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OWNER-OPERATOR COSTS OF HAULING FRESH FRUITS AND VEGETABLES IN REFRIGERATED TRUCKS

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Cost per mile for owner-operators hauling fresh fruits and vegetables are estimated. Analysis is similar to a 1979 study of multitruck firms hauling fresh fruits and vegetables. Data from eight owner-operators were used as cost elements. Costs per mile were estimated for (1) trips of different lengths and operating conditions and (2) for the number of miles driven each year. Unit costs tended to decrease for longer trips and as annual mileage increased. Driver cost was the most expensive item, and includes wages that owner-operators pay themselves, wages for a driver-helper, and trip-related costs such as per diem. Fuel was the second most expensive item, and includes fuel for operating the tractor and refrigeration unit.

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INTRODUCTION

Many independent truckers shut down their operations during the spring of 1979 to protest fuel shortages and price increases. This shutdown generated considerable interest about the cost of operating refrigerated trucks for hauling fresh fruits and vegetables. A study of the cost of operations by multitruck firms was completed in 1976 1/ and updated in July 1979. 2/ Some trucker representatives, however, wanted a study of owner-operator costs of operating refrigerated trucks to compare with the costs developed in the multitruck firm study. This report looks at these owner-operator costs. In order to make this study comparable to the 1979 report, the costs of operating trucks for various trip lengths, operating situations, and levels of truck use by owner-operators were analyzed.

SOURCE OF DATA

The first step was to define owner-operator for data collection and analysis. Owner-operator as defined in this study is a trucker who owns one or two trucks and is usually an active driver of one of the trucks.

Information on operations and costs was obtained from eight owner-operators in Florida, North Carolina, Washington, California, and Texas. Most of these truckers owned only one truck, and all hauled fresh fruits and vegetables in interstate movements.

The average annual mileage for the eight truckers was about 120,000 miles per year. The average one-way trip length was about 1,850 miles. While some truckers made short trips of about 500 miles and some made trips of about 3,000 miles, most reported preferring to make trips from the 1,000- to 1,500-mile range. Most of the truckers reported some seasonality in their operations but considered it necessary where they operated.

1/ Boles, Patrick P. Cost of Operating Refrigerated Trucks for Hauling Fresh Fruits and Vegetables. PB 270 625, National Technical Information Service, Springfield, Va., July 1977.

2/ _____. "Current Cost of Operating Refrigerated Trucks for Hauling Fresh Fruits and Vegetables by Multi-Truck Firms." Staff report. U.S. Department of Agriculture, Economics, Statistics, and Cooperatives Service, December 1979.

The costs of operations developed in this report do not necessarily represent the average cost of all owner-operators hauling fresh fruits and vegetables. Assumptions concerning operations were developed from interviews with the eight owner-operators or their representatives and from research publications. 3/ Most cost factors were derived from cost components reported by the eight firms.

COST COMPONENTS

The owner-operators reported some of their cost items in different forms, which made it necessary to develop comparable cost components. Averages of these components were developed and used as inputs in the synthetic cost analysis.

Fixed Cost

Fixed cost items were assumed to be most of those expenditures that the owner-operator must make for business at a relatively constant rate regardless of the number of miles driven during the year.

Interest on the tractor and trailer was the largest individual fixed cost item. The price of the tractor and trailer used in this analysis was based on 1979 prices for the type of equipment owned by the truckers interviewed. An average price of all the truckers' equipment was developed and used to determine yearly interest and the rate of depreciation. The interest rate or return to capital was assumed to be 13.5 percent. This was the average interest rate that the owner-operators financing their equipment were paying at the time they were interviewed. Interest charges for the tractor and trailer were estimated at $7,290 per year (table 1). Depreciation for the tractor and trailer results both from age and use; thus it was handled in a separate cost category from interest.

Table 1--Estimated interest cost for the tractor and refrigerated trailer, 1979

Item	Original cost 1/	Salvage value	Interest per year 2/
	Dollars	Percent	Dollars
Tractor	63,000	20	5,103
Trailer	27,000	20	2,187
Total	90,000	--	7,290

1/ Based on 1979 average prices for equipment owned by truckers interviewed.
2/ Assumes an interest rate of 13.5 percent applied to the average midlife value of the tractor and trailer.

3/ Boles, Patrick P. Cost of Operating Refrigerated Trucks for Hauling Fresh Fruits and Vegetables. PB 270 625, National Technical Information Service, Springfield, Va., July 1977; Lough, Harold W. Truck Transportation Cost of Bulk Milk, PB 270 891, National Technical Information Service, Springfield, Va., August 1977; and Moede, Herbert H. Over-the-Road Cost of Hauling Bulk Milk, MR-919, U.S. Department of Agriculture, Economic Research Service, January 1971.

