A DISTRIBUTION AND COST SCENARIO FOR ICELESS BROCCOLI

Corrugated Common Footprint offers the best value.

Executive summary: Using data provided by one of the largest growers and shippers of produce in the United States, the Full Disclosure® modeling tool was used to analyze and compare total, annual supply-chain costs using returnable plastic containers (RPCs) versus Corrugated Common Footprint containers to transport 34 million pounds of iceless broccoli over a distance of 2,000 miles (approximately the distance between Salinas, CA, and Atlanta, GA). Results showed:

- Shipping in Corrugated Common Footprint containers versus RPCs saves 25 percent annually in total supply-chain costs. The cost advantage is even higher, 29 percent, if the cost of purchasing and administering the pool of RPCs is included in the comparison.
- RPCs require backhauling to return from the retailer to the next point of use, incurring $788,000 in costs for shipping, handling, washing and storage. These costs are avoided altogether by using corrugated, which doesn't require a return trip and is recycled, providing revenue to the supply chain.
- The retailer costs increase significantly (almost 44 percent) using RPCs instead of corrugated, due mainly to the higher cost of transporting RPCs.
- The grower/shipper costs also increase sharply (more than 33 percent) in this scenario, primarily due to higher packaging costs. Just over 1 million corrugated containers are required at $1.05[1] each, while nearly 1.5 million RPCs must be rented at $0.97 per trip — costing $330,000 more for RPCs.

CORRUGATED
IT MAKES THE MOST SENSE

This case scenario clearly shows the economic advantages of corrugated containers when objectively compared to RPCs.

Shipping broccoli in corrugated costs less.

Retailers today are scrutinizing all supply-chain costs for potential profit improvements. Transport packaging is one of many areas where efficiency in total system economics may provide significant cost savings.

Determining the most cost-efficient type of container system requires a close examination of system costs from point of origin and package purchase (or rental) all the way through handling, shipping, storage, and in the case of RPCs, washing and backhauling, versus recycling for Corrugated Common Footprint containers.

The Full Disclosure activity-based cost modeling tool was applied to compare these total system costs for shipping iceless broccoli in Corrugated Common Footprint containers versus RPCs.

Actual cost factors were provided by a large produce grower and shipper in California's Salinas Valley. The analysis showed that in this scenario, shipping in corrugated rather than in RPCs reduced supply-chain costs by $2.9 million annually.

Iceless broccoli scenario.

(Figure 1)

Broccoli is grown in almost every state in the United States, including Alaska and Hawaii. However, California is the largest grower and shipper. In 2002, the U.S. produced 1.7 billion pounds of broccoli, and 97.5 percent of the production was in California.[2]

Broccoli is field-packed. Workers cut, trim and pack the product into pre-erected corrugated containers or RPCs. Historically, most broccoli was packed in waxed corrugated containers in the field, palletized and then transported to a cooling facility. Pallets with waxed corrugated containers were injected with a mixture of ice and water to maintain freshness.

In this scenario, costs[3] were analyzed using the grower/shipper's new "iceless" solution for packaging broccoli in both corrugated containers and RPCs. Iceless packaging offers significant advantages over traditional iced methods and addresses many of the issues associated with shipping in waxed containers. It uses a combination of package features, packing processes and cooling methods, allowing products to be cooled and shipped without using large amounts of injected ice and water.

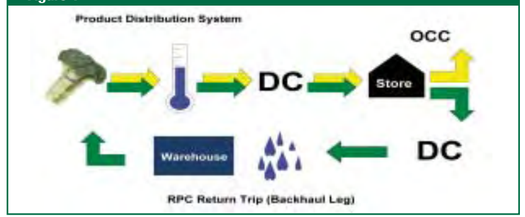
This case scenario assumes that broccoli is packed into either 32-pound capacity "iceless" Corrugated Common Footprint containers, or 22.9-pound capacity "iceless" RPCs. Corrugated containers weigh 2.8 pounds (tare weight); RPCs weigh 4.75 pounds (tare weight). The corrugated containers can hold an additional 9 pounds of product because the internal geometry of the box affords more head room than RPCs.

