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The Geographic Structure of Milk Hauling Cost and Efficiencies in New York State

by

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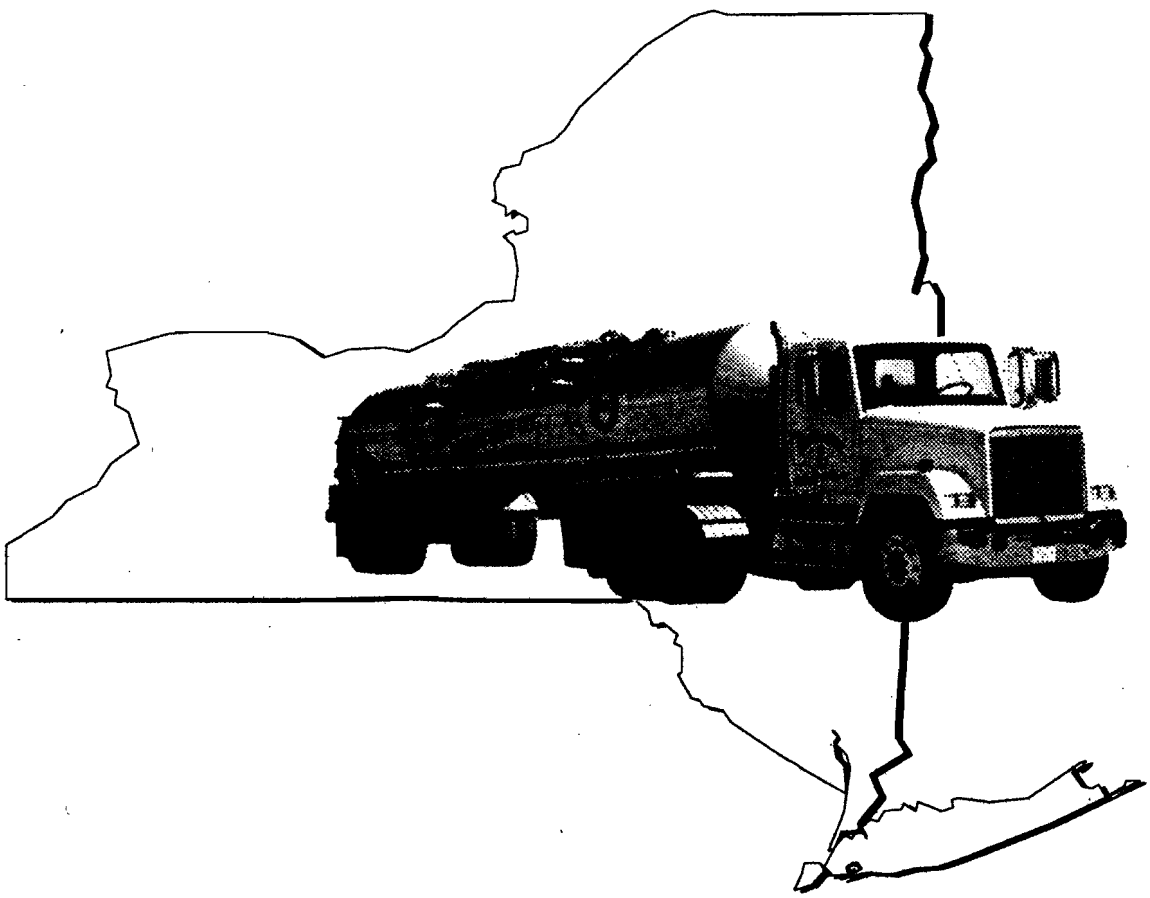

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Abstract

A survey of the milk haulers in the Northeast was conducted in June 1992 to assess the status of the industry. Detailed information on characteristics of the hauling businesses as well as the equipment operated was collected. Data submitted by milk haulers with New York addresses was isolated from the survey data set and analyzed on a regional basis.

Some of the general topics addressed include the number, size, and location of hauling businesses, wages paid to hired drivers, and the cost of milk hauling equipment. A section is devoted to measures of hauling efficiency. Two sections review the costs involved in milk hauling, the first of which is more general in its approach. The second cost-based section investigates differences in hauling costs between small- and large-sized milk haulers.

Introduction

In 1981, a study of New York milk hauling was conducted and completed by Dr. Bruce L. Anderson of Cornell University.[1] The study answered many questions concerning the structure and characteristics of milk hauling in New York State. There has been support from the New York-New Jersey Federal Milk Marketing Order, Market Administrator's Office and the Division of Dairy Industry Services, New York State Department of Agriculture and Markets to conduct a similar follow-up study to investigate the status of the milk hauling industry in the northeast. In the spring of 1992, a concerted effort to administer such a study was put forth by the aforementioned groups as well as the Department of Agricultural Economics at Cornell University. A survey was developed and distributed to all haulers in the state of New York as well as all non-New York operators hauling milk pooled in the New York-New Jersey marketing order (Federal Order No. 2). Milk haulers based in New York as well as those in central and eastern Pennsylvania constituted the majority of haulers on the list. However, a smattering of haulers from neighboring states such as Vermont, New Jersey, Connecticut, and Massachusetts were also included in the survey, a slight departure from the exclusively New York-based survey of 1981.

The list of haulers was divided into two size-based groups prior to mailing the survey. Haulers with six or fewer vehicles were designated "small haulers," and the haulers operating seven or more vehicles were classified as "large haulers". In early June, every hauler was sent a copy of the milk hauling survey along with a letter explaining the purpose and intent of the survey. Furthermore, the large haulers, as a result of the size and complexity of their operations, were contacted by telephone in order to set up a personal interview. A follow-up letter was sent to non-responding haulers in July to encourage their participation. In August a second letter was sent to non-responding haulers along with a shortened and simplified version of the survey form.

Of the 232 small haulers identified, 135 responded to the original survey or the shortened survey and indicated that they were currently hauling bulk milk. Of the 51 large haulers, 34 participated in the personal interview sessions. Fifteen of the haulers responded to the survey and indicated that they were no longer hauling bulk milk.[2]

Data for the present analysis is a subset of the information collected from the milk hauling survey and is based only on those milk haulers with New York addresses. Information on several hauling cost-related items in the hauling business, such as vehicle insurance premiums, registration fees, vehicle replacement costs, and tire costs is included. Particular attention is given to measures of efficiency.

As a prelude to the analysis, background information concerning milk marketing in New York state is reviewed. The remainder of the publication contains four sections. The first section provides basic background material on New York milk haulers, including size of hauling businesses, age of vehicles, cost of replacement vehicles, and wages paid to hired drivers. Section II concentrates on milk hauling efficiency measures. Among the topics covered in

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[1]Anderson, Bruce L. 1981. *The Structure and Characteristics of the Milk Assembly System in New York State.* A.E. Res. 81-16. Cornell University Department of Agricultural Economics.

[2]For more results on the Northeast Milk Hauling Survey, please refer to *The Structure of the Milk Hauling Industry in New York and Pennsylvania*, A.E. Res. 93-13, Cornell University Department of Agricultural Economics.

detail are the loads of milk hauled, the number of farm stops, the pounds of milk hauled, and the number of operating hours. Section III investigates some of the costs associated with milk hauling such as wages paid to hired drivers, insurance premiums, registration fees, tire costs, and repair costs. The final section reviews selected cost-related items, but focuses on the differences in costs between small and large haulers.

Background Information on Milk Marketing in New York State

For the purposes of the analysis, New York State is divided into four regions based on geographic considerations and milk movement patterns (Figure 1). Table 1 describes the size of each region in terms of number of counties, haulers, and vehicles; Figure 2 illustrates the location of the milk haulers participating in the present analysis. The western region contains 39% of the haulers in the study, though it is comprised of just eleven counties, the second smallest total of all regions. Nearly 40% of the vehicles are located in the central region, most of which are owned by a few large hauling operations based in that region. The northern region contains the fewest counties and the lowest vehicle total. The eastern region contains the lowest number of haulers, but the highest number of counties. As a reminder to the reader, a number of counties in the state report no milk hauling activity. Hamilton, Warren, and Essex counties, which are located in the northern region, fall into this category. The eastern region contains eight counties which also do not report any hauling activity: Rockland, Bronx, Richmond, New York, Kings, Queens, Nassau, and Suffolk.

Table 1. Number of Counties, Milk Haulers, and Milk Hauling Vehicles in New York State

Region	Number of Counties[1]	Number of Haulers	Number of Vehicles
West	11	35	134
Central	16	20	192
North	8	24	69
East	27	11	76
Totals	62	90	471

[1]Three counties in the north region and eight counties in the east region report no milk hauling activity

Most milk produced in western New York is regulated by a state, rather than federal, milk marketing order. This milk moves from the milkshed areas to processing plants located within the region. Milk is not restricted to remain in the western region, but because of the high demand for dairy products, it does not generally leave the region on a regular basis. Buffalo and Rochester provide outlets for fluid milk processing, and the southwest portion of the state contains a number of manufacturing plants. Milk in much of the rest of the state is covered by Federal Order No. 1 or Federal Order No. 2. While the milk produced in the northern region usually finds its way to one of many cheese manufacturing plants, milk produced in the central and eastern regions is typically slated for the Metropolitan New York City area to satisfy the demands for fluid milk or shipped to New England.

Section I: Characteristics of New York State Milk Haulers

Of the 283 surveys mailed in June and July 1992, ninety haulers indicate that they reside in the state of New York. From these haulers, detailed information on 471 vehicles is examined. Data collected on background information such as size of the hauling business,

