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Volume II

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FINAL REPORT

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16. Abstract

The product of this PUR project is a planning package (guidelines, estimating procedures, examples and computer software) for the highway oriented para-transit modes of car pooling, van pooling, and park and ride. The package is designed to be a reference to the planner who, for example, must assess the regional or sub-regional potential of one of these modes for TSM planning, or who, at a later stage, must estimate the costs and benefits of implementing that mode, or,still later, must target specific companies, stations or areas for actual implementation. It is further designed to be used by the implementor to estimate staff requirements, write specifications, design a marketing program, and so on.

Contained in this package are four individual reports, a Service Area Identification Methodology computer program, and an Executive Summary. The reports include:

The Car Pool Planning Manual..... VOLUME I
The Van Pool Planning Manual..... VOLUME II
The Park and Ride Planning Manual..... VOLUME III
The Service Area Identification Methodology Report (SAIM) ..... VOLUME IV

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METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
	AREA			
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
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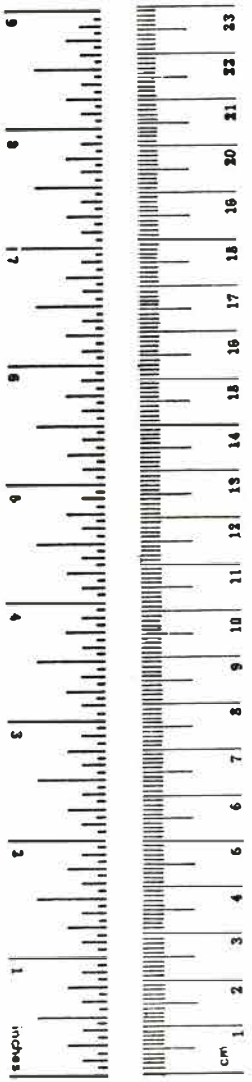
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
	VOLUME			
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.96	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
	TEMPERATURE (exact)			
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures. Price $2.25. SD Catalog No. C13.10:286.



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
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mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
	AREA			
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
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kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
	VOLUME			
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l	liters	1.06	quarts	qt
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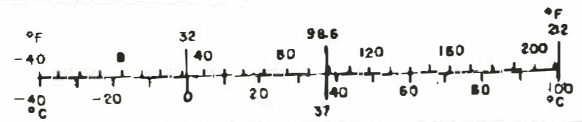

EXECUTIVE SUMMARY

1. Overview

The product of this PUR project is a planning package (guidelines, estimating procedures, examples and computer soft ware) for the highway oriented para-transit modes of car pooling, van pooling, and park and ride. The package is designed to be a reference to the planner who, for example, must assess the regional or sub-regional potential of one of these modes for TSM planning, or who, at a later stage, must estimate the costs and benefits of implementing that mode, or, still later, must target specific companies, stations or areas for actual implementation. It is further designed to be used by the implementor who, for example, must estimate staff requirements, write specifications design a marketing program, and so on.

Contained in this package are four individual reports, a Service Area Identification Methodology computer program, and this summary. The reports include, and are subsequently referenced as:

The Car Pool Planning Manual
The Van Pool Planning Manual
The Park and Ride Planning Manual
The Service Area Identification Methodology Report (SAIM)

Together, these reports and the computerized software constitute a comprehensive planning package for investigating, evaluating, planning, and implementing these three automobile-oriented transportation improvements. Each of these reports, however, can stand alone providing a self-contained explanation of its particular subject matter, or they can be used in various combinations to provide a complete package for any particular mode or pair of modes.

2. Report Descriptions

Mode Manuals. Each manual contains three parts: description, planning, and implementation. The first describes the mode, and places it in the context of the entire transportation system in terms of: the kinds of services the mode can reasonably provide, the groups of people served, the types of trips made, and the kinds of destinations served.

The objectives of this summary are: 1) to give the planner a good understanding of the strengths and weaknesses of a mode in a particular socio-geographic setting or transportation system and 2) to provide the estimates needed for grant applications and the implementation plans.

The second part of each manual (planning presents estimates, of and estimating procedures for the demand, costs and benefits of each mode. Demand estimation as most planners know is still very much an art. This is particularly true in the case of paratransit. Thus, although rather sophisticated demand models have been built in some cases (i.e., car pooling) we have chosen to only reference these models and present some general "rules-of-thumb" which can be used for essentially "sketch" planning. More detailed estimates of potential can be obtained with the SAIM computer package.

Costs have been estimated in 1975 dollar values, except where noted. To make the mode costs comparable to other modes with longer or shorter life spans, capital costs have been estimated so as to account for the increased expenditures (due to inflation) of replacing shorter lived vehicles and facilities. While the costs presented represent the best available information, we note that there is a great deal of variation, and by the time this report is published many prices will have changed. Thus, our intent is simply to provide initial estimates and relative costs. It is assumed the planner can scale these costs to current dollars and adjust for regional variation. The quantifiable benefits of congestion relief, energy savings, and reduced parking demand and pollution have been discussed for each mode. In many cases, tables or formulae are presented for estimating each benefit.

The final part of each manual deals with implementation planning. Here we present funding sources, staffing requirements, specifications, marketing guidelines, and so on. The objective in these sections is to provide sufficient information to create a reasonably detailed implementation plan or strategy.

These three sections (Car Pool, Van Pool, Park and Ride) combined should provide the tools and estimates necessary for effectively assessing the cost/effectiveness of each of these modes in any regional, sub-regional or local alternative analysis.

Service Area Identification Report. The SAIM Program Report describes a computer-based methodology for geographic identification of trip patterns that can be cost-effectively served by a particular mode. The SAIM programs were designed to be used with the manuals to help a planner identify those areas in a region where one of these modes could cost-effectively meet transportation needs. The searching techniques and parameters are derived from the cost, benefit and demand estimates explained in the planning parts of each of the manuals. The output of SAIM are both maps and various printed estimates. The maps geographically identify areas where a particular mode has high potential.

The printed output provides an estimate of the total regional potential of the mode in question. Various summary statistics (in the case of ride-sharing) provide a zone by zone analysis of the mode's potential.

SAIM was designed to be used with Census UTPP data, since these data are readily available at low cost to all metropolitan areas, although other data bases could be used. Because Census data often have to be adjusted in a variety of ways to yield results acceptable for planning, we have also included a documentation and computer program of methods we have found useful in making these adjustments.

3. Research Observations

Because the purpose of this project was to draw together current research and demonstration findings into a useable planning and implementation package and to present a computer-based methodology which could identify geographic areas in a region that could be well-served by car pooling, van pooling or park and ride, there are no research findings in the classic sense of finding an answer to a specific question. We have nevertheless made several observations from our surveillance of demonstration projects and other research efforts. We have also been able to identify those areas clearly in need of research and perhaps more important those areas in which further research would add only marginally to the body of knowledge needed to accurately plan for, implement and evaluate these modes. These are summarized below by mode.

Car Pooling. We have observed that car pooling, loosely defined is a major mode of transportation. There are, for example, twice as many car pool trips as solo-driver trips. We have distinguished two kinds of car pooling in our work: 1) "baseline" pooling or that kind of pooling that occurs naturally for reasons of economy or convenience; and 2) "promotion-induced" pooling. The vast majority of pooling is the former. We estimate that a car pool promotion program results in less than 1% of the commuters (about .33%) becoming new poolers. The cost of adding these new car poolers is not inconsequential; on the average it costs about $83 per year per new pooler or about $0.32 per day per pooler (assuming the average life span of these pools is about one year).* That nevertheless, compares very well to the most recent public transit operating subsidies of $0.23 per trip or $0.46 per day for a journey-to-work (APTA, Fact Book, 1977). While these figures as well as energy consumption and convenience measures argue strongly for public investment in car pooling, we nevertheless note that much car pooling has already been produced by the private market

* In "Evaluation of Carpool Demonstration Projects, Interim Report," Frederick Wagner reported $35 per new carpooler.

place. If there is a desire over the long run to establish a more permanent system of high occupancy transportation it may be wiser to allow increased prices (i.e., gas and parking) to induce car pooling and invest public money in a van pool system (which, in fact, induces car pooling) or other low density transportation systems.

If a choice is made to develop a car pool promotion program, we have observed that combined company-targeted, area-wide promotion is more effective than either approach alone. We have further found that the most effective marketing technique (and well worth the extra money) is what we call "turnkey service" where the ride-sharing representative after receiving permission/endorsement from top management handles all promotion, matching, organizing, etc. within the company--almost completely relieving company staff of time commitments to the program. We also note that matchlists per se may not directly overcome a "lack-of-match" barrier to car pooling. Their use is surprisingly low; once received, however, they may act as a catalyst to initiate a personal search for a poolmate. We thus suggest in a tight budget situation, that marketing should take priority over sophisticated matching systems.

Finally, in compiling this planning document we are satisfied that with two or three exceptions, further research would add little to the ability to make car pool matching/marketing policy decisions or to operate an effective matching/marketing program. (We are assuming that the formal evaluation of FHWA car pool demonstrations will update the cost, demand and benefit estimates presented here.) The exceptions are: 1) a carefully designed study is needed to assess the competition between promotion-induced car pooling and public transportation; 2) a study is needed to assess the changes in baseline car pooling due to car pool promotion. (We have had reason to believe that the load factors of existing car pools may increase as a result of promotion, yielding greater VMT savings than are usually reported.); and 3) we would encourage some general marketing research, not on the attitudes, and socio-economic status of the solo driver (these if anything have been overly researched), but rather on the marketing techniques that are effective in changing the solo-driver's behavior.

Van Pooling. We have been impressed with both the cost and energy efficiencies of van pooling as well as its market place success. Of the many low density (para-transit) modes we have observed, van pooling appears to have the ingredients for long term success, both as a component of an energy conservation program and as a comprehensive transportation system. We have noted four key elements for its marketplace success:

Door to Door Service. The mode provides nearly the access/ egress convenience of the auto and speed of the auto, with excess travel times averaging about 10 minutes per passenger.

Private Entrepreneur. Car pooling, too, provides the speed and comfort of a private automobile. The difference with van pooling is the incentive given to the driver, resulting in a personal commitment to provide adequate service to maintain a full van. Loss in ridership is a loss in incentive money to him/her. The result is a "mini-marketing" service with each van.

Vehicle Investment. An investment is made in a special journey-to-work vehicle. Sponsors must thus maintain some long term interest in program success.

Quality Transportation. Because a special vehicle is purchased, it can be customized to the consumers' taste and pocket-book. Many vans offer commuters a very attractive, comfortable ride that is genuinely comparable to that of the standard-sized automobile.

However, like car pooling, this mode does not totally pay for itself. The installation costs of a van pool program in a company are sufficiently high to limit its spontaneous implementation to those companies with acute transportation problems or to those firms which would substantially benefit from the good public relations.

These installation and ongoing administrative costs are quite low relative to other transportation subsidies, however. For a typical company implementing a ten van program, we estimate the annual cost at about $29 per van pooler over and above the full cost of van operation or about $60 per car removed since only about half of the van poolers can be expected to be former SOA's. The cost of providing "public" van pool service is considerably higher. Based on Commuter-Computer statistics (which may be unusually high over the long run) the annual cost of third party service (with a fleet of 200 vans) would be roughly $83 per van pooler, or $166 per car removed.

These simple cost estimates, along with the energy efficiencies which have been extensively reported elsewhere, argue strongly for public investment in van pooling. Adding weight to the argument is the fact that van pooling is more like provision of public high occupancy transportation than (say) car pooling. There may be some merit over the long run of re-orienting commuters from "private" provision of journey-to-work transportation (in the automobile or car pool) to the "public" provision of the same service, since ultimately we will have to make increasingly collective decisions on the consumption of our resources.

The cost figures further suggest that every effort should be made to have private companies sponsor van pooling through both tax incentives and public provision of turnkey installation service as discussed in the Car Pool Report. Where third-party service is warranted (i.e., small office complexes), we feel there are substantial economies to be realized (similar to those realized in private companies) from adding on to an existing transportation agency as opposed to setting up a separate entity. There are also the additional benefits of creating a coordinated transportation system, and such an approach could eliminate some of the regulatory and insurance problems van pooling has traditionally faced.

While we are enthusiastic about van pooling as an excellent mode for serving some low density transportation needs, we note that ultimately the role of van pooling in a total transportation system is limited. Nationally, only about 25% of the trips are in excess of ten miles. Many of these trips are CBD bound and could perhaps be better served by public transportation. Of the remaining trips, only a fraction are sufficiently clustered at both the origin and destination points to be effectively served by a van pool. In our final tests of Chicago area commuters, we found that only about 2200 van pools could realistically be expected to form in the six county area.

Park and Ride. Our study of the park and ride mode has indicated that the major advantage of providing a park and ride service is the diversion of parking from one destination to another. We have also found that generally it is necessary to provide about four park and ride spaces in order to divert just one auto from parking at the ultimate destination. Thus the park and ride mode increases the total number of parking spaces which must be provided in a metropolitan area. To justify this, the benefits of diverting parking from a particular destination must be significant. We have suggested that such a situation typically exists only in the CBD's of fairly large metropolitan areas. This recommendation is further supported by the results of surveys which indicate that commuters who switched to the park and ride mode from auto most often did so to avoid high trip costs, especially CBD parking charges. Thus in small CBDs where parking is easily available and inexpensive (say, less than $1.50 per day), the conditions necessary to stimulate demand for park and ride are absent.

We have distinguished two types of park and ride service by the location of the park and ride lot. Peripheral park and ride lots are located close to the destination and the transit service provided is typically a shuttle bus. Remote park and ride service provides a line-haul transit service originating from a lot considerably farther from the destination. Since peripheral park and ride lots are not located in low density areas (the primary focus of this report), we have limited our consideration to remote park and ride services.

In fact, remote park and ride is uniquely suited to low density areas, since it significantly increases the size of the area served by a single transit stop. The use of private automobiles for the first (collection) part of the journey makes it possible for persons who live in areas with densities too low to support feeder bus service to use transit for the line-haul part of their journey.

Experience with various transit modes indicates that commuters on relatively long work trips are sensitive to the travel time of the park and ride transit mode as compared to travel time by automobile. Thus local bus service is not used for remote park and ride. One rule-of-thumb states that park and ride with an express bus operating in normal highway traffic will not generate much demand if the bus trip is longer than five miles or twenty-five minutes. However, when park and ride is provided with transit service by modes which have a separate right-of-way, there are typically no problems in attracting park and riders to use the service. This information leads us to the major recommendation of the park and ride report: We recommend that in fairly large metropolitan areas (population over 250,000) with scarce and expensive CBD parking (at least $1.50 per day), park and ride service should be supplied in conjunction with any existing or planned commuter rail, rail rapid transit, or bus-on-busway systems.

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PART I - DESCRIPTION

CHAPTER 1: INTRODUCTION

1.1 Definition and Summary of Description

Van pooling is a travel arrangement where a number of people travel in the same vehicle (usually an 8-15 passenger van) and:

1. The vehicle is usually owned or leased by neither the driver nor any of the passengers, and is almost entirely used for pooling.

2. The driver (whose principal occupation is not the provision of transportation) is not formally compensated with wages, but may be given certain monetary or other incentives.

3. The vehicle owner is compensated by the passengers for the full capital and operating costs of the vehicle.

It is distinct from other forms of pooling (car pooling in particular) mainly in the vehicle ownership and special-use nature of the vehicle.

In the rest of this chapter and in the next three we describe van pooling as a mode, concentrating our attention on types of van pools, service characteristics, user characteristics and characteristics of destinations. A summary of some of the principal findings of these chapters is presented in tabular form in Exhibit 1-1.

1.2 Types of Van Pools

There are four types of van pool operations which are distinguished by vehicle ownership (and, to a lesser extent, the relationship of the poolers). Service and fare structure are generally the same. Vehicle ownership is an important distinction as it determines in many cases the mode's regulatory status, the extent of liability, and the ease of getting insurance.

The Employer Sponsored Van Pool. This is by far the most common van pool arrangement. Of the 30 van pool programs surveyed by EPA, well over two-thirds fell into this category (Forstater and Twomey, 1976). They are generally modeled after the 3-M program where a private employer purchases or leases the vans, provides the organization and administrative structure, and recovers the capital and operating costs through fares which are computed on an 8-9 passenger break-even basis. The company may or may not absorb the ongoing administrative costs but it absorbs the initial organizing costs. The driver of the vehicle is a company employee as are all the passengers. He/she is generally given any additional fares above those of the 8-9 passengers needed, to break even; he is also allowed use of the vehicle in the evenings and weekends for a moderate per mile charge.

In most states, this type of van pool operation is not regulated by existing Public Utility Commissions (PUC) legislation (for greater detail see Chapter 9). However, in many states this non-regulated status is almost entirely dependent on the service being offered exclusively to employees of the sponsoring company. Unfortunately, this requirement limits the potential of an individual program since if a van could pick up (say) six or seven employees and supplement the pool with employees of neighboring destinations, the number of van pools could be greater.

Since in this arrangement the company is the "owner" of the vehicle, there are some serious questions of the employer's liability in the event of an accident (see Chapter 8). While a precedent has never been clearly established in court--this potential liability has been somewhat of a deterrent since a company (as opposed to a private individual) has greater assets against which accident claims could be made. Moreover, insurance can be very expensive and difficult to obtain unless the company can simply add the insurance to existing company (umbrella) insurance at a small marginal cost.

Because the potential for matches is limited to employees only, and because of the high costs associated with both insurance and initial organization, this kind of van pool has been limited in most cases to companies of 1000 employees or more. Therefore, as we shall discuss later, this type of van pool has rather limited potential in an overall transportation system.

Commuter Clubs Sponsored Van Pools. There have been some instances where friends or company employees have joined together in a "club" or a "cooperative" to organize, finance and operate a van pool program for themselves. Here the organization is the "owner" of the vehicle and would probably have at least some liability.

The Sussex Commuter Club is a commonly cited example of this arrangement. The club is comprised of 8 members who lease a van and pay all the capital and operating costs for their daily round trip of 130 miles into New York City. Each member pays $60.00 a month and contributes an initial $150.00 for the club's emergency fund. The club commutes "in style" with coffee in the morning served in a customized van equipped with stereo, air conditioning, a card table and ice chest.

Commuter club sponsored van pools have been particularly useful for government employees since in many cases government vehicles cannot be used to transport employees to and from work. The TVA employee credit union van pool program is a good example where the union leases from Hertz (although Hertz does all the maintenance). A van pool committee consisting of 5 members, three from the credit union decides policy, determines fares, and selects drivers (Davis, et al., 1975 (2)).

The regulatory status of these operations is uncertain. On the one hand, the group has been formed for the express purpose of providing transportation. On the other, the driver, who is himself a commuter is not paid, and since the poolers are all members of the same club, the service cannot be considered publicly available.

While this type of pool has not seen widespread use, it may have substantial potential in the future. As gasoline prices increase, forming a transportation cooperative may become more and more attractive (much as food co-ops have become popular with rising food prices).

Third-Party Van Pool. In this arrangement, a private organization or entrepreneur sponsors a van pooling operation for the public at large--generally providing the matching service, the van, maintenance, insurance, fleet management, etc. Pooling applicants are organized into van pools on the basis of compatible origins and destinations by the private agency. One of the poolers is designated driver and generally receives some incentive. Fares are based on the full cost of the operation (overhead included) and may or may not include a small profit for the company depending on its status.

Monarch Associates of New York City were perhaps the forerunner of private van pool operators. They provided the vehicle, gas, maintenance, garaging, insurance and all other operating expenses. Van pool riders paid weekly fares of $9.50-10.50 each to cover costs. They had regulatory disputes with existing fixed-route systems and later, for financial reasons, went out of business.

There are some other well-known operations offering services which could be broadly classed in this category. In Atlanta, Dr. Dickerson of the Georgia Institute of Technology has formed a non-profit public corporation, MODNAR, which operates 4 vans which are primarily used for work trips, though one of the vans serves mid-day Peachtree destined shopping trips. Commuter-Computer, in Los Angeles is a non-profit car/van pool matching service now employing over 40 people with nearly 70 vans in operation and 200 more on order. The organization is based on a matching service, a leasing arrangement with a fleet dealer and a large marketing staff which "sells" ride-sharing to local businesses. The employer actually has little involvement--except for providing the match data and providing incentives (e.g., preferential parking for the van). Commuter-Computer handles matching the employees--not necessarily within the company groups, organizes the pools, manages the fleets, and provides the accounting services.

Such services obviously have great potential since they require little initiative from an employer and matches are not limited to any one destination (as in employer-sponsored pools), nor do they require several major organizing initiatives from individual commuters as in Commuter clubs. These types of services, however, have faced regulatory problems especially where there has been extensive investment in public transportation. Many states have considered third-party pooling organizations to be a common carrier and subject to the same regulations (including route franchising) as other common carriers. Since these organizations must pass through to the passengers all overhead costs, fares are higher than single party van pools. Start-up costs have been very high and some companies sponsoring this type of service have quickly gone out of business.

The Individually Owned Van Pool. This kind of van pool can be a very informal "large car pool" where an individual who owns a van (or who purchases one for the purpose) transports another group of employees and himself to work, charging a fare. There are variations of this "large car pool" concept which make the arrangement more closely akin to van pooling. In Knoxville for example, a third-party matching service organized pools with seed vans but after 6 months encouraged the driver to purchase the van and continue the service. In Lander, Wyoming several employees of U.S. Steel lease vans on an individual basis to make the 30-mile daily journey-to-work. The key is the use of the vehicle. If the vehicle is a journey-to-work vehicle only, it is likely to retain the attractiveness and stability that has made van pooling popular. However, if it is essentially a family car doubling as a pooling vehicle, the service to the other passengers is to a large extent, at the whim of the driver and may be perceived as somewhat less reliable.