Corrugated containers require a poly-liner bag, which costs $0.05 per container, to accommodate the pre-cooling process. RPCs do not require this poly-liner bag, but they do require an identification label on the outside of each container. The ID labels cost $0.03 each.

The processes for pre-cooling iceless Corrugated Common Footprint containers and RPCs are slightly different.

- Broccoli is packed into corrugated containers in the field and a poly-liner bag holds the product. With RPCs, broccoli is individually wrapped using special bags, then packed into RPCs in the field.
- Water is added to each poly-liner bag in corrugated. The RPCs do not require a poly-bag and no water is added to the container.
- Containers are palletized, loaded onto trucks and transported to the cooling facility.
- With corrugated, pallets are placed immediately (12 pallets per load) into a HydroVac™ cooling chamber at the cooling facility. During the vacuum-cooling process the heat from the broccoli causes the water to evaporate at greatly reduced pressure, lowering the temperature of the broccoli from about 70°F to about 34°F. Any water added to the container evaporates at this stage. With RPCs, containers are first cooled using forced-air cooling, then placed in the HydroVac cooling chamber.
- Pre-cooled pallets are stored at the cooling facility for shipment to the retailer's distribution center.

Figure 1



Yellow arrow – Corrugated Common Footprint containers
Green arrow – RPC

Broccoli can spend one to four days in cold storage, awaiting transportation to the distribution center (DC).

From the cooling facility, semi-trailer trucks transport the broccoli to the DC, where pallets of broccoli are "broken down" (reconfigured for retail), loaded onto delivery trucks and distributed to retail outlets.

Once at the retail stores, pallets are unloaded from the trailers and prepared for retail presentation. Iceless corrugated containers are knocked down, placed into balers and recycled for the positive economic value of old corrugated containers (OCC). At this point, the corrugated container's function in the distribution chain is complete. RPCs, on the other hand, must complete the return trip, which requires sorting, washing, sanitizing, warehousing and redistributing to the grower/shipper.

In 2003, over 73 percent[4] of all corrugated containers in the U.S. were recycled. It is estimated that this recycling rate grows to over 90 percent at the retail level.

Cost Summary

Corrugated Containers		Reusable Plastic Containers		Variance
Annual Container Cost:	1,115,625 $	Annual Replenishment Cost:	249,745 $	-865,880 $
Annual Label Cost:	53,125 $	Annual Label Cost:	44,619 $	-8,506 $
CC Trucking Costs:	5,923,274 $	RPC Trucking Costs:	8,457,148 $	2,533,874 $
Total trucking costs include trucking and any standing costs at unloading and loading		*Total trucking costs include trucking and any standing costs at unloading and loading*		
CC Handling Costs:	153,289 $	RPC Handling Costs:	802,767 $	649,477 $
Total handling costs include unloading, handling, and loading		*Total handling costs include unloading, handling, and loading*		
CC Operating Impacts:	0 $	RPC Operating Impacts:	0 $	0 $
Operating impacts are detailed at various distribution points		*Operating impacts are detailed at various distribution points*		
Disposal Cost (or Recycling Value):	-119,000 $	Disposal Cost (or Recycling Value):	-7,359 $	111,641 $
CC Inventory Value:	15,495 $			
CC Inventory Interest Cost:	930 $			-930 $
		RPC Initial Cost:	966,754 $	
		RPC Annual Amortization:	287,256 $	287,256 $
Annual CC Cost:	7,127,242 $	**Annual RPC Cost:**	9,834,176 $	2,706,933 $
			Variance without RPC Amortization:	2,419,677 $

RPC backhaul leg.

Unlike corrugated containers (which have been recycled for their OCC value), RPCs now begin the long trip back to the grower/shipper.

First RPCs are transported back to the DC where they are sorted according to size, condition and pooler. From there, RPCs are transported to a washing station where they are washed, sanitized and repaired as necessary. Finally they are transported to a warehouse for holding until needed by the grower/shipper.

It takes an estimated 72 days (or about 10 weeks), on average, for an RPC to make this round trip. Each RPC, therefore, makes about five complete cycles (or "turns") per year.

RPCs incur higher costs associated with trucking (just over $2.5 million annually) and handling (an additional $650,000 each year). These cost differences are primarily the result of RPC packing inefficiencies and RPC backhaul trip requirements, including washing and warehousing costs.