Insurance on the tractors and trailers was estimated at $6,860 per year and was the second largest item of fixed cost. Management expenses were estimated at $2,995 per truck (table 2). This included an office rental allowance, bookkeeping and legal services, telephone, travel, office supplies, and miscellaneous items. Licenses and permits were estimated at $1,990 per truck. Taxes were estimated at $310 and only include Federal use tax on the truck and miscellaneous taxes such as personal property taxes. The total annual fixed costs were estimated at $19,445 per truck (table 3).

Table 2--Estimated management expenses, 1979

Item	Cost per year
	Dollars
Telephone (standard charge)	180
Office rental allowance	825
Bookkeeping and legal services	610
Office supplies	110
Dues and charities	170
Travel (business)	360
Miscellaneous	740
Total	2,995

Table 3--Estimated annual fixed cost, 1979

Item	Cost per year
	Dollars
Interest on tractor and trailer	7,290
Management expenses	2,995
Insurance on tractor and trailer	6,860
Licenses and permits	1,990
Taxes	310
Total	19,445

Vehicle Depreciation

Vehicle depreciation was considered a function of a combination of age and use in the 1979 study of multitruck operations. The same assumption is used in this study since truckers reported various levels of annual mileage and years of depreciation.

Owner-operators reported that the average lifetime mileage was 650,000 miles for tractors and 750,000 miles for refrigerated trailers. A tractor and refrigerated trailer for a owner-operator were estimated to cost $90,000 in 1979 (see table 1). It was assumed that the equipment would have a 20-percent salvage value at the end of its useful life to the trucker. The tractor and trailer are assumed obsolete after a 10-year period. These assumptions result in an annual depreciation of $5,040 for a tractor for the first 65,000 miles driven each year, plus 7.8 cents for each additional mile driven. Annual depreciation for a refrigerated trailer is $2,160 for the first 75,000 miles driven each year, plus 2.9 cents for each additional mile driven.

Driver Cost

Most owner-operators reported paying themselves an amount for each trip or a percentage of the revenue as compensation for driving and management of their business. This averaged about $375 per week, or about 16 cents for each mile driven. They also reported paying driver-helpers on longer trips about 9 cents per mile. These costs per mile are approximately the same as those used in the July 1979 multitruck analysis.

Owner-operators were assumed to pay themselves 16 cents per mile when they drive alone, and 10 cents per mile when accompanied by a driver-helper, who received 9 cents per mile. Driver-helpers are assumed to receive a minimum annual salary of $11,915, but no minimum annual salary is set for the owner-operator. Total driver costs include fringe benefits consisting of social security taxes, worker's compensation insurance, unemployment compensation insurance for the driver-helper, and health insurance. Also included were per diem while on the road and motel costs were a layover is necessary to obtain a loaded backhaul (table 4).

Table 4--Estimated driver compensation, 1979

Item	Cost
Base pay (owner-operator alone)	16 cents per mile
Base pay (owner-operator plus helper)	19 cents per mile
Social security (owner-operator) taxes	8.1 percent of first $22,900
Social security (driver-helper) taxes	6.13 percent of first $22,900
Worker's compensation insurance	11.8 percent of total salary
Unemployment compensation insurance 1/	3.4 percent first $6,000
Health insurance	$35 per month per driver
Per diem	$15 per day on the road
Motel	$25 per day of layover

1/ Applied to driver-helper only.

Direct Variable Cost

Direct variable cost includes all those items only associated with trips made (table 5).

Table 5--Estimated direct variable costs for owner-operators of a refrigerated truck, 1979

Item	Per mile	Per hour	Per trip
	- - Cents - -		Dollars
Fuel for tractor:			
Loaded	22.8	--	--
Empty	19.6	--	--
Maintenance	8.1	--	--
Tires	3.4	--	--
Fuel for refrigeration unit:			
Truck loaded moving	1.4	--	--
Truck loaded stopped	--	63.0	
Unloading cost	--	--	88.00
Market fees	--	--	12.00
Scale fees	--	--	4.00
Telephone (long distance)	.7	--	--
Other 1/	.3	--	--

-- = not applicable.

1/ No provision is made for third structure taxes, such as axle-mile tax, since they are paid in only a limited number of States.

Fuel to operate the tractor is the most expensive item of direct variable cost, estimated at 22.8 cents per mile when the truck is loaded and 19.6 cents per mile when empty. These fuel costs were based on an average fuel consumption of 4.4 miles per gallon loaded and 5.1 miles per gallon empty, and an average cost of $1.002 per gallon as reported by the Interstate Commerce Commission for September 24, 1979.

Maintenance costs for the tractor and trailer were estimated at 8.1 cents per mile. These included servicing the vehicle, brake repairs, engine overhaul, servicing the refrigeration unit, miscellaneous repairs and services, and washing the vehicle. It did not include general maintenance labor performed by the owner-operator but did include a cost for some tools.