Exhibit 1-1

Summary of Van Pool Characteristics

Service:	Door-to-Door, Subscription
Travel Time	Average 5-10 minute increase over Auto Time
Vehicle	12-15 Passenger Van - Interior Customized to the taste and budget of Passengers
Speed	Comparable to auto on all networks
Dwell Time	1-2 minutes maximum per stop - average between 4-6 stops per van
Vehicle Ownership:	Single employer Employee organization Private individual Transportation "provider"
Cost:	
Per Vehicle Mile	Variable depending on route length Average - 27.5¢ (for 45 minute round trip, single company)
Per Passenger Mile	Variable depending on route length and load, Average - 3¢
Fare	Varies with vehicle route length Full cost passed through to passenger frequently paid 1 month in advance Average - between $1.00-1.50 round trip per day
Trip Length:	Is economically competitive with the variable cost of driving for trip lengths in excess of 8-10 miles; depending on capital cost of van
Origins:	Clustered in a line haul to deviation "Cone" of 5º (see Section II)
Destination:	
Size	Varies with location; Common Rule-of-Thumb - 500
Location	Suburban, rural and in need of a transportation alternative due to parking problems, etc.
Type	Employer of clerical and professional staff with limited "shift" work and little unionization

CHAPTER 2: SERVICE AND OPERATING CHARACTERISTICS

The success of van pooling over the last three to four years has been due to an unusual combination of operating and service characteristics--specifically the commuter driver, the driver incentives and the vehicle. Below we discuss these and other effects on the quality of service.

2.1 Labor

One of the chief distinguishing features of a van pool is that the driver is a commuter himself. This arrangement has a number of important consequences.

Reduced Cost. Since more than 50% of the costs of all traditional modes of public transportation are associated with drivers' wages, van pooling mileage costs are sharply reduced by comparison (see Chapter 6). Roughly speaking, over long distances a van pool can carry 3 times as many passengers as an auto at the per passenger-mile costs of a 3-person car pool. The average daily fare for a 40-mile round trip is about $1.50 (1975 prices), which is roughly equal to a 36-mile round trip fare for a commuter rail and may be compared to the $2.00-5.00 fare charged by airport limousines for much shorter trip lengths.

The Driver as a Private Entrepreneur. Another key ingredient in the success of van pooling is the incentive given to the driver. It is in the driver's direct interest to tailor service sufficiently to the desires of the passengers to maintain their participation, since loss of ridership is a direct loss of money to him. Should one member drop, he would have to "hussle" a new rider. In public transportation or in car pooling, this kind of incentive or responsiveness is absent. Numerous evaluations have shown that this driver commitment has been the key ingredient to the long term success of many programs.

Adaptation to Peaking. The previous two factors make the commuter driver attractive to consumers. However, use of the commuter driver can also be attractive to the regional transportation supplier as a solution to demand peaking problems. Use of a non-professional driver avoids the problems of scheduling drivers and gives a transportation system the flexibility to expand to peak-hour demand without inefficient use of labor during the day.

Energy Efficiency. Because van pooling eliminates the dead-heading associated with many high occupancy modes and generally runs with a full load, it is extremely energy-efficient. Exhibit 2-1 compares the energy efficiency of van pooling to both the automobile and fixed-route transit. Only bus pools are more efficient.

2.2 Vehicle

By far, the most popular vehicles have been 12-passenger vans manufactured by Chevrolet, Dodge, and Ford. Some van pools have used 15-passenger vans and occasionally 19-passenger mini-buses. The van offers a higher load factor for about the same driving expense of a standard American automobile while retaining the automobile flexibility and maneuverability in traffic and residential streets (it is actually a foot shorter and the same width as a full-sized station wagon). At full capacity over long trips, a van can achieve the cost efficiencies of a full load 50-passenger bus.* And because the load is small (usually 9 or 10) access, egress and dwell time normally associated with a larger bus is significantly reduced, resulting in a substantial savings in total travel time/cost to the passenger.

The Special Vehicle as a Factor in Longevity. The primary difference between a van pool and car pool is the ownership and financing of the vehicle. Most people own a car and consider it a necessity of their daily living. In van pooling, a special vehicle is purchased for the pool which gives the pool a sense of permanence. Moreover, the vehicle can be designed to the poolers' specifications. For example, at Aerospace Corporation in California vans have been fitted with reclining airline-type seats. Other van pools have added tables, ice chests, special reading lamps, stereo headphones, and so forth. The special purpose van designed to the passengers' taste and pocketbook is an important factor in fostering pool cohesiveness, and longevity. Finally, since an investment has been made in a special journey-to-work vehicle the sponsor has an incentive to keep ride-sharing alive and popular--unlike a car pooling program where once the program has been initiated, the company can assume it has met its civic obligation and pay little attention to the program.

2.3 Other Service Characteristics

Van pooling is unique in often offering the automobile convenience of door-to-door transportation, the energy efficiency of a high occupancy vehicle, and travel times that are competitive with private transportation.

Type of Collection. A common type of van pool arrangement is for the van to pick up the participant at his home at a designated time each morning and deliver him home each night. CONOCO (#1, 1975) which is operating a fleet

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*Even at full load (50 passengers) a bus costs about $0.02 to $0.03 a passenger mile compared to a van on long trips (XX miles) at $0.01 to $0.02 per passenger mile.

of 66 vans reports that 75% of their participants receive this kind of service. Alternatively, a van pooler may walk or drive to a designated spot to meet the van. Such an arrangement reduces deviation time and allows the van pool to make better use of high speed highways and expressway systems. At the Tennessee Valley Authority plant in Knoxville, 88% of the van pool participants have made this latter arrangement. It should be noted, however, that the park-and-ride arrangement involves additional schedule coordinating and the unpleasant aspects of transferring (one minute of transfer time has been valued by some as equivalent to 10 minutes of line haul time, e.g., see Pagitsas (1977)). Private conversations with a number of van pool coordinators indicate that most van pools use a combination--the first few participants receive door-to-door service but once the van is on a major highway, participants meet the van.

Leon Bush estimates that the vans at Aerospace generally make about 4-5 stops for their 8 passengers. The highway system and settlement pattern ultimately plays a fairly substantial role in the type of collection pattern used. In rural or highway-oriented communities such as is common in the west, there are more instances of park and pool arrangements. In more densely settled areas, door-to-door service is a little more common.

Travel Time. Travel time remains reasonably competitive with the automobile. A recent 3-M survey of its 77-van operation indicated that the average participant experienced no more than a 10-minute increase over direct drive time. A similar survey at Aerospace reports excess travel time averaging only 5 minutes. Exhibit 2-2 displays the distribution of travel time changes at the 3-M plant.

It is worth noting that these travel time differences are only slightly greater than those experienced in car pooling, suggesting that there may be a "maximum" tolerable time difference for pooling. Thus a greater origin density is required to support a van pooling program than car pooling as has been discussed in the car pooling report.

Convenience. The van pool offers the passenger a number of conveniences. It is reliable, since a single person is responsible for arriving at the same time each morning for pick-up. The passenger often has a more luxurious ride (if the interior has been converted) than his own car provides and he has the opportunity of reading, relaxing and/or visiting while someone else copes with the driving. The convenience of a van pool has been listed more frequently by participants than the cost savings as the reason for joining the pool. At General Mills, for example, 46% of the participants listed "convenience" as the principal motivation for van pooling compared to 22% who listed lower-cost, and another 22% who listed "reliability". In two other surveys, 64% (CONOCO) and 80% (3-M) of the van poolers found van pooling more convenient than their previous transportation mode (which for over three-fourths of the respondents was the automobile). The convenience of van pooling is further borne out by the fact of the 77 programs underway, only 2 of the programs have been discontinued and a majority are considering plans for expansion.

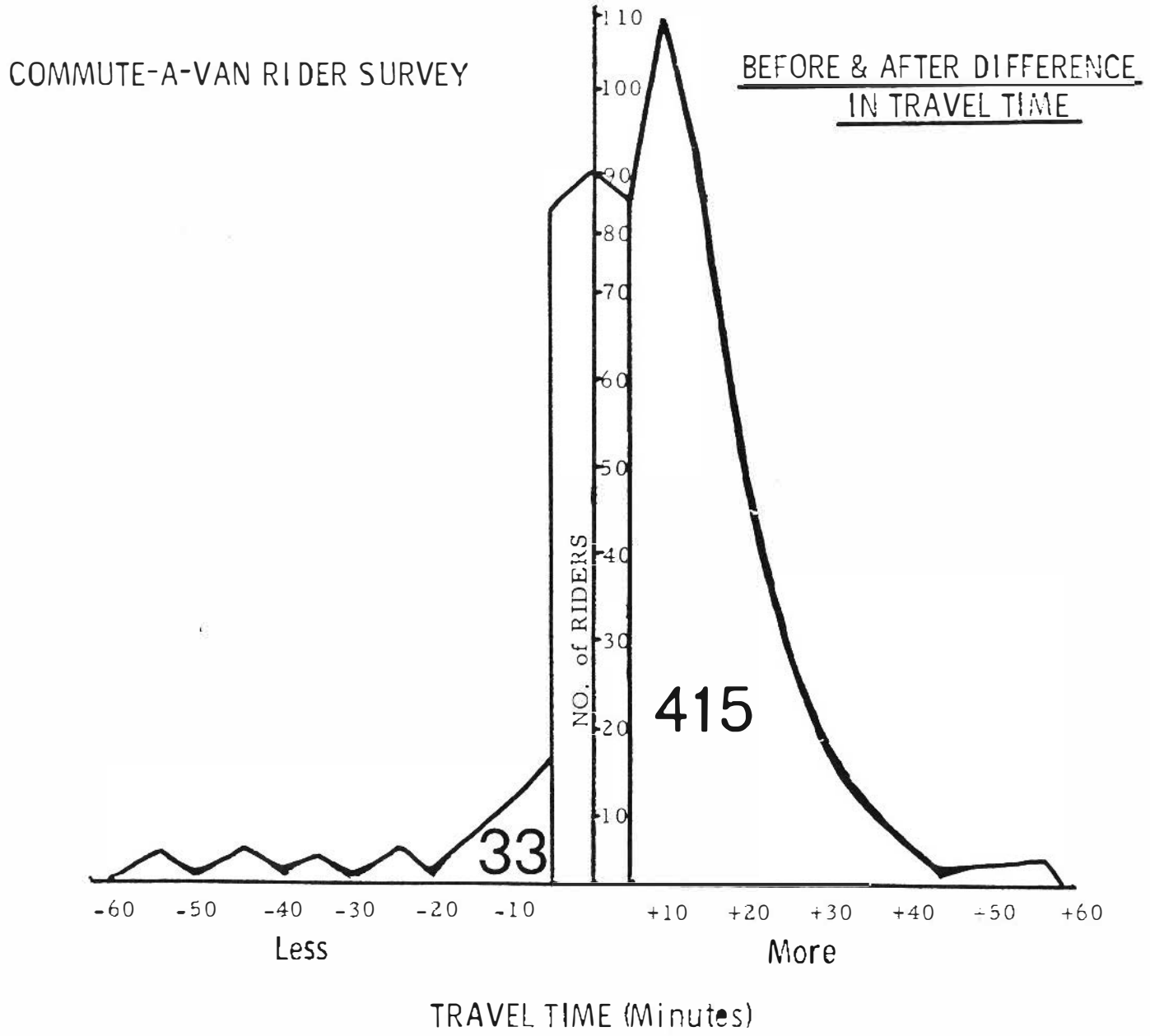
Exhibit 2-1

Comparison of Energy Use by Various Modes

Mode	Vehicle Occupancy per passenger mile	MPG	Energy Intensiveness (BTU/passenger mile) A Average Commuter Use	B Average Daily Use	C Pooling Vehicle (no deadheading)
Average U.S. Automobile	1.6	13	6,000		
	1.9	13		5,000	
	5.0	13			1,900
Subcompact Automobile	1.6	22	3,600		
	1.9	22		3,000	
	4.0	22			1,400
Van Pool	10	10	1,100	NA	1,100
Transit Bus (diesel)	16	4	2,100		
	11	4		3,100	
	44	4			600
Rail Transit			2,100		
				3,000	

Source: Lew W. Pratsch, 1975.

Exhibit 2-2



Source: Owens and Sever, 1977.

CHAPTER 3: SOCIOECONOMIC CHARACTERISTICS OF VAN POOLERS

Since all members of a van pool need to have the same arrival and departure times at work, those in occupations where this scheduling is difficult cannot van pool easily. Therefore, van pooling has not significantly penetrated the production worker category (where shift work and overtimes are common). The largest consumers are from the clerical/administration group (Shallbetter and Herzberg, 1975). Owens and Sever (1977) also note that for 3-M, "much of the growth in Commute-A-Van participation since 1974 has occurred in the office category of employment", and suggest that office employees represent a prime market for van pooling. Davis, et al., (1975) in their early study of van pooling describe the typical van pooler as a white collar, upper income, former solo driver. This will be discussed further in Chapter 4.

Except for the above-mentioned problem with certain occupations, it appears that van pooling can penetrate a wide range of commuters. Davis, et al., (1975) and Owens and Sever (1977) report a fairly homogeneous composition of van poolers at TVA and 3-M, respectively. (Davis et al., report 15% with incomes less than $10,000, 43% with incomes between $10,000 and $20,000, 70% with three or more people in their households, and 93% with at least one automobile. Owens and Sever (1977) state that 82% of 3-M van poolers are married, 82% live in single family dwellings and the average auto ownership is 1.6 per household). Tim Bander who is evaluating the Knoxville demonstration, and Chuck Geserick at Montgomery Ward in Chicago report otherwise (in private conversations with us). Bander states that vans have been successful among some of the lowest paid commuters in Knoxville at the knitting mills as well as with highly paid management types, and with production workers at manufacturing plants. Geserick reports that about 50% of the van pool riders in his program are in the management category and have incomes greater than $12,000, while about 50% are on "time cards" and have lower incomes (see also Exhibit 3-1).

Exhibit 3-1

Occupational Breakdown

3-M Corporation[1]

	1974	1976
Office	52%	56%
Supervisory	14%	14%
Management	10%	9%
Laboratory	21%	20%
Production	3%	1%

Montgomery Ward[2]

Office	38%
Supervison	12%
Management	50%

Sources: [1]Owen and Sever, 1977.
[2]Montgomery Ward, Interoffice Memorandum, 1976.

CHAPTER 4: DESTINATION CHARACTERISTICS

In this chapter, we discuss the influence on van pooling potential of three types of destination characteristics: size, geographical location, and type of industry.

Size. Most successful van pools currently in operation are sponsored by large employers with well over 1,000 employees (see Exhibit 4-1). It has been argued that a large employer can more easily absorb the initial start-up (estimated at between $30,000 and $50,000--see Chapter 6) and ongoing administrative costs of a van pool program. It has been further argued that the larger the "destination", the greater the likelihood of finding adequate numbers of suitably clustered origins. Evaluation of employer response to FEA marketing of van pooling in the Chicago area indicates that these two arguments are important considerations (see Exhibit 4-2). Sixteen percent of the 71 companies contacted felt they had too small of a work force to successfully launch the program, while 6% listed the administrative costs as too high. While these may deter initiation of van pool programs, Exhibit 4-3 suggests that there is no obvious relationship between employer size and van pool program size.

As a rule-of-thumb, a cut-off point of 500 employees has often been used. For example, the FEA van pool promotion demonstration in the Chicago area would not initially consider employers with less than 500 employees at a particular site. This rule-of-thumb was developed by Shallbetter and Herzberg (1975) who argued that 10 vans are needed to justify the formal management of the program and 8 vans are needed to produce an employer savings of $1,000 per van. Thus if between 8-15% participation rates are assumed, an employment center of about 500 seems to be reasonable. The analysis itself was based on somewhat tenuous assumptions, and since few employer-based van pool programs have actually been attempted with employment sizes below 1,000 there is little empirical evidence on the subject. As discussed in the Car Pool Manual (Report 2), we believe that precise cut-offs can be misleading.

It should be noted that Commuter-Computer in Los Angeles (a third-party type van pool) has worked successfully with employers of less than 100 people. Their initial work concentrated on small employers located on a strip along Wilshire Boulevard (the average employee density is roughly 4,600 per square mile), and they are now developing van pooling in the airport area with densities of about 1,350 employees per square mile.

Geographic Location. Probably of greater significance than employee size is the location of the prospective site and the transportation problems that the site presents. For many successful van pool programs, there was a reason other than energy conservation or air quality for which the programs were initiated. For example, limited parking (as with 3-M), traffic congestion near the plant, or plant relocation have been mentioned as reasons for starting van pools (in fact, Womack concludes that under present circumstances single employers will sponsor van pools only when such circumstances exist). While parking and congestion tend to be problems in high density areas (CBD's), these areas are often likely to have high concentrations of relatively smaller employers, and also tend to be well-served by public transportation. Both of these factors work against a van pool. It is not surprising then that of the

33 van pools surveyed by Forstater and Twomey (1976), 18 of them were suburban-based. Preliminary evidence indicates that van pools are particularly well-suited to the suburban or "rural" plant locations. Suburban originating trips are likely to be longer and without convenient public transit access. Also (very importantly), there will be fewer transportation links to the site.

We have noticed that transportation access links and settlement patterns seem to play a significant role in the penetration of the van pool concept in a given area. For example, van pooling has achieved a fair amount of success in areas where the plant is located in a fairly isolated area with the employees clustered in one, two, or three small neighboring communities. Usually there are a limited number of highway links connecting the employment site and residential community. Since these areas are still in a growth phase, the new employee can often "choose" the location of his home to be convenient to highway access to work resulting in the clustering of employees. In older, more densely populated areas, an employer often draws on the entire metropolitan area for employees whose residences are connected by a myriad of links to the employment site. The result is a wide dispersion of employees which is less conducive to employer-sponsored van pooling. This same concept is presented in terms of the gravity model in the Car Pool Manual.

Type of Industry. As was discussed in Chapter 3, van pools have been successful with a cross-section of income levels and occupational types. However, up to now a large portion of van pools have been at destinations employing large numbers of office workers, white collar professionals, technicians, etc. There have been relatively few examples of production workers who van pool. Two reasons at this point seem important. First, companies with strong unions have not been actively involved in van pooling, since there is a fear among management that the provision of van pooling may become a part of union negotiations and ultimately, a part of a labor contract where the company would have to underwrite transportation services for all employees. A result of such fears is an employee-sponsored van pool program for U.S. Steel in Lander, Wyoming. After failure of a subscription bus service to a plant located 30 miles from the community, employees investigated van pooling as an alternative. The company, however, was unwilling to become involved with the program. Interviews with employees indicate that an underlying reason was labor management relations--there was a fear that eventually transportation too, would become a negotiable item.

The second reason for lack of "heavy industry" participation in van pool programs is (as has been discussed earlier) that these industries tend to have greater variation in work times. Problems with variation in work schedules were explicitly stated as a deterrent for 10 of the 71 Chicago firms contacted in the van pool marketing experiment conducted by FEA.

Abbott Laboratories in the Chicago Area is a good example. They investigated the van pool option extensively, and estimated that it would require one full-time person for the first six months, and a quarter-time person after that to coordinate their 15 standardized shifts and their overtime schedules. They eventually decided against van pooling. Erving Paper Mills, however, represents a very interesting exception to the "non-shift workers" generalization. In 1972, Erving Paper Mills opened a new plant in Brattleboro, Vermont.

A van pooling program was initiated to reduce the impact of the average 25 mile commute on its employees. Erving Paper Mills operates 3 shifts a day with most of the shifts depending upon the residents and shift assignments. The vans are used to bring the new shifts of employees in and are then immediately filled with outgoing employees. The driver is responsible for taking the van to the home of the next shift's driver. Despite this heavy use of the vans, maintenance has presented little problem and the company is satisfied with the program.

