costs than corrugated. This is the result of higher trucking costs to ship onions to the distribution center in RPCs, the RPC back-haul trip requirements, handling costs at return distribution centers, plus washing and warehousing costs. At an estimated \$0.10 per container, washing alone adds \$100,000 to the annual cost of using RPCs.

Who pays for what?

With corrugated shipping containers, the grower pays for the containers and labor associated with managing them. Once the truckload leaves the grower’s packing operation, retailers pay all handling and shipping costs, but benefit from the sale of the used corrugated containers at the end of the one-way trip, when they are recovered for recycling. It does not work that way with RPCs.

A fair cost comparison must examine the effect that either packaging alternative has on the total system costs of distribution. If total costs go up, none of the supply chain participants (grower, distributor or retailer) can realistically save money in the long run. As the total cost picture (Figure 1) demonstrates, RPCs increase total system cost.

Full Disclosure data shows that, in a typical leasing arrangement, the retailer pays 9.9 percent more to receive onions shipped in RPCs as opposed to corrugated. The grower pays 15.4 percent more to ship in RPCs.

Retailer Costs

Details ("Drill Down") of RPC Rental Costs vs. Corrugated							
0T360 Northwest Onions 12-17-14							
Cost Owner:	Retailer (Onions)			Rental Costs		Total RPC	RPC Rental
	Full Disclosure Model			Fees	Other	Rental Cost	vs. Corrugated
	Corrugated	RPC	Variance				
	(1)	(2)	(3)=(2)-(1)	(4)	(5)	(6)=(2)+(4)+(5)	(7)=(6)-(1)
Container	0	0	0	0		0	0
Label	0	0	0			0	0
Trucking	6,234,236	6,722,992	488,756			6,722,992	488,756
Handling	38,974	37,561	(1,413)		0	37,561	(1,413)
Operating Impacts	0	22,700	22,700			22,700	22,700
CC Inventory	0		0			0	0
Recycling/Disposal	(99,700)	0	99,700			0	99,700
RPC Amortization		0	0			0	0
Total	6,173,510	6,783,253	609,743	0	0	6,783,253	609,743

Figure 2

Grower/Shipper Costs

Details ("Drill Down") of RPC Rental Costs vs. Corrugated							
0T360 Northwest Onions 12-17-14							
Cost Owner:	Grower-Shipper			Rental Costs		Total RPC	RPC Rental
	Full Disclosure Model			Fees	Other	Rental Cost	vs. Corrugated
	Corrugated	RPC	Variance				
	(1)	(2)	(3)=(2)-(1)	(4)	(5)	(6)=(2)+(4)+(5)	(7)=(6)-(1)
Container	1,109,000	0	(1,109,000)	1,140,000		1,140,000	31,000
Label	10,000	16,600	6,600			16,600	6,600
Trucking	0	0	0			0	0
Handling	4,155	5,133	978		0	5,133	978
Operating Impacts	0	136,800	136,800			136,800	136,800
CC Inventory	2,464		(2,464)			0	(2,464)
Recycling/Disposal	0	0	0			0	0
RPC Amortization		0	0			0	0
Total	1,125,620	158,533	(967,087)	1,140,000	0	1,298,533	172,913

Figure 3

Conclusion

Both growers and retailers lose money when RPCs are used to ship onions in this case scenario. As shown in Figures 2 and 3 above, the retailer pays over \$600,000 (9.9 percent or \$0.61/case) more annually to receive onions in RPCs and the grower/shipper pays \$173,000 (15.4 percent or \$0.17/case) more. No one wins.

Full Disclosure case studies detail the impact of major cost sensitivity factors on the total distribution system; and shipping container economics continually present a clear picture that corrugated containers offer the lowest-cost supply-chain solution for fresh produce. These facts have been demonstrated in Full Disclosure cost analysis [case studies for strawberries, tomatoes, apples, broccoli, citrus, grapes and watermelon](#).

In addition to proven cost benefits, corrugated is made from a renewable resource, is recyclable, with a 90+ percent recovery rate, and contains 47 percent recycled content on average.

Corrugated containers save both retailers and grower/shippers money. Freight loads are optimized. Damage from

collapsed pallets and collapsed loads is sharply reduced. Unnecessary and inefficient tracking and inventorying of RPCs is eliminated. RPC surcharges for fuel, international shipments, and returned containers cease. The revenue stream from used boxes (OCC) is retained.

Corrugated containers offer an enhanced, sustainable packaging option, fully recyclable, renewable, and economical – plus they offer branding and marketing opportunities to increase retail produce sales through attractive, printed graphics on the packaging.

Once again, the facts demonstrate that corrugated is the most economical transport packaging solution. 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 Disclosuresm was developed by the American Forest & Paper Association (AF&PA) and the Fibre Box Association (FBA).

The Corrugated Packaging Alliance (CPA) is a corrugated industry initiative, jointly sponsored by the American Forest & Paper Association (AF&PA), AICC - The Independent Packaging Association, the Fibre Box Association (FBA) and the Technical Association of the Pulp and Paper Industry (TAPPI). 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. CPA members include corrugated manufacturers and converters throughout North America.



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