Tire costs for the tractor and trailer were estimated at 3.4 cents per mile. Long distance telephone calls to shippers, receivers, and brokers were estimated at 0.6 cent per vehicle mile.

Fuel for the refrigeration unit was estimated at 1.4 cents per mile when the truck is loaded and moving. Fuel costs for the unit when loaded but not running were estimated at 63 cents per hour.

Per Mile Cost

The cost inputs developed for owner-operators were used to analyze the two basic types of situations developed in the study of multitruck firms. One of these basic situations is defined by truck trips of specific distances and operating conditions and the other by various levels of truck use under a specific operating condition.

The multitruck study was limited to 12 operating situations which were specified by the number of pickups, deliveries, and delays to obtain a loaded backhaul (table 6). One-way trip lengths were limited to six, ranging from 500 to 3,000 miles. Total trip mileages were derived using the information in table 7.

Time requirements for specific trips were important in determining per mile cost. Only truck checkout was standard regardless of trip length or operating situation. Deadheading, loading, unloading, and waiting time depended on trip length and the number of drivers (table 8). Layover was determined by delays in obtaining a loaded backhaul.

Owner-operators were assumed to drive alone on all one-way trips of 500 to 1,500 miles and to have a driver-helper on all one-way trips of 2,000 miles or more.

Table 6--Characteristics of 12 refrigerated truck operating situations

Operating situation	Initial haul		Backhaul		Delay for loaded backhaul
	Pickups	Deliveries	Pickups	Deliveries	
	Number				Days
1	1	1	0	0	0
2	1	1	1	1	0
3	1	1	1	1	1
4	1	1	1	1	2
5	2	2	0	0	0
6	2	2	2	2	0
7	2	2	2	2	1
8	2	2	2	2	2
9	4	4	0	0	0
10	4	4	4	4	0
11	4	4	4	4	1
12	4	4	4	4	2

Table 7--Information used to develop trip mileages for various refrigerated truck operating situations

Operating situation 1/	Pickup and delivery	Line haul		Total round trip 2/
		Fully loaded	Empty	
	Miles			
1	25	n	n	2n + 25
2	50	2n	0	2n + 50
3	50	2n	0	2n + 50
4	50	2n	0	2n + 50
5	75	n	n	2n + 75
6	150	2n	0	2n + 150
7	150	2n	0	2n + 150
8	150	2n	0	2n + 150
9	175	n	n	2n + 175
10	350	2n	0	2n + 350
11	350	2n	0	2n + 350
12	350	2n	0	2n + 350

n = One-way trip distance from point of last pickup to point of first delivery.

1/ See table 7 for characteristics of operating situations.

2/ Assumes a 25-mile empty movement from home office or point of last delivery to first pickup point, and 25-mile segments between individual pickup and delivery points.

Table 8--Estimated time required to operate a refrigerated truck

Item	Time required	
	Hours	
Truck checkout	0.25	per round trip
Loading and waiting time	2.0	per pickup
Driving time 1/	.022	per mile
Rest stops 2/	8.0	per stop
Meal stops	.5	per stop
Unloading and waiting time	2.0	per delivery
Layover 3/	0-48.0	per round trip

1/ Driving time includes time spent driving to pick up initial load and make deliveries. Each empty and partial load segment is assumed to be 25 miles long and to require 33 minutes to make. When there are four pickups and four deliveries, there would be 2.2 hours deadhead time for pickups and 1.65 hours for deliveries.

2/ Rest stops apply only to trucks having one driver. Federal safety regulations require 8 hours rest after 10 hours continuous driving or 15 hours on duty.

3/ Layover refers to time spent waiting for a loaded backhaul.

Hours away from home for a specific trip length and operating situation were used to determine the number of days required for the trip. This in turn was used to determine the number of trips a truck would make in a year for each operating situation and trip length (table 9). The number of trips per year times the total trip mileage gave the feasible total annual mileage (table 10). The fully loaded miles per trip times the number of trips yielded the total fully loaded miles per year (table 11).

In all cases except one, the cost per mile for all miles driven for the six different trip lengths and the 12 operational situations went down as the length of trip increase (table 12). The exception was the result of a scheduling problem that caused a lower total annual mileage than a shorter trip length, thus increasing the cost per mile.

