



Southeast Florida Regional Travel Characteristics Study Truck Movement Survey Plan and Findings

Prepared for:

Florida Department of Transportation, Districts IV and VI

Miami-Dade MPO

Broward County MPO

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1. Introduction

This report describes the methods and findings for the Truck Movement Survey for the Southeast Florida Regional Travel Characteristics Study (SEFRTCS) and its results.

1.1 Purpose

The purpose of the truck movement survey was to provide information on truck movements, which will provide data for developing a truck component for travel demand models. Truck traffic is a main concern for roadway pavement and intersection design. It is important for highway capacity analysis because a truck is equivalent to more than one car in the traffic stream. The truck movement survey focused on three primary types of truck activities:

- Truck, which is local delivery/distribution of goods, materials, and commodities.
- Freight, which is long-distance trucking.
- Service, which refers to the truck activity associated with the delivery of services, such as plumbers, repair services, etc.

1.2 Modeling Needs

One of the principles for survey planning is to first specify a travel model, and then design a survey to collect the data needed to develop, calibrate, and support the model. Stated another way, it is not a good idea to collect information about travel characteristics, in this case trucks, and then consider what model could be supported by the data. Yet, in some respects, the "unfavored" approach is the course specified for the SEFRTCS truck movement survey. Reasons for this include:

- Truck modeling in south Florida is new. It is new for most urban areas, and methods are not well defined.
- The availability of data is uncertain. In some cases, it may not be possible to understand what data are available until an effort is made to collect it.
- The state of the practice for truck modeling is in flux. New materials and research results are becoming available at a fast pace.

Two broad approaches to truck modeling have been taken in other urban areas and for statewide modeling. The first might be called an econometric approach. In this approach, the factors that cause the production and consumption of goods are identified, and transportation links between the producer and the consumer. In this approach, the movement of goods is quantified in tons or other appropriate unit for various commodities. Later in the analysis process, the movement of goods is allocated to mode, such as highway, rail, water or air. Then tons are converted to number of trucks, rail cars, ships and planes. In general, the methods used in this approach are unfamiliar to transportation planners, and there is little information on how well this approach is able to replicate truck traffic volumes on roadways.

The second approach uses traditional transportation modeling methods. This approach was used in the SERPM4, Broward and Palm Beach models. Similar approaches have been documented in the literature and have been used in several major cities throughout the country. In general, this approach establishes one or more truck trip purposes (by vehicle type, weight class, or other stratification). For each of the purposes, trips are generated, distributed and assigned to the highway network. The trip generation equations for truck trips are similar to non-home-based trip generation equations, and generally use employment variables. This is the method used in the SERPM4 model and the validation results are relatively good.

Initially, an extensive and detailed survey that collected truck trip origins and destinations was planned. However, during a pretest it was found that almost no trucking companies were willing to participate in the survey. As a result, a simplified survey was developed and the pretest response rate about 10%. On the basis of the pretest, the simplified survey was executed for all the counties.

2. Survey Approach

Two survey forms were initially developed for the truck movement survey. The first was designed to collect information about the firm operating the vehicles (Figure 1). Data items included the following:

- ◆ Company name;
- ◆ Type of business;
- ◆ SIC code;
- ◆ Category of business (freight, local delivery, local service, other);
- ◆ Address;
- ◆ Contact person information;
- ◆ Facility and employee information;
- ◆ Type of commodity or service provided;
- ◆ General description of the site; and,
- ◆ Number and type of trucks operated.

The second form was developed to capture truck movements for a 24-hour period (Figure 2). The form was designed to collect the following information:

- ◆ The type of truck;
- ◆ Addresses of stops;
- ◆ Arrival and departure times;
- ◆ Trip length;
- ◆ Land use at each stop;
- ◆ Type of business at each stop;
- ◆ The activity at each stop;
- ◆ The type of goods or services provided;
- ◆ The weight of goods loaded or unloaded;
- ◆ The approximate quantity of goods; and,
- ◆ The final destination of any goods loaded or unloaded.

The survey was mailed to 4,600 firms between June 22 and June 24, 1999. The mailing included a cover letter from the consultant explaining the purpose of the survey, a letter from the Florida DOT, a form to collect information on the firm, five trip logs, and a postage paid envelope to be used in returning the forms.