(CONTINUED ON BACK)

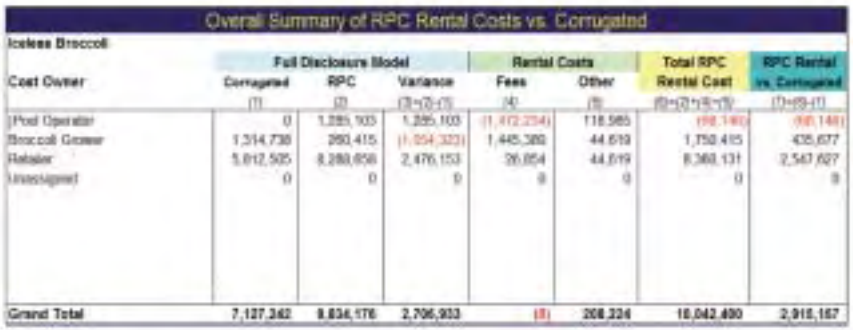
(front cover) 1. Based on market price estimate in November 2004.
2. Agricultural Marketing Resource Center, Commodity Profile: Broccoli, November 2003.
3. Costs based on market estimates in November 2004.
4. American Forest & Paper Association, 2004.

Who pays for what.

The Full Disclosure analysis further shows that rented RPCs result in higher costs for both the retailer and the grower/shipper, with only marginal profits for the RPC pool operator. (Figure 2)

- The retailer bears substantial added costs of $2,547,627 each year to ship in RPCs — or $1.71 more per container.
- The grower/shipper's net costs increase by $435,677 (or $0.29 per container) with RPCs, due to higher container and handling costs.
- The pool operator generates a small profit ($68,146), which raises questions about the long term viability of its currently documented rental rates.

Figure 2



Overall Summary of RPC Rental Costs vs. Corrugated

Iceless Broccoli

Cost Owner	Full Disclosure Model: Corrugated	RPC	Variance	Rental Costs: Fees	Other	Total RPC Rental Cost	RPC Rental vs. Corrugated
	(1)	(2)	(3)=(2)-(1)	(4)	(5)	(6)=(2)+(4)+(5)	(7)=(6)-(1)
Pool Operator	0	1,285,103	1,285,103	(1,472,234)	118,985	(68,146)	(68,146)
Broccoli Grower	1,314,738	260,415	(1,054,322)	1,445,380	44,619	1,750,415	435,677
Retailer	5,812,505	8,288,658	2,476,153	26,854	44,619	8,360,131	2,547,627
Unassigned	0	0	0	0	0	0	0
Grand Total	7,127,242	9,834,176	2,706,933	(0)	208,224	10,042,400	2,915,157

Conclusion.

The cost summary shows that corrugated containers provide an annual cost advantage of $2,419,677 (without RPC amortization). If you factor in the amortization cost of the RPCs over their useful life, the advantage of using corrugated containers is even more pronounced. Here you see an annual cost advantage of $2,706,933 for corrugated containers. RPCs increase overall costs in this supply-chain scenario by 34 percent, or by 38 percent if you include RPC amortization.

This Full Disclosure cost analysis proves that once again, corrugated transport packaging is more economical than RPCs for shipping iceless broccoli. Earlier studies have shown similar results for shipping apples, watermelon, grapes and oranges. When you then consider all the other advantages of corrugated packaging – its versatility, custom design, fast production, readily available supply, graphic and merchandising appeal and low container cost – and add the fact that 73 percent of all corrugated is recycled, the picture becomes clear: corrugated is the packaging material of choice because it offers the best overall value.

Full Disclosure was developed by the American Forest & Paper Association (AF&PA) and the Fibre Box Association (FBA). Full Disclosure is an activity-based costing software package designed to allow package buyers and users to objectively and systematically analyze shipping container alternatives by presenting the supply-chain costs for each approach. The Corrugated Common Footprint Standard was developed by the Fibre Box Association and its member companies, and has been approved by the International Corrugated Case Association (ICCA) for international use.

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 the 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.

Corrugated Packaging Alliance

Fibre Box Association

Corrugated Recycles

August 2005

10% recycled fiber

Union bug here

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