Table 9--Estimated number of trips per year for a refrigerated truck hauling fresh fruits and vegetables 1/

Operating situation	One-way distance (miles)					
	500	1,000	1,500	2,000 2/	2,500 2/	3,000 2/
	Trips					
1	100	60	42	58	49	38
2	87	55	35	50	43	38
3	60	50	35	43	38	35
4	50	43	33	38	35	31
5	87	50	35	55	45	38
6	71	46	29	46	38	34
7	60	43	29	43	35	34
8	50	38	29	38	31	31
9	70	46	29	46	38	34
10	43	29	25	35	31	28
11	43	29	25	35	31	28
12	38	29	25	35	31	28

1/ See tables 6, 7, and 8 for characteristics of operating situations, distances per trip, and time requirements.
2/ Indicates owner-operator and driver-helper on all trips in these mileage groups.

Table 10--Estimated annual mileage for a refrigerated truck hauling fresh fruits and vegetables 1/

Operating situation	One-way distance (miles)					
	500	1,000	1,500	2,000	2,500	3,000
	1,000 miles					
1	102.5	121.5	127.1	233.5	246.2	229.0
2	91.4	112.8	106.8	202.5	217.2	229.9
3	63.0	102.5	106.8	174.2	191.9	211.8
4	52.5	88.2	100.7	153.9	176.8	187.6
5	93.5	103.8	107.6	224.1	228.4	230.9
6	81.7	98.9	91.4	190.0	195.7	209.1
7	69.0	92.5	91.4	178.5	180.3	209.1
8	57.5	81.7	91.4	157.7	159.7	190.7
9	82.3	100.1	92.1	192.1	201.8	210.0
10	58.1	68.2	83.8	152.3	165.9	177.8
11	58.1	68.2	83.8	152.3	165.9	177.8
12	51.3	68.2	83.8	152.3	165.9	177.8

1/ See tables 6, 7, and 9 for characteristics of operating situations, distances per trip, and number of trips.

Table 11--Estimated fully loaded annual mileage for a refrigerated truck 1/

Operating situation 1/	One-way distance (miles)					
	500	1,000	1,500	2,000	2,500	3,000
	1,000 miles					
1	50.0	60.0	63.0	116.0	122.5	114.0
2	87.0	110.0	105.0	200.0	215.0	228.0
3	60.0	100.0	105.0	172.0	190.0	210.0
4	50.0	86.0	99.0	152.0	175.0	186.0
5	43.5	50.0	52.5	110.0	112.5	114.0
6	71.0	92.0	87.0	184.0	190.0	204.0
7	60.0	86.0	87.0	172.0	175.0	204.4
8	50.0	76.0	87.0	152.0	155.0	186.0
9	38.5	46.0	43.5	92.0	97.5	102.0
10	43.0	58 0	75.0	140.0	155.0	168.0
11	43.0	58.0	75.0	140.0	155.0	168.0
12	38.0	58.0	75.0	140.0	155.0	168.0

1/ See tables 6, 7, and 9 for characteristics of operating situations, distances per trip, and number of trips.

Table 12--Estimated refrigerated truck cost for owner-operators hauling fresh fruits and vegetables per vehicle mile, 1979

Operating situation 1/	One-way distance (miles)					
	500	1,000	1,500	2,000	2,500	3,000
	Dollars per vehicle mile					
1	0.976	0.894	0.871	0.821	0.811	0.813
2	1.034	.940	.929	.866	.852	.842
3	1.169	.973	.935	.902	.883	.863
4	1.294	1.024	.960	.937	.906	.889
5	1.008	.921	.899	.835	.824	.819
6	1.064	.970	.967	.872	.863	.852
7	1.144	1.000	.973	.898	.888	.865
8	1.251	1.046	.985	.932	.924	.888
9	1.031	.936	.935	.848	.847	.827
10	1.198	1.076	.993	.905	.878	.872
11	1.223	1.084	1.003	.924	.903	.886
12	1.314	1.103	1.016	.942	.917	.899

1/ See table 6 for characteristics of operating situations.

Within trip length categories, cost per mile increased as loaded backhaul, more pickup and deliveries, and delays for loaded backhaul were added. These increases were higher for shorter trips. The additional time required for these activities reduced the annual mileage that can be achieved and thus increased per mile cost.

Owner-operators and the multitruck firms interviewed in 1976 indicated that rates were established for one-way distances between originating producing areas and destination cities. Thus, revenue was generally based on miles driven when the truck was fully loaded (table 13). No allowance was made for deadhead miles driven or empty backhaul. Additional pickups, deliveries, loaded backhaul and delays to obtain a loaded backhaul, and the rates needed to cover these costs proved important to the cost of operation.