Follow up calls were made to larger entities such as grocery chains and larger service businesses in an attempt to elicit participation. During the calls, the surveyor attempted to set up a site visit where by they could assist in documenting the survey site information and also collect any type of trip logs the business might keep. As of July 15, 1999, responses had been received from only 12 companies, which represented 72 trucks.

Discussions among the survey staff revealed that firms.

- ◆ Did not want to participate;
- ◆ Did not want to fill out forms;
- ◆ Made excuses about no being able to fill out forms;
- ◆ Did not respond to what they said they would do; and,
- ◆ Said they had no trucks or no relevant activity.

It was felt by the consultant team that the biggest impediment to participation in the survey was the commitment of time involved in filling out the survey forms. Thus, it was determined that the number of questions would be reduced and a phone survey would be conducted asking a minimal number of questions. This approach was presented to and ratified by the Project Management Committee.

A second survey was developed with seven questions (Figure 3). A pretest was conducted resulting in approximately a 10 percent response rate. It was decided to proceed with the survey. A total of 4,110 firms were contacted to participate; 848 of them completed the survey, for a response rate of 20.6%.

The second round of data collection occurred between August 4, 1999 and August 25, 1999.

Figure 1

SOUTHEAST FLORIDA REGIONAL TRAVEL CHARACTERISTICS STUDY

Thank you for agreeing to participate in this very important truck movement survey in South Florida. The information from this survey will be used by state and local transportation planners to improve local roadways for trucking. **ALL INFORMATION IS CONFIDENTIAL.**

GENERAL COMPANY INFORMATION
ALL INFORMATION IS FOR THIS SITE ONLY

DATE OF THIS SURVEY: ____/____/1999 **NAME OF SURVEYOR:** _____

NAME OF COMPANY: _____
TYPE OF BUSINESS: _____
SIC CODE: _____
SITE CLASSIFICATION: freight [] local delivery [] local service [] or other: _____
ADDRESS: _____

TELEPHONE NUMBER: (____) ____-____ EXT: ____
CONTACT PERSON: _____
FAX NUMBER: (____) ____-____

NUMBER OF EMPLOYEES AT THIS SITE: _____ **SIZE OF SITE (Acres/Square Footage):** _____
OPERATIONS : DAYS OPEN: _____ **HOURS OPEN:** _____

Fill in **EITHER a) OR b)**
a)TYPE OF COMMODITY SHIPPED THROUGH THIS SITE: _____
OR
b)TYPE OF SERVICE PROVIDED: _____

PROVIDE A GENERAL SITE DESCRIPTION:
NUMBER OF LOADING DOCKS: _____ **TRUCK PARKING CAPACITY:** _____
FUELING CAPABILITY: [] YES [] NO **CAR PARKING CAPACITY:** _____
NUMBER OF PUMPS: _____ **OTHER:** _____

TRUCKS DATA:
NUMBER OF AND TYPE OF TRUCKS BASED AT THIS SITE ON A TYPICAL DAY:
Vehicle Classification/type - Number of Axles - Number of Vehicles

