Florida Citrus Company

This case study was developed by Dr. Hank Marcus, MIT Department of Ocean Engineering, and Paul Tagliamonte, Bose Corporation.

Introduction

The Florida Citrus Company is a large produce grower located near Tallahassee, Florida. The company grows and distributes a variety of products to the United States and Europe. Although the European distribution represents only a small portion of total production, it is a very profitable part of their business.

Jeff Mays, the Manager of Logistics for Florida Citrus, has a dilemma. When the European business was opened five years ago, only a few containers a month were being sent to Europe. Since he had relatively little experience with ocean container shipping, Jeff hired a freight forwarder to handle the arrangements for the overseas shipments. Southern Freight, Inc. arranges for empty refrigerated containers, "reefers", to be delivered to the plant, contracts for ocean carriage and handles all of the customs documentation.

Initially, when the European shipments represented only a small portion of Florida Citrus business, Jeff was satisfied with the service that Southern Freight was providing. However, now that the European market has grown into a more significant part of their business, Jeff has begun to question the level of service provided by the forwarder. He believes that the rates that FCC is paying are somewhat high and that the level of service they receive is relatively poor.

Lately, Jeff has read a great deal in industry journals concerning deregulation. He thinks that with the volume of containers that they ship, FCC might be better off arranging a long-term volume contract directly with an ocean carrier. This type of arrangement might provide better quality service and could give a lower, more consistent shipping rate.

Jeff has also been reading lately about many of the new e-commerce sites that are being developed. These on-line sites auction off slots aboard container vessels, sometimes at heavily discounted prices. Jeff wonders if the company might be better off using this type of service to contract its ocean carriage.

Background

Typically, FCC now loads four forty-foot reefer containers per day to be sent to Europe. Two containers are loaded with Oranges and the other two with Grapefruit. The produce is shipped in 4'x4'x6' crates; each loaded with approximately 1200 lbs. A total of 20 crates are loaded into each FEU for shipping.

FCC ships containers five days per week for 50 weeks out of the year. The company closes for the last two weeks of each year around Christmas and New Years. The containers are trucked to the Savannah, Georgia container terminal, where they wait for loading. Florida Citrus uses their own fleet of trucks to deliver the loaded reefer containers to the docks in Savannah. The trip from Tallahassee to Savannah usually takes from 5-6 hours and occurs overnight, after the containers are loaded. The internal cost for shipping a container to the terminal is \$350.

The containers are delivered by ship to Rotterdam, where they are unloaded and cleared through customs. Containers are typically available for pick-up 1 full day after ship arrival. Once cleared, the containers are picked-up and forwarded to a fruit wholesale

market. FCC uses a wholesaler in Rotterdam that they have a good relationship with. The wholesaler picks up the containers at the terminal, delivers them to market and handles sales. It takes one day for the wholesaler to pick-up containers, transport them to the market, and sell them. The wholesale company receives a commission on \$500 per container for its efforts.

Each container load of produce is auctioned on the spot market as it arrives. The price received for the produce is heavily dependent on condition and remaining shelf life. Longer delivery times from Tallahassee to Rotterdam result in a lower selling price for the fruit. Exhibit 1 shows average discounts in selling price per pound, based on the number of days after the produce is ready for shipping, for oranges on the spot market. Exhibit 2 shows similar data for grapefruit. This price discount represents the amount the selling price per pound of produce will be reduced from the full-price value. While the full-price value varies throughout the year, the level of discount remains fairly steady. FCC considers the discount in selling price to be part of the cost of shipping. In addition, they also consider inventory costs to be part of total shipping cost. FCC calculates inventory costs based on a yearly discount rate of 15%. The average value used for the produce for inventory calculation is \$1.60/lb for oranges and \$0.70/lb for grapefruit.

SOUTHERN FREIGHT, INC.

Southern Freight contracts all of its reefer movements through one ocean carrier. The carrier runs a weekly service on its North Atlantic trade route. Vessels are scheduled to call on Savannah every Thursday. All containers are required to be in the terminal 24 hours prior to sailing. Therefore, containers must be in the yard Wednesday morning in order to make that week's sailing. For example, a container that leaves the company facility on Tues. would consume 2 days until the ship sailed (one day of truck transport+"excess terminal waiting" and one day of required terminal waiting). A container that leaves the company facility on Mon. consumes 3 days. Of course, if that container is "bumped", it won't actually get on the ship.

Trucks leave the company facility for the terminal only on Monday through Friday nights. No trucks leave on Saturday or Sunday. The containers that leave the company facility on Friday night arrive at the terminal on Saturday morning. If a requested container for Friday is not supplied, the container does not leave the company facility before Monday night.

Jeff has compiled statistics on the service provided by Southern Freight for the past year. On average, the company has a 90% success rate in delivering empty reefer containers to the plant as needed. In the other 10% of cases, the required containers are delivered the next business day. In cases when reefer container(s) are delivered late, the company waits to load the produce and simply ships the container(s) the next business day, along with any containers that would normally be shipped out that day. The produce remains in refrigerated storage at FCC until it is loaded. However, the period for determining the selling discount for the fruit begins from the day that it was supposed to be shipped.