Table 13--Estimated refrigerated truck cost for owner-operators hauling fresh fruits and vegetables per fully loaded mile, 1979

Operating situation 1/	One-way distance (miles)					
	500	1,000	1,500	2,000	2,500	3,000
	Dollars per vehicle mile					
1	2.000	1.810	1.756	1.652	1.629	1.633
2	1.086	.963	.944	.877	.861	.849
3	1.228	.997	.950	.913	.892	.870
4	1.359	1.049	.976	.948	.915	.896
5	2.168	1.911	1.842	1.701	1.671	1.658
6	1.223	1.043	1.016	.905	.889	.873
7	1.315	1.075	1.022	.932	.915	.886
8	1.438	1.125	1.035	.967	.952	.910
9	2.420	2.035	1.981	1.770	1.754	1.702
10	1.617	1.264	1.108	.984	.939	.923
11	1.650	1.274	1.121	1.004	.966	.938
12	1.773	1.296	1.134	1.024	.981	.951

1/ See table 6 for characteristics of operating situations.

Total annual mileage was important in determining the cost per mile for owner-operators hauling fresh fruits and vegetables (table 14). This analysis was restricted to operating situation 6 and the 1,500-mile, one-way trip. Under these conditions, a truck operating 100,000 miles per year would have cost 14.8 percent more than one operating 180,000 miles per year.

Table 14--Estimated refrigerated truck cost for owner-operators for various annual mileages under operational situation 6 and a 1,500-mile, one-way trip, 1979 1/

Total annual mileage 2/	Cost per mile driven	Cost per fully loaded mile
	Dollars per mile	
100,000	1.019	1.070
110,000	.982	1.032
120,000	.956	1.004
130,000	.934	.981
140,000	.920	.966
150,000	.911	.957
160,000	.903	.949
170,000	.894	.939
180,000	.888	.933

1/ See table 6 for characteristics of operating situations.
2/ There would be the owner-operator and a driver-helper on all trips.

Table 15 illustrates the importance of the relationship between the four major cost components. Most of the savings that were generated by operating additional miles resulted from spreading fixed costs over additional miles. Savings generated in the driver cost category resulted primarily from the minimum annual driver-helper salary being spread over additional miles up to the 130,000-mile category. After this point, most of the driver cost became the same per mile regardless of the number of miles driven.

Table 15--Major cost components for owner-operators of refrigerated trucks for various annual mileages under operating situation 6 and a 1,500-mile, one-way trip, 1979 1/

Total annual mileage 2/	Cost component				Total cost
	Fixed Cost	Vehicle cost	Driver cost	Variable cost	
	Dollars per mile				
100,000	0.194	0.107	0.309	0.403	1.019
110,000	.177	.107	.295	.403	.982
120,000	.162	.107	.284	.403	.956
130,000	.150	.107	.274	.403	.934
140,000	.139	.107	.271	.403	.920
150,000	.130	.107	.271	.403	.911
160,000	.122	.107	.271	.403	.903
170,000	.114	.107	.270	.403	.894
180,000	.108	.107	.270	.403	.888

1/ See table 6 for characteristics of operating situations.
2/ Owner-operator and driver-helper on all trips.

APPENDIX I--Cost Equations

The various cost figures in this report were developed by using the following equations. In all cases, various cost components yielded total annual costs; these were then divided by total annual mileage to obtain the cost per mile shown in the text tables. These equations can be used to develop costs for annual mileages not shown in the text or they can be used with different cost inputs. The equations are as follows:

1. Fixed cost per mile is: $F = \frac{F_1}{M}$

where: F = Fixed cost per mile,

F_1 = Total annual fixed cost per truck ($19,445), and

M = Total annual mileage per truck.

2. Depreciation cost per mile is: $D = \frac{D_1 + X_1 M_1 + X_2 M_2}{M}$

where: D = Vehicle depreciation cost per mile,

D_1 = Minimum vehicle depreciation per year for tractor and refrigerated trailer ($7,290),

X_1 = Depreciation cost per mile for tractors (7.8 cents),

$M_1 = M - M_3'$ where $M > M_3'$, and

where: M_3 = Minimum miles per year for tractors (65,000),

X_2 = Depreciation cost per mile for refrigerated trailers (2.9 cents),

$M_2 = M - M_4'$ where $M > M_4'$, and

where: M_4 = Minimum miles per year for refrigerated trailers (75,000).

3. Driver cost per mile for owner-operator alone is:

$$C_1 = \frac{S_1 + X_3 S_m + X_5 S_1 + 2X_6 + X_8 d_1 + X_9 d_2}{M}$$

where: C_1 = Cost per mile for owner-operator alone,

$S_1 = R_1 M$,

where: R_1 = 16 cents,

X_3 = Social security rate for owner-operators (8.1 percent of wages),

$S_m = S_1$, where $S_1 \leq S_4$, and

where: S_4 = Maximum wages on which social security taxes are paid ($22,900),

X_5 = Worker's compensation insurance rate (11.8 percent of wages),

X_6 = Health insurance ($420 per year),

X_8 = Per diem on the road ($15 per day),

d_1 = Number of trip-days per year,

X_9 = Motel layover for backhaul ($25 per day), and

d_1 = Number of day delay to obtain backhaul per year.