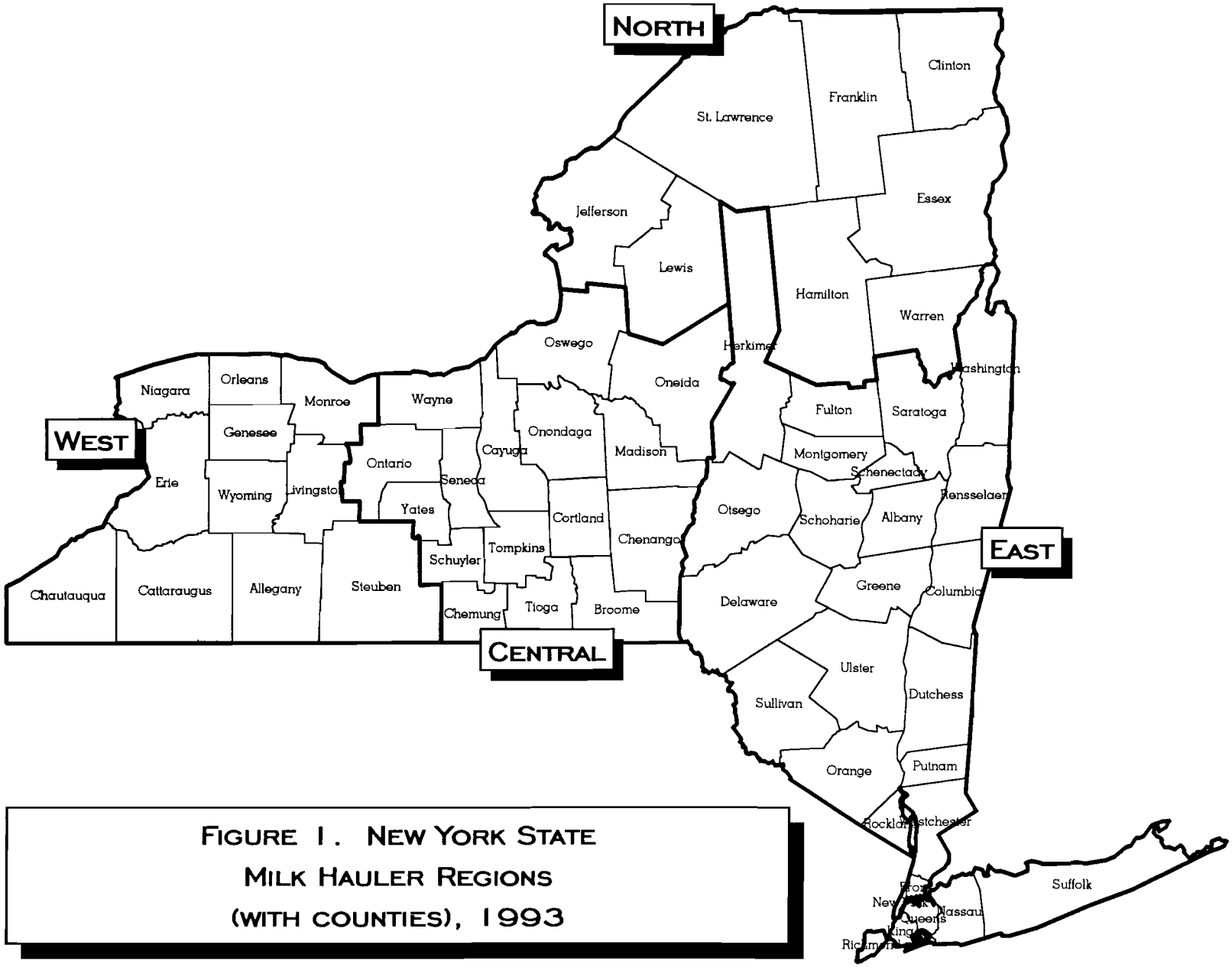


FIGURE 1. NEW YORK STATE MILK HAULER REGIONS (WITH COUNTIES), 1993

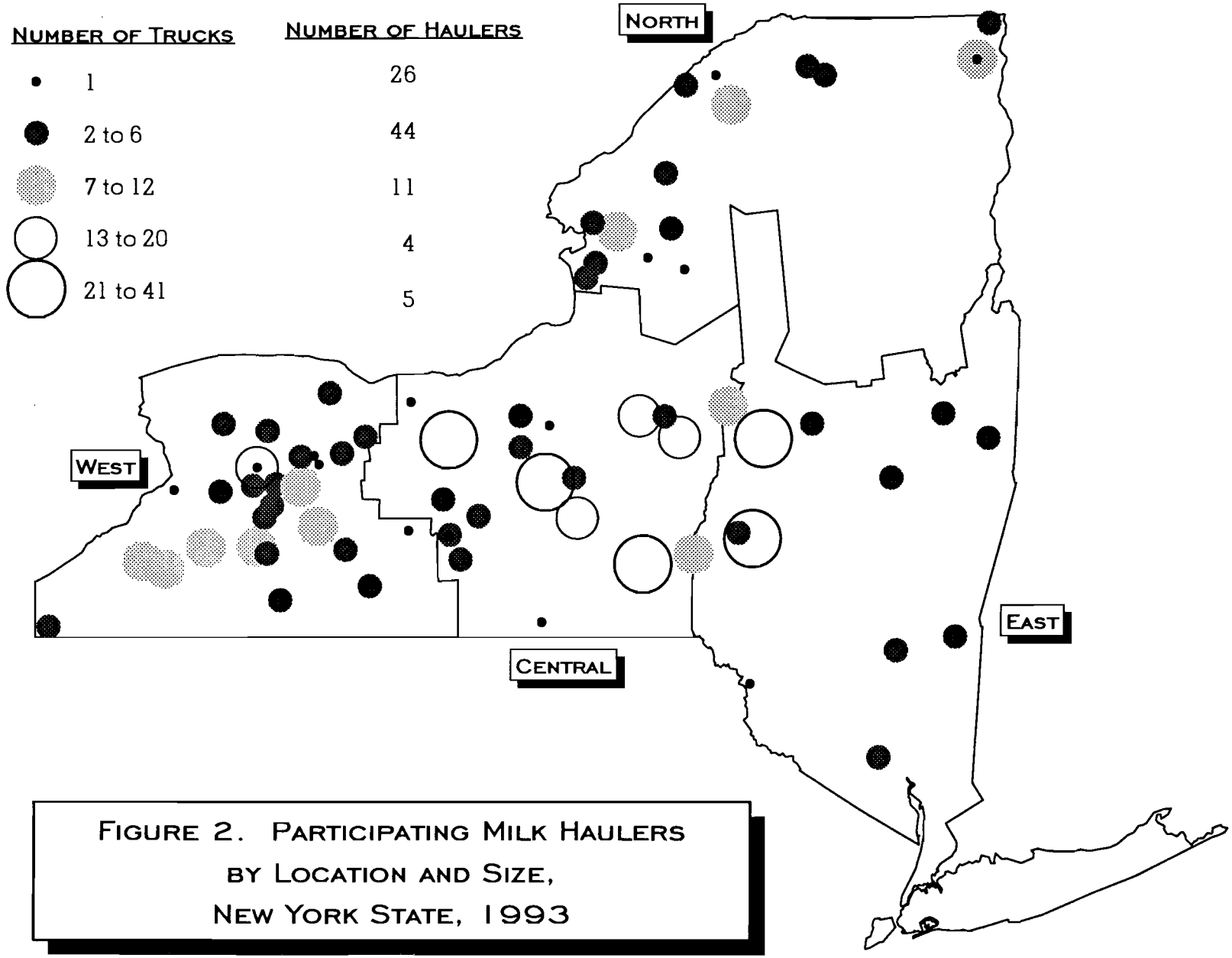


FIGURE 2. PARTICIPATING MILK HAULERS BY LOCATION AND SIZE, NEW YORK STATE, 1993

age of the vehicles in the fleet, replacement costs for milk hauling equipment, and wages paid to hired drivers is presented in the following section.

Hauling Business Size and Location

The New York milk hauling industry is characterized by a large number of widely-dispersed, small to medium sized hauling businesses and a few large and centrally-located hauling businesses. This contrasts to the historical structure of milk hauling in which most milk handlers operated their own fleets. However, businesses that specialized in hauling realized gains in efficiency over the handler-operated fleets. Consequently, most handlers chose to abandon their hauling practices in favor of contracting the work out to independently operated haulers. Currently, nearly all hauling businesses are independent contractors.

The smallest haulers, i.e. those operating a single vehicle, account for 29% of the haulers participating in the study, but only account for 5% of the vehicles in the survey. The five largest participating haulers operate about 30% of the vehicles in the survey. However, the bulk of the haulers surveyed operate small to medium sized businesses; 78% of the haulers operate six or fewer vehicles (Table 2).

Table 2. Size of Milk Hauling Businesses Participating in the New York State Milk Hauling Study

	Region of Hauler Location				
Size of Business	West (%)	Central (%)	North (%)	East(%)	NY State(%)
1 vehicle	31	20	42	9	29
2 - 6 vehicles	49	40	46	73	49
7 - 12 vehicles	17	10	12	0	12
13 - 20 vehicles	3	15	0	0	4
21 or more vehicles	0	15	0	18	6
Total (%)	100	100	100	100	100
Number of haulers	35	20	24	11	90
Number of vehicles	134	192	69	76	471

The western region accommodates 39% of the participating haulers who, in turn, operate about 28% of the vehicles. Haulers are more uniform in size than in other regions with most of the thirty-five haulers operating fewer than six vehicles (Table 2). Western New York haulers also tend to be more evenly distributed throughout the region. The central region haulers, though few in number, operate 41% of the vehicles. Despite the existence of twenty milk haulers in the central region, most of the vehicles are operated by the six largest haulers. Figure 2 shows that the large haulers in the central region are ideally placed for servicing both upstate and Metropolitan New York City facilities. The two remaining regions, the north and the east, together account for 31% of the vehicles. In the northern region there are twenty-four hauling businesses, four more than in the central region, but only one-third as many vehicles. Consequently, the northern region has the lowest vehicle per hauler ratio of the four

regions. Hauling operations in northern New York tend to be widely scattered. The locations of the businesses are largely attributable to existing city markets or manufacturing plants and the presence of the Adirondack Mountains in the interior of northern New York. The eastern region consists of mostly small haulers with two very large haulers operating the majority of the vehicles. Whereas the small haulers in the east are dispersed throughout the region, the two large haulers are situated near the western border of the region. As noted before, this position seems to be well-suited for accessing upstate dairy farms and transporting milk to upstate processing facilities, Metropolitan New York City plants, or out-of-state New England plants.

Regional Locations for Straight Trucks and Tractors

For much of the analysis, information is given for two categories of vehicles - straight chassis trucks and tractors. Separating the two chassis types alleviates the problem of confounding data which may be encountered when calculating averages. Straight chassis trucks (hereafter referred to as "straight trucks") include single-, double-, and triple-axle straight trucks. Double-axle straight trucks account for about 73% of the straight truck information submitted by milk haulers. Triple-axle straight trucks account for 23% of the straight trucks, while the remaining 4% of the straight trucks are of the single-axle variety.

Straight trucks tend to be concentrated in the western and central regions of the state; over 65% of the straight trucks are located in these areas. However, the northern and western regions have the highest *percentage* of straight trucks of the four regions. The preponderance of straight trucks in the northern and western regions may be explained in part by the close proximity of a large number of dairy farms as well as the location of major population centers. Milk in the west can either be transported to the processing plants in the cities of Buffalo and Rochester or shipped to one of many manufacturing plants in southwestern New York. In the northern region, milk is usually shipped to one of the many cheese manufacturing plants operating in that part of the state. In either case, the distance from the last farm on the route to the delivery point is usually short. Furthermore, the small haulers that characterize the western and northern regions may not be able to justify the expense of owning tractor-trailer rigs if the assembly routes do not require the increased capacity. Insofar as the supply points for milk are concerned, accessibility to dairy farms may be a consideration. The size and, in some cases, the location of dairy farms in these two regions may not provide tractors with an adequately designed driveway to approach the bulk tank. Considering the density of dairy farms and plants, the added expense of purchasing a tractor-trailer rig, and farm access limitations, haulers may find that straight trucks are better suited to assemble and transport milk in their particular area.

The eastern region contains the least number of straight trucks and the lowest percentage of straight trucks in the four regions. One reason for this is probably related to the distance that must be covered to reach a processing facility. Because of the lack of manufacturing plants in the region, haulers are forced to commute long distances to deliver milk. Most of the milk in the east is delivered to the Metropolitan New York City fluid milk and soft dairy products plants, a task which is accomplished exclusively through the use of tractors.

The most striking characteristic related to tractor numbers and location is that 63% of the tractors in New York are found in the central region. When combining the central region

tractors with those of the eastern region, the total represents 87% of all tractors in the survey. As alluded to earlier, eight of the nine largest haulers in New York are located in these two regions. The location of these haulers affords them the ability to pick up milk from widely-dispersed dairy farms for delivery to Metropolitan New York City and out-of-state New England plants, as well as local upstate processing facilities.

Chassis Type Within Fleets

As fleet size increases, the make-up of the fleet tends toward tractors and away from straight trucks (Table 3). The larger hauling businesses operate tractors primarily; 88% of the vehicles owned and operated by the five largest haulers in the state are tractors. However, when the fleet size is smaller than twelve vehicles, there is a 60/40 split between straight trucks and tractors. There may be several reasons for haulers shifting toward tractors as the primary vehicle in the fleet when the size of the business becomes larger. First, dairy farms are becoming less numerous, and surviving farms are adding cows to increase their herd size and boost the volume of milk produced. The result is that haulers face larger milk pickups with greater distances between farms than a decade ago. Second, the number of milk processing plants in New York, as well as the entire Northeast, is declining. With fewer processing plants available to accept milk, haulers are forced to travel longer distances to deliver a load of milk. Weighing these changes in the industry against the size of the investment to be made in a milk hauling vehicle, it becomes apparent that tractor-trailers, though more costly to purchase, are more flexible and, thus, better suited to perform the variety of milk hauling duties than straight trucks, barring any restrictions on load size and farm accessibility.

Table 3. Percent Make-up of Milk Hauling Fleets by Chassis Type

	Make-up of milk hauling fleet	
Fleet size	% straight chassis trucks	% tractors
1	58	42
2 - 6	61	39
7 - 12	61	39
13 - 20	29	71
21 or more	12	88
By region:		
West	74	28
Central	23	77
North	61	39
East	17	83

Dairy Farm and Milk Hauling Characteristics in New York State

Table 4 provides an abbreviated summary of the dairy farms and surveyed milk haulers in New York. Included is the number of dairy farms, number of available vehicles from participating haulers, and volume of milk produced for each region. A few additional inter-regional comparisons are also included. The statistics reviewed are based on only the milk haulers participating in the milk hauling survey; as a result of incomplete milk hauler participation, some of the figures may be bias.

Table 4. New York State Dairy Farm and Milk Hauling Business Characteristics

	Region of Hauler Location				
Item	West	Central	North	East	NY state
Dairy farms[1]	2,459	2,902	2,131	2,534	10,026
Production[2] (mil. lbs.)	3,035	3,502	2,206	2,839	11,582
Milk per farm (mil. lbs)	1.23	1.21	1.04	1.12	1.16
Participating haulers	35	20	24	11	90
Dairy farms per hauler	70	145	89	230	111
Milk per hauler (mil. lbs.)	86.71	175.11	91.92	258.08	128.69
Vehicles	134	192	69	76	471
Average vehicles per hauler	3.8	9.6	2.9	6.9	5.2
Dairy farms per vehicle	18	15	31	33	21
Milk per vehicle (mil. lbs.)	22.65	18.24	31.97	37.35	24.59

[1]Dairy farm statistics are taken from *New York State Dairy Statistics - 1992 Annual Summary*, Department of Agriculture and Markets, Division of Dairy Industry Services.

[2]All milk production figures are per annum.

The central region contains the most dairy farms and the largest volume of milk, while the northern region has the least number of dairy farms and smallest volume of milk. The number of milk haulers by region ranges from thirty-five in the west to eleven in the east. It may seem odd that the number of haulers is not more uniform across regions. Recall, however, that the regional boundaries are set for analytical purposes only, and the number of haulers in a region is a function of the boundaries selected for each region. Haulers may (and do) operate outside the region in which they are located. The likelihood of a hauler functioning in more than one region increases with the number of vehicles operated. In particular, the central and east regions contain a number of very large haulers who may operate in all areas in the state as well as out-of-state.

The average number of dairy farms per vehicle ranges from fifteen in the central region to thirty-three in the eastern region. This ratio reflects not only the number of dairy farms, but also the number of vehicles in a region. With the 192 vehicles in the central region, the ratio of farms to vehicles is greatly diminished relative to other regions. In the eastern and northern regions, disproportionately fewer vehicles are available for the number of dairy farms in the area.

Because milk production does not vary greatly from region to region, the magnitude of the milk to vehicle ratio is largely determined by the number of vehicles in the region. Consequently, the central region, by virtue of its large number of vehicles, has the lowest milk to vehicle ratio at 18.24 million pounds per year. Similarly, the east region's high milk

production level relative to hauling capacity results in a milk per vehicle figure of 37.35 million pounds per year, more than twice the comparable figure for the central region. Since a vehicle may (and often does) operate outside the bounds of the region in which it is located, any conclusions regarding the milk to vehicle ratio should be viewed with caution.

The two regions with the highest number of vehicles per hauler are the central and eastern regions; they average 9.6 and 6.9 vehicles per hauler, respectively. The magnitude of the averages is the result of a small number of large-scale hauling operations, which are shown in Figure 2 to be clustered near the center of the state. The average number of vehicles per hauler for the two remaining regions is considerably lower at 3.8 vehicles for the west and 2.9 vehicles for the north. Unlike the other regions, the western and northern regions have less variation in terms of hauler fleet size; most haulers operate between one and six vehicles.

Age of Milk Hauling Vehicles

Vehicle age has implications for many other aspects of milk hauling. For example, insurance premiums, fuel mileage, frequency of repair, and value of the vehicle are all affected, at least in part, by the number of years that the vehicle is operated.[3] Table 5 lists the average vehicle age for each of the four regions. Tractors tend to be newer, averaging 5.8 years across the state. Straight trucks are over 1½ years older with an average age of 7.4 years. The pattern of newer tractors and older straight trucks holds for three of the four regions. The east vehicles have the lowest average age by a substantial margin, mostly due to tractors being an average of two years newer than the next closest region. The oldest vehicles, on the average, can be found in the northern region. The western region is the only area in which tractors are older than straight trucks; this is partially explained by the preference of straight trucks over tractors as the primary milk hauling vehicle in the west.

Table 5. Age of Milk Hauling Vehicles in Years

	Region of Hauler Location				
Trucks[1]:	West	Central	North	East	NY state
Average age	6.1	8.1	9.1	5.9	7.4
Number of vehicles[2]	60	45	35	15	155
Tractors:					
Average age	6.8	6.1	7.4	3.9	5.8
Number of vehicles[2]	22	145	17	60	244

[1]Truck = straight chassis trucks: single-, double-, and triple-axle varieties

[2]Includes only the vehicles reporting data; vehicles with no response are excluded.