Exhibit 4-1

Characteristics of Selected Van Pool Operations

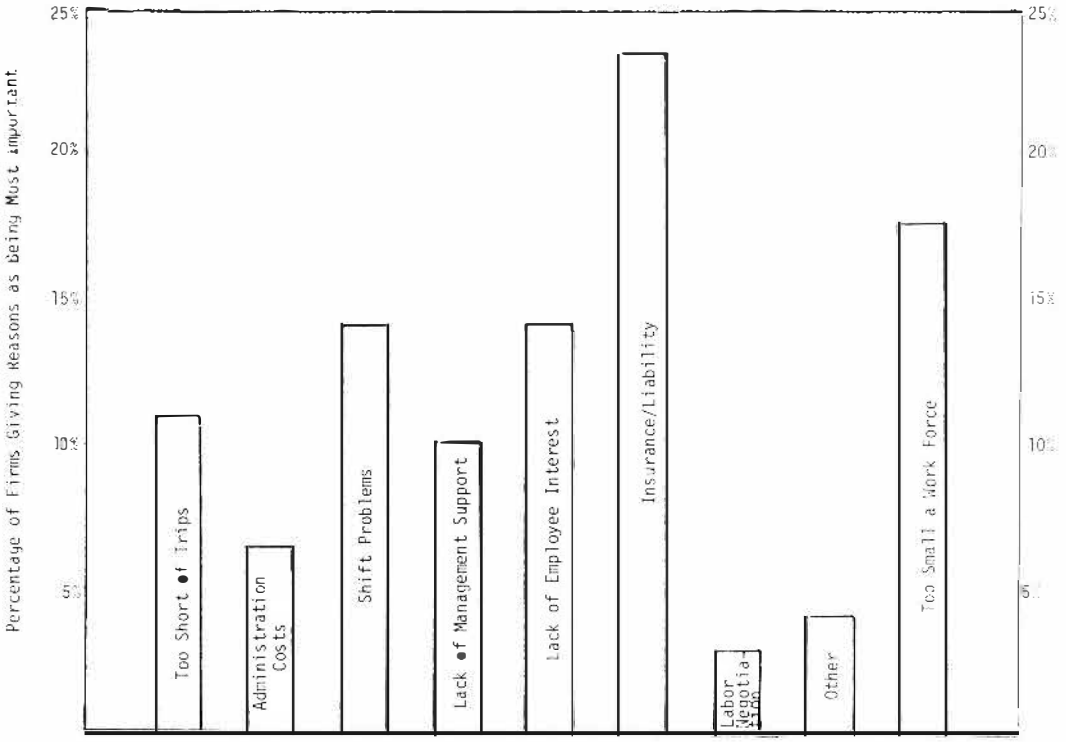
Organization Name	Type	Location	Date Started	Length of Time In Operation (as of 6/77) (Years)	Employment Population	# Of Vans	# Of Riders (Per Van)	% Of Employment
3M	Suburban	St. Paul,	4-73	4	10,000	75	780(10)	8%
CENEX	Suburban	St. Paul,	10-73	3½	700	21	175(8)	25%
Erving Paper Mills	Rural	Erving, Mass.	3-74	3¼	300	6	130(22)	43%
General Mills	Suburban	Minneapolis,	1-74	3½	1,800	16	165(10)	9%
Texas, Instruments	Suburban	Dallas, Tex	3-74	3¼	15,000	12	120(10)	.8%
Ralph M. Parsons	Suburban	Pasadena,	3-74	3¼	4,000	31	310(10)	8%
TVA	Urban	Knoxville	4-74	3¼	3,200	22	264(12)	8%
Sperry Flight	Suburban	Phoenix	4-74	3¼	3,100	10	120(12)	4%
Hoffman-LaRoche	Suburban	Nutley	6-74	3	6,000	20	240(12)	4%
Corning Glass	Small Town	Corning, N.Y.	12-73	3½	4,000	10	110(11)	3%
American Can Co.	Suburban	Greenwich, Conn.	7-74	3	1,800	1	11(11)	.6%
Chrysler	Urban	Detroit	Mid-74	3	(Demo Projects Over Several Areas)	6	60(10)	-
Gulf Research Development	Suburban	Pittsburgh	8-74	3	1,600	3	36(12)	2%
Honeywell, Corp.	Suburban	Minneapolis, Minn.	Fall-74	2 3/4	13,000	4	40(10)	.3%
Montgomery Ward	Urban	Chicago, Ill.	10-74	3	4,000	14	150(11)	4%
Winnebago Inds.	Small Town	Forest City, Iowa	2-74	2½	2,700	15	250(16)	9%
Continental Oil	Urban	Houston, Texas	3-75	2¼	DK	10	103(10)	-
Aerospace Corp.	Suburban	El Segundo (L.A.) Suburb	4-75	2	5,900	13	130(10)	2%
CALTRANS	Urban	Sacramento	7-75	2	--	3	30(10)	-
Prudential, Ins.	Urban	Newark, N.J.	7-75	2	--	8	85(10)	4%
Scott Paper	Urban	Philadelphia	8-75	1 3/4	1,500	2	19(10)	1%
Golden Gate Bridge	Urban	San Francisco	9-75	1 3/4	--	1	9(9)	-
Nabisco	Suburb	Newark (E. Hanover)	10-75	1½	1,000	13	140(10)	14%
Polaroid	Suburban	Boston, Mass.	10-75	1½	98,000	2	22(11)	< 1%
Cooper-Woodruff*	Rural	Amarillo, Texas	2-74	--	90	10	40(4)	44%
Utah County*	Small Town	Provo, Utah	11-74	--	120	2	24(12)	20%

*As of 1/77.

Source: Forstater and Twomey (1976) and updated with information from Miller and Green #3, 1977.

Exhibit 4-2

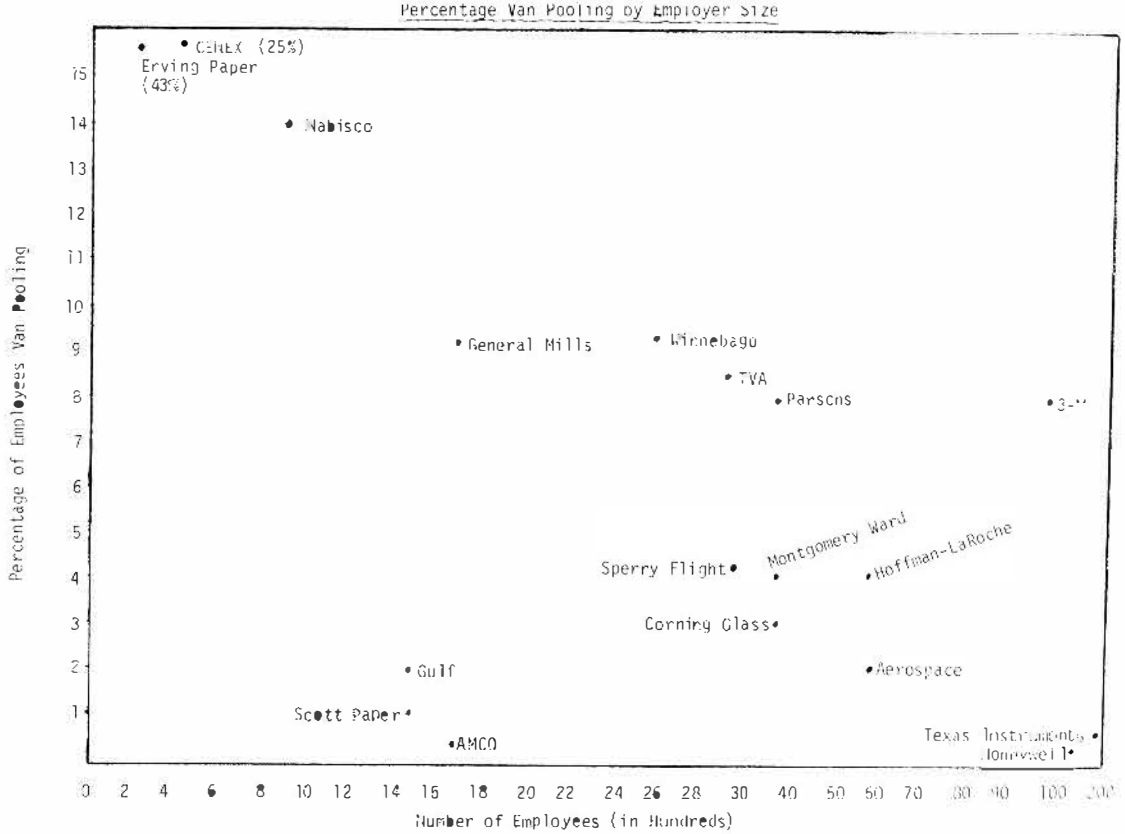
Major Impediments Listed to Van Pooling in 71 Chicago Suburban Companies



Source: SRI Preliminary Data for Evaluation of FEA Van Pool Marketing Demonstration Project 1977. (Mark Roddin, 1977, private correspondence.)

Exhibit 4-3

Percentage Van Pooling by Employer Size



Source: Based on Exhibit 4-1.

CHAPTER 5: DEMAND

5.1 Introduction

As in the case of other modes, demand for van pooling is defined as the number of people who would use the mode if it were available. For conventional modes, demand is estimated with the help of demand models which either predict the number of users of a mode under a given set of conditions or estimate the probability that an individual will use the mode under a given set of conditions. Unfortunately, models of this kind have not as yet been calibrated for van pooling.

In this chapter, we first present a set of conditions that we believe are necessary for most individuals to consider van pooling; then we present some estimates of the proportion of those for whom these conditions are met, and who can be expected to van pool. There are two such conditions:

A. The trip length must be greater than some minimum length. This condition is discussed in Section 5.2.
B. There must be enough trips with a common destination and with origins clustered in a thin wedge-shaped area to form a van pool. This condition is established in Section 5.3.

In Section 5.4, we present a procedure for quickly estimating the potential of van pooling in a region. In Section 5.5, we discuss the very important question of what a van poolers previous mode was. This is important in estimating benefits (Chapter 7).

5.2 Trip Length

Van pools now in operation tend to serve very long journeys-to-work. Lew Pratsch (1975) reports the average van pool trip length nationwide is 20 miles. This compares to a 9.4 mile average for all commuters, 73% of whom have trip lengths less than 10 miles (NPTS, #8).

Exhibit 5-1 presents some other reported averages and Exhibit 5-2 presents some ranges of van pool round trip route lengths. Few are less than 10 miles and the majority are reporting minimum round trip lengths of around 20 miles. Miller and Green (1977) suggest three plausible explanations for the success of van pools only on longer trip lengths: 1) the cost advantage over other modes increases with trip length (see Chapter 6); 2) the importance of time spent doing something else (e.g., reading) increases with travel time; and 3) passenger collection and distribution time become more tolerable at longer trip lengths (see following Section).

Two other factors which have been reported to affect the trip length "market" of a van pool are weather and network speed. Directors of van pool programs in the north and east have reported significantly shorter "successful" trip lengths than directors in California. Both have suggested weather may account for the difference--pointing out that the advantages of going from

a warm house to a warm van without the "start-up" worry may significantly outweigh the out-of-pocket cost advantage of driving alone on very short trips (see Chapter 6). This hypothesis is further supported by 3-M's observation that ridership is significantly down in the summer months. In Southern California where weather is not a factor, routes generally start at 30-40 miles per round trip. Leon Bush of Aerospace has suggested that network speed may also influence the attractiveness of van pooling. In the Palos Verdes area, for example, where commuters must travel on heavily congested arterials, van pooling programs have been popular. However, in the Santa Monica area where employees drive on a relatively lightly used freeway, all attempts at introducing van pooling have failed. The distances involved from the two suburbs to the Aerospace plant are roughly the same.

5.3 Route Deviation

In this section, we present the theoretical derivation of a deviation to route length ratio (d/ℓ) which we calculate to be between .25 and .33. We present some empirical evidence and discuss the ratio in light of other reported results. The ratio is then used to derive an estimate of the maximum service area of one van.

An Analytical Model of the Decision to Van Pool. Since the driver of most van pools has a significant incentive to deviate from his normal route to work to pick up passengers, we focus on the first passenger and assume that he or she will only van pool if the total costs of the van pool trip, which include the cost of extra time spent on the deviations for all remaining passengers, are less than or equal to the total cost of driving an automobile. Since the results of the calculations are a reasonable facsimile of actual behavior (see following empirical evidence) the assumptions would appear to be justified.

That condition may be expressed as:

$$\left[[\ell + d][(\frac{T}{S_v}) + C_v^v]\right] + C_f^v \leq \left[\ell[(\frac{T}{S_a}) + C_v^a]\right] + C_f^a \qquad (1)$$

where

ℓ is the length of the direct trip from the first passenger's home to work

d is the total length of the deviations to pick up remaining van pool passengers

T is the dollar value commuters place on one hour of time

S_v is the average speed of the van pool including pick-up time

S_a is the average speed of the automobile

C_v^v is the average per passenger mile variable cost of operating a van

C_v^a is the average variable cost of operating an automobile

C_f^v is the daily average per passenger fixed cost of a van pool

C_f^a is .20 the daily fixed cost of operating an automobile

If these conditions cannot be met for some first passenger, no van pool will be formed. Notice that we should have added the term aC_v^v/n to the left side of (1), where a is the distance from the driver's origin to the first passenger's origin and n is the number of passengers, but this number is very small compared to the other terms and we decided for simplicity to ignore it.

The New York Tri-State Regional Planning Commission's (1976) comprehensive study, Urban Densities for Public Transportation, reported that between 15% and 20% of ex-drivers actually give up a work car. The TVA van pool project reported 17% of its participants either sold or put off buying a new car (Davis, et al., 1975). Similarly, the CONOCO project reported 25% of their participants either delaying purchase of, or selling a car (Continental Oil, Co., 1975). On this basis, we have equated the fixed cost of automobile driving to be approximately 20% of the full fixed daily costs.

The fixed costs for an automobile vary depending on size and make. We have computed the daily cost for a work automobile at about $4.30 (see Car Pool Manual). The U.S. Department of Transportation estimates (inflated to 1975 prices) range between $3.88 and $4.94 (U.S. DOT, 1974). Thus C_f^a, the daily fixed costs of driving, may be set roughly at $0.86, which is 20% of our estimate of $4.30.

The reported daily fixed costs of van pooling range from a high of $1.45 at TVA to around $0.70 for CONOCO's program. Our own estimates place the cost at about $0.94 (see Chapter 6), very close to that of the automobile (using the 20% allocation previously explained). We have thus set C_f^v and C_f^a as equal and the ratio of deviation to total length may now be expressed as:

$$d/\ell = \left[\frac{\left(\frac{T}{S_a} + C_v^a \right)}{\left(\frac{T}{S_v} + C_v^v \right)} \right] - 1$$

The variable cost of a van is commonly reported as $0.10 a mile or about $0.011 per passenger mile for a 9-person base fare. The variable cost of an automobile is estimated to be about $0.078 per mile (based on 12 m.p.g. at $0.60 per gallon, and DOT maintenance costs inflated to 1975 dollars, of $0.028).

Let us assume an average automobile speed to be about 30 miles per hour. This is reasonable considering that a typical van pool trip is probably suburban-based, and that a large portion of it will probably be traveled on limited access expressways with speed limits of 55 m.p.h. While the van pool can travel as fast as the automobile, it must spend a longer amount of time on side streets for pick-up and a small (unknown) amount of dwell time at each stop. Accordingly, we set the van speed lower--about 25 miles per hour. We have assumed the value of time to be about $4.00* per hour, which is high

*The standard rule-of-thumb which has been used by a number of researchers is .40 of hourly wage rate (see, for example, Navin, 1974).

compared to values often used in modal-split studies. However, we are dealing with higher incomes in suburban areas and van pooling seems to be very popular among white-collar professionals, partly because of their more regular schedules (Davis, et al., 1975; Owens and Sever, 1974).

Substituting in these values, we obtain a ratio of total deviation distance to line haul travel distance of about .24. The computation, however, is reasonably sensitive to choice of speed and travel time. For example, if we were to assume a lower value of time (say) \$3.00, the ratio would be about .35; if we were to choose higher speeds, $C_v^v = 30$ and $C_v^a = 35$ with T = \$4.00, our ratio would be about .33. At lower speeds, $S^v = 2$ and $S^a = 23$ with T = \$3.00, the ratio is about .3 and with T = \$4.00, the ratio is about .2. In general, other things being equal, greater deviation will be tolerated at higher van pool speeds and the opposite is true for auto speeds. In fact, with the reasonably high speeds that would be characteristic of rural areas, deviation lengths as much as half of total line haul distance may be reasonably expected. Such variations in deviation lengths, according to congestion and driving speed, have in fact been noticed as will be observed below.

Empirical Verification of the Analytical Model. In the previous section, we have presented an analytical model of the maximum deviation tolerable for a given route length based on an economic rationale. As discussed in Chapter 2, there are a number of other factors besides cost which affect the choice. To accurately quantify convenience and reliability variables in an analytical model would be difficult. On the other hand, to estimate precisely this maximum deviation to route length ratio from empirical data is an intractable statistical problem, since what we are trying to estimate is the mean of a random continuous variable which represents a maximum value. Even if a procedure were created, it is unlikely that the data presently available would be adequate.

With this understanding, we nevertheless felt it important to verify the predictions of the analytical model against some actual van pool routes. The Ralph M. Parsons Company, a construction firm in California, has published a map of its van pool routes. A direct route from the first pick-up point of each route to the destination was measured and subtracted from the total route length for the total collection distance. The results are presented in Exhibit 5-3. Because the map of the routes is not particularly detailed, the distances presented are good, but not precise, estimates. Only one value (Observation 9) exceeded the postulated maximum of .33 and six of the values were very close to it.

We were also able to obtain very detailed maps of eleven of Montgomery Ward's van pool routes in Chicago, Illinois (1974). Unlike many van pool programs, Montgomery Ward is located on the fringe of a CBD and its van pool participants are city and suburban, both of which are represented in the sample. The collection and line haul distances were similarly measured (with greater precision in this case) and the results are presented in Exhibit 5-4.

The ratios in this set of routes show greater divergence, though their average is about one-fourth. The highest ratios found in the first three observations are from distant suburbs (Rolling Meadows, Lombard, Hoffman Estates) where reasonably high speeds can be maintained for the pick-up,

although portions of the express trip may be slower due to congestion (as we discussed earlier). The lower ratios come from denser northern and southern suburbs or from parts of the city itself where there is substantial congestion for much of the trip.

Relation to Previous Research. Several van pool coordinators have reported results that can shed further light on the validity of this ratio. Owens and Sever (1974) have reported that the average van pool trip for 3-M is 25 miles one-way. They have further reported, (Owens and Sever, 1977) based on a comprehensive survey of the nearly 600 participants in the 3-M van pool program, that the average increase in travel time for each passenger is about 10 minutes. Private conversations with H. C. Wood, director of the van pooling program for Chrysler Corporation, and with William Fortune, who is in charge of CONOCO's van pooling program, indicated that their drivers are reporting increases in travel time between 25 and 30 minutes (for some very long routes the travel time increases are higher--45 minutes to an hour).

Let us consider these reported travel times in light of the d/ℓ ratio. If we consider the average 3-M van pool route of about 25 miles and estimate from the d/l ratio of .25, a direct automobile route of about 20 miles for the first passenger, we find that the automobile trip takes about 40 minutes where the van pool trip takes close to an hour (using the assumed 30 m.p.h. and 25 m.p.h. figures previously discussed) with a travel time difference of 20 minutes. Thus if we assume that the deviation time is equally distributed among the remaining 8 passengers, the average increase in travel time would be roughly 10 minutes, exactly the average increases reported at 3-M. Further, since the driver had to deviate to pick up the first passenger, this travel time difference is well in line with the excess driver times reported by Wood, Owens, and Fortune.

Owens and Sever (1974) have developed a utility ratio calculated as:

$$\frac{\text{Pick-up Time in Minutes}}{\text{Line Haul Time in Minutes}}$$

which has been used as a rule-of-thumb in many van pool programs. It is generally assumed that if the ratio remains under one, a stable van pool is possible. That assumption has held up in a number of programs. The purposes of the d/ ratio and the utility ratio are somewhat similar. However, from the perspective of a regional planner or even a local sponsor who must do the initial matching, there are two important differences. First, the utility ratio is measured in time and thus requires fairly precise knowledge of both the routing and traffic conditions, neither of which are available at the regional planning or initial implementation stage. Second, and perhaps more important, the collection time in the utility ratio is not measured in absolute terms. That is, a typical route may look something like Exhibit 5-5. Collection time would be measured from A to B and line haul from B to C. However, the driver as he collects is making progress towards his destination, so that the absolute collection time is the difference in travel time between ($A + b_1 + b_2 , \ldots, + b_8$), and a straight line route (AB). Thus, while the utility ratio is very useful in the final stages of implementing and route planning, the ratio cannot be used to help a planner estimate whether there is sufficient employee clustering to consider van pooling in a particular area.

Application of d/ℓ Ratio. Since the maximum deviation of a van pool is a constant proportion of the trip length, the service area of a single van pool is a truncated wedge defined by the parameters illustrated in Exhibit 5-6. As discussed in greater detail in Report 5, α can be derived from the d/ℓ ratio through the formula

$$\alpha = \frac{3\ d/\ell}{n-1}$$

where n is the load factor of the van pool. Assuming a load of 10 and a d/ℓ ratio of .25 we estimate α to be about 5°. The l' parameter is the minimum trip length for van pooling. Based on the discussion in 5.2 and in Chapter 6, we have suggested 10 miles as a parameter.

Based on the discussion so far, we would need at least 10 people within the 5° truncated cone as shown in Exhibit 5-6. In practice, however, we know there must be more since some people will need a car for work and will have slightly different work schedules, etc. Bob Owens (internal memorandum) has suggested that it is reasonable to expect between one-fourth and one-half of the eligibles in a van pool area to actually participate. Eligibles are defined as those who live in a targeted van pool general area and who could potentially participate. Leon Bush has done a headcount of potential van poolers vs. actual van poolers in three different target areas served by the Aerospace van pool system. In each case, he found that at longer distances, 50% of the potential market were either participating in van pooling or bus pooling (Bush #2, 1975).

These findings are somewhat consistent with the findings from surveys of persons who have not participated in car pool programs (see Car Pool Manual, Report 2). Between 10-15% of these participants report being unable to pool because they need a car during the day. Another 35% report schedule incompatabilities. There are also a number--generally not represented in these surveys--who are "hard-core solo drivers". We thus estimate that between one-half to two-thirds of those clustered in a van pool service area wedge will probably not participate.

5.4 Estimating the Regional Potential of Van Pool

While the SAIM package (see Report 5) can provide a more accurate estimate of the regional potential of van pool, a very rough, but quick estimate can be made from the following calculation:

$$PV = T \times P1' \times C \times B$$

where

PV is the potential number of van poolers in an area
T is the number of trips to large employers (say 500+)
P1' is the proportion of trips in the area in excess of l', where l' is the minimum trip length to be considered for van pooling
C is the proportion of long trips likely to be clustered sufficiently to van pool
B is the proportion of clustered trips likely to pool.

T may be obtained from most Chambers of Commerce. It is simply an estimate of the total number of people employed at firms in excess of a certain size. P1' may be available locally, or the national distribution may be used in which case if l' is 10 miles, P1' is about 25%. That is, about 25% of the journey-to-work trips nationally are in excess of 10 miles. It is interesting to note that while it might be expected that large destinations would attract a disproportionate number of long trips, we have found just the contrary with Chicago data (see Exhibit 5-7). Based on our work with SAIM in the Chicago area we have found that about 33%* of the trips in excess of 10 miles are clustered sufficiently to van pool (the C parameter). We caution, however, that the estimate of C could vary considerably depending on geograhpy and employment mix. In Section 5.2 we have estimated B as about 30%.