4. Driver cost per mile for owner-operator and a driver-helper is:

$$C_2 = \frac{S_2+S_3+X_3S_n+X_4S_w+X_5(S_2+S_3)+2X_6+X_7+2X_8d_1+2X_9d_2}{M},$$

where: C_2 = Cost per mile for owner-operator and driver-helper,

$S_2 = R_2M$ = Yearly salary for owner-operator, and

where: R_2 = 10 cents, and

$S_3 = R_3M_5$, where $S_3 > S$ = Yearly salary for driver-helper, and

where: S = Minimum yearly salary for driver-helper ($11,915),

R_3 = Rate per mile for driver-helper (9 cents),

$M_5 = M - M_6$, where $M > M_6$, and

M_6 = Yearly mileage required to achieve minimum yearly salary (132,389),

$S_n = S_2$, where $S_2 \leq S_4$,

X_4 = Social security rate for driver-helper (6.13 percent of wages),

$S_w = S_3$, where $S_3 \leq S_4$,

X_7 = Unemployment compensation rate for driver-helper ($204 per year).

5. Direct variable cost is:

$$Y = F + A + B + E + G,$$

where: $F = \frac{F_1M_7+F_2M_8}{M}$ = Fuel cost per mile,

where: F_1 = Fuel cost per when truck is driven loaded (22/9 cents),

M_7 = Miles per year when truck is driven loaded,

F_2 = Fuel cost per mile when truck is driven empty (19.6 cents),

M_8 = Miles per year when truck is driven empty,

A = Maintenance cost per mile (8.1 cents),

B = Tire cost per mile (3.4 cents),

E = NH = Unloading and related cost per year, and

where: N = Number of trip per year,

H = Unloading and related cost per trip ($104),

G = Miscellaneous cost per mile (0.9 cents).

6. Total cost per miles is:

$T_1 = F + D + C_1 + Y$ = Total cost per mile for owner-operator alone, and

$T_2 = F + D + C_2 + Y$ = Total cost per mile for owner-operator and two driver-helpers.

APPENDIX II--Owner-Operator Cost Guide

It is important for owner-operators to know per mile costs. Without this knowledge, they may haul for rates that do not provide enough revenue to cover costs and continue in business. This outline illustrates what the owner-operator's cost would be for operating situation 6; the 1,500-mile, one-way trip; and 130,000 miles per year. The owner-operator would have a driver-helper on these trips (table 15). Fixed cost are those items that remain the same regardless of the number of miles driven during the year. Variable costs result only when trips are made.

Owner-operators can substitute their own cost items in this guide to calculate their own total yearly cost and cost per mile. The trucker will probably have to use previous expenses for many cost items, but if good estimates are available for some expected cost items, then these can be used.

Fixed Costs

1. The first item under fixed cost is interest on the tractor and trailer. The interest cost developed is for a return to capital and is not necessarily the same as the interest that would be paid to a lender. Interest cost would provide for a return to owner-operators for the use of their own money. Salvage value is included because it is part of the capital asset.

2. Management and overhead includes various items that are not readily associated with trips on the road. The office rental allowance is for a portion of the owner-operator's home that is used for an office. It includes part of the utilities used for that purpose. Telephone is for the standard monthly charge but does not include long distance calls. Travel is for business-related trips that do not involve the owner-operator's truck.

3. The amount of insurance depends on the driving record and the loss and damage claims record of the owner-operator.

4. Cost of licenses and permits depend on the States in which the owner-operator drives the truck and how many miles or trips are driven in each State.

Variable Costs

5. Although vehicle depreciation has attributes of both fixed and variable cost, it is handled as a variable cost in this guide. The number of miles driven is probably a better measure than age in determining the useful life of a truck. Using a standard number of years for depreciation may overstate the per mile cost for truckers with low annual mileage and understate per mile cost for those with high annual mileage.

6. Driver cost is the second item of variable cost. It is important that the owner-operators include a cost for their own driving. This is an opportunity cost which should approximate what the trucker would be able to make driving for someone else. These costs can vary considerably. Owner-operators may feel that their driving and management is worth more than shown here. Rates may also be different for worker's compensation insurance, health insurance, and per diem.

7. Fuel has become a very important part of the trucker's cost. Owner-operators can readily determine their own per mile cost for fuel by dividing

gallons purchased by miles driven for the year or some other period. During periods of time when the price of fuel changes rapidly, a recent month or trip should be used to determine fuel cost per mile.

8. Maintenance cost can vary considerably depending on how much of the work the trucker does himself and the age of the vehicle. Maintenance is an area where the owner-operators can get a distorted picture of their cost. For example, the first year of owning a new truck, maintenance cost may be very low. However, in the second and third year expenses start to show up for major repairs such as an engine overhaul. These expenses must be anticipated and funds allocated to pay for them.