There is a general pattern of vehicle use based on vehicle age prevailing in New York state. The more demanding, longer distance routes are usually assigned to newer vehicles, while the older vehicles are used for local deliveries or for strictly milk assembly purposes.

[3]Mileage, rather than age, seems to be a better indicator of when a vehicle will be replaced. Haulers usually decide if a vehicle will be retained, traded, or sold after 500,000 miles of service. If the vehicle is to be kept, an out-of-frame rebuild is usually required to ensure proper and safe operating condition. An out-of-frame rebuild entails removing and servicing all major components of the vehicle's drivetrain.

On long hauls, especially those destined for the Metropolitan New York City area, it is particularly important that vehicles operate reliably and perform consistently. Major vehicle breakdowns are, at best, an inconvenience and can be, at worst, a disaster for haulers. When a breakdown occurs in or around the Metropolitan New York City area, the problem is only exacerbated. In order to maintain newer and more dependable vehicles, haulers may opt to lease rather than buy vehicles. Some of the larger haulers in the central and eastern regions have attractive lease agreements with truck dealerships, enabling those haulers to operate dependable vehicles with the latest technological advancements.

Generally speaking, as vehicles accumulate more and more mileage, their primary function may change from everyday use to occasional use. Some haulers may elect to retain older straight trucks and tractors for use as reserve vehicles, rather than attempt to resell the chassis.

Vehicle and Tank Replacement Costs

There are only slight regional cost differences for capital expense items such as straight trucks, tractors, tanks, and trailers. Tables 6 and 7 specify the average replacement costs for these items. Replacement costs for vehicles are variable and dependent on the location of the purchase and the number of vehicles purchased. Vehicle specifications and options such as turbocharged electronic diesel engines, air conditioning, and sleeper berths also influence the cost of the vehicle. The estimated replacement cost for straight trucks excluding the tank range from $23,000 to $100,000 with an average of $67,558 statewide. Comparing regions, the average replacement cost was lowest in the north ($62,973) and highest in the east ($72,733). Between the highest and lowest cost regions, there is a difference of $9,800 (about 15%) in the average replacement cost.

The sizable gap in average straight truck replacement cost is not evident with tractors, but location-dependent price differences do exist. The replacement cost for a tractor, excluding the trailer, averages $68,301. The regions can be grouped based on reported replacement costs. The northern and western regions belong to the higher cost group with average costs of $72,222 and $70,346, respectively. The central and eastern regions have lower reported tractor replacement costs. The difference between the average costs in the central and eastern regions is less than $200; the central region averages $67,766, and the east averages $67,954. A difference of about $4,500 (about 6%) separates the highest and lowest cost regions.

As is the case with straight trucks and tractors, there appears to be cost advantages afforded to haulers when purchasing tanks and trailers depending on the location (Table 7). It should be mentioned that there is an obstacle in comparing average replacement costs between regions for tanks and trailers, not unlike the difficulty encountered when comparing vehicle replacement costs. Estimated replacement costs are a function of both the capacity of the tank or trailer and any features or options that may be available.[4] Areas of the state that purchase tanks and trailers with greater volume tend to report higher replacement costs. Conclusions concerning the cost advantage of one region over another should be examined carefully since the cost estimates have not been corrected for tank volume or value of special

[4]Stainless steel cradles and frames are popular options among milk haulers since stainless steel components extend the life expectancy of the tank or trailer and increase the resale value.

Table 6. Cost of Replacement for Milk Hauling Vehicles

	Region of Hauler Location				
Trucks[1]:	West	Central	North	East	NY state
Average cost	$70,882	$65,795	$62,973	$72,733	$67,588
High	$86,000	$75,000	$95,000	$100,000	$100,000
Low	$23,000	$60,000	$35,000	$40,000	$23,000
Number of vehicles[2]	51	44	37	15	147
Tractors:					
Average cost	$70,346	$67,766	$72,222	$67,954	$68,301
High	$76,000	$80,000	$85,000	$70,000	$85,000
Low	$60,000	$60,000	$65,000	$61,500	$60,000
Number of vehicles[2]	13	145	18	56	232

[1]Truck = straight chassis trucks: single-, double-, and triple-axle varieties

[2]Includes only the vehicles reporting data; vehicles with no response are excluded.

Table 7. Cost of Replacement for Milk Tanks and Trailers

	Region of Hauler Location				
Tanks[1]:	West	Central	North	East	NY state
Average cost	$27,500	$26,390	$28,037	$28,714	$27,392
Number of tanks[2]	48	41	41	14	130
Trailers:					
Average cost	$49,143	$52,600	$48,111	$50,123	$51,393
Number of trailers[2]	14	135	18	57	224

[1]Tanks = tanks attached to straight chassis trucks: single-, double-, and triple-axle varieties

[2]Includes only the tanks and trailers reporting data; tanks and trailers with no response are excluded.

features. Nonetheless, tanks average $27,392 across the state with the central region ranking as the lowest cost region of the four. The state average for replacement trailer cost is $51,393 on 224 units. Though reported tank prices in the central region are the lowest in the state, the replacement costs for trailers are the *highest*, averaging $52,600. This peculiarity may be the result of the options selected on the equipment purchased. For example, trailers to be used for long hauls are usually outfitted with surge baffles in the tank compartments, a feature which may not be necessary for shorter hauls. For both tanks and trailers, there is less than a 10% difference in estimated replacement costs between the most and least costly regions.

There does not appear to be much correlation between the replacement costs for vehicles and replacement costs for tanks or trailers within a region. For example, the rank of regions from highest to lowest estimated tractor replacement cost is north, west, east, and central. But a similar ranking for trailer costs is central, east, west, and north which is the exact reverse.

Wages Paid to Hired Drivers

Milk haulers were requested to indicate the wage rate paid to hired drivers. The survey provided three methods of compensation from which to choose: wage rate per hour, per day, and per week. The wage rates excluded the value of fringe benefits provided for the driver. A daily wage was the most popular choice of haulers who hire drivers, followed by an hourly wage and a weekly wage. One factor that influenced the method of compensation was the type of driving. Milk assembly drivers usually earned an hourly wage, while drivers who transported milk over long distances were typically paid by the load, the day, or the week.

One pervasive driver-related concern is the number of hours of service. "Hours of service" refers to the number of consecutive on duty hours logged by a driver. The problem faced by many haulers is maximizing the time logged by each driver without exceeding or violating any of the Department of Transportation (DOT) regulations. Because the DOT may audit any hauling business to determine the extent of compliance, hauling businesses are advised to record the number of hours that a driver works. Depending on the location of the assembly route and destination of the delivery, a single driver may be restricted to as few as ten hours of service, after which a mandatory off duty period of eight consecutive hours must be taken.[5] Haulers who transport milk over long distances are particularly affected by DOT regulations. It is not unusual for a hauling operation to assign two drivers to a route - one driver to assemble the milk, and a second driver to transport the milk to its final destination. In addition, hauling businesses may provide vehicles equipped with sleeper berths for drivers who travel long distances; the sleeper berths can be used to accumulate the eight hours of off duty time required by DOT regulations.

The percent of haulers paying within a specified wage range per hour and per day is displayed in Tables 8 and 9. Because payment by the week is used by only a few haulers, a detailed listing is not presented. Though not explicitly shown in the tables, driver wages may be influenced by employment characteristics of the region. Competition for drivers from other businesses outside the milk hauling industry as well as other competitive occupational

[5]For more information, see *Federal Motor Carrier Safety Regulations*, Part 395 - Hours of Service of Drivers. U.S. Department of Transportation.

Table 8. Daily Wages Paid to Hired Drivers by Milk Hauling Businesses

	Region of Hauler Location				
Wage Rate	West[1] (%)	Central (%)	North (%)	East (%)	NY state (%)
<$60.00	8	0	8	0	6
$60.00 - 69.99	58	40	23	0	38
$70.00 - 79.99	18	0	15	0	12
$80.00 - 89.99	8	0	31	0	16
$90.00 - 99.99	8	20	15	0	12
$100 and over	0	40	8	100	16
Totals(%)	100	100	100	100	100
Average	$67.54	$83.00	$77.15	$138.00	$78.23

[1]For each region, the percentage of hauling businesses paying a specified wage level is calculated.

Table 9. Hourly Wages Paid to Hired Drivers by Milk Hauling Businesses

	Region of Hauler Location				
Wage Rate	West[1] (%)	Central (%)	North (%)	East (%)	NY state (%)
<$6.00	0	0	8	0	3
$6.00 - 6.99	0	17	0	0	3
$7.00 - 7.99	50	17	33	0	34
$8.00 - 8.99	50	17	33	100	42
$9.00 - 9.99	0	32	9	0	9
$10 and over	0	17	17	0	9
Totals (%)	100	100	100	100	100
Average	$7.78	$8.48	$8.08	$8.13	$8.04

[1]For each region, the percentage of hauling businesses paying a specified wage level is calculated.

opportunities may encourage haulers to offer higher wages to attract potential drivers. Most milk hauling businesses that employ drivers report very high driver turnover rates; it is uncommon for a driver to remain with a single milk hauling operation for more than five years.

Although the wage rate may be quite varied depending on the region, 75% of the haulers who pay by the hour maintain wage rates that range between $7.00 and $9.00 per hour. The average for all regions is $8.04 per hour. Only an insignificant percentage of hauling businesses pay less than $7.00 per hour. The central region haulers offer the highest wage

at $8.48 per hour while the west reports the lowest rate at $7.78 per hour. The average wages of the two remaining regions exceed $8.00 per hour.

When evaluating the distribution of hauling businesses that pay drivers on a daily basis, it is clear that there is no primary level of compensation in New York's four regions. The state average is $78.23 per day. The west pays the least per day at $67.54, followed by the northern region at $77.15 and the central region at $83.00 per day. The eastern region maintains the highest wage per day at $138.00 per day, more than twice the wage rate paid by the western region. The large difference between regions is probably related to the number of hours worked. Only 6% of the haulers pay less than $60.00 per day, and 50% of the haulers pay between $60.00 and $80.00 per day.

Section II: Measures of Efficiency in Milk Hauling

Several survey questions were posed to haulers to try to gain an understanding of efficiency in milk hauling. Among the topics addressed were the number of farm stops, pounds of milk hauled, number of loads delivered, miles traveled, and number of operating hours. Information for each of the subjects was collected on two consecutive weekdays for each vehicle in the fleet. The data was averaged to produce a "per day" figure.

Average Number of Farm Stops

One measure commonly used to gauge efficiency in milk hauling is the number of farm stops per day during milk assembly. It is advantageous to keep the number of farm stops as low as possible without negatively impacting the size of the loads delivered. Regardless of a farm's level of milk production, mandatory tasks require a fixed amount of time, amounting to ten to fifteen minutes per stop. Some of the duties include positioning the milk hauling vehicle for milk transfer, reading and recording the milk dipstick, agitating the bulk milk tank, obtaining milk samples, and connecting/disconnecting the fill hose. For vehicles travelling to local or upstate facilities, the time savings resulting from stopping at fewer farms may translate to more loads delivered daily. For the Metropolitan New York City bound tractors, it is imperative that the number of farm stops be held to a minimum. A full run consisting of milk assembly, delivery, and return may take sixteen to eighteen hours to complete. Understandably, a hauler cannot afford to schedule more than ten or twelve farm stops on the route if the delivery timetable is to be maintained. Note that the number of farm stops per day is a one-dimensional measure and does not indicate how a vehicle is being used. A vehicle may be delivering several loads of milk per day and requiring only eight to ten farm stops per load while another may be delivering just a single load of milk and traveling to twenty or more farms to assemble the load.

Table 10 reports the average number of farms stops per day in each of the four regions. For the state, straight trucks and tractors average 12.5 and 10.2 farms stops per day, respectively. With the capacity advantage of tractors, it may seem that tractors should average *more* farm stops per day than straight trucks. However, tractors do not deliver as many loads of milk per day as straight trucks (see Table 11). In addition, haulers may be scheduling routes so that tractors are assigned to larger farms that produce greater amounts of milk.

Table 10. Average Number of Farm Stops Per Day

	Region of Hauler Location									
	West		Central		North		East		NY State	
Number of farm stops	TRK[1]	TRA	TRK	TRA	TRK	TRA	TRK	TRA	TRK	TRA
0 - 5 per day	10	7	2	7	0	0	1	1	13	15
5.5 - 9 per day	17	5	2	35	4	2	5	10	28	52
9.5 - 13 per day	15	3	15	72	7	3	5	32	42	110
13.5 - 17 per day	5	1	11	4	4	8	1	10	21	23
17.5 - 24 per day	0	0	6	6	12	2	3	2	21	10
Over 24 per day	0	0	4	0	1	0	0	0	5	0
Number of vehicles[2]	47	16	40	124	28	15	15	55	130	210
Average per day	8.8	6.7	14.2	9.8	16.1	14.3	12.6	11.2	12.5	10.2

[1]TRK = straight chassis trucks: single-, double-, and triple-axle varieties; TRA = tractors

[2]Includes only the vehicles reporting data; vehicles with no response are excluded.

Table 11. Average Number of Loads of Milk Delivered Per Day

	Region of Hauler Location									
	West		Central		North		East		NY State	
Number of Loads	TRK[1]	TRA	TRK	TRA	TRK	TRA	TRK	TRA	TRK	TRA
3 per day	0	0	0	3	5	0	0	0	5	3
2 per day	17	3	17	23	19	8	7	0	60	34
3 per two days	15	6	11	6	2	6	2	1	30	19
1 per day	21	13	11	114	2	2	6	54	40	183
1 per two days	5	0	2	1	0	1	0	0	7	2
Reserve vehicle	5	2	4	6	9	1	0	6	18	15
Number of vehicles[2]	63	24	45	153	37	18	15	61	160	256
Average per day	1.4	1.3	1.5	1.2	2.1	1.6	1.5	1.0	1.6	1.2

[1]TRK = straight chassis trucks: single-, double-, and triple-axle varieties; TRA = tractors

[2]Includes only the vehicles reporting data; vehicles with no response are excluded.