5.5 Estimating Demand at the Company Level

Based on the participation levels reported by Forstater and Twomey (1975), we estimate that between 4-9% of a company's employees can be expected to participate in a van pool program (see Exhibits 5-8 through 5-10) if it is offered. This is further supported by our previous discussion since

$$P1' \times C = .0825$$

if P1' = .25 and C = .33. B would, of course, be less applicable since there would be less scheduling problems at a single destination. Nevertheless, application of B = .5 gives us a final estimate for a company of about 4%, which is well in line with actual findings.

We caution, however, that Twomey and Forstater's findings are tentative since most programs surveyed were just beginning and invariably had plans to expand. We also note, based on the breakdown presented here, that the presence of an acute transportation problem (i.e., parking) can result in considerably higher participation.

5.6 Diversion

In converting demand estimates to VMT and energy saving for evaluating the van pool alternative vs. other modes, it is important to have a reasonable estimate of the source of new van pool riders. Preliminary evidence indicates that many van poolers are former car poolers. About half are former solo-drivers. Exhibit 5-11 summarizes diversion rates of programs that have reported such statistics.

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*Our own results are highly dependent of the D and CBD parameters of the SAIM program. For example, using the most stringent parameters (i.e., excluding 36 square miles of Chicago and requiring a destination density of 2000 per squar mile, C = 10%.

Two observations are worth noting. First, van pooling has a considerably lower diversion of solo drivers than car pooling (two-thirds). More important, however, in most areas where van pooling has been tried there has been little if any public transportation. Only in the Montgomery Ward operation is there a situation of open competition with public transportation (bus, rapid transit, and commuter rail; see Exhibit 5-12). Clearly, the van fares very well against traditional forms of mass transit. Such an observation deserves further investigation since the policy implications on a metropolitan and nationwide basis are far reaching.

Exhibit 5-1

Average Round-Trip Route Lengths for Selected Van Pool Programs

Montgomery Ward	30 miles[1]
General Mills	35 miles[2]
CONOCO	45 miles[3]
3-M	25 miles[4]
Chrysler	greater than 30 miles[5]

Source: [1]Geserick, 1975.
[2]Deshler, 1976.
[3]CONOCO #1, 1975.
[4]Estimation of Pilot Program Distances Owens, 1977
[5]Chrysler Corporation #2, 1975.

Exhibit 5-2

Range of Round Trip Route Lengths for Selected Van Pool Programs

Company	Round Trip Lengths (miles)	Company	Round Trip Lengths (miles)
3-M Company	5-150	Erving Paper Mills	25-35
Ralph M. Parsons	45-70	Montgomery Ward	30-90
Cenex	10-100	Scott Paper Co.	25-45
Hoffman-LaRoche	10-140	Cooper & Woodruff	60-200
General Mills	18-110	Gulf Research & Development	5-80
Aerospace	25-75	American Can Co.	70
Continental Oil Co.	20-70	TVA	40-140
Texas Instruments	55-130		
Winnebago Industries	20-60		
Sperry Flight Systems	27-65		
Corning Glassworks	50-140		
Prudential Insurance	50-110		

Source: Miller and Green (1977).

Exhibit 5-3

Route Distances for 11 Ralph M. Parson's Van Pools

Observation	Line Haul Distance (miles)	Collection Distance (miles)	Ratio
1	44	5	.11
2	42	12	.29
3	34	2	.06
4	26	8	.31
5	28	3	.11
6	24	8	.33
7	24	8	.33
8	24	8	.33
9	20	8	.40
10	40	12	.30
11	36	12	.33
		Average	.26

Exhibit 5-4

Route Distances for 11 Montgomery Ward's Van Pools

Van Pool	Line Haul Distance (miles)	Collection Distance (miles)	Ratio
1	28.25	12.50	.43
2	28.00	14.00	.50
3	20.75	14.50	.40
4	19.00	4.00	.21
5	11.50	1.50	.13
6	12.00	4.00	.30
7	28.25	5.00	.18
8	36.25	5.50	.15
9	25.00	4.00	.16
10	37.25	3.00	.08
11	27.50	5.00	.18
		Average	.25

Exhibit 5-5

Collection Time/Distance

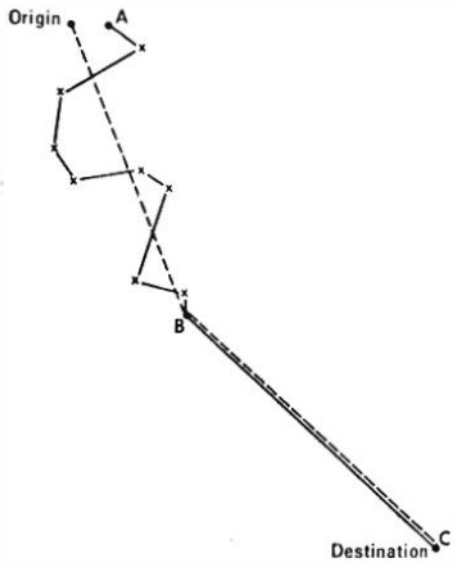

Exhibit 5-6

Service Area of a Van Pool

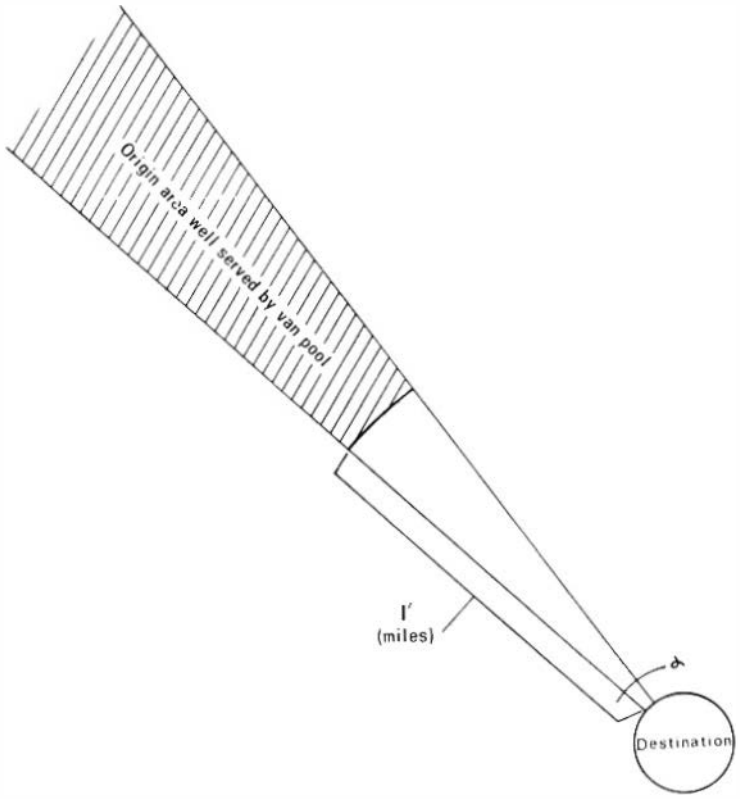

Exhibit 5-7

Cumulative Distribution of Trip Lengths by Trip Length

	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50
100	52	67	75	82	87	92	95	97	98	99
200	55	72	80	88	91	94	97	98	99	99
300	62	78	88	81	99	97	99	99	99	99
400	59	78	87	92	95	97	99	99	99	99
500	83	81	89	93	96	97	98	99	99	99
600	64	83	90	95	97	98	99	99	99	99
700	83	83	92	96	95	99	99	99	99	99
800	62	82	92	96	97	98	99	99	99	99
900	65	84	93	97	95	99	99	99	99	99
1000	64	83	92	98	98	99	99	99	100	100
1100	67	85	90	95	98	99	99	99	99	99
1200	63	83	92	96	98	99	99	99	99	99
1300	62	80	92	96	98	99	99	99	100	100
1400	65	85	92	96	98	99	99	99	99	99
1500	65	84	92	96	97	98	99	99	99	100
1600	65	83	92	96	98	99	99	99	99	99
1700	84	84	92	96	98	99	99	88	99	99
1800	84	82	91	97	97	99	99	99	99	99
1900	63	83	91	96	98	98	99	99	99	99
2000	57	81	89	95	98	99	99	99	99	100
2100	69	85	92	95	98	99	99	100	100	100
2200	55	83	92	98	99	98	98	99	99	99
2300	65	78	89	95	97	99	99	99	99	99
2400	65	85	94	97	99	97	99	99	99	99
2500	65	82	90	94	97	99	99	99	99	99
2600	63	88	94	98	99	98	99	99	99	99
2700	50	76	87	98	99	98	99	100	100	100
2800	58	80	91	95	98	99	99	99	99	99
2900	67	83	91	95	98	98	99	99	99	100
3000	65	86	94	97	99	99	99	99	99	99
3100	57	79	89	94	98	98	98	99	99	99
3200	59	83	91	96	99	94	99	100	100	100
3300	54	79	89	95	98	99	99	99	98	99
3400	55	78	87	97	94	99	99	97	99	99
3500	61	88	94	92	99	99	99	99	100	99
3600	62	84	95	98	99	99	99	100	99	100
3700	53	81	91	97	99	96	99	99	99	99
3900	60	83	93	98	99	99	99	99	99	100
4000	55	80	91	95	98	99	99	99	99	100
4100	85	88	97	95	99	99	100	100	100	100
4200	78	83	92	94	94	94	100	100	100	100
4500	59	85	98	95	99	99	100	100	100	100
4600	65	94	97	98	96	98	99	99	99	99
4900	75	88	96	97	98	98	99	99	99	99
5000	62	85	97	98	99	99	100	100	100	100
5200	62	85	97	98	99	99	100	100	100	100
5500	55	85	98	99	99	100	100	100	100	100
5800	52	51	85	47	99	99	100	100	100	100
5900	73	88	97	98	99	99	100	100	100	100

Exhibit 5-8

Companies with High Levels of Van Pool Participation

Company	Employer Population	% in Vans	# of Riders	Months in Service	Reason for Van Pooling
Erving Paper Mill	300	43%	130	26	Company relocation
Cenex	620	26%	160	27	Energy crisis, isolated site
Nabisco	1000	14%	140	3	Company relocation
General Mills	1800	9%	165	24	Energy Crisis
Winnebago	2700	14%	378	12	Energy crisis; small town; 70% out of town
Ralph M. Parsons	4000	8%	310	22	Company relocation
Hoffman La Roche	6000	4%	240	19	Energy crisis; limited public transportation
3M	10,000	8%	750	33	Severe traffic congestion and parking shortage

Source: Forstater and Twomey, 1976.

Exhibit 5-9

Companies with Mid-Range Van Pool Participation Levels

Company	Employer Population	% in Vans	# of Riders	Months in Service	Reason for Van Pooling
Sperry Flight	3100	4%	120	21	Response to energy crisis
TVA	3200	4%	140	21	Response to energy crisis
Montgomery Ward	4000	4%	150	14	Response to energy crisis
Corning Glass	4000	3%	110	19	Response to energy crisis
Aerospace	5900	2%	130	9	Enlarged ride-sharing program
Texas Instruments	20,000	6%	130	22	EPA regulations and energy conservation ride-sharing program

Source: Forstater and Twomey.

Exhibit 5-10

Companies with Lower Levels of Van Pool Participation

Company	Employer Population	% in Vans	# of Riders	Months in Service	Reason for Limited Van Pooling Program
Scott Paper	1,500	1.0%	19	5	Program just beginning
Gulf R & D	1,600	1.5%	24	27	Original 2 vans for employees being relocated to main plant
American Can	1,800	.6%	18	18	Not enough interested employees living near each other
Honeywell	13,000	.3%	40	15	13 plant locations, not enough people living near each other
Polaroid	98,000	.02%	22	3	Program just beginning

Source: Forstater and Twomey

Exhibit 5-11

Diversion Rates of Selected Van Pool Programs

	% Who Formerly Drove Alone	% Who Formerly Car Pooled	Public Transportation
3-M[1]	44%	39%	
TVA[2]	38%	57.5%	
Montgomery Ward[3]	15%	29%	53%
General Mills[4]	51%	36%	
CONOCO[5]	39%	55%	
Aerospace[6]	40%	51%	

Source:
[1]Owens, 1977.
[2]Davis #2, 1975.
[3]Montgomery Ward, 1975.
[4]Deshler, 1976.
[5]CONOCO #1, 1975 (Number Interested in Pooling)
[6]Bush, #1, 1976.

Exhibit 5-12

Former Mode of Montgomery Ward Van Poolers

15% Driving Car Alone
7% Driving Car with Passenger
10% Taking Turn Driving Car Pool
12% Riding in Car Pool
2% Being Dropped Off at Work
16% CTA
15% Suburban Commuting Train
22% Both E and G.

Source: Montgomery Ward, 1975.

CHAPTER 6: ESTIMATING THE COSTS OF VAN POOLING

6.1 Introduction

In this Chapter we consider two costs: user and supplier. The costs and/or benefits to society are handled in Chapter 7. In Section 6.2, we present the costs associated with operating a van pool, both fixed and variable. These costs are generally fully recovered in the user's fare. Program costs or the costs associated with promoting or organizing a van pool generally are not (see Exhibit 6-1) and may in fact, represent a hidden deterrent to implementation. These costs are outlined in Section 6.3. In Section 6.4, we briefly discuss the users costs which are primarily fare and travel time. Finally, in Section 6.5 we compare the costs associated with operating a van pool to other modes.

6.2 Operating Costs

Typical costs associated with operating a van pool are presented in Exhibit 6-2. Based on these estimates, costs per vehicle mile and per passenger mile were calculated and are presented in Exhibit 6-3. From these tables, and using methods presented in Chapter 11 typical fares may be estimated. We caution that these costs (which are all expressed in 1975 dollars) may significantly vary, depending especially on: 1) the kind of van; 2) the degree to which it is customized; and 3) the price of the insurance package. The assumptions made in estimating these costs are discussed below, along with costs variations. A more detailed discussion of cost variation and a discussion of the methods used to annualize costs are presented in the cost appendices in both this manual and the Car Pool Manual.

Vehicle Costs. Vans can either be purchased or leased. The decision depends on the company's cash flow, size of the program, commitment of the company to the program and the way the firm handles transportation for company business. The advantages and disadvantages involved in the lease/ buy decision are discussed in Chapter 11. About half the firms involved in van pooling operations have purchased their own vans.

If the van is purchased, it can be purchased wholly with the firm's own funds or with credit. The interest is generally absorbed by the firm. Company benefits, such as reduced demand for parking or improved company morale are used to justify this subsidy which is not inconsequential as noted in Appendix B. We note, however, that FHWA funds are available to private firms (interest free) to purchase vans for van pool programs (see Chapter 10). If the van is leased, the interest would be reflected in the lease cost and would probably increase the cost of an individual's fare by $4-5 per month. The lease price also varies considerably with what is offered in the lease package. Some firms simply lease the vehicle with the company purchasing the insurance, handling much of the maintenance, etc. On the other hand, some leasing companies offer a lease package which includes a customized commuter van with airline reclining seats, a two-tier maintenance package, loaner vehicles and complete liability and collision insurance at a higher lease

rate. Exhibit 6-4 presents the vehicle acquisition costs of some programs.

In our own computations, we have estimated the 1975 cost of a van at roughly $7,000 including state and local taxes, dealer preparation, etc. (customized vehicles generally run in excess of $10,000). The annualized cost (Exhibit 6-2) assumes no real growth in van prices (see Appendix A for full calculation). Recently, van prices have been rising sharply due to their sudden popularity. Conversations with dealers indicate, however, that supply will catch up to demand within a year or two and van prices will then increase at about the same rate as those of automobiles, which are just keeping up with inflation. The salvage value was estimated at roughly 20% of original value after 4 years--a rough rule-of-thumb used by fleet leasing companies. Again, this figure may be somewhat low over the short term due to the sudden popularity of vans. Resale figures as high as 33% over four years, and 50% over three years have been reported (DOT Guidelines, 1976). The average life span of a van used for van pooling is assumed to be four years.

Insurance. Insurance costs vary widely from program to program and depend on the legal classification of the pooling operation, driver selection criteria, driving record of the firm, the amount of coverage and the method of insurance. Costs range from a low of $10 per month per van at Montgomery Ward using a company umbrella policy, to premiums of well over $1,000 per van annually ($1,700 at Commuter-Computer). Obtaining insurance at reasonable rates has presented the most serious barrier to van pooling operations. In some cases, it has been difficult to find an insurance agent willing to insure a van pool. In other cases, insurance rates have been set arbitrarily high because of a lack of actuarial experience for van pools. When possible, many companies have opted to self insure. The effect these fluctuations in rates can have on the potential market of a van pool has been demonstrated by Womack (1977) in Exhibit 6-5, which illustrates the trip lengths where the van pool fare becomes less than the out-of-pocket costs of driving, depending on the cost of van pool insurance. With the recent Insurance Services Organization ruling on insurance, (see Chapter 8) these rates may stabilize and/or be reduced.

Typical insurance includes: general liability, comprehensive-collision, and medical coverage. Some programs have general umbrella policies for added protection. For a private company, annual costs per van generally range from $400-800 (1975 prices) with the general assumption that some of the insurance is self insurance or is added to an existing policy. For our computations, we will use $600 for the single-employer cost, and $1,010 for multiple-employer operations.

Taxes and Licensing. Licensing and registration requirements vary from state to state. The annual $70.00 figure used in this computation is in line with other reported fees.

Maintenance. Maintenance of a van involves roughly the same work as that of a standard automobile, and according to conversations with service departments of large dealers, maintenance costs are about the same. However, some van pool directors (Knoxville program and Montogomery Ward program) have indicated that van maintenance has been a difficult problem, particularly in the first 10,000 miles.

On the other hand, many programs report that individual drivers take considerable pride in their assigned vehicle and tend to personally keep it in peak condition with good preventive maintenance and thus reduce overall costs. It should be noted that if the van is leased, these expenses are generally included in the lease cost and the leasor becomes responsible for a regular maintenance program.

Our cost estimate of $0.02 per mile assumes a 40 mile daily round trip and is based on the rather extensive maintenance records kept by the CONOCO van pool program and reported briefly in their brochure (#1, 1975).

Fuel Costs. Most van pool programs are reporting mileage of about 9 to 10 miles per gallon. Mileage costs for our computations are based on 9 m.p.g. at $0.60 per gallon.

6.3 Program Costs

Van pooling is often praised as transportation which pays for itself--especially since most of it has occurred in the private sector free of public involvement. There are, in fact, few (if any) programs, public or private, which "pay for themselves". Considerable staff time and other resources are required to promote the concept, match and organize the pools, and manage an ongoing program. In this section, we present estimates of the costs associated with two types of programs: the company-based van pool program, and the third-party operation.

Company-based Program. In this type of operation, the entire van pool program, including acquiring vehicles, obtaining insurance, matching and organizing pools, and collecting fares is handled by the company staff. The "cost" of these efforts according to many who have organized van pool programs have been surprisingly high. They frequently cite the time costs of several meetings with top management for initial decision-making, and the time of getting legal opinions, finding insurance, arranging for vans, etc.

However, assessing the cost of this organizational and administrative effort is difficult since few companies have kept records on staff time expenditures, and since payrolls are not immediately increased to implement a ride-sharing program. Chuck Geserick, director of the Montgomery Ward van pool operation in Chicago, Illinois estimated the initial organizational cost to his company to be about $30,000. Dave Roper with Commuter-Computer in Los Angeles estimated the organizational costs of a company-sponsored, ride-sharing program to be between $30,000 and $50,000. Several other coordinators have agreed that $30,000 is a reasonable (and perhaps low) estimate of a company's initial staff time requirements for a ride-sharing program. We may annualize this cost as was done for car pool program costs (see Car Pool Manual) by assuming that the money for these costs is borrowed and that the principal will never be repayed. The annual "cost" of the investment is the interest on it. We assume this interest to be 3% which is the difference between what one would have to pay in cash for the interest less the inflation rate. Thus we estimate the annual start-up cost for company van pooling to be .03 x $30,000, or $900.

In Exhibit 6-6, various estimates of the administrative effort involved in maintaining a van pool program are reported along with reasonable but arbitrarily chosen dollar values of that time. The increase in maintenance cost with respect to program size is surprisingly linear as can be seen from Exhibit 6-7.

From the above-mentioned exhibit, we estimate an annual program maintenance cost of about $200 per van which results in a total annual private company van pool cost function of:

$$\text{Annual Program Cost} = \$900 + \$200v$$

where v is the number of vans.

Third-Party Operations. In these arrangements, an independent organization promotes, manages and organizes van pools for an entire region. These organizations incur the following types of administrative expenses: 1) the costs associated with start up (e.g., office set-up, promotion, etc.); 2) costs of marketing and establishing a certain size van pool fleet; and 3) the costs of simply maintaining a van pool fleet of any given size. In estimating these costs we have relied heavily on the Commuter-Computer organization; they are one of the few such operations in existence, and are the only organization which has maintained such records.

(a) Start-up Costs. Dave Roper, director of Commuter-Computer, estimates that a minimum of $50,000 in "front money" is necessary to begin such an operation. This money would be used for initial promotion, market research and office set-up, but would not include matching or marketing staff salaries.

(b) Marketing Costs. Based on nearly 2 years of marketing experience, Commuter-Computer estimates about .55 person months in marketing time is spent putting one van pool on the road. Their marketing staff salaries average about $10,000. Using these salaries and annualizing the initial investment at 3%, we estimate the annual start-up cost of a third-party van pool program to be:

$$\text{Start-up} = .03 \times 50{,}000 = 1{,}710$$
$$\text{Marketing} = .03 \times .55 \times 1{,}105^{*}/\text{Van}$$
$$\text{Total} = \$1{,}710 + 18/\text{Van}$$

(c) Maintenance Costs. Commuter-Computer estimated that the cost of simply maintaining a program with 200 van pools under their current organizational structure would be between $50-70 per month per van. Arbitrarily using $66 per month, the total cost is about 160,00 annually.