_____	-	_____	-	_____
_____	-	_____	-	_____
_____	-	_____	-	_____
_____	-	_____	-	_____
_____	-	_____	-	_____

PLEASE PROVIDE US WITH ANY COMMENTS AND SUGGESTIONS YOU MAY HAVE: _____

Figure 2

At the beginning of my workday my truck was at: (Please indicate the exact street address including zip code) _____ _____		<h2 style="margin:0;">24 Hour Truck Trip Log</h2> <h3 style="margin:0;">For Survey Vehicle Number 1</h3> <p style="margin:0;">If you need space for additional trips please use the other side of this form.</p>					Vehicle Classification: _____ (See Below) <ol style="list-style-type: none"> 1. Pickup/van 2. 2-Axle, Single Unit Truck 3. 3-Axle, Single Unit Truck 4. 4-Axle, Single Unit Truck 5. 2-Axle Tractor w/ 1 or 2-Axle Trailer 6. 3-Axle Tractor w/2-Axle Trailer 7. 3-Axle Tractor w/3-Axle Trailer 8. 5-Axle Multi-Trailer 9. 6-Axle Multi-Trailer 10. 7 or More Axle Trailer 11. Other (Write in) 														
Start Time: _____ AM/PM (Circle One) Start Odometer: _____		At the end of my workday: (Should be the same as last stop) End Time: _____ AM/PM (Circle One) End Odometer: _____																			
I went to Name & Address of Stop Please Give EXACT street address, St, Ave., etc.	Zip code of stop	I arrived at (time)	My Odometer was	Land Use at Stop <small>See below</small>	Activity at Stop <u>See below</u>	Type of Business at Stop	I Carried (Goods or Service) <small>See Below</small>	It weighed	Quantity of Goods <small>see below</small>	Destination of Goods <u>See below</u>	I left at (time)										
		AM PM									AM PM										
		AM PM									AM PM										
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		AM PM									AM PM										
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<table style="width:100%; border:none;"> <tr> <td style="width:33%; border:none;">Land Use At Stop</td> <td style="width:33%; border:none;">Activity At Stop</td> <td style="width:33%; border:none;">Goods or Service</td> <td style="width:16.5%; border:none;">Quantity of Goods</td> <td style="width:16.5%; border:none;">Goods Destination</td> </tr> <tr> <td style="border:none;"> 1. Residential 2. Retail 3. Manufacturing, Warehousing, etc. 4. Transportation 5. Utilities 6. Communications 7. Hospital 8. Public/ Government 9. Office/ Services 10. Other (Write in) </td> <td style="border:none;"> 1. Pick Up Load 2. Drop Off Load 3. Load & Unload 4. Service Call 5. Fuel Vehicle 6. Meal/ Other Personal </td> <td style="border:none;"> 1. Petroleum & Coal 2. Timber & Forest Products 3. Mining 4. Farm & Food Products 5. Equipment, Machinery, & Instruments 6. Industrial Products 7. Consumer Goods 8. Waster Materials 9. Other Goods 10. Service </td> <td style="border:none;"> 1. Empty Truck 2. Partial Load 3. Full Truck </td> <td style="border:none;"> 1. This is a Final Destination 2. Goods will be shipped from here 3. Unknown </td> </tr> </table>												Land Use At Stop	Activity At Stop	Goods or Service	Quantity of Goods	Goods Destination	1. Residential 2. Retail 3. Manufacturing, Warehousing, etc. 4. Transportation 5. Utilities 6. Communications 7. Hospital 8. Public/ Government 9. Office/ Services 10. Other (Write in)	1. Pick Up Load 2. Drop Off Load 3. Load & Unload 4. Service Call 5. Fuel Vehicle 6. Meal/ Other Personal	1. Petroleum & Coal 2. Timber & Forest Products 3. Mining 4. Farm & Food Products 5. Equipment, Machinery, & Instruments 6. Industrial Products 7. Consumer Goods 8. Waster Materials 9. Other Goods 10. Service	1. Empty Truck 2. Partial Load 3. Full Truck	1. This is a Final Destination 2. Goods will be shipped from here 3. Unknown
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Figure 3

Travel 2000 Truck Survey/Information Sheet

Name of Firm:

1. Trucks are located at:
 Street Number
 Street Name
 City
 Zip

2. Type(s) and number(s) of trucks you have:
 Type(s) – See Sheet with Pictures

<u>Types of Trucks</u>	<u>Yes/No (circle one)</u>		<u>Number of Vehicles</u>
A. Pick-up Van	Y	N	
B. Medium	Y	N	
C. Heavy/HD (tractor trailer)	Y	N	

3. Number of employees at the truck location

4. Number of trucks on the road per day

5. Average miles, per truck per day

6. Average hours (operated) per truck per day

7. Average number of stops per truck per day

8. Type of business SIC
 (As described by respondent.) *(Off truck list)*

Once completed, fax to (954) 480-8836 or call with information toll free (877) 764-3266.

3. Results

Eight hundred forty-eight companies completed surveys in Broward, Dade, and Palm Beach Counties. Approximately 40 percent of the surveys were collected in Broward County, 32 percent in Dade County and 28 percent in Palm Beach County (Table 1).