Nearly 93% of all vehicles have seventeen or fewer farm stops per day. The western region reports the lowest number of farm stops per day needed for both straight trucks and tractors. In addition, the western region is the only area to have no vehicles visiting more than seventeen farms per day. The northern region has the most daily farms stops averaging 16.1 for straight trucks and 14.3 for tractors. Two factors may be contributing to the increased number of farm stops. First, milk production per farm in the northern New York is the least of any area in the state (see Table 4). Consequently, haulers may have to schedule more farms on a route to fill a tank or trailer. Secondly, the northern region also boasts the highest number of loads delivered per day (see Table 11). Undoubtedly, the high number of farm stops is also a consequence of the high number of loads delivered per day.

The central and eastern regions ship milk long distances using tractors. As suggested in earlier discussion, the number of farm stops for these vehicles ought to be held to a minimum in order for the drivers to maintain a suitable timetable. Thus, it is not a surprise that the number of farm stops for tractors in both the central and eastern region are reasonably low.

Average Number of Loads Delivered

A second criterion used to determine the operating efficiency of a milk hauling business is the number of loads assembled and delivered in a single day. With the enormous amounts of money invested in milk hauling equipment, haulers are advised to reduce the idle times of their fleets by scheduling vehicles to pickup and deliver as many loads of milk as possible each day. More loads delivered daily means that the vehicle is being utilized more efficiently, all other components of hauling being equal. However, many factors work to limit the number of loads moved. Among the principal forces limiting loads per day for haulers are: (1) increases in the number of miles traveled as a result of greater distances between farms, (2) changes in density of milk production throughout the state, (3) seasonal and unexpected delays at processing plants during the unloading process, and (4) external factors which affect the ability of haulers to schedule routes to make the best possible use of equipment on hand.

A distribution of the number of loads delivered per day is given in Table 11. Straight trucks move 1.6 loads per day on average while tractors move just 1.2 loads per day. In New York, only 25% of all vehicles reporting load information deliver two or more loads per day. On the other hand, over 60% of the vehicles reporting load information deliver one or fewer loads per day, excluding the vehicles designated as reserves. Tractors are more likely to belong to this group. Only the central and northern regions report any vehicles hauling as many as three loads per day.

Northern New York hauls the most loads per day in each of the vehicle categories. Straight trucks average 2.1 loads daily, and tractors manage to deliver 1.6 loads per day. The main reasons contributing to the elevated averages in this region seem to be the density of dairy farms and their relative proximity to processing plants in the northern section of the state. The tractors operating in the east have the lowest average at 1.0 loads per day. Clearly, the eastern haulers do not enjoy the same conveniences as the northern haulers. In particular, the tractors in the east are usually assigned Metropolitan New York City or out-of-state New England plants as final delivery points. The amount of time expended during transport and return on routes to these destinations make delivering more than a single load per day infeasible.

Average Pounds of Milk Delivered

Table 12 summarizes the amounts of milk delivered per day in each of the four regions. Tractors deliver an average of 58,255 pounds per day, which exceeds the daily average of straight trucks by 3,820 pounds. Despite the advantage imparted to straight trucks in delivering more loads of milk per day, the capacity edge of trailers over tanks more than compensates for the difference in the number of loads moved. About 80% of the tractors transport 40,100 to 60,000 pounds of milk per day and is linked to the overwhelming number of tractors with hauling capacities of 6,000 gallons or more. Straight trucks have more variation in both tank capacity and number of loads delivered per day, and thus it is more difficult to make definitive statements regarding the pounds of milk delivered per day.

The average number of pounds hauled by straight trucks ranges from 44,461 pounds in the west to 71,366 pounds in the north. For tractors, the amounts delivered range from 52,582 pounds in the east to 74,879 pounds in the north. The most important influence on the amount of milk delivered appears to be the number of loads delivered per day. As shown in Table 11, the northern section transports the most loads per day for each of the chassis types, and consequently, the most pounds of milk per day. If the number of pounds delivered per day in all regions is adjusted by the number of loads delivered per day, the resulting figure is a rough measure of tank or trailer capacity (Table 12). The calculation indicates that the eastern region has an advantage for both chassis types. The implication is that either the eastern region haulers operate equipment with more hauling capacity or they utilize the capacity of their equipment more fully than the other three regions.

Average Number of Operating Hours

Table 13 outlines the number of operating hours per day for the four regions; "operating hours" includes the time required to assemble, deliver, unload, and return to the garage. Not all vehicles perform these tasks each day. In particular, some tractors may be used exclusively to assemble loads while others are used for milk transport only. Tractors tend to operate about two hours more per day than straight trucks. The reason for the difference lies in the duties assigned to the different chassis types. Whereas straight trucks are more often used to deliver to local processing facilities and do not typically travel long distances to do so, tractors are usually assigned to routes that include a significant number of transport miles (see Table 14).

The western region reports the lowest number of operating hours per day for both chassis types, reflecting the close proximity of dairy farms and processing plants as well as the excess hauling capacity mentioned earlier. The central and eastern regions rank highest in terms of vehicle use, especially within the tractor category. With the prevalence of tractors delivering to Metropolitan New York City fluid or soft products plants, there is little wonder that the average time in use for tractors is more than twelve hours per day.

Insofar as partitioning the operating hours among the duties of assembling, transporting and unloading milk, and returning to the garage, there is no strong consensus as to how time is allocated throughout a day. For vehicles traveling shorter distances during milk transport, there is a tendency for longer assembly times and an increased number of farms on the milk assembly route. Any vehicle used to transport milk over longer distances usually spends less time assembling milk, visits fewer farms to assemble a full load, and spends less idle time at

Table 12. Average Pounds of Milk Delivered Per Day

	Region of Hauler Location									
	West		Central		North		East		NY State	
Pounds of Milk	TRK[1]	TRA	TRK	TRA	TRK	TRA	TRK	TRA	TRK	TRA
0 - 20,000	7	1	1	0	0	0	0	1	8	2
20,100 - 40,000	14	0	9	1	2	1	3	1	28	3
40,100 - 60,000	15	9	12	121	6	3	6	51	39	184
60,100 - 80,000	10	5	18	5	15	6	0	2	43	18
80,100 - 100,000	1	1	0	9	2	6	3	0	6	16
Over 100,000	0	0	0	7	3	1	0	0	3	8
Number of vehicles[2]	47	16	40	143	28	17	12	55	127	231
Average per day	44,461	56,411	53,320	58,667	71,366	74,879	57,708	52,582	54,435	58,255
Corrected average[3]	31,758	43,393	35,547	48,889	33,983	46,800	38,472	52,582	34,022	48,546

[1]TRK = straight chassis trucks: single-, double-, and triple-axle varieties; TRA = tractors

[2]Includes only the vehicles reporting data; vehicles with no response are excluded.

[3]Average pounds of milk per day is adjusted for the number of loads delivered per day.

Table 13. Average number of Operating Hours for Milk Hauling Vehicles Per Day

	Region of Hauler Location									
	West		Central		North		East		NY State	
Hours per vehicle	TRK[1]	TRA	TRK	TRA	TRK	TRA	TRK	TRA	TRK	TRA
0 - 5 per day	8	2	1	3	3	0	0	1	12	6
5.1 - 9 per day	11	8	10	36	5	5	0	0	26	49
9.1 - 13 per day	21	4	15	49	18	8	9	8	63	69
13.1 - 17 per day	5	2	11	17	1	3	2	37	19	59
17.1 - 24 per day	2	0	3	34	0	1	1	9	6	44
Number of vehicles[2]	47	16	40	139	27	17	12	55	126	227
Average per day	9.1	9.0	11.9	12.3	9.9	10.6	11.6	14.9	10.4	12.5

[1]TRK = straight chassis trucks: single-, double-, and triple-axle varieties; TRA = tractors

[2]Includes only the vehicles reporting data; vehicles with no response are excluded.

Table 14. Average Number of Miles Traveled by Milk Hauling Vehicles Per Day

	Region of Hauler Location									
	West		Central		North		East		NY State	
Number of miles	TRK[1]	TRA	TRK	TRA	TRK	TRA	TRK	TRA	TRK	TRA
0 - 150 per day	35	9	17	31	20	15	0	4	72	59
151 - 300 per day	15	6	18	46	8	2	11	6	52	60
301 - 500 per day	0	2	5	36	0	0	4	37	9	75
Over 500 per day	0	0	0	26	0	0	0	8	0	34
Number of vehicles[2]	50	17	40	139	28	17	15	55	133	228
Average per day	130	164	174	312	139	115	237	406	157	309

[1]TRK = straight chassis trucks: single-, double-, and triple-axle varieties; TRA = tractors

[2]Includes only the vehicles reporting data; vehicles with no response are excluded.

the garage. Time spent at plants, which includes waiting time and time allotted for unloading and rinsing the tank, are highly variable. The normal amount of time spent at a processing plant is around two or two and a half hours, but most haulers can document periodic plant times of four to six hours. In some cases, the extreme waiting times occur during the flush season when the number of vehicles delivering milk to the plant greatly exceeds the capacity of the receiving bays or storage tanks. However, with the decline in the number of processing plants, the effective number of available receiving bays also decreases, a fact which is not readily acknowledged by all milk processors. A few milk processors have attempted to relieve the congestion at the plants by constructing additional receiving bays and/or developing individual delivery schedules for haulers that deliver to the plant on a regular basis.

Average Number of Miles Traveled

Associated with the number of operating hours per day is the number of miles traveled per day. The degree of association depends on vehicle use. For example, a tractor hauling to New York City may have a high correlation between hours of operation and miles traveled, but a straight truck delivering several loads of milk assembled from nearby farms might have a low correlation between miles covered and number of hours in operation. Hence, though not infallible, the number of miles covered may give some indication as to the final destination of the vehicle. All vehicles travel an average of 253 miles per day, including assembly, transport, and return miles. Tractors cover an average of 309 miles per day, and straight trucks average about half that distance on a typical day (Table 14). Only about 7% of the straight trucks report travel in excess of 300 miles per day. In contrast, about 48% of the tractors cover more than 300 miles per day.

Across regions, it is not universal that straight trucks travel fewer miles than tractors. For instance, the straight trucks in the east travel more miles on average than both chassis types in the western and northern regions. Furthermore, this relationship does not necessarily hold within a region. The tractors in the northern region travel an average of 20% fewer miles per day than straight trucks.

Proximity to delivery points appears to be the main factor determining the number of miles covered per day. As might be expected from earlier discussion, the vehicles in the central and eastern regions log in the most miles per day. The east leads all regions with averages of 237 and 406 miles per day for straight trucks and tractors, respectively. The tractor average of 406 miles is over 90 miles more than the next highest regional average. Because of the convenient locations of processing plants in the west and the north, vehicle averages in those areas are substantially lower than the central and east.

The division between assembly mileage and transport/return mileage is inconsistent. Asserting that the miles traveled can be categorized easily based on hauler location would be misleading, and specifying "rules of thumb" would be difficult because there are numerous exceptions to the rule. Notwithstanding these caveats, assembly mileage usually does not exceed 75 miles per day, and transport/return miles constitute the remainder of the miles traveled.

Average Work Performed (Ton-Miles)

To understand the different assignments that straight trucks and tractors receive, a multi-dimensional measure is needed. All previous measures are one-dimensional and, used independently, may not be reliable indicators of actual efficiency of the operation. Ton-miles is a union of two efficiency measures - miles traveled per day and pounds of milk delivered per day. It is a proxy for the amount of work performed by each vehicle. Ton-miles is calculated by multiplying the pounds of milk delivered by the number of miles traveled during transport, then dividing the resulting product by 2,000 pounds. Assembly and return miles are not included in the calculation. Table 15 verifies that tractors perform more work than straight trucks in each of the four regions. On the average, tractors work 3½ times as much as straight trucks. The central region shows the greatest disparity between chassis types; tractors have more than a four to one edge over straight trucks in ton-miles. The eastern region realizes a smaller but similar inequality as well. The disparity in ton-miles for the two regions is largely attributable to final destinations and load sizes for tractors. On the average, the tractors in the two regions travel 339 miles per day and deliver 56,914 pounds of milk. Though tractors located in the west and north may also deliver enormous amounts of milk each day, the shorter distances traveled to deliver the milk significantly reduces the ton-mile figures in those regions.

When reviewing the hauling efficiency data, it becomes apparent that the western region has the greatest imbalance between milk supply and available milk hauling vehicles of the four regions. That is, there may be more milk hauling vehicles operating in the western region than are necessary, given the volume of milk produced. This is supported by the figures reported for number of farm stops and number of loads per day, both of which tend to be low relative to the volume of milk delivered. The low number of vehicular operating hours in western New York also lends support to the claim that there may be excess hauling capacity in the western region.

Section III: Cost Items Related to Milk Hauling

What does it cost to haul milk? What is the right fee to charge for hauling milk? Though these are often-asked questions in the industry, there are no simple answers. Without knowledge of specific details such as the equipment used, the location of the route, the number of farms on the route, the number of miles covered, and the final destination, it would be difficult if not impossible to determine a milk hauling cost. That is not to say, however, that milk haulers are unaware of the costs involved in hauling milk. This section reviews summary statistics for each of the cost questions in the survey, including details on insurance premiums, registration fees, tire costs, and vehicle repair costs. Categorical averages, high amounts, and low amounts are reported. Not all haulers reported information on each cost item. As a result, the number of vehicles upon which the calculation is based is included for each of the regions. Rather than try to locate and report specific information on each vehicle in the fleet, some haulers chose to determine the total cost for each item over all straight trucks and tractors. The average resulting from the total was assigned to each vehicle in the fleet.