Assuming that about $40,000 of these costs were fixed costs (see Exhibit 6-8 for a plausible breakdown of the fixed costs) we estimate on-going maintenance costs at:

$$\$40{,}000 + \$600v \quad (= 160{,}000 \text{ when } v = 200)$$

Combined with the annual cost of the initial investment we estimate the yearly costs of a third party van pool to be

$$\$41{,}700 + \$618v$$

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*One-twelth Annual of $10,000 + 33% overhead.

6.4 Users Cost

The costs to the user are principally the out-of-pocket cost of the fare and the travel time. The fare for the most part, represents the vehicle operating cost of the program--capital and mileage expenses. In the past, program costs have been absorbed by sponsors.

When comparing van pooling as an alternative to the automobile, the only significant time cost is the additional time spent for collection. This time has been reported to average about an additional 10 minutes per passenger. The value of time has been estimated by a number of investigators to be about 40% of the hourly wage. A reasonable default value would be $3.00-4.00 ($15,000-20,000 annual income).

It is assumed that the transportation costs of a van pool driver are zero since his out of pocket costs are zero, and generally he receives extra fares and use of the van which can be considered reimbursement for time and other inconveniences.

Other costs which may be attributed to the user are the loss of schedule flexibility and the costs incurred when the van is not used (i.e., van is missed and a back-up system needed). These, however, are difficult to quantify.

6.5 Comparison of Costs to Other Modes

By comparing the van pool fares based on the operating costs presented in Exhibit 6-2 to the costs of using other modes, we find van pool to be well-suited to long-distance commuter trips, but not competitive for short trips; Exhibit 6-9 compares the cost per vehicle mile; and Exhibit 6-10 compares coverage costs per passenger mile for various modes. In Exhibit 6-11, per passenger mile cost of various modes are presented for different trip lengths; and Exhibit 6-12 compares the daily fares of various modes at various trip lengths. Several observations may be made from these exhibits. First, all modes are less expensive than the full costs of owning and operating a car solely for the journeyto-work (see Exhibit 6-12). However, few people consider the full cost of driving, thus a more realistic comparison for the automobile is with the variable costs of driving, in which case the van pool becomes competive with the automobile only after a 15-20 mile round trip (8-10 miles one way) depending on initial capital costs. Only on a very long trip is van pooling less expensive than the variable costs of car pooling which is the basis for many car pool fares. Van pooling will always exceed the cost of a four-person variable cost car pool and will probably always exceed the cost of a fixed-fare, fixed-route bus.

Exhibit 6-1

Cost Summary

	Generally Not Recovered From Fare	Recovered From Fare
Fixed Costs		
Administrative Costs:		
Personnel Staff Time	X	
Telephone Charges	X	
Postage and Stationery	X	
Program Promotion:		
Fliers, Posters, etc	X	
Initial and Follow-Up Surveys:		
Postage and Return Postage	X	
Stationery	X	
Computer Matching	X	
Printing Charges	X	
Billing and Fare Collection:		
Staff Time	X	
Printing Materials	X	
Program Monitoring and Preparation of Status Reports:		
Staff Time	X	
Supplies	X	
Publication Costs	X	
Vehicle Costs		
Capital Cost of Van		X
Financing Costs	X	
Taxes		X
Decals, or Vehicle Insignia		X
Insurance:		
Collision		X
Liability		X
Vehicle Licensing		X
Driver Preparation (Physical, Defensive Driving Course)	X	
Parking		X
Tolls		X

	Generally Not Recovered From Fare	Recovered From Fare
Variable Costs		
Fuel, Oil		X
Maintenance:		
Tires		X
Lubrication		X
Wash		X
Tune-Up		X
Wheel Alignment		X
Fluids Replaced		X
Miscellaneous		X

Source: Miller and Green, #3, 1976

Exhibit 6-2

Cost Summary of Van Pool Operation

	Single Employer				Multiple Employer			
Fixed Costs	Annual Cost Per Vehicle	Monthly Cost Per Vehicle	Cost Per Vehicle Mile (in cents)	Cost Per Passenger Mile (in cents)	Annual Cost Per Vehicle	Monthly Cost Per Vehicle	Cost Per Vehicle Mile (in cents)	Cost Per Passenger Mile (in cents)
Administrative Cost	$ 0	$ 0	0¢	0¢	$ 360	$ 30	3.6¢	0.5¢
Capital Cost (annualized)	1,548	129	15.5	1.9	1,548	129	15.4	1.9
Insurance	600	50	6.0	0.8	1,010	84	10.0	0.8
Taxes and Licenses	71	6	0.7	0.1	71	6	0.7	0.1
TOTAL - Fixed Costs	$2,219	$185	22.2	2.8	$2,989	$249	29.7	3.3
Variable Costs								
Fuel	$ 605	$ 50	6.0	0.8	$ 605	$ 50	6.0	0.8
Maintenance	202	17	2.0	0.3	202	17	2.0	0.3
TOTAL - Variable Costs	$ 807	$ 67	8.0	1.1	$ 807	$ 67	8.0	1.1
TOTAL	$3,026	$253	30.1	3.9	$3,769	$316	37.7	4.4

Assumptions: Van costs $7,000 and is sold after 4 years for $1,200. Drivers' own use of van is not included. 40 miles round-trip work trip length and 60¢ per gallon for gasoline.

Maintenance

Tune-Up @ 10,000 miles	$39.95	Lubrication, Oil Change & Filter @ 4,000 miles	$15.00
Cooling System Flush @ 1 per year	12.95	Wash at $2.00 each for 26 annually	52.00
Wheel Alignment and Balance @ 1 per year	29.95	Transmission Fluid Change @ 35,000 miles	20.00
Miscellaneous and Unforeseen per 10,000 miles	25.00	Rear-End Fluid Change @ 50,000 miles	20.00
		Miscellaneous and Unforeseen per 10,000 miles	5.00

Exhibit 6-3

Total Cost of Operating a Van for Different Trip Lengths
Single Employer - (Multi-Employer)

Total Miles Per Day	Total** Monthly Miles	Total* Annual Miles	Annual* Cost Per Vehicle	Monthly** Cost Per Vehicle	Pass.+ Annual Cost	Pass. Monthly Cost	Pass. Daily Cost	Pass. Cost Per Mile
10	210	2,520	2,492 (3,263)	208 (272)	312 (408)	26 (34)	1.24 (1.62)	0.124 (0.162)
20	420	5,040	2,671 (3,441)	223 (287)	334 (430)	28 (36)	1.32 (1.70)	0.066 (0.085)
30	630	7,560	2,846 (3,616)	237 (301)	356 (452)	30 (38)	1.41 (1.80)	0.047 (0.060)
40	840	10,080	3,025 (3,795)	252 (316)	378 (474)	32 (40)	1.50 (1.88)	0.038 (0.047)
50	1,050	12,600	3,201 (3,971)	267 (331)	400 (496)	33 (41)	1.59 (1.97)	0.032 (0.039)
50	1,260	15,120	3,397 (4,167)	283 (347)	425 (521)	35 (43)	1.69 (2.07)	0.028 (0.034)
70	1,470	17,640	3,558 (4,328)	296 (361)	445 (541)	37 (45)	1.77 (2.14)	0.025 (0.031)
80	1,680	20,160	3,745 (4,508)	312 (376)	468 (564)	39 (47)	1.86 (2.24)	0.023 (0.028)

*21 Days per Month
**252 Days per Year
+8 Passengers

Assumptions: CONOCO Direct Operating Costs (see Exhibit 6-2), $30 Administrative Cost Per Month, Van Costs $7,000, Sold for $1,400 After 4 Years Use, Insurance $600 for Single Employer, $1,010 for Multi-Employer, Gasoline Costs $0.60 per Day, No Parking Costs, Does Not Consider Private Use By Driver.

Exhibit 6-4

Selected Vehicle Acquisition Costs.

Purchase		
3-M	With Fleet Purchase	$4,891 (1976)[1]
GMI		$7,200 (1976)[2]
Lease		
Commuter Computer	With Conversion Package	$2,112 per year (1976)[3]
CALTRANS		$2,052 per year (1975)[4]
Chrysler		$2,106 per year (1975)[4]
CENEX		$1,920 per year (1975)[4]

Sources: [1] Owens and Sever, 1977.
[2] Deshler, Kay, 1975.
[3] Commuter-Computer, 1976.
[4] Forstater and Twomey, 1976

Exhibit 6-5

Break-Even Distance For Van Pooling Versus Lone Auto Commuting, As a Function of Van Pool Insurance Costs (In Miles One Way)

Type Auto Formerly Used	Yearly Cost of Van Pool Insurance			
	$400	$800	$1200	$1600
Standard	6.9m	8.3m	9.6m	10.9miles
Compact	9.4	11.2	13.0	14.8
Subcompact	11.9	14.2	16.5	18.8

Assumptions:

Fixed Cost of the vehicle per month per fare paying passenger $19.42
Operating cost of the van pool per passenger mile $.0118
Auto operating costs per mile were taken from FHWA (1976). These vary with the size of the vehicle:

Standard	$0.0835 per mile
Compact	$0.0653 per mile
Subcompact	$0.0536 per mile

The breakeven distance is then calculated by setting auto operating cost per mile times the commute distance equal to the fixed cost plus operating cost per passenger mile for vans and solving for distance.

Source: Womack, 1977.

Exhibit 6-6

Estimate of Staff Time Required to Maintain a Private Van Pool Program

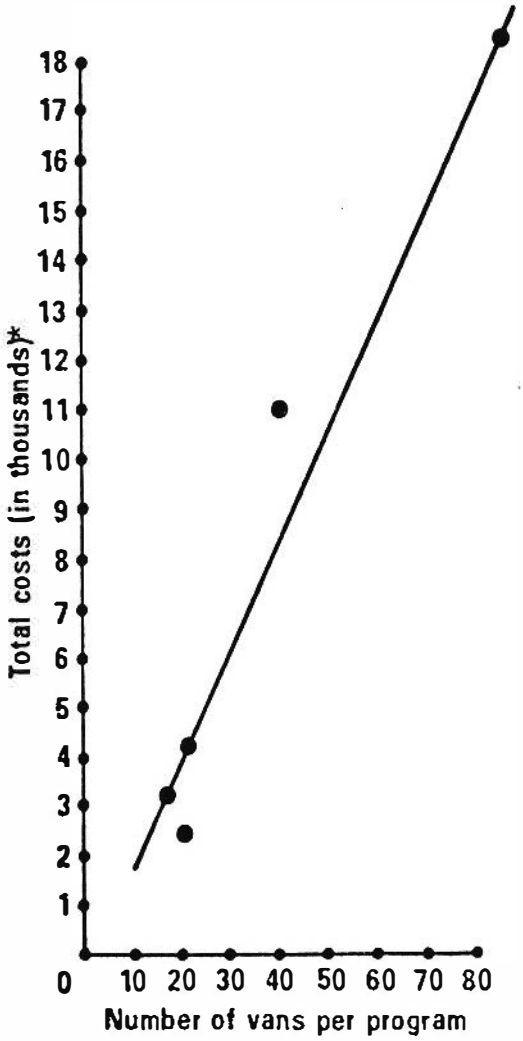
Sources	Estimated Management Time*	Annual Management Cost (25,000)**	Estimated Secretarial Time	Annual Secretarial Costs (12,000	Overhead (33%)	Total Costs	Vans in Program	Cost per van
Shallbetter and Herzberg[1]						$15,000-25,000		
3M Company[2]	.5	$12,500	.125	$1,500	$4,620	18,620	80	$232.00
CONOCO[2]	.33	8,250	.01	120	2,762	11,132	37	300.87
Hughes Tool[2]	.725	3,125	.01	120	1,071	4,315	20	215.00
Hoffman LaRoche[2]	.05	1,250	.05	600	610	2,460	20	123.03
Montgomery Ward	.10	2,500	--	--	825	3,325	16	207.81

*Expressed as % of one person's full time effort.
**Based on annual salaries of $25,000 for management and $12,000 for secretarial services.

Sources: [1]Shallbetter and Herzberg (1975).
[2]Grey-North Advertising (1976).
[3]Private conversation with Chuck Geserick

Exhibit 6-7

Annual Operating Costs vs. Van Pool Program Size



*Annual Figure

Exhibit 6-8

Estimated Costs of a Third-Party Van Pool Program*

A. Initial Costs

			Annual Cost
"Start-up" Money	$50,000	@3%	$1,500
Computer Costs	7,000	@3%	210
Marketing Costs	609	@3%	18/Van

B. On-Going Costs

Estimate $66.00 per month per van for fleet size of 200

Assume fixed costs are

Rent:	$6,000
Secretary:	$12,000
Director:	$15,000
25% Overhead:	6,750**
	39,750

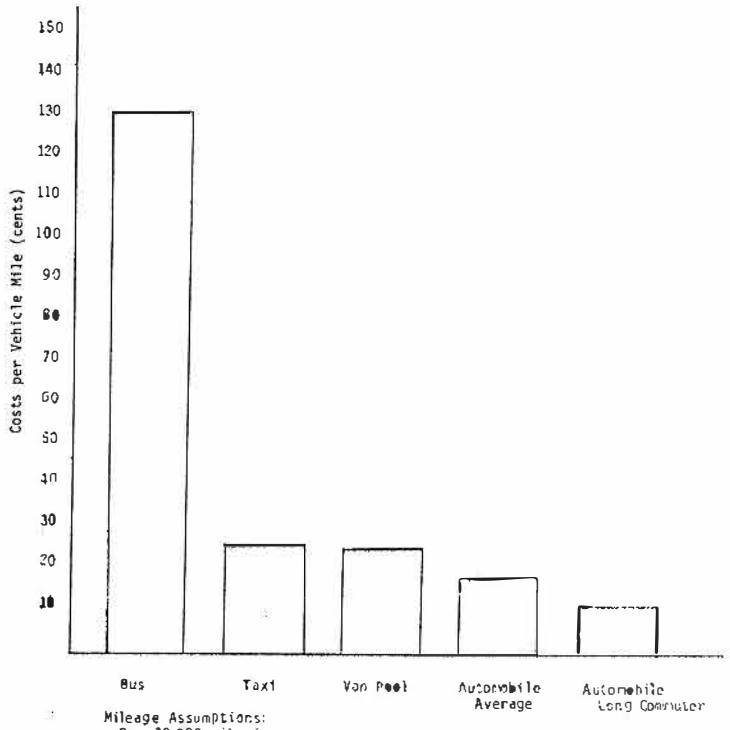
Annual operating expenses are then estimated at:

$$39,750 + 600v$$

*Based on data from Commuter-Computer.
**Less than 33% since rent is excluded.

Exhibit 6-9

Cost Comparison of Operating Costs for Various Modes

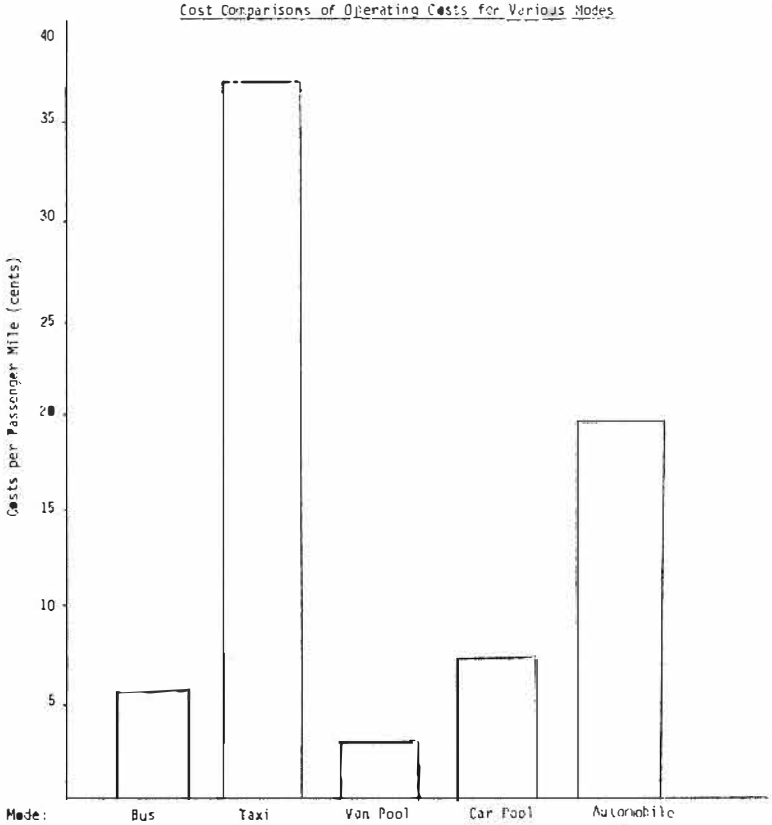


Mileage Assumptions:
Bus 30,000 miles/year
Taxi 40
Van Pool 12,600 miles/year
Automobile (average) 10,800 miles/year
Automobile (long commuter) 31,600 miles/year

See Appendix A for detailed calculations.

Exhibit 6-10

Cost Comparisons of Operating Costs for Various Modes



See Appendix A for detailed calculations.

Exhibit 6-11

Variable Cost Per Passenger for Various Modes

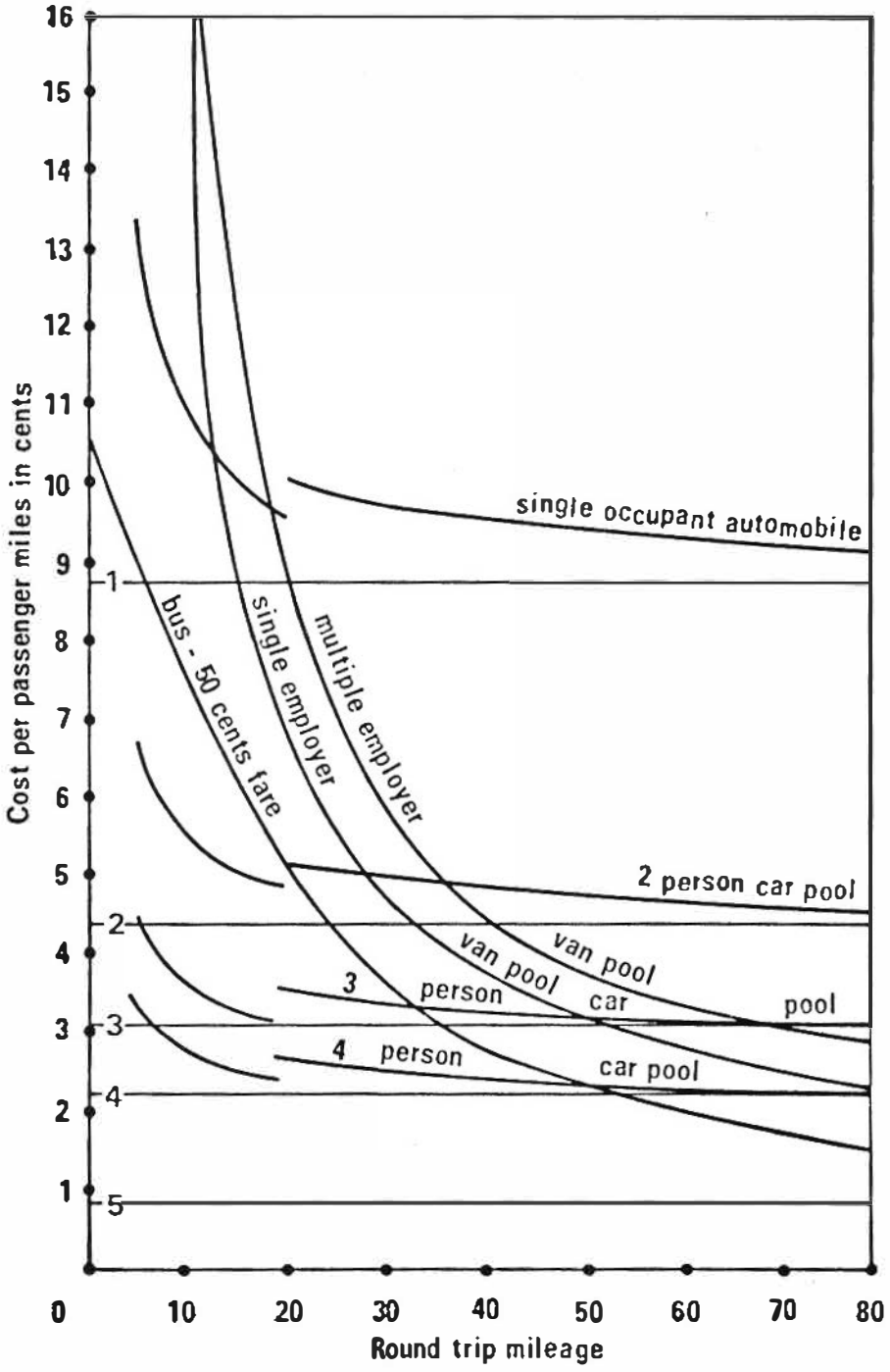
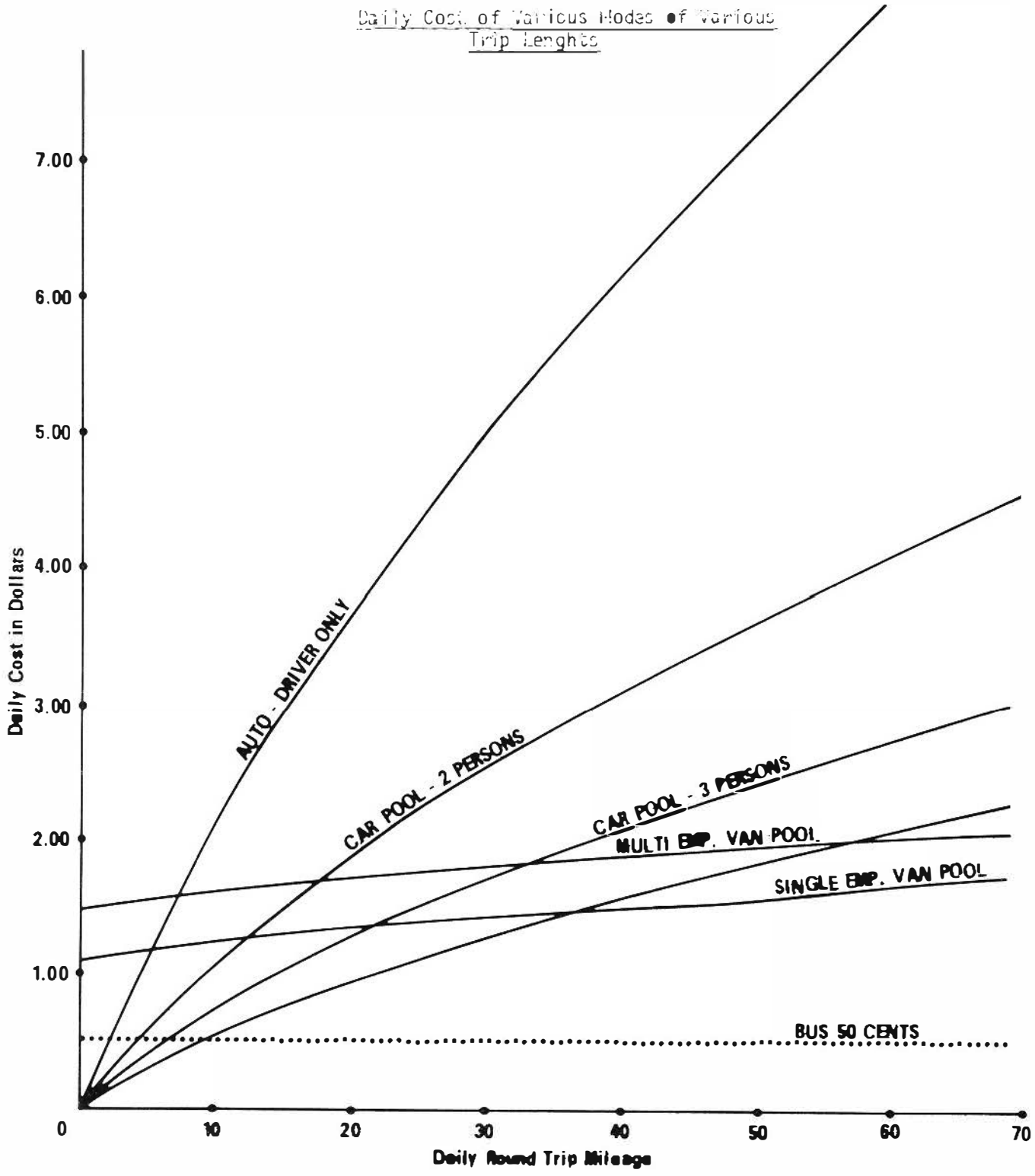