Table 1
Number of Surveys Returned by County

County	Frequency	Percent
Broward	335	39.5
Dade	272	32.1
Palm Beach	241	28.4
Total	848	100.0

3.1 Type of Firm

The truck movement survey focused on three primary types of firms:

- **Local Delivery,** which is local delivery/distribution of goods, materials, and commodities.
- **Service,** which refers to the truck activity associated with the delivery of services, such as plumbers, repair services, etc.
- **Freight,** which is defined as long-distance trucking for the purpose of this study.

Of the 848 firms that participated in the survey 72 percent identified themselves as Local Service Trucking, followed by local trucking and delivery with 18 percent, and freight with 10 percent (Table 2).

Table 2
Type of Trucking Firm

	Frequency	Percent
Freight	86	10.1
Local	154	18.2
Local Service	608	71.7
Total	848	100.0

The number of responses for each category was roughly proportional to the population, except that it would seem that there should have been more responses from service companies in Miami-Dade County (Table 3).

Table 3
Number of Firms by Type by County

	Dade	Broward	Palm Beach	Total
Freight	39	25	22	86
Local	68	39	47	154
Service	165	271	172	608
Total	272	335	241	848

Over 83 percent of the 842 companies that responded to this section reported using pick-up trucks: 18 percent of 821 companies reported using medium trucks, and 25 percent of 811 companies reported using heavy tractor trailer trucks (Table 4).

Table 4
Number of Companies With Each Type of Truck

Type of Truck	Number
Pick-Ups?	703
Medium Trucks?	226
Heavy Tractor Trailer Trucks?	196

3.2 Average Number of Trucks per Firm by Type by County

Dade County averaged the most pick-up trucks per responding firm with 6.0; followed by Palm Beach County with 5.6 pick-ups, and Broward County with 5.0 pick-up trucks. Dade County also averaged the most medium trucks with 6.0 per firm; followed by Broward and Palm Beach Counties with 4.4 medium trucks per firm. Dade County averaged the most heavy tractor trailer trucks per firm with 16.5; followed by Broward County with 9.7 heavy tractor trailer trucks, and Palm Beach County with 5.8 heavy tractor trailers per firm (Table 5).

Table 5
Average Number of Trucks per Firm by County

	Dade	Broward	Palm Beach
Pick-ups	6.0	5.0	5.6
Medium Trucks	6.0	4.4	4.4
Tractor trailers	16.5	9.7	5.8

Service firms in Broward County reported the largest number of pick-ups (33.5%), followed by Palm Beach (26.7%) and Dade County (25.6%). Medium sized trucks were more evenly distributed among the three types of firms. Local trucking and freight firms in Dade County reported the most medium sized trucks (22.6% and 17.4%), while local trucking firms in Broward County reported having 15.6% of the medium trucks. Palm Beach County on average had less than 9% of the medium trucks per type of firm. Freight firms in Dade County had the most tractor trailers (45.2%), followed by freight firms again in both Broward and Palm Beach Counties (21.9% and 10.8%) (Table 6).

Table 6
Percentage of Trucks by County by Type of Firm

County	Firm	Pick-Ups	Medium Trucks	Tractor trailers	Total
Dade	Freight	1.6%	17.4%	45.2%	16.9%
	Local	5.3%	22.6%	2.3%	7.2%
	Service	25.6%	13.2%	1.2%	16.5%
Broward	Freight	1.3%	1.7%	21.9%	7.4%
	Local	2.3%	15.6%	7.7%	6.1%
	Service	33.5%	11.5%	2.7%	20.9%
Palm Beach	Freight	0.3%	0.9%	10.8%	3.5%
	Local	3.4%	8.3%	5.1%	4.7%
	Service	26.7%	8.8%	3.2%	16.9%
	Total	100.0%	100.0%	100.0%	100.0%

Table 7

Number of Pick-Up Trucks by Type of Firm

Most Firms reported having 2 pick-up trucks (7.1%), then 4 trucks (7.0%), and the third most reported category was 6 trucks (6.8%) (Table 7).