9. Tire replacement represents a major outlay especially if several tires are purchased at one time. Funds should be allocated for this expense.

10. Miscellaneous cost per mile can vary depending on the length of haul, where the load is going, and the type of backhaul load. If the trucker operates in States that have third structure taxes such as an axle-mile tax, the cost of these should be added to miscellaneous cost.

Owner-operators can use columns three and four of the following table for their own cost elements and to calculate their cost per mile for specific cost items and total cost.

Owner-operator's guide to calculating per mile cost for a refrigerated truck to haul fresh fruits and vegetables

Item and computation procedure	November 1979 estimated		Owner-operator's	
	Cost per year	Cost per mile	Cost per year	Cost per mile
	Dollars	Cents	Dollars	Cents
Fixed Costs:				
1. Interest on equipment:				
([Purchase price - salvage value) ÷ 2] + salvage value) X interest rate				
Truck price = $63,000				
Trailer price = $27,000				
Salvage value = 20 percent				
Interest rate = 13.5 percent				
Miles per year = 130,000				
$\frac{\$90,000 + \$18,000}{2}$ = $36,000				
$36,000 + $18,000 = $54,000				
$54,000 X 13.5 percent =	7,290			
$7,290 ÷ 130,000		5.6		
2. Management and overhead:				
Office rental allowance =	825			
Bookkeeping fees =	310			
Legal fees =	300			
Telephone =	180			
Travel =	360			
Office supplies =	110			
Dues and charities =	170			
Federal use tax =	210			
Other taxes =	100			
Miscellaneous =	740			
Total =	3,305			
$3,305 ÷ 130,000 =		2.5		
3. Insurance on equipment:				
Liability =				
Collision = X.XX				
Cargo = X.XX				
Bonds = X.XX				
Other = X.XX				

Continued--

Note--Owner-operators may use right-hand colums to calculate their own individual costs.

Owner-operator's guide to calculating per mile cost for a refrigerated truck to haul fresh fruits and vegetables--continued

Item and computation procedure	November 1979 estimated		Owner-operator's	
	Cost per year	Cost per mile	Cost per year	Cost per mile
	Dollars	Cents	Dollars	Cents
Total insurance = X.XX	6,860			
$6,860 ÷ 130,000 =		5.2		
4. Licenses and permits:				
State licenses fees = X.XX				
Trip permits = X.XX				
Other = X.XX				
Total = X.XX	1,990			
$1,990 ÷ 130,000 =		1.5		
Variable costs:				
5. Vehicle depreciation				
[(Purchase price - salvage value) ÷ years of useful life] ÷ minimum annual mileage				
Years of useful life = 10				
Maximum lifetime mileage:				
Tractor = 650,000				
Trailer = 750,000				
Minimum lifetime mileage:				
650,000 ÷ 10 = 65,000				
750,000 ÷ 10 = 75,000				
Tractor:				
$63,000 - $12,600 = $54,400				
$54,400 ÷ 10 = $5,040				
$5,040 ÷ 65,000 = 7.8 cents		7.8		

Continued--

Note--Owner-operators may use right-hand colums to calculate their own individual costs.

Owner-operator's guide to calculating per mile cost for a refrigerated truck to haul fresh fruits and vegetables--continued

Item and computation procedure	November 1979 estimated		Owner-operator's	
	Cost per year	Cost per mile	Cost per year	Cost per mile
	Dollars	Cents	Dollars	Cents
Trailer:				
$27,000 - $5,400 = $21,600				
$21,600 ÷ 10 = $2,160				
$2,160 ÷ 75,000 = 2.9 cents		2.9		
Total =	13,910	10.7		
6. Driver cost:				
Wages:				
Owner alone 16 cents per mile	--			
Owner with helper at 10 cents a mile	13,000			
Helper at 9 cents a mile (minimum salary $11,915)	11,915			
Social security:				
Owner = 8.1 percent of salary up to $22,900	1,053			
Helper = 6.13 percent of salary up to $22,900	730			
Worker's compensation insurance:				
Owner = 11.8 percent of salary	1,534			
Helper = 11.8 percent of salary	730			
Unemployment compensation insurance:				
Helper only = $204	204			
Health insurance:				
Owner = $420	420			
Helper = $420	420			
Subsistence:				
Per diem = $15 per day on the road				
Number trips = 41 (41.2 trips rounded)	2,460			

Continued--

Note--Owner-operators may use right-hand colums to calculate their own individual costs.