Exhibit 6-12


Daily Cost of Various Modes of Various Trip Lenghts
Daily Cost in Dollars
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0
10
20
30
40
50
60
70
Daily Round Trip Mileage
AUTO - DRIVER ONLY
CAR POOL - 2 PERSONS
CAR POOL - 3 PERSONS
MULTI EMP. VAN POOL
SINGLE EMP. VAN POOL
BUS 50 CENTS

CHAPTER 7: ESTIMATING THE BENEFITS OF A VAN POOL PROGRAM

7.1 Introduction

The benefits of van pooling accrue to the non-user as well as the user and the sponsor of the program. In Section 7.2, we discuss supplier benefits--specifically reduced parking demand, reduced local congestion, reduced tardiness and absenteeism, improved access to distant labor pools, reduced transportation costs, and tax benefits. In Section 7.3, user benefits are discussed--savings in operating and insurance costs, and added convenience. In Sections 7.4 and 7.5, we discuss the most quantifiable benefits to society--namely, energy conservation and pollution and congestion reduction. In this section we discuss methods of estimating reductions in VMT and then translate those estimates to energy saving and pollution and congestion reduction.

7.2 Supplier Benefits

Many of the successful company-sponsored van pools have realized substantial benefits from their van pool investment. Some of the more commonly cited benefits include reduced parking demand, reduced local traffic congestion, improved access to distant labor markets, improved company morale, good public relations, and reduced tardiness. In some cases (as with parking), the benefits have been easily quantifiable. In others, the benefits have been subjective--entirely dependent on the value management assigned to them.

Reduced Parking Demand. It is estimated that a single van will remove about 6 vehicles from an employer's parking lot (actual reported reductions are presented in Exhibit 7-1). These reductions, if parking is congested, can result in substantial savings to the employer and even justify a heavily subsidized van pool fare. 3-M, for example estimated a $2.5 million savings from their van pool program since it eliminated the need for constructing 1,500 additional parking spaces. Shallbetter and Herzberg (1975) have made a generalized estimate of the annual savings due to reduced parking demand of about $139.00 per surface parking stall and $395.00 per structured parking stall.*

*The surface estimates were based on a reduction of 7.4 automobiles per van, 300 square feet per car, land cost of $2 per square foot, construction cost at $2 per square foot, maintenance at $20 per space, taxes at 4% of improvements, with the cost of capital at 10%. The structured parking costs are the same except construction is assumed to be $3,000 per space with maintenance and operation being $30 per space.

Other parking-related savings which may be counted are the alternative uses of available land originally allocated to parking for plant expansion, etc., and the savings on real estate taxes for unnecessary parking land and facilities.

Reduced Congestion. One of 3-M's motivations for initiating their van pool program was the extreme peak hour congestion in the access streets to their plant. This kind of congestion can increase travel time dramatically and can cause serious tardiness problems to the company. The savings derived from reducing congestion are, however, very local. Few firms, particularly suburban firms encounter acute congestion. The calculation should thus be made on a company-by-company basis using formulae presented in Section 7.5.

Reduced Tardiness and Absenteeism. Company savings due to reduced tardiness and absenteeism have often been claimed. The reasoning behind this claim is that a van pooler is less likely than a solo driver to impulsively take a sick day because of the peer pressure of his van pool mates. Owens and Sever (1977) in an investigation of this claim, however, did not find a statistical difference in the absenteeism of poolers and non poolers. Kocher and Bell (1977) in a study of Knoxville poolers report a similar result. The reduced tardiness argument, although it has not been formally investigated is based on somewhat more valid reasoning. Since the van pools are generally scheduled to arrive early to make up for variations in travel time, it is likely that the passengers arrive on time more consistently.

Improved Access to Inaccessible Labor Pools. Often when a company relocates, it loses some of its old labor force due to excessive travel distances. The cost of hiring and re-training large numbers of new employees all at once can easily justify the cost of a van pool program which would be used to bring present employees to the new site, and this has been done in many instances. However, to date, there have been no reports on the actual value placed on re-training (vs. van pooling). The Erving Paper Mills in Battleboro, Vermont initiated a van pooling program to prevent the loss of many highly skilled personnel when their plant relocated 25 miles from its previous location. The Nabisco Company faced a similar problem when it moved to East Hanover, New Jersey. Management realized that the lengthy commuting distance would prevent many workers from continuing their employment for Nabisco. In order to minimize this problem, the company initiated a shared ride program including 13 van pools.

Reduced Company Transportation Costs. There are some instances where a van can be used for mid-day transportation in place of a company car or where a van may replace the need of a shuttle service from (say) a train to an isolated location. Such was the case at the Montgomery Ward headquarters located on the fringe of the Chicago CBD. They estimate an annual savings in transportation costs of between $11,815-30,348 annually.

Tax Benefits. Although many of the benefits previously discussed have been well documented, few have mentioned the tax benefits that can accrue to companies sponsoring van pool programs. A company may take an investment tax credit of

as much as 10% of two-thirds the value of the vans. An example calculation is presented in Appendix B.

7.3 Estimating User Benefits

Reduced Operating and Insurance Costs. Direct cost savings over operating an automobile is the single outstanding quantifiable user benefit of a van pool program. Exhibit 7-2 presents the daily cost savings of a single employer van pooler over a single occupant automobile commuter associated with various trip lengths under each of the following assumptions: no parking fee, parking fee of $1.00, and journey-to-work automobile sold. When estimating these savings on a regional basis, it is reasonable to expect between 15-20% of the participants to sell or delay purchasing a second car (see Chapter 6).

In addition to operating expenses, most van poolers can realize significant savings in insurance ranging between 10%-15% since they are moving from very high mileage categories to the "pleasure-use" category (see Chapter 8 of Report 2).

Other User Benefits. There are also numerous non-quantifiable benefits that users have reported, and according to many participants of the evaluation surveys, these benefits may be more important than monetary savings as an incentive to pool. Most of the benefits passengers report are associated with the convenience of someone else driving in rush hour traffic on a daily basis. They enjoy the reliability of always having the van arrive at a specified time regardless of the weather, and being relieved of regular maintenance responsibilities. Many are very positive about the social relationships formed as a result of the pool.

7.4 Societal Benefits

Estimating Reductions in VMT. In order to estimate social benefits, it is necessary to know what average trip lengths are (see Chapter 5), how many van passengers were former solo auto drivers (see Chapter 5), and how much mileage is generated as a result of a car being left at home.

An employer who sponsors a van pool will generally know the average trip length of the vans in his program. Such information is also available from the SAIM package. If this information is not available, the Federal Energy Administration (1976) has recommended the use of the figures in Exhibit 8-3 of the Car Pool Manual for rough averages. The average length of the auto trip that would have occurred without the van will be slightly shorter than the van trip since usually the driver of the van lives the farthest away.

Experience of past van pool programs has shown that 5 to 6 passengers per van (a total of ten passengers) were formerly auto drivers (see Chapter 5).

FEA (1976 #3) estimates that when a car that was formerly used for driving to work is left at home, it is driven one to two miles per day for .122 gallons of gasoline in energy consumption. Given these estimates, a formula which can be used to estimate the percentage reduction in VMT, V, is:

$$V = \frac{N[\ A\ (L_a - M) - L_v\ ]\ 100}{X}$$

where

N = number of van pools formed,
A = number of auto work trips eliminated per van,
L_a = average round trip length of autos eliminated,
M = mileage generated by auto left at home,
L_v = average round trip length of van,
X = daily VMT in region before program.

As an example, suppose a hypothetical community travels 20,000 miles in work trips daily. A van pool program consisting of 10 vans is instituted. The average van trip is 40 miles, and the average auto trip eliminated is 38 miles. Assume each van replaces six autos, each of which is used at home for travel that amounts to 1.5 miles. Applying the formula:

$$V = \frac{10\ [\ 6\ (38 - 1.5) - 40]\ 100}{20{,}000}$$

$$= 8.95\%.$$

Reductions in Gasoline Use. A formula similar to the one above which can be used to estimate gasoline savings is:

$$G = N\ [\ A\ (F_a - H) - F_v\ ]$$

where

G = gallons of gasoline saved per day
N = number of van pools formed
A = number of auto work trips eliminated per van
F_a = gallons of gasoline consumed by average auto in journey to and from work
F_v = gallons of gasoline consumed per van in journey to and from work
H = gallons consumed by car left at home.

A van pool travels an average of nine miles per gallon (3-M, 1976) and the average auto travels 13.5 miles per gallon (APTA, 1975-76). Applying these figures and formula to the example of the last section,

$$G = 10\ [\ 6\ (2.8 - .122) - 4.4\ ]$$

$$= 116.7 \text{ gallons saved per day}$$

Thus the program will save approximately 117 gallons of gasoline per day.

7.5 Other Social Benefits

Reductions in Pollution. The formula in the previous section used to calculate percentage reduction in VMT can be adopted for calculation of percentage change in auto-related air pollution. One van mile is approximately 1.5 times as polluting as one auto mile (Sen, et al., 1977). Weighting the mileage accordingly, the formula becomes:

$$P = \frac{N \left[A \left(L_a - M \right) - 1.5 \, L_v \right]}{X}$$

where

P = percentage reduction in auto-related air pollution

All other variables are defined as in 7.4.

Reductions in Congestion. The methodology described in Chapter 8 of the Car Pool manual can be applied to calculate reductions in congestion resulting from van pooling. A van uses approximately the same amount of road capacity as an auto; thus, the formula which gives the benefits of removing one auto from the stream of traffic can also be used to give the cost of adding one van.

Exhibit 7-1

Reduced Parking Demand in Selected Van Pool Programs

	# of Parking Spaces Saved	Ratio of Spaces Saved to Vans
3-M	435	5.8
General Mills	140	7.7
CALTRANS	18	6.0
CONOCO	80	8.0
Aerospace	100	7.7
Corning Glass	70	7.0
CENEX	120+	6.7
Ralph M. Parsons	300	9.7

Exhibit 7-2

Savings to a Single Employer Van Pool Passenger
Over a Single Occupant Auto Commuter
($/Day)

Round Trip Miles Per Day	If Car is Maintained (No Parking)	If Car is Maintained $1 Parking Fee	If Car is Sold No Parking
5	- .51	.43	--
10	- .18	.82	.92
20	.62	1.62	2.40
30	1.56	2.56	3.66
40	2.34	3.34	4.74
50	3.11	4.11	5.66
60	3.89	4.89	6.59
70	4.74	5.74	7.40

PART III - IMPLEMENTATION

CHAPTER 8: INSURANCE

8.1 Introduction

The inaccessability of adequate van pool insurance (for a variety of reasons) and uncertainty over sponsors and potential drivers' liability has posed the single most difficult institutional barrier to van pooling. In the FEA van pool marketing experiment in the Chicago area, for example, 17 companies out of 77 listed insurance or liability problems as a primary deterrent to initiating company van pools.

Prospective insurance companies are hesitant to cover van pools for three reasons:

1) The mode is new and has virtually no history on which to base rates.

2) The insurance company often has little knowledge about the drivers they are insuring.

3) The liability of the employer in the event of an accident is very uncertain.

In Section 8.2, we present the insurance ratings that have been recommended by the Insurance Services Organization. Section 8.3 makes some brief recommendations on controlling driver selection, and Section 8.4 discusses a variety of problems associated with employer liability in the event of an accident. The problems of concentrated driver liability, which was discussed at length in the Car Pool Manual, are magnified because a van pool carries three times as many people as an automobile. In addition, there have been several questions raised about van pool sponsors' liability and the applicability of workmen's compensation, which we discuss in the latter part of Section 8.4. For greater detail in any of these areas, we highly recommend Frank Davis' (1977) report, "Van Pool Insurance Study: Final Report." We conclude the chapter with a discussion (Section 8.5) of the methods for insuring van pools bearing in mind that present insurance practices somewhat limits van pooling to large companies.

8.2 Insurance Ratings

Based on 14,770,865 documented van pool miles and an accident rate of 3.76 per million vehicle miles, the National Insurance Services Organization has formally established three van pool categories with recommended ratings in a revised commercial automobile classification manual. These three categories are:

1) Privately-Owned, Shared Expense Pools. The pool members ride in the same vehicle every day and contribute to the expense incurred by the driver.

2) Employer-Provided Pools. The pool riders are employees of the same firm where ridership in the pool is not a condition of employment, an inducement to employment, or incidental to employment of the riders.

3) All Other Pools. All other pooling arrangements whether third-party operators, multiple employment center pools, or employer pools where workmen's compensation probably will not apply.

Category 1 would be rated similarly to a car pool (see Car Pool Manual). The ratings for Categories 2 and 3 are presented in Exhibit 8-1. These multipliers are based on the lowest commercial rate (i.e., small pick-up truck used in business). A van pool carrying employees to work in an employer-furnished pool would then pay 1.05 times the lowest commercial rate for the area and coverage desired. It should be understood that at this writing, these ratings are only recommendations. They will have to be approved by each state and then it will be up to the individual insurance underwriters and their companies to decide if they will or will not write insurance policies at these rates.

8.3 Driver Selection

Many firms have been reluctant to insure van pools because of the limited knowledge they have about the driver they are insuring. They point out that when they are asked to insure a regular automobile, they base the premium on the driver's age, sex, location, driving records and sometimes his personal habits. With a van pool, the problem is that while the driver may have a good record, the insurer knows little else about him. Some representatives of insurance industry have urged that as states adjust their regulations regarding van pooling, they should incorporate rather strict driver requirements (such as a required defensive driving course, a chauffeur's license, and an annual driver record review) to insure control over the quality of drivers.

8.4 Liability

A van pool severely concentrates liability for an accident on the driver and on the owner of the vehicle. This problem has been treated in the Car Pool manual and we refer the reader to that report. In addition, since the sponsor (rather than the commuter) is often the "owner" of the vehicle there have been several questions raised concerning the company's liability. Below, we discuss the liability of both the private company and the third-party operator as well as the applicability of workmen's compensation insurance.

Employer Liability. Of concern to many companies considering van pooling, is the extent to which claims can be made against the assets of the company in the event of a catastrophic accident. There are virtually no precedents from which judgment can be made. That will come with the first catastrophic van pool accident. In the meantime, two issues are frequently discussed: 1) the extent to which the journey-to-work can be considered part of regular employment thus making the employer liable for an accident; and 2) the extra-legal fact that, despite various interpretations of the law, a company has "the deepest pockets" and will find itself in court protecting its assests in any accident.

For the first issue, a defense commonly cited is the Fellow Servant Doctrine, a theory developed from common law which states that an employer is not liable for injuries caused solely by the negligence of a fellow employee.

There are certain limitations upon the application of this theory to deny employees' recovery. The most important limitation is that workmen's compensation statutes do away with common law defenses where the statutes apply. That is, if workmen's compensation is applicable, the doctrine will not deny recovery. However, if workmen's compensation is held inapplicable, then the common law defenses would become available to the employer.

Although the wording of workmen's compensation statutes varies from state to state, usually the coverage depends on showing that the injury occurred "during the course of employment". Whether the journey-to-work is included is open to serious question. Davis points out in his discussion that workmen's compensation,

> ...does not authorize an award in case of injury or death from a peril which is common to all mankind, or to which the public at large is exposed. The argument seems to be that if the workman were permitted to recover in such cases he would enjoy privileges above those of the public generally and in effect be insured against every sort of calamity, which is not the intention of the statute (Davis #1, 1977).

On the other hand, it has been held that where there is an express or implied contract by the employer to furnish transportation to the employee and an injury is sustained by the employee on his way to or from work that such injury is covered by workmen's compensation. See, for example, Swanson vs. Lathan, 92 Conn. 87, 101 A. 492, Rock County vs. Industrial Commission, 185 Wis. 134, 200 N.W. 657, and Dunn vs. Trego, 279 Pa. 518, 124 A. 174. There have been no formal rulings to date, on whether van pool sponsorship implies a contract to furnish transportation. However, the current ISO ratings are based on the assumption that workmen's compensation would apply in the event of an accident. It is strongly advisable that the details of each state statute be checked out individually. In addition, Davis recommended that:

> The safest recourse would be to amend the individual state workmen's compensation statutes so as to include van pooling. The scope of workmen's compensation could thereby be enlarged to cover an employee from the time he leaves his home to go to work until he returns there provided that the travel is an employee sponsored vehicle (Davis, #1, 1977).

Liability of a Third-Party Sponsor. There is much less question of the liability of a third-party van pool sponsor. It has been held that "one who permits others to operate motor vehicles under his permit or franchise is liable for the injuries caused by the negligent operation of the motor vehicles or the fact such others that are independent contractors and not employees." (Blashfield, Automobile Law and Practice, Chapter 252, Section 21) (Davis #2, 1975). Under this principle, it is virtually certain that a transportation agency or operator would be held liable in a van pool operation, whether operated through purchase of service or directly, much as an ordinary bus company.

8.5 Methods of Insurance

Two principal methods of insuring van pools have been used, to date--either coverage is obtained under an existing company umbrella or fleet policy, or a special van pool policy is written.

Existing Company Insurance. In many instances, a company has either existing insurance for a fleet of company cars or some sort of umbrella coverage to which van pool coverage can be added. If either of these two options are open, they provide the easiest and least expensive form of van pool insurance.

By using an existing company policy, the liability coverage is essentially in place and paid for (except for a marginal increase in premium). Comprehensive and collision insurance can be added to existing umbrella coverage through a self insurance fund such as has been done by the Aerospace Corporation in Los Angeles. Each van was assessed $20 per month at first to build up an insurance pool to cover the vans. The negligible losses enabled the monthly assessment to be lowered to $10 per van. If the firm already has insurance for a fleet of business vehicles, the cost of the additional insurance for the van pool operation is minimal. The savings from fleet insurance can be substantial (over $250 per year per van). Exhibit 8-2 compares the insurance costs of self or fleet-insured van pools to van pools insured with special policies. Similar savings can be obtained when vans are leased. Some companies who handle large volumes, with good experience and who have a high rating can include insurance in their lease cost at rates 20-40% below standard rates (Mass Pool, 1976). To do so, however, the lessor may require some control in the driver selection process.

Special Insurance Policies. If a company has no other option but to take out a special van pool insurance policy, there will be two important factors the insurance underwriter will be concerned with: 1) the financial capability of the firm and the degree of control the firm has on the program (Shallbetter and Herzberg, 1975); and 2) the degree of control a firm has on the van pool program relates to the employers' responsibility for driver selection and driver safety. To date, this has not presented a significant problem since most firms have established rather stringent driver criteria and often require drivers to take a defensive driving course.

Grey-North Advertising suggests that the company may have to educate prospective underwriters about van pools.