Number of Trucks	Freight	Local	Service	Total
1	8.1%	7.7%	4.4%	4.9%
2	8.1%	10.0%	6.7%	7.1%
3	9.7%	4.3%	6.8%	6.6%
4	3.2%	11.5%	6.6%	7.0%
5	8.1%	4.8%	6.6%	6.4%
6	0.0%	2.9%	7.5%	6.8%
7	0.0%	1.7%	4.5%	4.0%
8	6.5%	0.0%	4.4%	4.0%
9	7.3%	0.0%	1.9%	1.9%
10	0.0%	14.4%	3.4%	4.5%
11	8.9%	0.0%	0.7%	0.9%
12	0.0%	0.0%	2.6%	2.2%
13	0.0%	0.0%	0.8%	0.7%
14	0.0%	3.3%	2.1%	2.2%
15	0.0%	0.0%	3.7%	3.1%
16	0.0%	0.0%	1.0%	0.8%
17	0.0%	0.0%	0.5%	0.4%
18	0.0%	0.0%	1.1%	0.9%
20	0.0%	4.8%	4.9%	4.7%
22	0.0%	0.0%	1.3%	1.2%
23	0.0%	0.0%	1.4%	1.2%
25	40.3%	0.0%	4.6%	5.2%
28	0.0%	0.0%	0.9%	0.7%
30	0.0%	14.4%	5.5%	6.3%
35	0.0%	8.4%	1.1%	1.8%
48	0.0%	0.0%	1.5%	1.3%
50	0.0%	12.0%	1.5%	2.6%
70	0.0%	0.0%	4.3%	3.7%
80	0.0%	0.0%	2.4%	2.1%
85	0.0%	0.0%	2.6%	2.2%
100	0.0%	0.0%	3.1%	2.6%
Total	100.0%	100.0%	100.0%	100.0%

Table 8

Number of Medium Trucks by Type of Firm

The most common number of medium trucks reported by all firms was 100 trucks (26.1%), followed by 2 trucks (8.9%), and then 1 truck (7.5%) (Table 8).

Number of Trucks	Freight	Local	Service	Total
1	3.5%	4.5%	14.0%	7.5%
2	3.5%	6.0%	16.1%	8.9%
3	1.3%	6.7%	7.8%	6.0%
4	0.0%	9.0%	5.2%	5.9%
5	4.3%	5.6%	1.3%	3.9%
6	0.0%	5.6%	3.1%	3.6%
7	0.0%	2.6%	1.8%	1.8%
8	3.5%	1.5%	2.1%	2.1%
9	3.9%	0.0%	0.0%	0.8%
10	0.0%	7.5%	7.8%	6.1%
11	0.0%	2.1%	0.0%	1.0%
12	0.0%	4.5%	3.1%	3.1%
13	0.0%	0.0%	3.4%	1.1%
14	0.0%	2.6%	0.0%	1.2%
15	0.0%	0.0%	3.9%	1.3%
18	0.0%	0.0%	4.7%	1.6%
20	0.0%	0.0%	5.2%	1.7%
24	0.0%	0.0%	6.2%	2.1%
25	10.9%	4.7%	6.5%	6.5%
30	0.0%	0.0%	7.8%	2.6%
59	25.7%	0.0%	0.0%	5.1%
100	43.5%	37.3%	0.0%	26.1%
Total	100.0%	100.0%	100.0%	100.0%

Table 9

Number of Tractor Trailer Trucks by Type of Firm

The most common number of tractor trailers reported by all firms was 100 tractor trailers (24.6%), followed by 30 tractor trailers (8.8%), and then 15 tractor trailers (5.2%) (Table9).

Number of Trucks	Freight	Local	Service	Total
1	0.4%	5.2%	23.8%	2.8%
2	0.4%	10.4%	15.4%	2.9%
3	0.4%	7.8%	12.6%	2.4%
4	1.5%	3.9%	8.4%	2.4%
5	0.6%	6.5%	10.5%	2.2%
6	1.1%	7.8%	4.2%	2.4%
7	2.6%	4.6%	0.0%	2.7%
8	1.5%	2.6%	0.0%	1.6%
9	0.6%	0.0%	6.3%	0.9%
10	1.9%	3.3%	0.0%	2.0%
11	1.4%	0.0%	0.0%	1.1%
12	0.0%	3.9%	8.4%	1.2%
13	0.8%	0.0%	0.0%	0.6%
15	4.7%	4.9%	10.5%	5.2%
16	1.0%	0.0%	0.0%	0.8%
17	3.2%	0.0%	0.0%	2.5%
18	1.1%	0.0%	0.0%	0.9%
20	2.5%	6.5%	0.0%	2.9%
21	1.3%	0.0%	0.0%	1.0%
22	1.4%	0.0%	0.0%	1.1%
25	1.6%	0.0%	0.0%	1.2%
29	1.8%	0.0%	0.0%	1.4%
30	11.3%	0.0%	0.0%	8.8%
32	2.0%	0.0%	0.0%	1.6%
35	4.4%	0.0%	0.0%	3.4%
38	2.4%	0.0%	0.0%	1.9%
40	2.5%	0.0%	0.0%	2.0%
50	3.2%	0.0%	0.0%	2.5%
58	3.7%	0.0%	0.0%	2.9%
60	3.8%	0.0%	0.0%	3.0%
65	4.1%	0.0%	0.0%	3.2%
86	5.4%	0.0%	0.0%	4.2%
100	25.2%	32.6%	0.0%	24.6%
Total	100.0%	100.0%	100.0%	100.0%