Much of the data submitted on cost-related items tends to be very diverse. As a result, a truncated range for each of the cost items is included to circumvent any ill-effects encountered by including outlying data points in the statistical calculations. The "inner 90%

Table 15. Average Work Performed by Milk Hauling Vehicles Per Day (Ton-Miles)

	Region of Hauler Location									
	West		Central		North		East		NY State	
Ton-miles per day[1]	TRK[2]	TRA	TRK	TRA	TRK	TRA	TRK	TRA	TRK	TRA
0 - 1,000	29	5	25	15	13	4	3	4	70	28
1,001 - 2,000	11	7	14	16	10	5	4	4	39	32
2,001 - 3,000	2	0	1	22	1	5	1	1	5	28
3,001 - 4,000	1	3	0	7	0	0	0	12	1	22
4,001 - 5,000	1	0	0	5	0	0	3	4	4	9
Over 5,000	0	1	0	55	0	0	1	30	1	86
Number of vehicles[3]	44	16	40	120	24	14	12	55	120	205
Average per day	966	1,860	943	3,988	938	1,630	2,475	4,557	1,103	3,814

[1]Ton-miles = (pounds of milk delivered per day X number of miles traveled per day [loaded]) ÷ 2,000 pounds

[2]TRK = straight chassis trucks: single-, double-, and triple-axle varieties; TRA = tractors

[3]Includes only the vehicles reporting data; vehicles with no response are excluded.

range" is centered on the median and omits the lowest and highest 5% of the data submitted for each cost item. The inner 90% range is a procedure to correct for extreme data points, but in most cases the averages calculated from the full data set and the truncated data set do not differ significantly. The truncation procedure is applied to the statewide data only. Regional figures are based on the full data set.

Insurance Premiums

Figure 3 specifies the average annual insurance premiums paid per vehicle by milk haulers. In New York, the average premium paid to insure tractors is $4,715; straight trucks average about $880 less at $3,836. The range for all vehicles is $624 to $11,148. The inner 90% range for straight trucks is $624 to $8,000; the inner 90% range for tractors is $2,800 to $8,500. Using the truncated data set, the average premium paid to insure vehicles is $4,613 for tractors and $3,680 for straight trucks.

The difference in the premiums paid by chassis type is sizable, but several factors contribute to the wide range of payments reported. Insurance premiums are partially influenced by the type of vehicle, age of the vehicle, value of the vehicle, destination of the vehicle, number of hours operated or miles traveled, volume or value of product carried, and amount of coverage desired.

The premiums for tractor insurance do not vary greatly between regions; however, it is likely that rates tend to increase around urban areas throughout the state. The lowest regional average is $4,338 while the highest average payment is $4,936, a difference of $600. The premiums paid for straight trucks are quite varied, depending on hauler location. The northern region averages $2,265 while the east tops all regions at $4,870 which is more the twice the amount paid in the north. Again, the amount of insurance coverage above the state allowed minimum may be the largest contributing factor to the level of premiums. Some haulers are self-insured and do not carry any insurance coverage above the minimum. Vehicle differences related to the age of the vehicle, the number of axles on the truck, and the amount of miles traveled may also contribute to the disparity in costs for straight truck insurance.

Registration Fees

Registration fees do not normally include the cost of acquiring overload permits, but for the purposes of this analysis, registration fees and cost of overload permits are lumped together. Overload permits purchased in New York are valid on specified roadways in New York only. Milk haulers who pass through Pennsylvania report strict enforcement of state laws on overloaded vehicles. Violating Pennsylvania road limits may result in impoundment of the vehicle in addition to stiff fines.

Registration fees paid on milk hauling vehicles are presented in Figure 4. The cost of registering a straight truck is far less than the cost of registering a tractor. The statewide averages for straight trucks and tractors are $697 per year and $1,422 per year, respectively. The inner 90% range for straight trucks registration fees is $290 to $1,500 with an average of $659 per year. For tractor registration fees, the inner 90% range is $924 to $1,730 with an average of $1,423 per year.

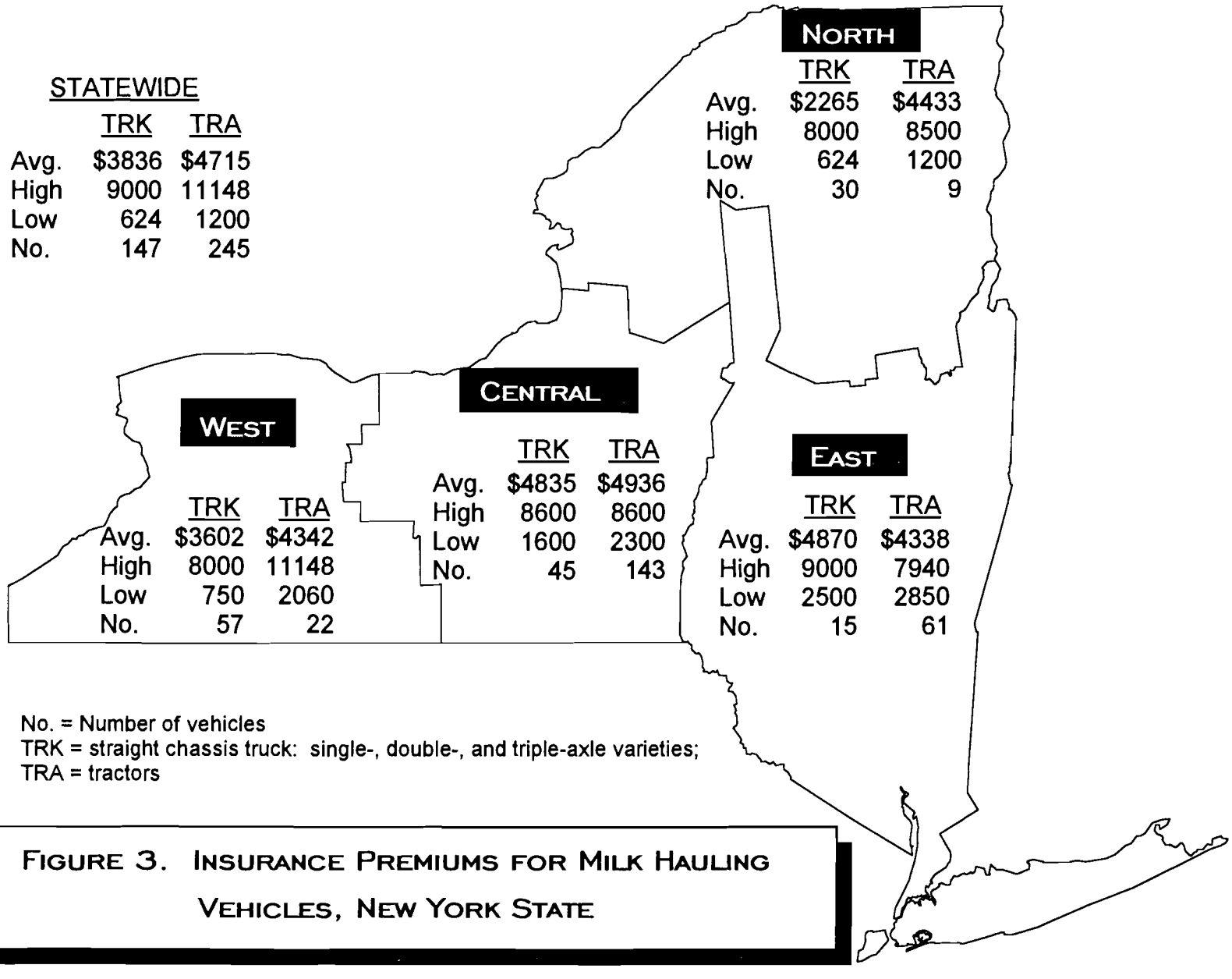


FIGURE 3. INSURANCE PREMIUMS FOR MILK HAULING VEHICLES, NEW YORK STATE

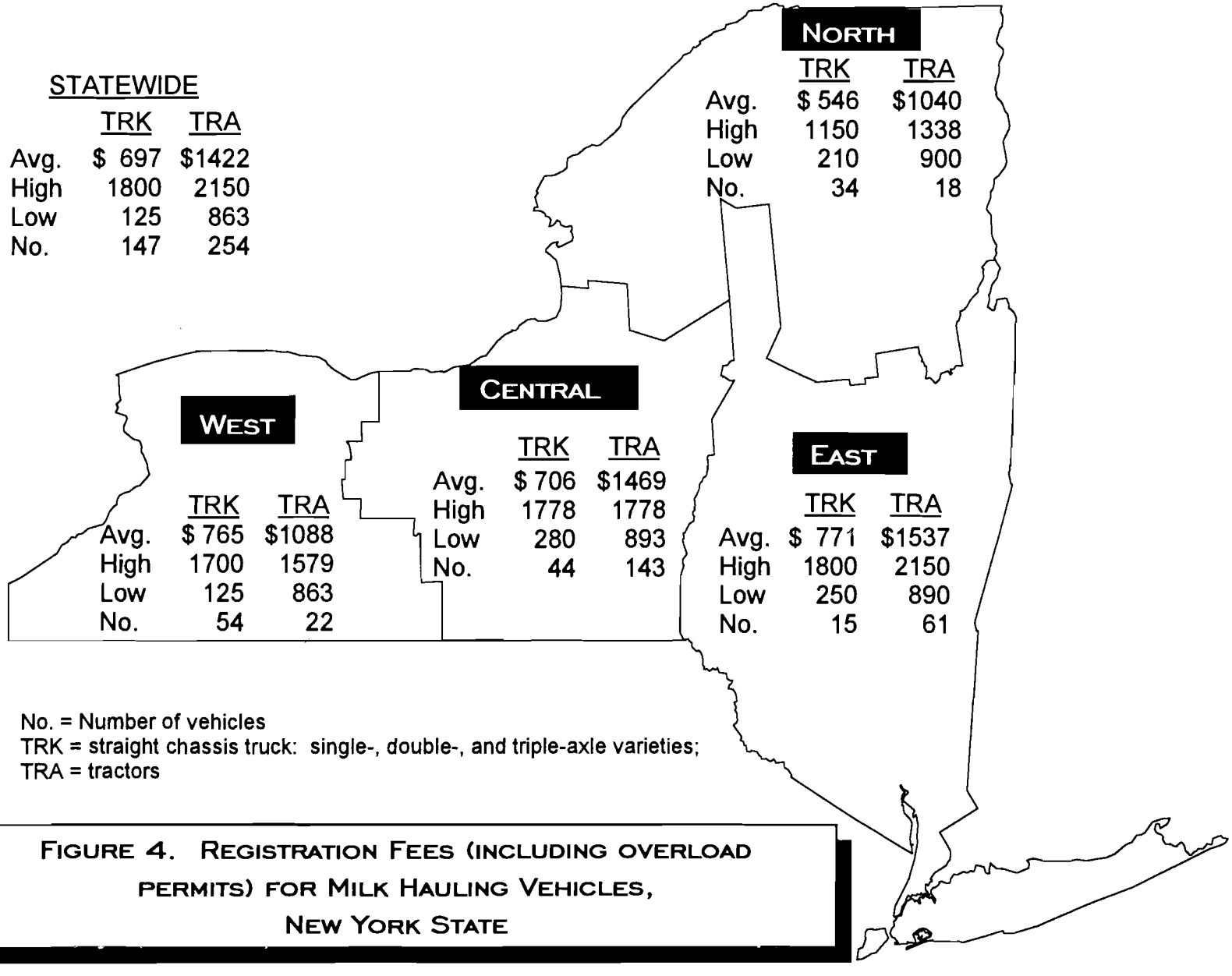


FIGURE 4. REGISTRATION FEES (INCLUDING OVERLOAD PERMITS) FOR MILK HAULING VEHICLES, NEW YORK STATE

With the exception of the unusually low average in the north, there is some consistency in the straight truck registration fees paid across all regions. With tractors, a different pattern is evident. The registration fees in the central and eastern regions are roughly $400 more than the averages of the western and northern regions. Because the tractors in the central and east tend to haul larger loads than the other two regions, the difference in fees is likely to be related to the cost of acquiring overload permits.

Tire and Recapping Costs

Among the list of frequently purchased items essential for milk hauling is tires. With many vehicles traveling in excess of 500 miles per day and six or seven days a week, haulers may find that entire sets of tires need to be replaced as frequently as once every fifteen months. For straight trucks, this means that as few as six tires (single-axle) and as many as 14 tires (triple-axle) will need to be purchased. Tractors have just ten tires, but the accompanying trailers account for another eight tires. It is plain to see how tire expenses can quickly become a major component of the cost of operating and maintaining a vehicle.

Figure 5 summarizes the data submitted on tire costs on a per tire basis. The average price of a tractor tire in New York is $338 which is $50 less than a straight truck tire. The difference in average cost may be related to physical attributes or quality characteristics of the tires. Specialized tires are available for different applications and are designed to correspond to various suspension types. As noted above, tractor-trailer rigs require more tires than straight trucks, and the difference in average cost per tire may also be an indication of the discounts received for purchasing the tires in bulk. Some haulers report outfitting straight trucks with balloon tires on the steering axle. Balloon tires offer more stability than conventional tires, but may cost an additional $200 or more per tire. The inner 90% range excludes the higher-priced balloon tires as well as any low-priced tires. The truncated range for the cost of a tractor tire is $300 to $400 with an average of $336, and the truncated range for the cost of a straight truck tire is $300 to $467 with an average of $388.

The central and eastern regions pay less for tires on average than the other two regions. The reason for the dissimilarity in tire costs may be related to the types of haulers in the regions. Most of the vehicles in the central and east sections are owned by large haulers who are in a better position to purchase tires in bulk than smaller haulers. Accessibility to and availability of tire dealers may also influence tire costs. With more distributors in a region, prices may be lower as a result of competition for customers.

Extending the life of a tire without exceeding safety limits is an objective for all haulers. Recognizing the expense of replacing tires, recapping worn tires would seem to be a viable and popular alternative. Nonetheless, only about two out of three haulers report using recapped tires. The primary reason cited for not using recapped tires is poor past performance. For non-users, applying the money that might have been appropriated for recapping toward new tires is more sensible. Recapping worn tires may extend the life of the casing by 35% - 50%. If recapping is available and reasonably priced, it offers a cost effective strategy for minimizing expenditures on tires.