> Van pool insurance is new. In the absence of additional information, they assume an unsafe vehicle, an irresponsible driver and 12-15 heads of families exposed to accidents 24 hours a day. The burden of proof is on the driver and company to prove that the van pool program uses safer vehicles, has better than average drivers, and operates a limited period each day (Grey-North Advertising, 1976).

Coverage. While insurance policies must be tailored to the particular company, it seems reasonable to carry no more than 100/300 liability and to increase medical/injury coverage to $50,000 per passenger. The reasoning behind this recommendation is presented in Davis (#1, 1977) and summarized here. If van pools consistently carry large amounts of liability they may become a target for suits where a large portion of the money is absorbed in lawyer's fees and court costs. If there is limited liability coverage, but the capacity to immediately pay medical bills, lost wages, etc., there is less likelihood of a law suit. For further insurance recommendation see Davis (1977).

Exhibit 8-1

ISO Recommended Multipliers for Van Pool Insurance

CLASSIFICATION	SEATING CAPACITY			
	1-8	9-20	21-60	over 60
Employer Furnished	1.00	1.05	1.40	1.90
All Other	1.10	1.25	1.80	2.30

Exhibit 8-2

Comparison of Costs for Various Methods of Insuring Van Pools

Self Insured	
3-M	$ 480
Fleet Insured	
Aerospace	$ 674
CALTRANS	$ 267
Scott Paper	$ 480
Special Policies	
Commuter-Computer/ARCO	$1260
MODNAR	$ 713
Polaroid	$ 450
New England Mutual	$ 527

CHAPTER 9: REGULATORY BARRIERS TO VAN POOLING

9.1 Introduction

There have been many discussions of the real and potential regulatory barriers to para-transit in general, and to van pools in particular. Of particular concern to some has been the carrier classification of van pools since common carrier classification can significantly increase costs. At present, the regulatory status of van pooling is in a state of flux as each state develops its own ride-sharing (or para-transit) policy out of a series of conflicting issues.

In this chapter, we will discuss both the current regulatory status of van pooling and the relevant policy issues. In Section 9.2, we present some background material on regulation in general, answering the questions: who is regulated and who are the regulators? In Section 9.3, we discuss how some of the current regulatory statutes are being applied to van pooling and in Section 9.4 we discuss some broad policy considerations underlying the decision to regulate (or de-regulate) van pooling. In Appendix C of this manual, we present some examples of new state legislation specifically addressing the van pool legislation question.

9.2 Background

Who is Regulated? When a regulatory agency has jurisdiction over a mode of transportation, it is generally over services where a vehicle and/or driver are used "for hire", or where compensation or "consideration" for services are involved in the transportation of persons and baggage over either a fixed, or variable route (Wolfington, 1975). The Supreme Court upheld this jurisdiction in the case of Packard vs. Banton, 264 U.S. 140 1923 when it stated,

> The streets belong to the public and are primarily for the use of the public in an ordinary way. Their use for the purposes of gain is special and extraordinary and, generally at least, may be prohibited or conditioned as the legislature deems proper."

The power to regulate generally comes from federal or state legislation. The state power of regulation is often delegated in whole, or in part to smaller jurisdictions (i.e., cities) for modes operating exclusively within those boundaries.

Passenger modes which are regulated are generally classed as common or contract carriers. Although the definition varies with each state's legislation, a common carrier usually is one which offers transportation services to the public at large (generally on a fixed route and schedule) for compensation. The key concepts are "general public" and "compensation". Commuter rail and local buses are typical examples and are variously regulated by state PUC's, municipalities, and transit authorities.

A contract carrier is generally defined as one engaged in the transportation of persons for a particular place (i.e., airport) or under special individual agreements (i.e., taxis) (David #2, 1975). The distinguishing feature here is the "chartered" nature of the service.

Who Regulates? Exhibit 9-1 presents a summary of the most usual regulatory agencies and their powers. It is accompanied by a summary discussion of the jurisdictional areas of each, excerpted from a presentation by Wolfington in Regulation and Para Transit (1976).

The principal areas subject to regulation and the matters on which regulatory bodies normally focus include the following:

Rates and Fares. The regulatory body must protect the public interest and is therefore, interested in monitoring: (a) amount charged to the public; (b) quality of service; and (c) reasonableness of compensation. The control over the rates and fares is exercised by requiring either the filling of rates and fares by way of application for approval of changes. Normally, the basis of approval or rejection of rates is related to the maintenance of a predetermined rate of return. In most instances, the fares of the carriers who operate on fixed routes are more closely scrutinized. That condition also prevails where the rate is determined on a passenger basis, rather than on a charter group basis.

Insurance. Normally, the regulatory body stipulates a minimum level of insurance coverage in the areas of liability, collision, and property damage and requires some evidence of such coverage. For instance, the California Public Utility Commission protection against liability sets forth rules requiring that certain carriers of passengers provide adequate protection against liability imposed by law on such carriers for the payment of damages for personal injuries, including death resulting therefrom, and damage to or destruction of the property. In most instances, private operators will arrange insurance coverage greater than that required by regulatory bodies.

Equipment. A basis commonly used by regulatory bodies to distinguish various services and to determine jurisdictional control is the passenger capacity of the vehicle. Often, the passenger capacity is a criterion for classification and as such can trigger a further degree of control related to vehicle specification, safety standards, and color. Vehicle specifications and safety standards may include requirements related to factors such as the number of doors on the vehicle, warning lights, and adherence to federal safety standards.

Drivers. The most common element of regulation over drivers is related to driver licensing. In some instances, the operator will independently require a road test if a specific designation, such as chauffeur is specified on the license. In most instances, the operator will independently require a physical examination and some record of former employment and driving experience (i.e., accident experience and traffic violations).

Routes. Control over routes is generally restricted to the common carriers operation on fixed-routes, pursuant to a certificate of public convenience and necessity. In that instance, the exercise of control may include a review of the proposed method of operation, proper inspection of the vehicle, a detailed description of the route, and fares related to the movement of persons along that route. In the area of variable routes, control is normally limited to the description of boundaries within which persons can be picked up and discharged at any point.

Licensing and Taxes. Normally, the public transportation carrier or operator or both must be properly licensed and registered as such with the regulatory body and further must make such licensing and registration visible through a tag, permit, or markings on the vehicle.

Fees. It is not uncommon for a public utility commission or regulatory body to impose a fee or tax on public vehicles operating over defined regular routes. In most instances, those public vehicles operating in variable routes are not subject to a joint metropolitan area authority or airport commission.

Accounting. A regulatory body that exercises a high level of control will often require that operating and financial statements be filed in a form and format it prescribes. In addition, it retains the right to audit the records of the operating entity. The extent to which there is an accounting requirement is generally proportional to the extent of control of the other areas that are subject to regulation.

Entry Control. Entry control generally relates to the number of vehicles, financial responsibility and fitness of proposed operator, and monopoly atmosphere with respect to service territory. In most instances, the degree of control exercised is greater with airport commissions and the regulatory bodies of public transportation operators traveling over defined, fixed routes. There is no common degree of enforcement of such control, and the control over factors such as the number of vehicles is normally exercised at the city and county levels.

9.3 Current Regulatory Status of Van Pooling

The way a van pool operation is classed for regulatory purposes is important to the sponsors for two reasons: 1) cost; and 2) freedom to operate in the general territory of another carrier. If a van is classed as a common carrier, direct costs in terms of insurance, fees and licenses significantly increase--as do the fares (see Chapter 6). A greater cost according to some van pool operators is the time required to keep the necessary government records, to petition for classification, a route change, or a fare change, etc. If classed as a common carrier, a van pool program can be severely limited or even probited from operating in some areas if it is contested by a previously existing operation.

For these reasons, many see the regulation of van pooling as a major barrier to implementation and operation of the mode.

The classification of "common" or "contact" carrier often rests wholly or in part on whether the passenger compensates the provider of the service and whether or not the service is available to the general public. How the regulatory language is interpreted vis-a-vis van pooling, which clearly does involve compensation and (in the case of third-party systems) is often open to the general public, has varied radically from state to state.

When 3-M began its pilot program, they sought legal opinions from federal, state and local levels of government as to the statutes and regulations they would have to comply with. All participants uniformly noted there was virtually no precedent, but believed 3-M could operate essentially as a private vehicle.

The important thrust of each of these legal opinions was that: 1) the employer who is not in the business of transporting people is the provider of the service (not the driver who may be receiving compensation); 2) the employers must exercise dominion and control over the operation (e.g., by selecting the passengers and driver) and bear the burdens of transportation (e.g., payment of cost of operation maintaining and insuring vehicle); 3) the service must not be open to the public--only to employees of the company; and 4) there must be no profit made in the provision of the transportation service. These legal opinions have been used for a number of van pools in obtaining "private" classification, and as a precendent, have fostered the growth of van pooling within companies as opposed to third-party pooling.

Womack (#2, 1976) has surveyed 12 state Public Utility Commissions and compiled a table of how van pools are being classified now or how they would be classified if the question arises (see Exhibit 9-2). He found that four states do not regulate van pools at all, four states regulate all types of van pools, and the remainder regulate some forms--most notably, third-party. He notes that these conflicting regulatory decisions are often based on similar PUC regulatory language. The attorney general of the State of Massachusetts, for example, found that "an employer whose primary business is not that of providing transportation, who provides vans for his employees to use for commuting to and from work does not come under Public Utility Regulation."* Whereas, the Public Service Commission (PSC) ruled that "since van pools carried persons for hire between fixed points or 'termini' on regularly scheduled routes, they must therefore be classed as 'common carriers' and be subjected to the rules and regulations of the PSC." They further noted that, "any transportation for hire, regardless of whether a profit is intended, involving different persons should be seen as 'public'."

Womack (1976) further observes:

> . . .in Georgia, where a regional transit provider and another common carrier were quick to brand van pools as an economic threat, the PUC classified van pools as common carriers. In Pennsylvania, by contrast, the proposed

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*It is noted that Massachusetts, which has a large public transit investment, uses an interpretation that applies only to employer-sponsored vans.

> van pools were at employment sites with no transit service. No objections were heard and the PUC declined to assert jurisdiction. This sensitivity to the existing common carriers is the key... to whether classification as a common carrier will be a significant barrier to the success to van pooling.

That is, where van pools are seen as a threat to existing transportation operations, regulatory language is interpreted as applicable. Where there has been little need to protect other operations such interpretations have not been made.

In almost all cases, third-party pools have received the most stringent regulation. For example, a van pooling system was created and operated by Monarch Associates as a private enterprise in New York City; Monarch provided the vehicle and took care of gas, maintenance, garaging, insurance, tolls and all other operating expenses. The passenger fares covered the cost of the operation. From a demand perspective the operation was a success, but the service experienced rather strict regulatory restriction. Finally, after suffering financial problems, the operation was discontinued (Voorhees #1, 1974).

In Reston, Virginia a van pool-type service is offered through a commuter association. Initially, this service (though it was absolutely non-profit) was determined by the State Corporation Commission (SCC) to be subject to regulation as a common carrier, However, the group was able to obtain an amendment to existing Virginia law exmpting "mini-buses" from SCC regulation as long as their routes and schedules do not coincide with those of certified carriers. MODNAR, another "third-party" but non-profit van pool service in Atlanta, Georgia was classed as a common carrier. Its operation has been heatedly contested by the local transit authority on the grounds of competition, with accusations of "cream skimming". These types of problems have made it difficult for any but employer-sponsored van pools to operate.

9.4 Some Policy Considerations

Coordination and Control. Many who have been involved with van pooling have argued strongly for de-regulation of van pooling citing many of the problems presented above. But we have seen from Section 9.2 that there are some legitimate reasons for regulating in general. The reasons for regulating are based on three general purposes:

1) Safety. To insure to the public that the vehicle (that is using public roads) is safe and adequately insured for the protection of its passengers and others on the road.

2) Service. To insure that all members of society receive a certain (base) level of service and are not charged exorbitantly for that service.

3) Coordination. It has been argued that transportation is a "systematic commodity" which requires a very long term investment and that for a mode to adequately provide a network of service, it must be protected from competition. Regulations have been developed to basically guarantee exclusive use of a specific route or area to a particular mode.

The last general purpose, that of coordination, is a controversial issue and will be at the heart of any transportation policy regarding van pooling. The public interest is served to the extent that regulations prevent overlaping investment and encourage economic, well balanced, integrated systematic service as opposed to a myriad of competing and somewhat transient services. However, these same regulations have often served as a barrier to implementing new services that meet changing transportation needs, and in many instances have served to protect the special interests of particular modes (most notably rail and bus), and for that reason have come under severe criticism.

Effective coordination of transportation service and investments does require some degree of control over their operation--either through the power to deny or the power to implement. This control (whether or not it ultimately rests in the hands of the planner) can either be the "barrier of regulation" or the incentive of government funding, promotion and/or technical assistance.

It should be understood, however, that regulatory control need not be inflexible nor a barrier to innovation. In fact, regulation (if done on the basis of cost/effectiveness) may be one of the most powerful tools in integrating innovations like van pooling to existing transportation systems.

Competition or Complementarity. It seems evident that one of the underlying issues behind any regulatory policy for van pooling is competition with existing public transportation. If van pooling is to be expanded beyond the single company operation and begins assuming a significant role in a transportation system, this question will have to be addressed at a policy level. In Chapter 6, we have suggested that van pooling has a "natural" market in low density, long commuting trips. From the perspective of many suburban bus companies struggling to survive, that "natural" market overlaps their own larger market which includes shorter, high density trips and non-rush trips as well. Where a third-party van pool operation serves several firms, it takes on many of the characteristics of a subscription bus and bitter territory disputes could result.

The facts on which to assess the extent to which van pooling competes with other modes are sparse, since van pools have tended to operate where no other form of transit exists. An exception is the Montgomery Ward Van Pool program located on the fringe of the CBD of Chicago--a CBD well served by commuter rail lines, a fairly complete rapid transit system, and a grid bus system. Ward, however, is not within easy walking distance of the CBD termini of the transportation system. When their van pool system was established, they found that 60% of their riders were former users of public transportation--at least half of these were former users of commuter rail. In this case, the van pool represented greater convenience at the destination although it was more expensive than either bus or rapid transit.

On a theoretical basis, it would appear that van pooling may be extremely competitive with public transportation. Consider the example presented in Exhibit 9-3 where the total costs of a 15 mile bus and van pool trip are calculated. For the bus, we make the rather favorable assumption of one-fourth mile walking time, and 3 minutes waiting time. Still, the van pool remains at least equally attractive, despite the higher fare.

The issue of competition between the modes deserves further research at a national level and certainly should be carefully evaluated at a local level.

Exhibit 9-1

Profile Chart of Regulatory Framework

Regulatory Body	Areas Subject to Regulation: Rates and Fares	Insurance	Equipment	Drivers	Route	Licensing and Taxes	Fees	Accounting	Entry
Federal									
Interstate Commerce Commission	X	X		X		X		X	X
Federal Saftey Standards			X						
Airport Commission	X	X	X	X	X		X	X	X
State									
Public Utility Commission or State Corporation Commission	X	X	X		X	X	X	X	X
Department of Motor Vehicles		X	X	X					
Airport Commission	X	X	X	X	X		X	X	X
Secretary of State	X	X	X	X	X	X	X	X	X
Department of Transportation	X	X	X	X	X	X	X	X	X
County									
Department of Motor Vehicles		X	X	X		X			
Public Utility Commission	X	X	X	X	X		X	X	
Airport Commission	X	X	X	X	X		X	X	X
Department of Transportation	X	X	X	X	X	X	X	X	X
City									
Department of Motor Vehicles		X	X	X		X	X		
Police Department		X	X			X			
Taxi Commission		X	X	X		X	X		X
Airport Commission		X	X		X		X		
Department of Transportation	X	X	X	X	X	X	X		
Joint Metropolitan Commission									
Port Authority	X	X	X		X		X	X	X
Area Transit Commission	X	X	X		X		X		X
Airport Commission	X	X	X		X		X		

Note: X indicates the area that is subject to regulation by the regulatory body.
Source: Wolfington, 1976.

Exhibit 9-2

State Common Carrier Regulation of Ride Sharing*

State	Employer Van Pool	Non-profit Van Pool	For Profit Van Pool	Government Van Pool	Local Exemption**	Key Determinants of Regulatory Status
Arizona	N	Y	Y	Y	N	Car pool: Profit for driver Van pool & Subscription bus: compensation for vehicle owner
California	N	N	N	N	N	Vehicle size; whether driver & passengers are work trim commuters
Colorado	Y	Y	Y	Y	N	Compensation for driver or vehicle owner
Florida	Y	Y	Y	Y	Y	Compensation for driver or vehicle owner
Georgia	Y	Y	Y	Y	Y	Compensation for driver or vehicle owner
Massachusetts	N	?	Y	?	NA	Whether arrangement is for hire as a business
Minnesota	N	N	N	N	NA	Vehicle size; whether driver & passengers are work trip commuters
Ohio	N	N	?	N	NA	Whether person is in business of hauling passenger for profit
Oregon	Y	Y	Y	Y	Y	(Attorney General's opinion pending)
Pennsylvania	N	N(?)	Y	N(?)	NA	Profit for driver or vehicle owner
Tennessee	N	N	N	N	Y	Vehicle size; whether driver & passengers are work trip commuters
Virginia	N	N	N	N	NA	Whether passengers are work trip commuters

* Source: New Perspectives Ride Sharing Survey Questionnaire (Womack, 1976).
** Exemption for common carriers operating exclusively within a municipiality

Key: Y= Arrangement Considered a Common or Contract Carrier
N= Arrangement not a Common or Contract carrier
E= Arrangement Exempt from Regulation by PSC/PUC policy

Exhibit 9-3

User Costs for an Express Bus for One-Way 15 mile Commute

Bus Fare		$.50
¼ mi. Access Walk	@ 3 mph = 5 min	
	@ $7.50 per hour	$.63
3 min. Wait	" " " "	$.37
15 mi. Line Haul	@ 25 mph average	
	@ $3.00 per hr.	$1.80
3 min. Egress	@ $7.50 per hr.	$ .37
		$3.67

User Costs for Van for Equivalent 15 mile* Commute

Van Fare for 20 mi.		$ .66**
20 mi. Line Haul	@ 25 mph average	
	@ $3.00 per hr.	$2.40
		$3.06

*Assume 15 mi. + 1/3 Collection Distribution = 20 mi. with door-to-door service.

**Single employer van pool.

CHAPTER 10: INSTITUTIONAL INCENTIVES TO VAN POOLING

Van pooling is seen by many, as a popular measure for energy conservation, pollution control, and for provision of peak-hour low-density transportation service. Thus several agencies--FHWA, UMTA, FEA, and EPA-- have been actively involved in promoting it. Especially as concern over energy heightens, the number and variety of van pool incentives increase.

In this chapter, we will briefly outline the primary sources of funding and technical assistance for van pool programs, as well as certain regulatory measures which have acted as disincentives to solo driver automobiles and thus indirectly encouraged van pooling.

10.1 Funding and Technical Assistance

There are three principal federal sources of van pooling program funds. These are: the FHWA (Federal-Aid Highway Act of 1976); FEA (Energy Policy and Conservation Act); and UMTA (Service and Methods Demonstration). Of these, FHWA has been most utilized though even this program has very scant experience to date. Urban Mass Transportation funds have been used to sponsor several very experimental programs--the most well-known concept in Knoxville, Tennessee is the brokerage concept. The Federal Energy Administration has funded a major van pool marketing experiment through Grey-North Advertising and a nationwide series of van pool workshops aimed at company representatives. FEA money will also be used to fund certain van pool activities which are part of State Energy Conservation plans. It is believed at this writing, however, that these later two sources will phase out with primary responsibility for van pool promotion resting with the FHWA.

FHWA Funds. The Federal-Aid Highway Act of 1976 allows states to use primary and Urban System Highway Trust funds for ride-sharing activities. The activities eligible for funding through this Act have been broadly defined with few specific requirements. According to Stephen Baluch in FHWA, local officials are being encouraged to exercise considerable initiative and creativity in developing projects with the funds which are tailored specifically to local needs. The complete regulations have been published in the June 25, 1976 Federal Register, highlights of which are presented below:

Federal-aid primary system and urban system funds may pay 90 percent of the cost of car pool demonstration projects including van pool projects. The normal federal share for primary and urban projects is 70 percent, and the 90 percent federal share provides a bonus to encourage states to participate in the program.

It is FHWA policy that federal-aid highway funds should not participate in car pool or van pool projects that attract a substantial number of persons who use public transportation. The metropolitan planning organization is designated as an appropriate forum to coordinate the development of ride-sharing projects with public transportation operators.

The maximum federal share for a single demonstration project is $1 million; however, there is no limit on the number of projects within a state.

Projects must have the concurrence of the metropolitan planning organization, clearance by the A-95 agency in accordance with local procedures, and provisions for project evaluation.

Eligible costs for a van pool project include three items:

1) Costs directly attributable to the establishment of van pool programs, such as personnel as well as other costs. These might include, for example, reasonable public information and promotion expenditures, computer matching of applicants, resolving legal and institutional barriers, and establishing operating procedures.

2) The vehicle acquisition costs, with two stipulations:

   a) The vehicle is restricted to a van pool vehicle for use by 8-15 persons;

   b) Vehicle costs must be repaid within 4 years out of van pool programs.

3) The financial losses if a van pool project should discontinued permaturely. For example, should a van pool covered by a loss agreement have to be terminated for lack of riders, and the van sold, the project funds could be used to cover actual financial losses. The regulations indicate that one year would normally be sufficient time to provide this risk insurance.