Owner-operator's guide to calculating per mile cost for a refrigerated truck to haul fresh fruits and vegetables--continued

Item and computation procedure	November 1979 estimated: Cost per year	November 1979 estimated: Cost per mile	Owner-operator's: Cost per year	Owner-operator's: Cost per mile
	Dollars	Cents	Dollars	Cents
Days per trip = 4	2,460			
Driver = 164 X $15 = $2,460	2,460			
Helper = 164 X $15 = $2,460	2,460			
Layover = $25 per day	--			
Other	--			
Total =	35,602			
$35,602 ÷ 130,000 =		27.4		
7. Operating cost:				
Fuel for tractor:				
(Fuel cost per gallon ÷ miles per gallon loaded) X percentage of miles loaded				
+				
(Fuel cost per gallon ÷ miles per gallon empty) X percentage of miles empty				
Fuel cost per gallon = $1.002				
Miles per gallon loaded = 4.4				
Miles per gallon empty = 5.1				
Percent of miles loaded = 95 percent				
Percent of miles empty = 5 percent				
$1.002 ÷ 4.4 = 22.77 X .95 = 21.63				
$1.002 ÷ 5.1 = 19.65 X .05 = .98				
22.61 cents				
130,000 X 22.61 =	29,391	22.6		
8. Maintenance:				
Grease, oil, filters = X.XX				
Brakes = X.XX				
Trailer repairs = X.XX				
Refrigerater unit repairs = X.XX				
Washing = X.XX				
Other = X.XX				

Continued--

Note--Owner-operators may use right-hand columns to calculate their own individual costs.

Owner-operator's guide to calculating per mile cost for a refrigerated truck to haul fresh fruits and vegetables--continued

Item and computation procedure	November 1979 estimated		Owner-operator's	
	Cost per year	Cost per mile	Cost per year	Cost per mile
	Dollars	Cents	Dollars	Cents
Subtotal = X.XX	$ 7,410			
$7,410 ÷ 130,000 = 5.7 cents		5.7		
Overhall				
$6,000 ÷ 250,000 = 2.4 cents	3,144	2.4		
Total =	10,554	8.1		
9. Tires:				
(Cost per tire X number of tires) ÷ average tire mileage				
Cost per tire = $283				
Number of tires = 18				
Average tire mileage = 150,000				
$283 X 18 = $5,094				
$5,094 ÷ 150,000 =	4,420	3.4		
10. Miscellaneous:				
Refrigeration fuel:				
[(Gallons per hour X price per gallon) ÷ average miles per hours]				
+				
[(Gallons per hour X price per gallon) X (hours truck loaded but not moving per trip)] ÷ miles per trip				
Gallons per hour = 73 cents				
Price per gallon = 86.2 cents				
Average miles per hour = 45				
Hours truck loaded but not moving = 23				
Miles per trip = 3,150				
73 cents X 86.2 cents = 63 cents				
63 cents ÷ 45 = 1.4 cents		1.4		
63 cents X 23 = $14.49				
$14.49 ÷ 3,150 = .5 cents		.5		

Continued--

Note--Owner-operators may use right-hand columns to calculate their own individual costs.

Owner-operator's guide to calculating per mile cost for a refrigerated truck to haul fresh fruits and vegetables--continued

Item and computation procedure	November 1979 estimated		Owner-operator's	
	Cost per year	Cost per mile	Cost per year	Cost per mile
	Dollars	Cents	Dollars	Cents
Total =	2,470	1.9		
Unloading, market and scale fees:				
Unloading, market fees and scale fees per trip ÷ miles per trip				
Unloading fee per trip = $88 Market fee per trip = $12 Scale fee per trip = $4 $104 ÷ 3,150 = 3.3 cents	4,290	3.3		
Other miscellaneous costs:				
Telephone calls = X.XX Tolls = X.XX Icing fees = X.XX Other = X.XX				
Total = X.XX				
1,300 ÷ 130,000 =	1,300	1.0		
Total miscellaneous =	8,060	4.2		
11. Total costs:				
Fixed costs:				
Interest on equipment	7,290	5.6		
Management and overhead	3,305	2.6		
Insurance on equipment	6,860	5.3		
Licences and permits	1,990	1.5		
Subtotal	19,445	15.0		
Variable costs:				
Vehicle depreciation	13,910	10.7		
Driver cost	35,602	27.4		

Continued--

Note--Owner-operators may use right-hand colums to calculate their own individual costs.

Owner-operator's guide to calculating per mile cost for a refrigerated truck to haul fresh fruits and vegetables--continued

Item and computation procedure	November 1979 estimated		Owner-operator's	
	Cost per year	Cost per mile	Cost per year	Cost per mile
	Dollars	Cents	Dollars	Cents
Operating Costs:				
Fuel for tractor	29,391	22.6		
Maintenance	10,554	8.1		
Tires	4,420	3.4		
Miscellaneous	8,060	6.2		
Subtotal	52,425	40.3		
Total cost =	121,382	93.4		

Note--Owner-operators may use right-hand colums to calculate their own individual costs.

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