In the state, the cost of recapping a tractor tire averages $101 while a straight truck averages $120 (Figure 6). With the truncated data set, the averages for recapping costs are scarcely affected; recapping a tractor tire averages $100, and recapping a straight truck tire

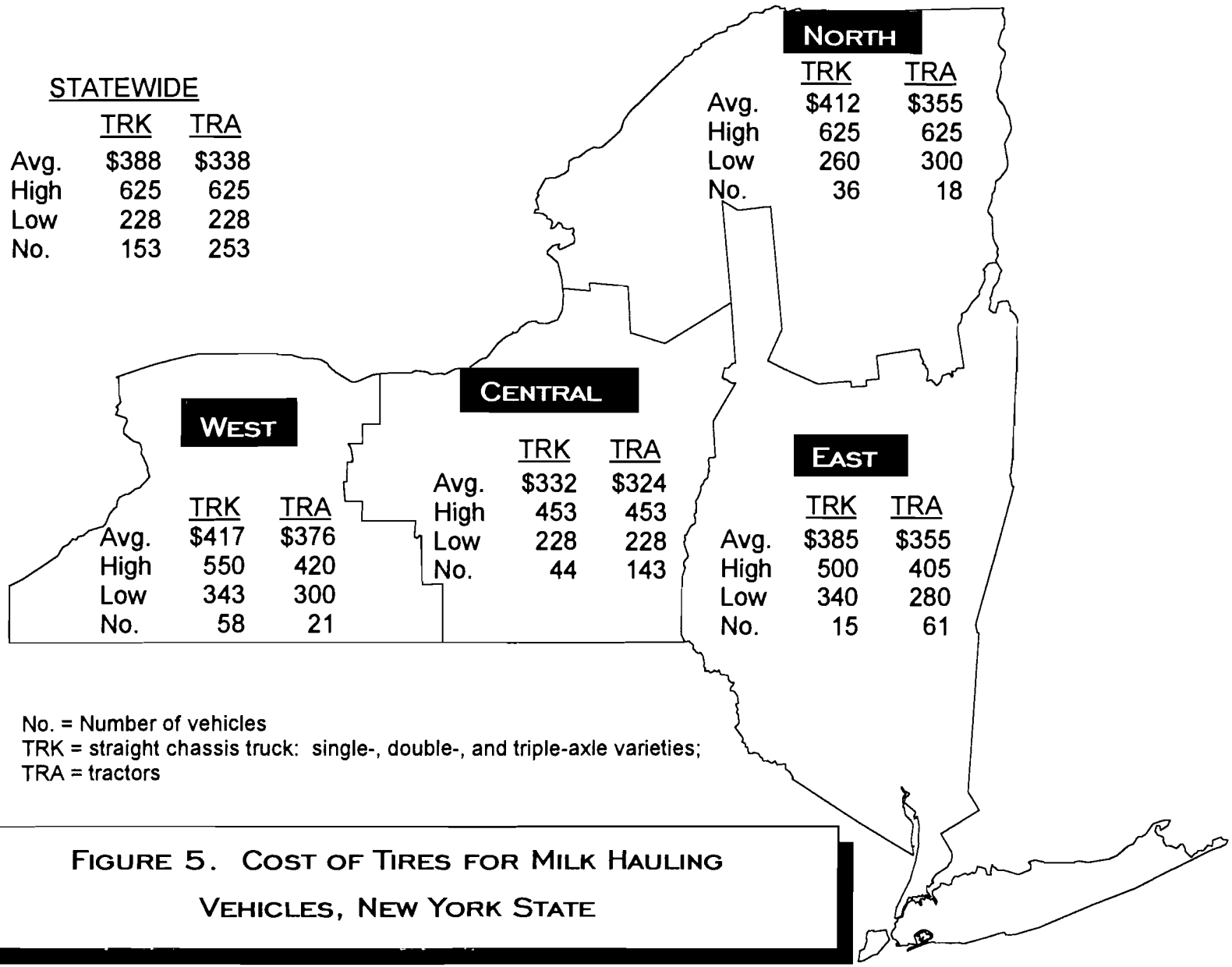


FIGURE 5. COST OF TIRES FOR MILK HAULING VEHICLES, NEW YORK STATE

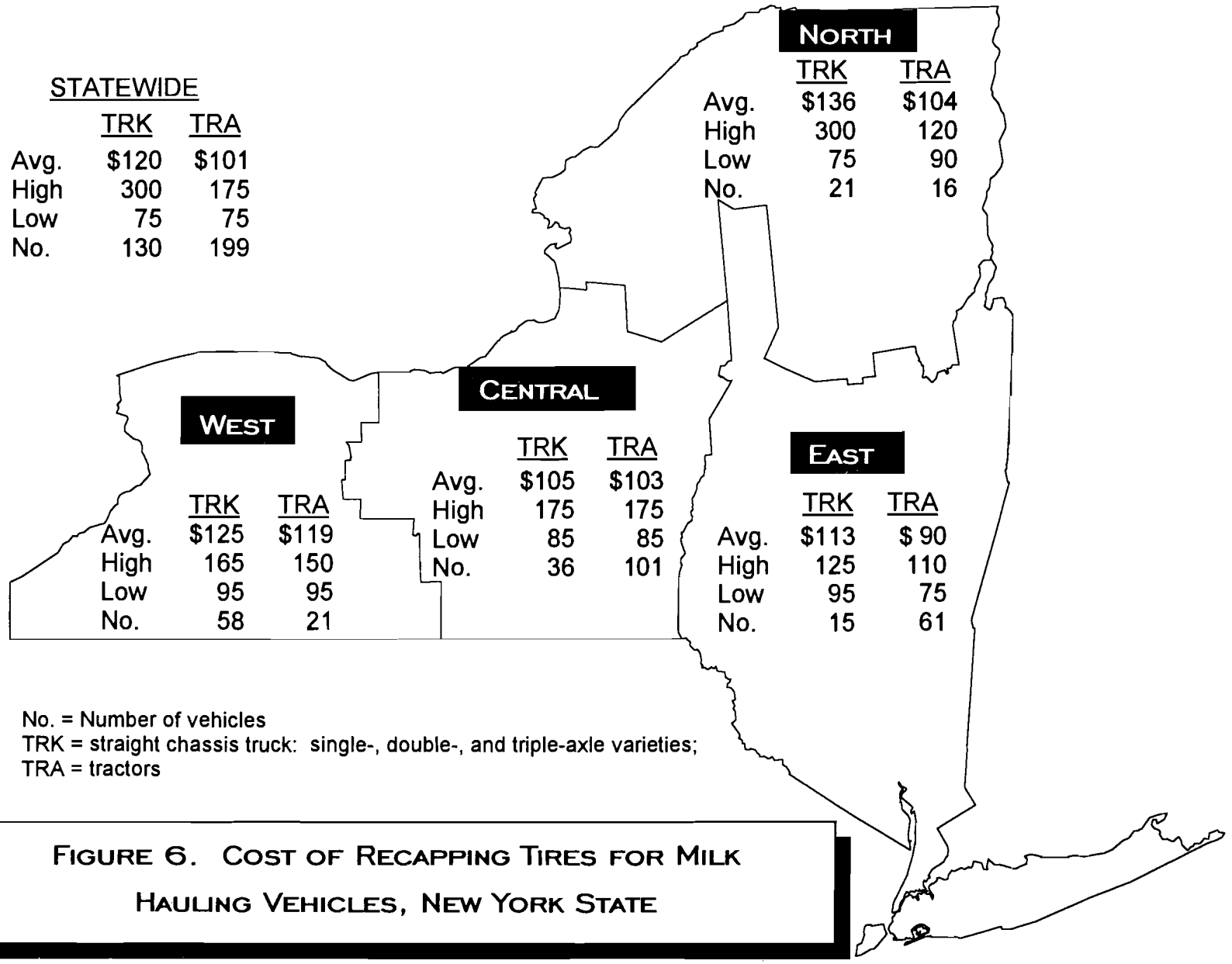


FIGURE 6. COST OF RECAPPING TIRES FOR MILK HAULING VEHICLES, NEW YORK STATE

averages $116. The inner 90% range for tractors and straight trucks is $75 to $128 and $85 to $175, respectively.

Throughout all of the regions, recapping tractor tires is less expensive on the average than recapping straight truck tires. Ranking regions by the cost of recapping tractor tires from lowest to highest favors the eastern and central regions, independent of chassis type. Large haulers may have a cost advantage over smaller haulers because several worn tires can be delivered to a tire service center for recapping at one time. The western region stands out as a relatively expensive region for recapping tires; the reported average cost for recapping is $125 for straight truck tires and $119 for tractor tires.

Miles per Tire

As revealed in the previous section, tires can become a significant expense, especially if they are replaced frequently. Table 16 summarizes the data submitted involving the life expectancy of tires in miles. Tractor tires are expected to outlast straight truck tires in each of the four regions, particularly in the east where tractor tires are expected to achieve 3½ times the mileage of straight truck tires. The difference in expected tire life between tractors and straight trucks may be explained by the contrast in weight distribution. This is particularly true for the steering tires. With the increases in tank sizes, more cargo weight is placed on the steering tires. As straight trucks maneuver into position for milk pickup, the grinding action on the steering tires caused by frequently turning the steering wheel is exacerbated. The steering tires on tractors are not subjected to the same treatment because the majority of the cargo weight rests on the trailer tires and the tractor drive tires.

Tire life expectancy is dependent on not only the chassis type and number of miles driven, but the type of miles that are covered and duties to which the vehicle is assigned. Among the factors contributing to reduced tire life are: (1) an increased number of farm stops, (2) an increased number of assembly miles covered, and (3) improper driving technique. Although it may not be possible to reduce the number of farm stops on a route or the number of assembly miles traveled, improper driving technique can be eliminated so that tire life is prolonged.

As presented in the survey, the question regarding number of miles traveled per tire allows for one recap if recapping is used. The haulers utilizing recapping are able to boost tire mileage by an additional 35% - 50% on the average with some haulers documenting an astonishing 75% increase in miles traveled. As stated earlier, not all haulers take advantage of recapping tires. The most frequently cited reason for not recapping tires is poor past performance of recapped tires.

Repair and Routine Maintenance Costs

All vehicles experience breakdowns and part failures over their useful lives. The frequency of vehicle breakdowns is not unrelated to other aspects of hauling. For example, there is a close relationship between the age or accumulated mileage of a vehicle, the primary use of the vehicle, and the number (and cost) of breakdowns experienced.

Table 16. Average Number of Miles Traveled Per Tire by Milk Hauling Vehicles

	Region of Hauler Location									
	West		Central		North		East		NY State	
Miles per tire[1]	TRK[2]	TRA	TRK	TRA	TRK	TRA	TRK	TRA	TRK	TRA
0 - 100,000	36	9	23	63	26	8	15	6	100	86
100,001 - 200,000	19	6	20	84	8	10	0	33	47	133
Over 200,000	0	0	1	6	0	0	0	21	1	27
Number of vehicles[3]	55	15	44	153	34	18	15	60	148	246
Average per tire (x 1,000 miles)	91.0	93.0	109.1	121.6	91.6	122.5	53.3	189.0	92.7	136.3

[1]Includes one recap if recapping is used

[2]TRK = straight chassis trucks: single-, double-, and triple-axle varieties; TRA = tractors

[3]Includes only the vehicles reporting data; vehicles with no response are excluded.

Haulers were asked to report the estimated repair costs *per mile* for each vehicle in the fleet. The figures were to contain only the expense of the parts and labor for *non-routine* repairs; all preventive and routine maintenance expenses were reported in a separate section. A number of haulers reported high repair costs, possibly the result of operating older equipment or suffering an unexpected number of breakdowns. Reported repair costs may have been affected by the extent of the shop facilities maintained and number of full-time mechanics employed as well. Some haulers chose not to operate a shop facility because the size of the business did not justify the added expense. Seasonal and terrain variations throughout the state may have also affected the frequency and magnitude of repairs.

Reported repair costs range from a low of ½¢ to a high of 33¢ per mile (Figure 7). The inner 90% range is 2½¢ to 22¢ for straight trucks and 5½¢ to 17¢ for tractors. The wide range of reported repair costs suggests that vehicle repair records tend to be poor. Nonetheless, tractors average 9.9¢ per mile, and straight trucks average about 3¢ more per mile. Using the truncated data set, tractor repair costs average 9.5¢ per mile, while straight truck repair costs average 12.9¢ per mile.

The north reports the highest repair costs for the four regions. This is not surprising since the haulers in the north retain their vehicles longer than haulers from other regions (see Table 5). The east is a low repair cost region for both chassis types, and although the east leads all other areas in miles traveled per vehicle, it also has the newest vehicles of all regions. The west is the only region in which the estimated repair costs for tractors exceed that of straight trucks. It may be tempting to cite the relative age of straight trucks and tractors in the west (6.8 years versus 9.1 years) and miles traveled (130 miles per day versus 164 miles per day) to explain away the apparent inversion of repair costs. However, other regions (notably the eastern and central regions) show comparable patterns in age and mileage, but they exhibit *lower* tractor repair costs compared to straight trucks.

Preventive and routine maintenance includes any expenses incurred during regular maintenance procedures including oil, filters, and labor. Costs for more extensive repairs are not included in estimating the preventive maintenance cost. Reported costs range from 1¢ per mile up to 10¢ per mile, as shown in Figure 8. Straight trucks average 3.4¢ per mile, and tractors average 2.3¢ per mile. The inner 90% range for straight truck and tractor routine maintenance costs is 1.2¢ to 6¢ per mile and 1¢ to 5¢ per mile, respectively. Average figures for routine maintenance costs using the truncated data set are quite similar to the costs calculated with the full data set; straight trucks average 3.3¢ per mile, and tractors average 2.2¢ per mile.

Throughout the state, tractors repair costs are generally lower than straight trucks, although the west shows almost no difference in routine maintenance costs between the chassis types. The eastern region reports the lowest estimated routine maintenance cost for both chassis types, followed by the central region. The two remaining regions rank differently depending on the chassis type in question.