The ocean carrier used by Southern Freight bumped FCC's cargo, on average, 5% of the time. That is, in 5% of the cases where the container was in the terminal on time, the shipment was delayed until the next week's sailing. All shipments bumped were placed on

the next ship. It is because of the delays in equipment availability and the bumping of containers that Jeff was concerned about Southern Freight's performance.

The rates provided by Southern Freight were somewhat variable, based mostly on seasonal demands. The average freight rate over the past year was \$2500 per container, with a low rate of \$1390 and a high rate of \$3510. The ship had a nominal schedule of 17 days from Savannah to Rotterdam and met this schedule with near 100% performance. Occasionally containers would arrive one day early or one day late due to weather conditions. Data for the freight rates and shipping times for the past year is provided in Exhibit 3.

OCEAN CARRIERS

Jeff has contacted three ocean carriers that handle reefer containers from Savannah to Rotterdam to negotiate volume contracts for service. From each he obtained a fixed rate per container that would apply throughout the year. In exchange for the cargo volume, all of the carriers agree to guarantee that reefer containers are always available, on time, to FCC and promise to reduce the occurrence of bump to 2%. All three carriers make offers based on a volume of from 10 to 20 containers per week (excluding the two-week shutdown period).

Each of the carriers has a different docking schedule in Savannah and different transit times to Rotterdam. Company A offers FCC a guaranteed price of \$2400 per container. Their service calls in Savannah once per week on Thursdays and has a 22-day transit time to Rotterdam. Company B has a higher price of \$2600 per container, but offers a faster 17-day service. Company B also calls in Savannah one time per week on Mondays. Finally, Company C offers FCC a price of \$2700 per container. However, Company C calls on Savannah twice per week on Mondays and Thursdays and also offers a 17 transit. With all carriers, containers must be in the yard 24 hours prior to sailing, except for Company B, which requires that containers must be in the yard before 8:00 AM Monday morning. Data for all three carriers is summarized in Exhibit 4.

E-COMMERCE

Jeff has contacted a fellow grower who has been using e-commerce for the past year to ship reefers from Savannah to Rotterdam. This friend has supplied Jeff with the rates per container that he has gotten over the past year and the shipping times for each container. In addition, he has also provided a breakdown of the time it took to get empty reefer containers at the plant for loading and the average time it took for a container to make it on-board a ship. Data summarizing rates and shipping times for the past year is provided in Exhibit 5. Data concerning equipment availability and waiting times is provided in Exhibit 6. Shipping data for the coming year are expected to be similar to those for the past year.

Immediately, Jeff notices that the average shipping rate, only \$2300 per container, is significantly lower than he has been paying. He also notices, however, that almost all of the shipments were with second tier carriers. The carrier used by Southern Freight, and all of the carriers that Jeff contacted himself, have all been first tier. (First tier carriers are typically the larger lines, which utilize newer, faster ships operating on well defined routes. Second tier carriers are usually smaller lines, operating older ships, on less-defined routes or in charter service.) From the data, Jeff can see that the time to get equipment, time

spent waiting on dock, and time in transit are much more highly variable than with the first tier carriers. While the low prices offered are very attractive, Jeff is not sure if it is worth using this service in light of the degraded performance.

FASTSHIP Option

While Jeff was considering his plan for the next year, a representative from FastShip Atlantic called him to see if FCC had any interest in their service in the future. FastShip plans to start offering thrice-weekly shipments to Europe, leaving on Mondays, Wednesdays, and Fridays out of Philadelphia, beginning in two years. The service would provide a five-day Atlantic crossing to Cherbourg, France. The FastShip representative told Jeff that the per container reefer rate for this service would be approximately \$3,900 in present dollars. FastShip guarantees that containers arriving on the morning of sailing will make it onto that day's sailing. FastShip also guarantees the on-time delivery of the pick-up containers to the Florida Citrus Company's facility. Jeff believes that he would still be able to ship containers overnight from the plant to the containerport by truck, however the additional distance will add \$50 to the cost of shipping. He also thinks that one additional day will be required in Europe to drive the containers from Cherbourg to Rotterdam for sale, at an additional cost of approximately \$400 per container. Jeff told the representative that he would consider this option for the future.

Plan

Jeff must come up with a plan in the next week for the next year's shipments to Europe. He can either continue sending all of his product through Southern Freight, he can contract directly with an ocean carrier, or he can try to book carriages himself through e-commerce sites. He might also use different methods of shipping for each type of produce.