3.3 Average Characteristics of Firms by County

Companies were asked the number of employees at their location. Firms in Dade County Averaged 16.8 employees per firm; followed by Broward County with 15.2 employees, and Palm Beach County Averaged 14.1 employees per firm. The three county average was 15.4 employees (Table 10).

Dade County averaged the highest number of trucks on the road per firm with 9.4 trucks; followed by Palm Beach County with 6.6 trucks, and Broward County with 5.6 trucks on the road per firm. The three county average was 7.2 trucks.

Dade County had the highest average miles per truck per firm per day with 86.9 miles for each truck; followed by Palm Beach County with an average of 74.6 miles, and Broward County with 72.9 miles per truck per firm per day. The three county average was 78.1 miles.

Trucks in Broward County averaged 6.0 hours of operation each day; followed by Dade County with 5.9 hours of operation, and Palm Beach County averaged 4.5 hours per truck per day. The three county average was 5.5 hours.

Trucks in Dade County averaged 4.9 stops per day; followed by Broward and Palm Beach Counties with 4.8 stops each. The three county average was 4.8 stops.

Table 10
Trucking Company Averages by County

	Dade	Broward	Palm Beach	Total
Average Number of Employees	16.8	15.2	14.1	15.4
Average Number of Trucks on the Road	9.4	5.6	6.6	7.2
Average Miles per Truck per Day	86.9	72.9	74.6	78.1
Average Operation Hours per Truck per Day	5.9	6.0	4.5	5.5
Average Number of Stops per Truck per Day	4.9	4.8	4.8	4.8

4. Coding of Questions and Responses

The following provides information on the questions asked and the range of possible answers provided. Each survey question and response was coded. Each question has an associated variable label, which is identified in parentheses immediately following the text of the question. Each possible response has an associated value label, which is identified in the parentheses adjacent to the question's possible choices:

Question 1: "Trucks are located at: (address)?"

- Truck location street number (Q 1),
- street name (Q 1 a)
- city name (Q 1 b)
- zip code (Q 1 c)

Question 2: "Have pick-up trucks?" (Q 2)

- 'Yes' (1)
- 'No' (2)
- 'no answer' (9)

Question 2a: How many pick up trucks?(Q 2a)

- number (999)
- 'no answer' (9)

Question 2b: Have Medium Trucks?(Q 2b)

- 'Yes' (1)
- 'No' (2)
- 'no answer' (9)

Question 2c: How many medium trucks?(Q 2c)

- number (999)
- 'no answer' (9)

Question 2d: Have heavy tractor trailer trucks?(Q 2d)

- 'Yes' (1)
- 'No' (2)
- 'no answer' (9)

Question 2e: How many heavy tractor trailer trucks?(Q 2e)

- number (999)
- 'no answer' (9)

Question 3: "Number of employees at the truck location?"(Q 3)

- number (9999)
- 'no answer' (9)

Question 4: "Number of trucks on the road per day?"(Q 4)

- number (9999)
- 'no answer' (9)

Question 5: "Average miles, per truck, per day?"(Q 5)

- number (9999)
- 'no answer' (9)

Question 6: "Average hours per truck per day?"(Q 6)

- number (99)
- 'no answer' (9)

Question 7: "Type of business?"(Q 7)

- number (999)
- 'no answer' (9)

Question 8: "Standard Industrial Code (SIC)"(Q 8)

- six digit SIC (999999)
- 'no answer' (9)