Section IV: Comparison of Hauling Cost Items Between Small and Large Haulers

As suggested in earlier sections of the publication, large haulers may have cost advantages in certain areas of milk hauling as a result of the size of the operations. Put another way, large haulers may experience economies of scale by virtue of the size and

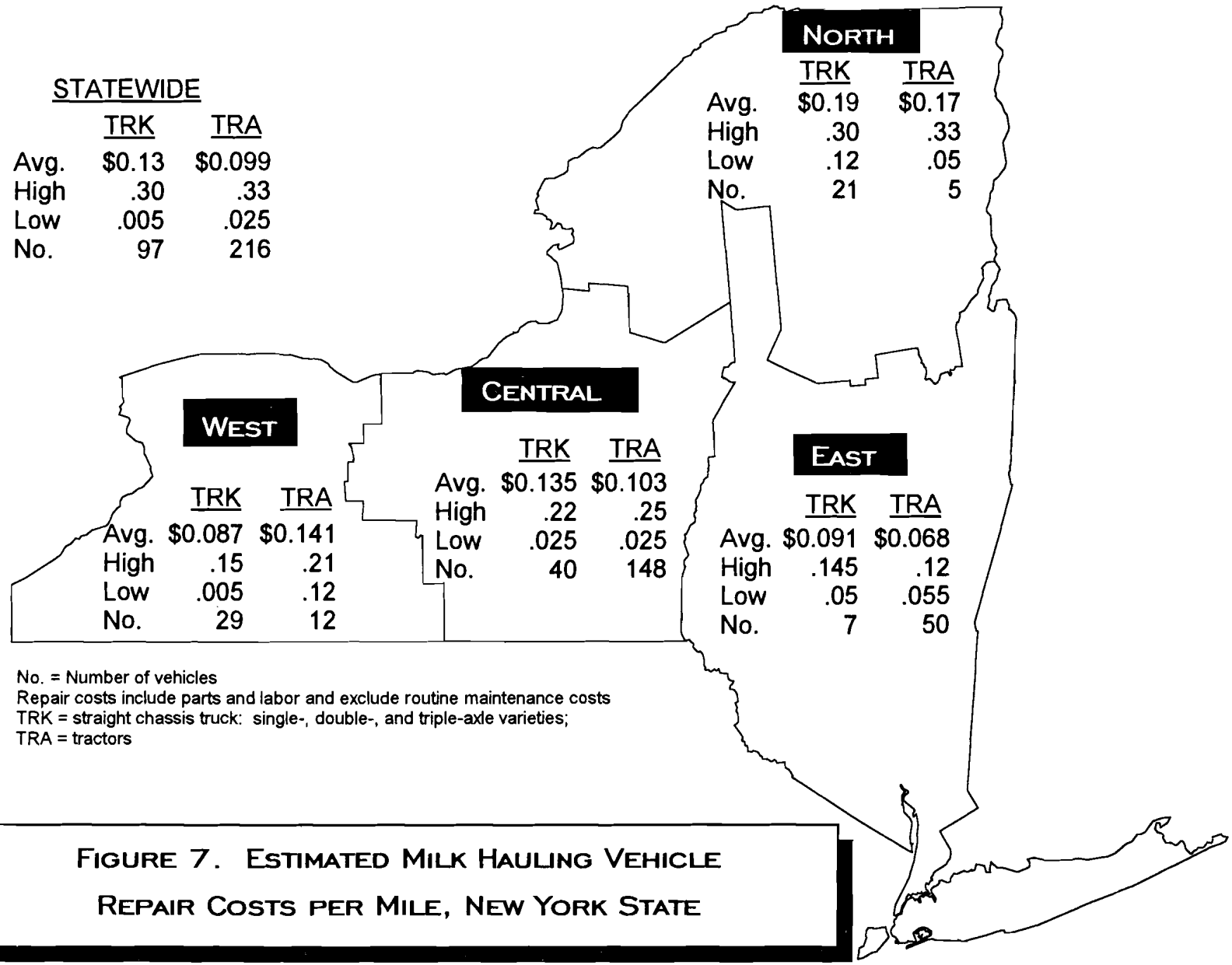
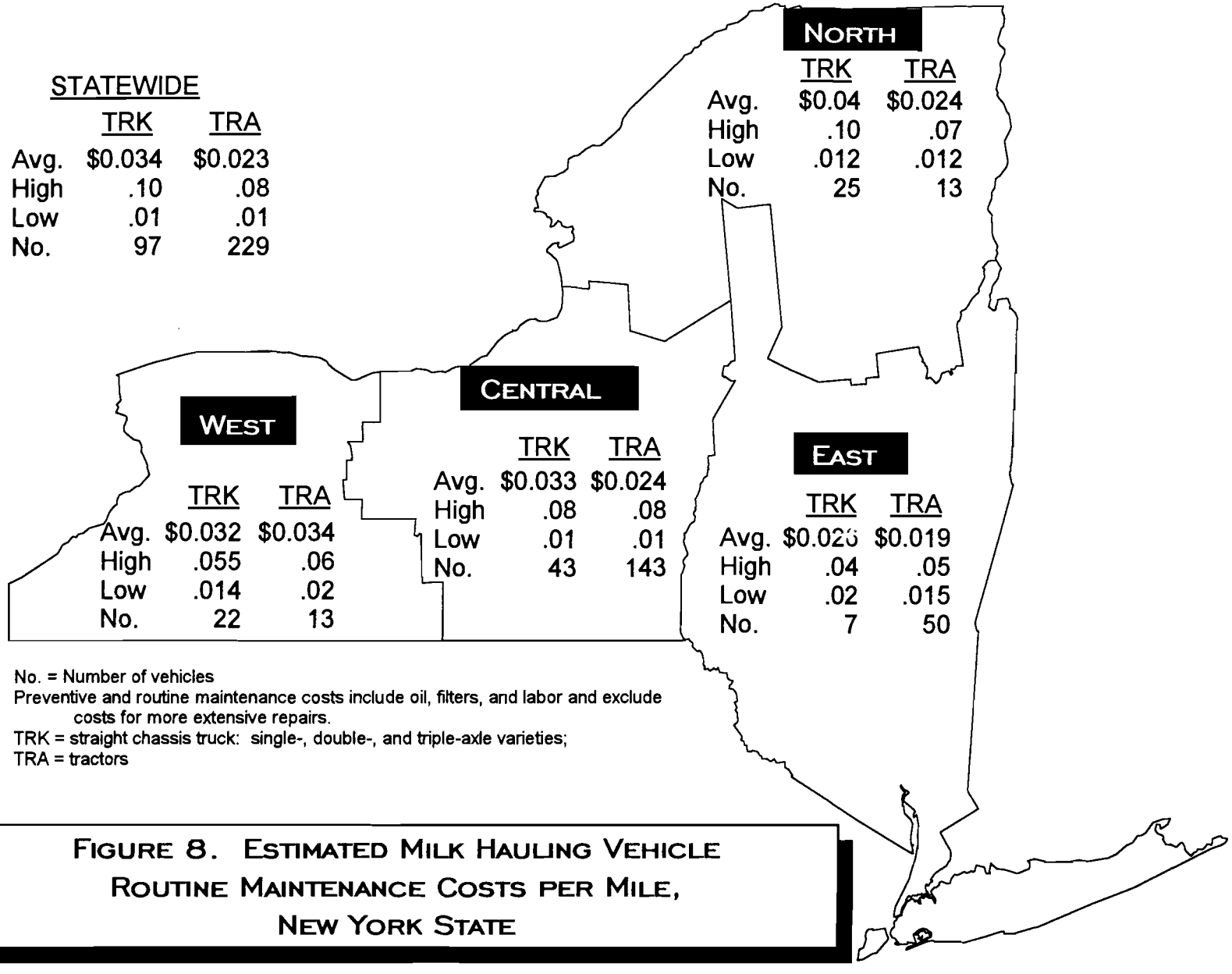


FIGURE 7. ESTIMATED MILK HAULING VEHICLE REPAIR COSTS PER MILE, NEW YORK STATE



No. = Number of vehicles
Preventive and routine maintenance costs include oil, filters, and labor and exclude costs for more extensive repairs.
TRK = straight chassis truck: single-, double-, and triple-axle varieties;
TRA = tractors

FIGURE 8. ESTIMATED MILK HAULING VEHICLE ROUTINE MAINTENANCE COSTS PER MILE, NEW YORK STATE

inherent flexibility of the business. Among the chief advantages a hauling business may realize relate to capital expense items, insurance costs, and repair costs. Section IV investigates the cost differences between small and large hauling businesses. Small operations refer to businesses with six or fewer vehicles while businesses with seven or more vehicles constitute the large firms. For both small and large operations, the information presented is separated into straight truck and tractor categories. The average cost is presented for each item along with the number of vehicles upon which the average is based. The high and low amounts are also reported to reflect the range of costs for all haulers in the survey.

Cost of Replacement Equipment

For most capital expense items, it appears that larger haulers are afforded reductions in prices. Table 17 indicates that haulers with seven or more vehicles pay, on the average, about $2,900 less for straight trucks and $1,950 less for tractors than haulers operating six or fewer vehicles. With tanks and trailers, the purchase price advantage of large haulers is less consistent (Table 18). Certainly, price breaks exist for tanks; large haulers pay an average of $2,630 less than small haulers. However, only a very modest price difference of $272 exists between what large and small haulers pay for trailers. The reductions in equipment purchase prices for large haulers may be the result of purchasing several vehicles or tanks at one time, though this does not seem to apply for trailers.

Table 17. Cost of Replacement for Milk Hauling Vehicles by Size of Hauling Business

	6 or fewer vehicles		7 or more vehicles	
Item	TRK[1]	TRA	TRK	TRA
Average	$68,520	$69,830	$65,633	$67,881
High	$100,000	$85,000	$85,000	$77,000
Low	$23,000	$60,000	$55,000	$61,000
Number of vehicles[2]	98	50	49	182

[1]TRK = straight chassis truck: single-, double-, and triple-axle varieties; TRA = tractors

[2]Includes only the vehicles with data; vehicles with no response are excluded.

Table 18. Cost of Replacement for Milk Tanks and Trailers by Size of Hauling Business

	6 or fewer vehicles		7 or more vehicles	
Item	TRK[1]	TRA	TRK	TRA
Average	$28,343	$51,609	$25,713	$51,337
High	$45,000	$62,000	$40,000	$70,000
Low	$12,000	$40,000	$20,000	$35,000
Number of vehicles[2]	83	46	47	178

[1]TRK = tanks attached to straight chassis truck: single-, double-, and triple-axle varieties; TRA = trailers

[2]Includes only the vehicles with data; vehicles with no response are excluded.

Insurance Premiums

The amount of money paid in insurance premiums does not differ significantly between the small and large haulers (Table 19). Large haulers actually pay slightly more in premiums for both chassis types than small haulers. This is a curious result because large haulers are in a better position to "shop around" for the most economical insurance package. In addition, insurance companies are more apt to provide insurance coverage at reasonable rates if several vehicles are to be insured. What is not addressed in the analysis and may be the reason for the unexpected result is the amount of coverage provided by each of the hauler's policies. The similarity between the premiums paid may be the result of larger haulers requesting more insurance coverage on all vehicles in the fleet. Though large haulers may be receiving a bargain on the minimum level of insurance, the extra coverage requested may be responsible for masking any price benefits that large haulers receive.

Table 19. Insurance Premiums Paid on Milk Hauling Vehicles by Size of Hauling Business

	6 or fewer vehicles		7 or more vehicles	
Item	TRK[1]	TRA	TRK	TRA
Average	$3,745	$4,667	$3,921	$4,730
High	$9,000	$11,148	$8,600	$8,600
Low	$250	$1,200	$624	$2,060
Number of vehicles[2]	92	58	56	187

[1]TRK = straight chassis truck: single-, double-, and triple-axle varieties; TRA = tractors

[2]Includes only the vehicles with data; vehicles with no response are excluded.

Tire Costs

Large haulers pay a lower price for tires across both chassis types; straight truck tires cost an average of $42 less , and tractor tires cost an average of $28 less (Table 20). The need to have a sufficient inventory of tires to replace worn tires or blow-outs increases with the size of the hauling business. Though the price differences may look insignificant, when compounded over a number of vehicles the savings on tire expenses alone could prove to be substantial. Large haulers are more likely to receive quantity discounts as a result of purchasing several tires at one time.

Table 20. Cost of Tires by Size of Hauling Business

	6 or fewer vehicles		7 or more vehicles	
Item	TRK[1]	TRA	TRK	TRA
Average	$405	$359	$363	$331
High	$625	$625	$467	$420
Low	$260	$300	$228	$228
Number of vehicles[2]	93	57	60	196

[1]TRK = straight chassis truck: single-, double-, and triple-axle varieties; TRA = tractors

[2]Includes only the vehicles with data; vehicles with no response are excluded.

Repair and Routine Maintenance Costs

Large haulers are more likely to maintain extensive shop facilities as well as full-time mechanics to service fleet vehicles. In some cases, the shop facilities are equipped to the point where none of the repair work requires the assistance of an outside, independently-operated repair center. The variation in extent of the shop facilities may explain, at least in part, the disparity between repair costs for straight trucks and tractors depending on hauler size. From Table 21, repair costs for straight trucks operated by small haulers are 3¢ per mile less than the reported costs for large haulers. Nonetheless, tractor repair costs for small haulers are 3½¢ per mile *more* than large haulers.

Table 21. Repair Costs Per Mile by Size of Milk Hauling Business

	6 or fewer vehicles		7 or more vehicles	
Item	TRK[1]	TRA	TRK	TRA
Average	11.3¢	13¢	14.3¢	9.4¢
High	30¢	33¢	33¢	17¢
Low	0.5¢	2.5¢	2.5¢	5.5¢
Number of vehicles[2]	41	29	56	187

[1]TRK = straight chassis truck: single-, double-, and triple-axle varieties; TRA = tractors

[2]Includes only the vehicles with data; vehicles with no response are excluded.

Differences in preventive and routine maintenance costs between the two groups are also apparent; large haulers report a lower cost per mile for both chassis types (Table 22). In fact, large haulers estimate that routine maintenance costs are roughly half of what small haulers pay. Large haulers can justify buying and stocking huge quantities of necessary items such as oil and filters, and thus, quantity discounts appear to be the main reason to explain the cost differences between the two hauling groups.

Table 22. Routine Maintenance Costs Per Mile by Size of Hauling Business

	6 or fewer vehicles		7 or more vehicles	
Item	TRK[1]	TRA	TRK	TRA
Average	4.7¢	4.1¢	2.7¢	2¢
High	10¢	8¢	5.5¢	5.5¢
Low	1.4¢	1.5¢	1¢	1¢
Number of vehicles[2]	37	33	60	196

[1]TRK = straight chassis truck: single-, double-, and triple-axle varieties; TRA = tractors

[2]Includes only the vehicles with data; vehicles with no response are excluded.

