



TOMATO CASE STUDY

TOMATOES ARE MORE COST-EFFECTIVELY SHIPPED IN CORRUGATED

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

Executive Summary

Using data provided by a large grower in Mexico*, the Full Disclosuresm modeling tool was used to analyze total annual costs involved in using corrugated containers vs. reusable plastic containers (RPCs) to ship 144,356,725 pounds of Roma tomatoes to Houston, TX.

- Corrugated demonstrates an annual cost advantage of \$6.8 million vs. RPCs.
- RPCs require backhauling to return from the retailer to the next point of use. During the backhaul leg of the trip, RPCs incur \$4.1 million in costs for shipping, handling and washing. These costs are avoided altogether by using corrugated since it does not require back-shipping.

Shipping Tomatoes in corrugated costs less.

Grocery retailers are looking 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 Disclosure 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. Actual cost factors were provided by a Roma tomato grower in Mexico.

This analysis showed that, in this scenario, the corrugated solution realized a cost advantage of \$6.8 million compared to RPCs.

Tomatoes scenario

In this study, it was assumed that 144 million pounds of Roma tomatoes would be shipped annually over a distance of 1,905 miles from the tomato farm to the grower's distribution center (DC) and then to the retailer's DC. (This approximates the distance from the grower's location in Mexico to San Diego, California and then to Houston, Texas.)

These prime-quality tomatoes are first hand-picked and transported to a facility where they are cleaned and sorted, packed into containers (either 25-lb.-capacity corrugated containers or RPCs), loaded onto standard pallets (fitting 14 layers of 5 RPCs each, or 10 layers of 8 corrugated containers each) and placed in 48-foot refrigerated trailers. Since each pallet holds 70 RPCs or 80 corrugated



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containers, trucks cube out at 18 pallets holding 1,260 RPCs or 1,440 corrugated containers. Each truckload carries either 31,500 lbs. of tomatoes in RPCs or 36,000 lbs. in corrugated containers; more truckloads are required to ship the same total amount of tomatoes in RPCs than in corrugated. The semi-trailer trucks then transport the tomatoes to retail distribution centers where pallet loads of tomatoes 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 tomatoes 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 shipped to a washing center in San Antonio, Texas, where they are washed, sanitized, refurbished and then sent to an RPC DC for staging in San Diego. They are ultimately shipped back to the grower on an as-needed basis.

Clear total cost picture

Corrugated Containers		Reusable Plastic Containers		Variance
<u>Annual Container Cost:</u>	4,590,544 \$	<u>Annual Replenishment Cost:</u>	1,583,799 \$	-3,006,744 \$
<u>Annual Label Cost:</u>	0 \$	<u>Annual Label Cost:</u>	315,275 \$	315,275 \$
<u>CC Trucking Costs:</u>	23,004,767 \$	<u>RPC Trucking Costs:</u>	29,851,293 \$	6,846,527 \$
<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>	91,225 \$	<u>RPC Handling Costs:</u>	714,337 \$	623,111 \$
<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>	0 \$	0 \$
<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>	-404,199 \$	<u>Disposal Cost (or Recycling Value):</u>	-259,292 \$	144,907 \$
CC Inventory Value:	127,515 \$	RPC Initial Cost:	8,661,404 \$	-6,695 \$
<u>CC Inventory Interest Cost:</u>	6,695 \$	<u>RPC Annual Amortization:</u>	1,862,971 \$	1,862,971 \$
Annual CC Cost:	27,289,032 \$	Annual RPC Cost:	34,068,384 \$	6,779,352 \$
		Variance without RPC Amortization:		4,916,381 \$

The Full Disclosure analysis summarized above shows a total annual cost of more than \$27.2 million for corrugated vs. \$34 million for RPCs (assuming that the cost of initial RPCs in the float are amortized). In other words: total packaging, shipping and handling costs were about \$6.8 million (nearly 25 percent) higher using RPCs.

This analysis reveals that RPCs incur higher trucking and handling costs than corrugated — \$7.5 million higher. This is the result of the RPC backhaul trip requirements, handling costs at return distribution centers, plus washing costs. At a conservative estimate of \$0.10 per container, washing alone adds \$577,000 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 DC dock in San Diego, 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.

Details ("Drill Down") of RPC Rental Costs vs. Corrugated							
0T250 Roma Tomatoes 10-10-12							
	Cost Owner: Retailer			Rental Costs		Total RPC Rental Cost (6)=(2)+(4)+(5)	RPC Rental vs. Corrugated (7)=(6)-(1)
	Full Disclosure Model			Fees	Other		
	Corrugated (1)	RPC (2)	Variance (3)=(2)-(1)	(4)	(5)		
Container	0	0	0	0		0	0
Label	0	0	0			0	0
Trucking	20,282,238	23,336,479	3,054,241			23,336,479	3,054,241
Handling	72,178	103,112	30,934		0	103,112	30,934
Operating Impacts	0	0	0			0	0
CC Inventory	0	0	0			0	0
Recycling/Disposal	(404,199)	0	404,199			0	404,199
RPC Amortization		0	0			0	0
Total	19,950,218	23,439,591	3,489,373	0	0	23,439,591	3,489,373

A study of the data using a special rental analysis module of Full Disclosure shows that, in a typical leasing arrangement, the retailer pays \$3.5 million (17%) more to receive Roma tomatoes shipped in RPCs as opposed to corrugated. The grower pays \$893,000 (12%) more to ship in RPCs. So, not only are the total costs higher, but the retailer also shoulders a higher cost increase.

Details ("Drill Down") of RPC Rental Costs vs. Corrugated							
0T250 Roma Tomatoes 10-10-12							
	Cost Owner: Grower-Shipper			Rental Costs		Total RPC Rental Cost (6)=(2)+(4)+(5)	RPC Rental vs. Corrugated (7)=(6)-(1)
	Full Disclosure Model			Fees	Other		
	Corrugated (1)	RPC (2)	Variance (3)=(2)-(1)	(4)	(5)		
Container	4,590,544	0	(4,590,544)	4,503,930		4,503,930	(86,614)
Label	0	315,275	315,275			315,275	315,275
Trucking	2,722,529	3,390,522	667,994			3,390,522	667,994
Handling	19,047	21,768	2,721		0	21,768	2,721
Operating Impacts	0	0	0			0	0
CC Inventory	6,695	0	(6,695)			0	(6,695)
Recycling/Disposal	0	0	0			0	0
RPC Amortization		0	0			0	0
Total	7,338,814	3,727,565	(3,611,249)	4,503,930	0	8,231,495	892,681

Conclusion

Both growers and retailers lose money when RPCs are used to ship Roma tomatoes in this case scenario.

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 the total distribution 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.

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 (CPA) is a corrugated industry initiative, jointly sponsored by the American Forest & Paper Association (AF&PA), the Association of Independent Corrugated Converters (AICC), 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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