Exhibits

Exhibit 1: Selling Price Discount for Oranges vs. Delivery Time

Deliver	Discount in Selling	Deliver	Discount in Selling
Time (days)	Price (cents/lb.)	Time (days)	Price (cents/lb.)
0	0.0	23	6.9
1	0.2	24	7.3
2	0.4	25	7.7
3	0.6	26	8.2
4	0.8	27	8.7
5	1.1	28	9.2
6	1.3	29	9.8
7	1.6	30	10.3
8	1.8	31	11.0
9	2.1	32	11.6
10	2.4	33	12.3
11	2.7	34	13.0
12	3.0	35	13.8
13	3.3	36	14.6
14	3.6	37	15.5
15	3.9	38	16.5
16	4.3	39	17.5
17	4.6	40	18.5
18	4.9	41	19.7
19	5.3	42	20.9
20	5.7	43	22.2
21	6.0	44	23.6
22	6.4	45	25.1

Deliver	Discount in Selling	Deliver	Discount in Selling
Time (days)	Price (cents/lb.)	Time (days)	Price (cents/lb.)
0	0.0	23	2.9
1	0.1	24	3.0
2	0.2	25	3.2
3	0.3	26	3.3
4	0.5	27	3.5
5	0.6	28	3.6
6	0.7	29	3.8
7	0.8	30	3.9
8	0.9	31	4.1
9	1.1	32	4.2
10	1.2	33	4.4
11	1.3	34	4.6
12	1.4	35	4.7
13	1.5	36	4.9
14	1.7	37	5.1
15	1.8	38	5.3
16	1.9	39	5.4
17	2.1	40	5.6
18	2.2	41	5.8
19	2.3	42	6.0
20	2.5	43	6.2
21	2.6	44	6.4
22	2.7	45	6.6

Exhibit 2: Selling Price Discount for Grapefruit vs. Delivery Time

Week	Shipping Cost	Shipping Time	Week	Shipping Cost	Shipping Time
		(days)			(days)
1	\$1,350	17	26	\$3,350	17
2	\$1,360	17	27	\$3,380	17
3	\$1,370	17	28	\$3,400	17
4	\$1,380	17	29	\$3,410	17
5	\$1,390	17	30	\$3,430	17
6	\$1,400	16	31	\$3,440	17
7	\$1,410	17	32	\$3,450	17
8	\$1,420	17	33	\$3,470	17
9	\$1,450	17	34	\$3,440	16
10	\$1,500	17	35	\$3,420	17
11	\$1,540	16	36	\$3,400	17
12	\$1,630	17	37	\$3,390	17
13	\$1,700	17	38	\$3,380	17
14	\$1,840	17	39	\$3,330	18
15	\$1,960	17	40	\$3,310	17
16	\$2,060	17	41	\$3,250	17
17	\$2,370	17	42	\$3,180	17
18	\$2,580	17	43	\$3,080	17
19	\$2,730	17	44	\$2,960	17
20	\$2,820	17	45	\$2,650	17
21	\$2,990	17	46	\$1,840	17
22	\$3,100	18	47	\$1,600	17
23	\$3,160	17	48	\$1,480	17
24	\$3,270	17	49	\$1,450	17
25	\$3,330	17	50	\$1,400	18

Exhibit 3: Past Year Shipping Costs and Times Using Southern Freight, Inc

	Company				
	Α	В	С		
Sailing Days	Thursday	Monday	Monday / Thursday		
Sailing Time (days)	22	17	17		
Chance of Bump	2%	2%	2%		
Equipment On-Time Rate	100%	100%	100%		
Cost Per Reefer	\$2,400	\$2,600	\$2,700		

Exhibit 4: Comparison of Direct Contracts with Ocean Carriers

Week	Shipping Cost	Shipping Time	Week	Shipping Cost	Shipping Time
		(days)			(days)
1	\$420	23	26	\$3,650	20
2	\$440	24	27	\$3,650	18
3	\$450	25	28	\$3,710	24
4	\$460	28	29	\$3,730	28
5	\$500	17	30	\$3,750	26
6	\$510	41	31	\$3,760	23
7	\$520	20	32	\$3,740	25
8	\$550	25	33	\$3,740	13
9	\$610	28	34	\$3,720	21
10	\$730	27	35	\$3,700	23
11	\$790	32	36	\$3,680	27
12	\$980	20	37	\$3,640	28
13	\$1,060	19	38	\$3,650	18
14	\$1,400	23	39	\$3,570	20
15	\$1,640	24	40	\$3,400	36
16	\$1,830	20	41	\$3,380	23
17	\$2,430	30	42	\$3,260	20
18	\$2,790	28	43	\$3,010	28
19	\$3,010	22	44	\$2,920	22
20	\$3,120	22	45	\$2,160	26
21	\$3,210	20	46	\$1,380	31
22	\$3,320	25	47	\$930	25
23	\$3,360	27	48	\$680	22
24	\$3,400	18	49	\$610	25
25	\$3,530	24	50	\$520	16

Exhibit 5: Past Year Shipping Costs and Times Using E-Commerce Sites

Days for Empty Reefer to Arrive	Occurrences Over Past Year
1	10
2	10
3	15
4	10
5	5

Exhibit 6: Equipment Availability and Sailing Time Data for E-Commerce

Days for Reefer to be Loaded on Ship	Occurrences Over Past Year
3	2
4	4
5	5
6	5
7	6
8	6
9	6
10	5
11	4
12	3
13	2
14	2