Summary

The New York dairy industry is a complex network of dairymen, supporting businesses, consumers, and government. Milk haulers provide an essential service by transporting raw milk from dairy farms to processing plants. Prior to the 1992 Northeast Milk Hauling Survey, relatively little was known about the status of the businesses that they operate and how the milk hauling industry has evolved in the past decade. To highlight a few of the points revealed by this analysis:

- About three-quarters of all New York milk haulers operate six or fewer vehicles.

- Tractors are the most popular chassis type among the largest haulers, and account for about 80% of the fleet vehicles on the average.

- Capital costs of entering the milk hauling business are high. Tractors-trailer rigs average about $120,000 while straight trucks equipped with tanks average about $95,000.
- Wage rates paid to hired drivers are variable. A daily wage is the most popular method of payment and averages $78.23 statewide. Regional differences in daily wage rates are extremely large. The average hourly wage for New York drivers is $8.04 per hour; only small differences exist between regions.

*****

New York is the third-leading milk producing state. With the volume of milk produced, it is necessary to maintain an efficient and organized network of milk haulers so that the raw product is delivered to the appropriate processing plants in a timely manner. One section of the publication addresses the efficiency aspects of New York's milk hauling industry, and several points bear repeating:

- Tractors require an average of 10.2 farm stops per day and deliver an average of 1.2 loads of milk per day. Straight trucks require 2.3 more farm stops per day, but deliver 1.6 loads per day.

- Only 25% of all vehicles deliver 2 or more loads per day.

- 80% of the tractors deliver between 40,100 and 60,000 pounds of milk per day. Straight trucks are more variable in the amount of milk delivered each day as a result of variations in tank size and loads of milk moved per day.

- Tractors operate about 2 hours more per day and cover about twice as many miles per day as straight trucks.

*****

Milk hauling businesses have seen price increases in almost every item needed to operate a hauling business. The costs for such essentials as straight trucks, tractors, tanks, trailers, insurance, tires, and repairs have attained levels that are forcing some of the less efficient haulers to exit the business. Milk haulers are also subjected to year to year fluctuations in milk volume which does not allow haulers to operate consistently at optimum capacity.

To reiterate some of the costs experienced by haulers:

- Annual insurance premiums for tractors and straight trucks average $4,715 and $3,836 respectively. Tractors average $1,422 in registration fees per year (including overload permits), and straight truck registration fees average $697 annually.

- Straight truck tires cost an average of $388 each; tractor tires cost $50 less at $338 each.

- Repair costs are variable depending on the size and location of the hauling business. Overall, tractor repairs cost 3¢ less per mile than straight trucks.

★★★★★

Though some items such as insurance premiums and repair costs are inconclusive, larger haulers can obtain price breaks on a number of cost-related items:

- Tractor replacement costs are about $1,950 less for large haulers, and straight truck replacement costs are about $2,900 less. A 10% price break on tank purchase prices is reported for large haulers, but few savings are evident when trailers are involved.

- Routine maintenance costs for large haulers are about half of the amount reported by small haulers.

Appendix:

The Milk Hauling Survey

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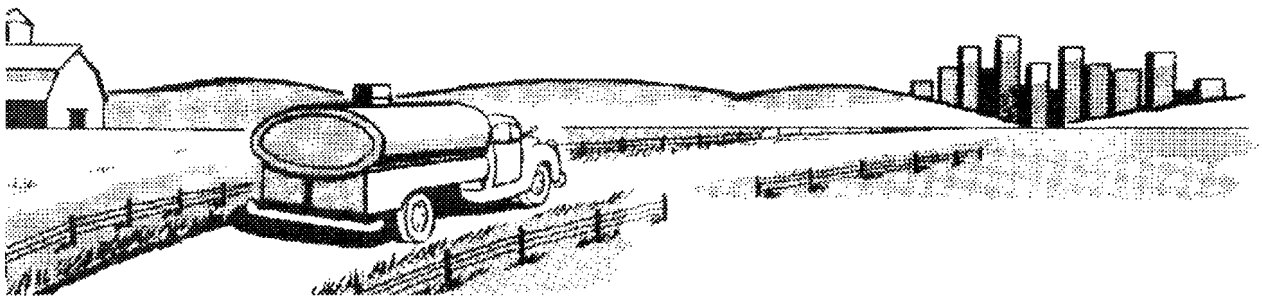
Milk Hauling Survey



Respondent Name: _____

Company Name: _____

Address: _____

_____

Phone: _____
(area code)

Date: _____

Co-sponsored by:

Cornell University
NY-NJ Market Administrator
NYS Department of Agriculture & Markets

In order to help you, we need your help!

As we indicated in our cover letter, we will be using this survey information to assess the changes that have occurred in our bulk milk transportation system over the last decade and to update and enhance the milk hauling cost analysis computer program by adapting the software to current hauling practices. We will again publish the results in an extension bulletin that will be sent to all participants. Upon conclusion of the survey and updating of the computer program, we hope to hold several hauler meetings throughout the region to review and analyze the results with you.

Information from this survey will allow you to compare your business to regional averages and efficiency standards for similar businesses in your area. Additionally, by comparing how the industry has changed since the last analysis, you may get ideas on how to structure your milk hauling business for future growth and profitability. The information may also prove to be useful in your discussions with lenders and milk dealers.

You are an integral part of the bulk milk hauling system in this region. ***Therefore, please take a few minutes to fill out this survey as accurately as possible and return it in the enclosed envelope as soon as possible.*** Your help in getting this information is greatly appreciated.

All information about your business will be held in the strictest confidence. Information from your fellow milk haulers will be combined with yours, so no one will be able to extract individual business information from the combined published data.

If you have any questions concerning the survey, please contact Walter C. Wasserman at (315) 255-1183 or Edward W. Gallagher at (518) 452-4410. Thank you for your assistance.

1. Do you currently operate one or more milk trucks in New York, New Jersey and/or Pennsylvania? (Check one)
   - ❑ Yes. If yes, please complete the rest of the form
   - ❑ No. If no, return the survey in the self-addressed stamped envelope

2. Do you utilize your milk hauling vehicles for purposes other than milk hauling?
   - ❑ Yes. If yes, a) specify type of business _____
     b) what % of truck time is involved with this other business _____%
   - ❑ No.

3. Please indicate which milk dealers you regularly haul for. (list names)

   _____

   _____

   _____

   _____

4. Please list all states and counties in which you have one or more farm stops.

   _____

   _____

   _____

   _____

5. How many vehicles do you operate all year round?
   - _____ Number of straight chassis trucks used year round
   - _____ Number of tractors used year round
   - _____ Number of trailers used year round

6. Number of additional vehicles used during the flush period or as reserves?
   - _____ Additional straight chassis trucks
   - _____ Additional tractors
   - _____ Additional trailers

7. If you do not maintain reserve vehicles, how do you meet your needs in flush periods or when vehicles break down? (Check the appropriate answers)
   - ❑ Spread hauling demands over existing vehicles
   - ❑ Temporarily rent or lease additional vehicles
   - ❑ Request assistance from fellow milk hauler
   - ❑ Request assistance from milk dealer
   - ❑ Other (please specify) _____

8. What was the most recent price you paid for fuel?
   Gasoline $_____per gallon Diesel $_____per gallon

9. If you have hired drivers, please indicate the approximate average wage rate that applies to your situation.
   Wage rate $_____per hour;
   Wage rate $_____per day;
   Wage rate $_____per week

   Please indicate the value of fringe benefits on an hourly or percent of salary basis. Fringe benefits include social security contribution, workmen's Compensation, hospitalization insurance, unemployment insurance, bonuses, vacations, etc.

   Rate per hour $_____ Percent of wages _____%

10. Approximately what percent of your farm stops are *every day* pick ups?
    ON AVERAGE _____% SPRING _____% FALL _____%

11. Of the vehicles you operate, how many are owned by:

	Straight Chassis Trucks	Tractors	Trailers
Yourself or your firm	_____	_____	_____
A cooperative dealer	_____	_____	_____
A proprietary dealer	_____	_____	_____
An independent leasing firm	_____	_____	_____
Another private individual	_____	_____	_____
Other (please specify)			
_____	_____	_____	_____

12. Of the vehicles you own, how many were financed by:

	Straight Chassis Trucks	Tractors	Trailers
Yourself or your firm	_____	_____	_____
A loan through the truck dealership	_____	_____	_____
A loan through a commercial bank	_____	_____	_____
A loan through a private lender	_____	_____	_____
A loan through a milk dealer	_____	_____	_____
Other (please specify)			
_____	_____	_____	_____

13. What interest rate are you currently paying for financing milk hauling equipment?
_____% Other: _____

The remainder of the survey attempts to identify information about each straight truck and/or tractor-trailer used in your milk hauling operation. Therefore, in column #1, please indicate information about a chassis and a tank or trailer that is normally used together. Please give information in subsequent columns for each such truck that you regularly operate. If you have spare milk hauling equipment, include that information after you have entered information on all regularly used vehicles.

Our identification of each vehicle:	#1	#2	#3	#4	#5	#6
Your identification (optional):	_____	_____	_____	_____	_____	_____
14.Make of truck or tractor chassis: (i.e., Mack, International)	_____	_____	_____	_____	_____	_____
15. Model year of chassis:	_____	_____	_____	_____	_____	_____
16. Total number of years you expect to keep each chassis:	_____	_____	_____	_____	_____	_____
17. Type of chassis: (Check one)						
Single axle-straight chassis	_____	_____	_____	_____	_____	_____
Double axle-straight chassis	_____	_____	_____	_____	_____	_____
Tractor	_____	_____	_____	_____	_____	_____
Other (specify)						
_____	_____	_____	_____	_____	_____	_____

Our identification of each vehicle: Your identification (optional):	#1	#2	#3	#4	#5	#6
18. Maximum gross weight of each vehicle						
19. Type of fuel used: (G=gas; D=diesel)						
20. Average miles per gallon for all trucks:						
all uses						
farm pick up						
over-the-road						
21. Engine size (in hp):						
22. If you own the truck or tractor, approximate cost when it was new:						
23. Approximate cost to replace the truck or tractor today:						
24. Estimated salvage value when sold or traded:						
25. If you lease the truck or tractor, annual cost of the lease:						
26. Tank capacity (gallons):						
27. Milk pump capacity: (gallons/minute)						
28. What is the model year of the tank or tank trailer:						

Our identification of each vehicle: Your identification (optional):	#1	#2	#3	#4	#5	#6
29. Total number of years you expect to keep each tank or tank trailer:						
30. If you own the tank or tank trailer, approximate cost when it was new:						
31. Approximate cost to replace each tank or tank trailer today:						
32. If you lease the tank or tank trailer, annual cost of the lease:						
33. Estimated salvage value of tank or tank trailer:						
34. The PRIMARY & SECONDARY function of each vehicle are: (P=primary; S=secondary)						
Farm pickup to reload station						
Farm pickup to upstate plant						
Farm pickup to metropolitan New York City plant						
Farm pickup to out-of-state plant						
Upstate plant to another upstate plant						
Upstate plant to metropolitan New York City plant						

Our identification of each vehicle:	#1	#2	#3	#4	#5	#6
Your identification (optional):						

Consecutive Weekdays (continued)

36. Number of drivers per day						
First day						
Second day						
37. Name of plant or reload station						
First day						
Second day						
38. Daily mileage:						
Assembly:						
From garage to last farm stop						
First day						
Second day						
Transport:						
From last farm to plant (or reload)						
First day						
Second day						
From plant (or reload) to garage						
First day						
Second day						
39. Daily time for milk assembly [minutes]						
First day						
Second day						
Time from end of assembly to plant (or reload) [minutes]						
First day						
Second day						

Our identification of each vehicle:	#1	#2	#3	#4	#5	#6
Your identification (optional):						

39. Daily time (minutes) for milk assembly (continued)

Total time at plant						
First day						
Second day						
Time waiting to unload						
First day						
Second day						
Time from plant (or reload) to garage						
First day						
Second day						

40. Number of farm stops

First day						
Second day						

41. Total pounds hauled

First day						
Second day						

Seasonal variation in load size:
high_____ low_____

Please indicate your best estimate of current operating costs for these vehicles. Only include information for those vehicles used in the hauling of bulk fluid milk (this does not include cream). If individual truck data is not available, please include your best estimate of total fleet cost and allocate on a per truck basis.

42. Annual insurance per truck						
43. Annual registration fees (include overweight limit permits)						
44. Annual fixed or overhead costs: (i.e., office, garage, fleet management, accounting, etc.)						

Our identification of each vehicle: Your identification (optional):	#1	#2	#3	#4	#5	#6
45. Cost of new radial tire						
46. Cost of recapping (if used)						
47. Number of miles per tire (new tire plus 1 recap)						
48. Average repair cost/mile for parts and labor over life of new truck						
49. Average PM per mile including routine maintenance (oil, filters, labor, etc.)						
50. Daily tolls:						
First day						
Second day						
51. Annual federal highway tax						
52. Other state taxes (i.e., TMT, etc.)						

☞ ***See back of this page for comments section.*** ☞

Additional information for questions 36-41 and for trucks hauling more than one load per day.

For the first load, assembly miles and time are those from the trucks garage to the last farm stop. Transport miles and time are those from the last farm stop to the plant or reload station. If the truck runs another load on that day, the assembly miles and time for the second load are those from the plant or reload to the last farm stop for that load. Transport miles and time are those from the last farm stop to the plant or reload station. In case a third load is assembled during the day, the procedure is the same as for the second load. For truck's last load of the day, list the miles and time from the plant to the garage separately. Do not include with assembly.

Milk transported from a reload or plant to another plant.

If you transport milk from a reload or plant to another plant, identify the information under the appropriate truck that is used for this movement. Please answer the appropriate questions in 36-42. For miles and time to the plant, indicate the information on the appropriate lines "From last farm to plant (or reload)" and "Time from end of assembly to plant (or reload)". Also include information on miles and time from plant of delivery to the garage and the time at the plant.

53. Additional comments about your milk hauling situation:

_____

_____

_____

_____

Thank you for your cooperation.

OTHER AGRICULTURAL, RESOURCE, AND MANAGERIAL ECONOMICS RESEARCH BULLETINS

(Formerly A.E. Res. Publications)

No.	Title	Author(s)
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93-08	Evaluating U.S. Generic Milk Advertising Effectiveness Using an Imperfect Competition Model	Nobuhiro Suzuki Harry M. Kaiser John E. Lenz Olan D. Forker
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