It is important to understand that these funds are not "new" or additional funds to the state. Rather, they are existing funds which are regularly allocated to states to be used for a wide variety of transportation (mainly highway) projects. Car pooling and van pooling have simply become new eligible activities. As such, these ride-sharing activities face severe competition from other state and local projects in actually getting funded. Funding then, becomes a priority question: Which is more important, road construction for a highway link carrying thousands of passengers daily, or a van pool program? To date, these funds have not been a particularly effective incentive because of that competition. The process for obtaining the funds is similar to that which has been outlined in the report for car pooling. Projects using primary system funds are initiated at the state highway agency, and proposed urban system projects are initiated at the local level--through the MPO. Further information on FHWA funding for vanpools can be obtained from:

Federal Highway Administration
Urban Planning Division (HHP-26)
Washington, D.C. 20596

Urban Mass Transportation Administration. Funding from UMTA for van pool programs is at present, at a very experimental state. To date, only a few demonstrations have been undertaken. All have been third-party type van pool operations. A policy paper by Altshuler (1975) indicates that these are the only type operations UMTA is likely to fund. Even widespread funding of these rests somewhat precariously on the definition of "mass transportation" and how 13(C) (the labor protection clause of the Urban Mass Transportation Act) is interpreted vis-a-vis third-party van pooling.

The Urban Mass Transportation Administration's Service and Methods Demonstration program has funded a few vanpool demonstrations mainly as part of the transportation brokerage demonstrations. These demonstrations are in the evaluation phase. Additional demonstrations of vanpooling are not anticipated in the near future.

Federal Energy Administration. FEA involvement in van pooling has primarily been limited to providing marketing provision of technical assistance. It has sponsored a major van pool marketing experiment in five cities to determine the best marketing techniques and targets for promoting van pooling. They have also sponsored a nation-wide series of workshops on how to set up a van pool program. Written products of those workshops are available from FEA.

The addition to these, however, the FEA through the Energy Policy and Conservation Act has provided one of the most effective impetuses to van pooling by making a car pool/van pool program a required element in State Energy Conservation Plans. The minimum criterion for meeting this element is fairly broadly defined and can include promotion of public transportation as an alternative. These plans have been funded at least in part, through FEA funds for FY 78. At this writing, however, there is some question as to whether FEA will continue funding van pool promotion activities.

10.2 Disincentives to Solo Driving

In some cases, pressure of EPA regulations has provided some disincentives for SOA's, and thus incentives for other high occupant modes.

The Clean Air Act requires the achievement of certain air standards by 1977. In 20 cities, the EPA has fostered transportation control plans which call for reductions in vehicle miles of motor vehicle travel to help achieve these standards.

At least seven of these plans include ride-sharing elements. Boston is an example of one of these cities. Their current plan requires:

1) All employers of more than 50 persons make a "good faith" effort to promote ride-sharing and transit use by their employees;

2) All employers of more than 250 persons provide a car pool matching service to their employees;

3) And all employers of more than 1,000 persons set up a van pool program.

Noncompliance can result in fines of up to $25,000 per day.

In support of this plan, the State of Massachusetts has launched the most extensive ride-sharing program in the country--Mass Pool. Operationally, Mass Pool is a 3-year, $600,000 program directed towards implementing destination or employer based ride-sharing programs. While the Mass Pool program was borne out of EPA regulations--it, like other ride-sharing components of TCP's has been funded out of a variety of other federal funds, including FHWA.

CHAPTER 11: IMPLEMENTING A COMPANY SPONSORED VAN POOL PROGRAM

11.1 Introduction

Most van pool programs have been company-sponsored, organized, and administrated. In this chapter we detail the tasks and recommended procedures for implementing a van pool program by a company. In the Car Pool Manual we have presented the implementation procedures for a region ride-sharing program and we refer the reader to those chapters for information on establishing a "third-party" van pool marketing and/or operating organization. Likewise, much of the material presented here will be applicable to establishing a company car pooling program.

Because of the success employers have had with van pooling, many have written excellent "how-to-do-it" van pool manuals to "spread the good word". In addition, the Urban Mass Transit Institute (Miller and Green, 1976) and the Environmental Protection Agency (Grey-North Advertising, 1976) have prepared guidelines for setting up van pool systems. We have drawn on their suggestions (and in many cases excerpted procedures, tips, and marketing ideas) from all of these manuals. They are collected here to complete this planning guide.

In Exhibit 11-1, we present a flow diagram of the tasks involved in taking van pooling from a concept to a fully implemented program. In Section 11.2, we begin by discussing the initial investigation into van pooling including the questions to be asked, the "selling" of top management, and putting together a team to implement the program once an affirmative policy decision has been made. In Sections 11.3 and 11.4 we discuss two concurrent activities: 1) investigation of the financial and legal aspects of the program, and 2) van pool promotion; and in Section 11.5 we discuss matching. All three are inputs to a final commitment to van pooling. In Section 11.6 we discuss methods of driver selection and in Section 11.7 actual pool formation and route selection are presented. Section 11.8 presents some recommendations on administrating an on going program.

11.2 The Initial Investigation

There are four objectives which must be accomplished in this initial phase: 1) obtaining top management support and commitment; 2) establishing the program goals; 3) determining if there is sufficient employee interest to proceed; and 4) setting up the structure to investigate and implement a van pool program.

Van pool programs begin as an idea, at some level in the company. If the program is to be implemented, however, top management support and commitment will be needed. The "selling" of top decision makers should focus on company problems that van pooling can solve, or the general benefits the company can derive from a van pool program (e.g., public relations, energy conservation, etc.). To the extent that these benefits can be quantified and supported by an indication of employee interest and enthusiasm, the more effective the presentation. Commitment and enthusiastic support by top management is absolutely critical to the success of any van pool program.

In obtaining that support it is important to achieve unanimous agreement on the goals of the program, if it is instituted. The goals could be among the following:

- Alleviation of traffic congestion
- Provision of more parking spaces for employees
- Provision of space for capital expansion
- Compensation for lack of public transportation for employees
- Demonstration to the community of the company's involvement in energy conservation and pollution control
- Preparation for future emergency in which energy sources for employees' transportation again become scarce or overly expensive.

One or two of the above will undoubtedly be a more important rationale for adopting a van pooling program than the others (Grey-North Advertising, 1976).

These goals will help determine policy decisions regarding the extent to which the program should be subsidized and what efforts should be made in providing van pool incentives. For example, if the company stands to save several thousand dollars in parking costs, some subsidy seems justified. There should also be policy level decisions regarding employee work schedules--schedules can be arranged to make van pooling more convenient. It is important that management realizes that spot overtime will tend to undermine the van pool program, and late afternoon meetings will have to end on time.

During this initial phase, enlisting top management support should receive top priority. At the same time, it is useful to test the level of employee interest. Ultimately, they are the users. At this stage, the concern is not to obtain firm commitments, it is rather to "test the waters" and help determine whether the company should pursue investigation of the program. Department heads can informally ask employees whether or not they would be willing to participate. A survey may be conducted using a brief "interest slip" or informal inquiries might be made through employee organizations, unions, and/or social organizations. However, the more formal the contact the greater is the expectation of delivery.

After exploring van pooling with both management and employees and receiving a "go ahead", some kind of organizational structure and time table should be established to formally investigate and implement the program. One person is usually appointed as a van pool administrator. This person should be of middle-management level or higher. In addition, it is important to involve representatives from the following departments in the planning of the program:

- Chief Executive's Office
- Engineering
- Transportation
- Insurance
- Legal
- Office Administration
- Public Relations
- Personnel
- Comptroller's Office

These departments logically have an interest in the operation and success of the van pool program. Further, their experience, support, and help will be needed

at various points in the promotion and implementation of the program. For example:

- Legal Office: van acquisition, insurance, taxation, potential liability.
- Public Relations: in-house promotion, community-relations, incentives, benefits.
- Accounting: keeping track of cash flow from van riders to vendors (van dealer, service stations, etc.) and the driver.
- Personnel: arranging for preferential parking for van poolers. Even if the entire parking lot is close to the plant entrance, an area set aside for the vans is a highly visible expression of management commitment and an effective promotional tool.
- Payroll: for collecting van fares via payroll deduction, if that option is chosen.

Incorporating these interests into the planning process may formally be done by having these representatives form an advisory committee on van pool implementation. This committee may investigate program feasibility and consider various alternative programs. Subcommittees may be formed to address single issues such as: identification of the potential market, legal issues, and financial considerations. Or it may be done informally, simply by keeping each of these interests well informed.

11.3 Investigating the Financial Aspects of the Program

This phase of the program implementation is iterative--becoming more precise as the program takes shape. Three basic elements are involved: 1) making initial cost estimates; 2) determining from these cost estimates and other information a financing mechanism for the program; 3) determining a fare policy.

Initial Estimate of Costs. Chapter 6 presents a detailed analysis of cost estimation from which initial cost estimates for the company can be made. For added information, see Appendix A. Once initial cost estimates are made, the net cost to the company can be estimated by determining how the program will be paid for--that is, which of the cost items will not be passed on to the passenger, and what will be sources of revenue for the program other than the commuter fare? Listed below are several methods for program finance:

- Fares pay all costs
- Fares pay all but administrative costs
- Each van operates on break even basis
- Entire program operates on break even basis
- Partially financed through leasing of van to employees for personal use
- Partially financed through business use of van
- Partially financed through leasing of van to community groups
- Company pays all costs
- Partially funded by casual riders

Before a policy decision is made on a secondary use of the vans, the following argument should be considered. Several van pool directors feel that the success

of their program is partly due to the "pride-of-ownership" that each of the drivers take in their vehicles. If the company regularly and arbitrarily takes the vehicle during the mid-day, that sense of ownership is gone.

Financing Mechanism. The principal question in financing the van pool program is whether to lease or purchase the vans. Some cost savings and tax benefits can be realized if vans can be purchased outright. Few companies, however, can afford to tie up that much capital (even for a moderately-sized program of 8-12 vans) over a four-year period. Barring that option, generally the decision is between purchasing the vans "on credit" or leasing the vehicles. Each course of action has advantages and limitations. In terms of cost, however, the Maryland Department of Transportation (1975) determined that except for the resale value of the vehicle (which recently has ranged between $2,000-3,000 for a four year old vehicle) the dollar costs of the two options are about the same.

The Leasing Option. One advantage of a lease arrangement is the potential flexibility it offers. If the program does not "take", the company does not have its money tied up in vans that cannot be used and will not suffer the loss of reselling them. Many leases, however, are written over a 48-month period with a very stiff penalty imposed for breaking the lease. If the program is extremely successful and there is demand for expansion, the leased fleet can be relatively easily expanded on short notice to meet that demand.

There are a variety of lease arrangements. They may or may not include maintenance, insurance and licenses for the vehicle. The leases may be "open" or "closed". Under an open lease, the company returns the vehicle at the end of the lease period and the lessor has the responsibility of disposing of it. The closed lease requires the lessor to purchase the vehicle for an agreed amount at the end of the lease. Closed lease rates are lower than open leases. Some leasing firms offer a combination where the lessor has the option to buy the vehicle or pay for any damages incurred.

Some examples of ongoing van pool lease arrangements include Montgomery Ward's five-year open-end lease which allows for vehicles to be sold by the company at the end of five years or 60,000 miles and funds used to pay off the remaining lease cost if any exists. Hoffman LaRoche Pharmaceuticals in Nutley, New Jersey, obtained vans through a lease-buy arrangement with the lease agreement extending over 40 months.

Ultimately, a decision to lease will depend on: a) availability of an interested, aggressive lessor; b) company cash position; c) tax options, (e.g., use of investment tax credit); and d) ability to dispose of vehicles at the end of their useful lives.

Vehicle Purchase. The FHWA financing assistance takes away much of the risk and cash flow problems involved in investing in company owned vans. Under this provision, FHWA provides the initial capital for the vans with the provision that the money be repaid in four years. Allowing the full cost savings of a cash purchase, FHWA further will underwrite losses that might be incurred if the program fails. This source of financing should be strongly considered in

the lease/buy decision.

Even if such funds are not used, companies may still opt for the company-owned van to take advantage of savings from use of the vehicle beyond its depreciated life span, the tax benefits, or to realize the savings from a well maintained van's very high resale value.

Purchasing vans with company funds involves an implicit company cost and risk. Financing arrangements have varied both in the amount of down payment and in the interest. The Reston program purchased vans with a 25 percent down payment and a 10 percent loan financed over three years. Commuter clubs at Polisar, Ltd. in Sarnia, Ontario financed their van purchase with a three year, 12 percent loan (on the outstanding balance) from the Polisar Employees Credit Union. With an initial cost of $5,500, accumulated charges on the van amounted to about $1,000.

If the size of the purchase is substantial or if the company regularly purchases vehicles, a fleet package should definitely be investigated. The 3-M Company, for example, obtained its last group of 1975 vans at a fleet price of $6,400. Texas Instruments purchased two 1975 Ford Econoline vans at a fleet price of $7,200. If purchased without a fleet price these vans could cost as much as $8,000.

Fare Structure. There are several mechanisms for determining the amount each passenger will pay for van pool service, ranging from a flat across-the-board fare to fare policies sensitive to individual trip lengths and the number of days the van services are actually used. The fare structure chosen will depend on the risk the firm will accept of taking a loss, who is doing the accounting (and the degree of complexity acceptable), and the extent to which the potential passengers are sensitive to fares.

a) Flat Fares. In a flat fare system, the same rate is charged to all passengers regardless of route length. Erving Paper Mills in Vermont charges $1.00 per day for van service. The average trip length is about 35 miles one-way and the company subsidizes any deficit (the deficit is small since the same set of vans are used for 3 different shifts). Corning Glass Works in New York also charges a flat rate of $1.20, but each van is required to have a minimum route length of 25 miles. The company again subsidizes the deficit.

A flat fare policy will be most successful where trip lengths are somewhat similar (so that very short trips are not grossly overcharged), and where there has been a decision to directly subsidize the program. One method of determining the rate is as follows:

1) Determine annual fixed cost of program
2) Estimate total annual operating costs of the program
3) Total annual cost = (1) + (2)
4) Subtract total amount company is willing to subsidize the program from (3)
5) Estimate total number of passengers annually
6) Determine annual fare by (4)/(5)

b) Route Length Fare Structure. This is by far the most common of all fare structures. It is relatively simple to compute, but has the flexibility to reflect the different costs associated with different route lengths. Fares

for each van are computed separately. After the route has been determined, the annual operating costs are added to the annual fixed costs and divided equally among the passengers. A sample calculation is presented below:

1) Monthly Mileage = Daily Vehicle Round-Trip Mileage x 21 days (average number of working days per month);
2) Fixed Cost per Mile = (Annual Fixed Costs ÷ 12)
3) Operating Cost per Month = $0.10 x (1)
4) Total Monthly Cost = (2) + (3)
5) Cost per Person per Month = (4)/Number of Passengers.

The number of passengers over which the cost is divided depends in part, on the driver incentive policy. Some firms, as an incentive have allowed the driver to keep the last one or two extra fares and computed breakeven costs on an 8 or 9 passenger basis (driver's fare is generally free).

While this type of fare is simple to administrate, two problems should be recognized. Breakeven costs are based generally on everyone paying, whether or not the service is used (a van pool in Utah failed because they were unable to force employees to pay for service during their vacation). The fare structure also tends to discourage a route with widely spaced pick-ups, since the riders near the destination end of the route subsidize the riders who board the van early.

Two variations of this fare policy attempt to deal with these problems. The first calculates costs over 11 months only, giving regular riders one month of free riding (presumably partially used during vacation). The second calculates the costs for each passenger based on individual trip length. An example calculation is presented below:

$$\text{Total Daily Fare} = \text{Fixed Cost per Day} + \text{Operating Cost}$$

$$\text{Fixed Cost} = \frac{\text{Daily Fixed Cost of Vehicle}}{\text{Number of Paying Passengers}}$$

$$\text{Operating Cost} = \text{Cost per Passenger Mile} \times \text{Individual Trip Length}$$

$$\text{Cost per Passenger Mile} = \frac{\text{Total Vehicle Operating Cost per Day}}{\text{Sum of Individual Trip Lengths}}$$

c) Daily Fare Structure. Often passengers require a more flexible schedule than would be provided by the previous fare schedules (e.g., executives). In these cases, the type of fare system worked out by Leon Bush for Aerospace Corporation migh be considered. Under this scheme, approximately one-third of the monthly costs are collected as a monthly subscription fee and the remaining two-thirds cost is covered by a daily fare which is based on a 17-day month (compared to a 21-day month in other fare structures). Fares will breakeven with costs if riders average one absence per week. At Aerospace, when regular passengers are absent, their seats are available to casual riders who pay a rate which is approximately 20 percent higher than regular daily fares. Income from casual riders helps keep fares low for regular passengers and drivers are permitted to keep about 40 percent of these fares. Thus there is incentive for drivers and regular riders to find casual passengers.

It should be remembered that any fare structure that accommodates irreg-

ularity is faced with fluctuating route lengths and thus imprecise estimates of cost.

11.4 Promotion and Planning Pilot Program

Very early in the investigation of a van pool program the initial size of the program must be determined. Four objectives are involved: 1) a decision must be made as to whether there will be a "pilot" or an all out company effort; 2) the target area or areas must be identified; 3) the van pool program must be promoted and interested poolers identified; and 4) the potential poolers must be matched. The activities associated with the first three of these objectives are detailed below. Matching is discussed in the following section.

Pilot Program and Target Area. Before embarking on a company-wide effort, the company may want to begin with a few pilot vans. This strategy has many advantages. It limits the company's initial financial involvement and uses the first van pools to sell others. Most of the successful large programs of today started with a few (3 to 6) demonstration pools. Such a start-up is strongly recommended by many van pool coordinators, who point out that a pilot is easier to administer and allows company "bugs" to be ironed out. Because the concept is new they point out that the actual operation of the vans and the enthusiasm of the first participants will result in "selling" a much larger program than might otherwise have been achieved.

If the pilot approach is chosen, the initial areas can be targeted in a number of ways. The easiest and quickest method is using the output from the SAIM package if it is available at any of the local planning and/or transportation agencies or use of an FHWA density matrix. Using either Census data or data supplied from the company, the SAIM package can give a rough estimate of the total potential for van pooling, based on trip length and densities. More importantly, it can visually locate those areas where van pooling has the greatest potential due to a fairly large number of similar origins.

Barring the availability of SAIM or similar programs, employee records may be consulted and sorted on the basis of community or Zip Code to determine clusters of origins. If such a quick sorting procedure is not possible, it may be desireable to do a company-wide promotion and interest survey to develop a van pool data base, and then select one or two areas for initial implementation. If this latter course is chosen, promotion and survey material should clearly state that the van pool program may not initially be implemented in the respondent's area.

Van Pool Promotion. Before a "sign-up" campaign or survey is initiated, the van pool program must be explained thoroughly and promoted to the employees, either in the prospective target areas or company-wide. The sign-up activity may culminate the promotion.

The first formal, official word that employees hear about the prospective van pool program should have the enthusiastic endorsement of top level manage-

ment. The single point emphasized by virtually every van pool coordinator is that, "Where there is top management support and contact, a van pool program should flourish. When this support and interest is absent or only faintly perceptible, then the typical van pool program will not succeed." (Grey-North Advertising, 1976).

This initial introduction may be over the company P.A. system with the president, vice president or some other officer making an enthusiastic presentation. Alternatively, one of the officers may initiate a memo or letter to all employees describing the program and making it very clear that the upper management approves of, encourages, and supports van pool participation. A sample letter which may also serve as a cover letter for a questionnaire is presented in Exhibit 11-2.

A number of other methods can be used for the promotion effort. Some of them are outlined below. The mix used by an individual company will depend on the size of the firm, nature of activity centers and organizational structure--Grey-North Advertising suggest some of the following:

Posters. Posters encouraging the van pooling idea and having "tear-off pads" or sign-up sheets should be posted in key employee traffic areas, such as the company cafeteria to allow maximum exposure during the initial period of employee sign-up.

Employee Posters/Paycheck Stuffers. A simplified explanation of the van pool idea in the form of a 4-page folder could be used by the company in a separate mailing or reproduced as a paycheck stuffer to further promote the idea among employees.

Company Newspaper Announcements. The company newspaper can be a vital medium in communicating the value of van pooling to the employee. Newspaper ads can be placed in the company newspaper at the inception of the program and through-out to maintain interest.

Loudspeaker Announcements. To further promote the van pool idea, announcments explaining the program could be introduced over the company loudspeaker system.

Demonstration Van. A fully equipped demonstration van may be obtained from a local dealer to display in the company parking lot.

If there are companies in the area who have successful van pool programs, they can probably be called on to help promote the program. Also, many state, local, and regional agencies are promoting car pooling and ride-sharing and they should be contacted for promotional assistance.

The key to developing a van pool promotion is the fact that van pooling is new. "In most cases, the employee cannot immediately perceive the benefits that accrue directly to himself/herself" (Grey-North Advertising, 1976). The promotion should clearly explain how the program will work and spell out the benefits recognizing that the potential passenger will be most motivated by personal benefits, and relatively unmoved by company and societal benefits. Promotional information should stress the individual savings of commuting costs, the convenience of door-to-door service, the relaxed ride, and the

opportunity to read and socialize. In presenting these cost savings, it should be recognized that most commuters consider only the gasoline savings when making an economic decision to switch, not the full variable costs of tires and maintenance.

Company incentives to the program should also be outlined. For example, Chrysler gave a $100 reward to the winner of a van pool logo contest. 3-M offered a free demonstration ride period. CONOCO also offers introductory "free rides" of 1-4 weeks. It has also arranged with the highway department for special lanes and reduced tolls for vans.

The Van Pool Interest Survey. Once the van pool program has been explained to the employees, efforts should be directed toward collecting the names of individuals (either company-wide or in the pilot area) who are interested in participating in the program.

Before conducting the sign-up or survey, careful consideration should be given to the kind of matching technique to be used because these surveys should serve as input into that method. If, for example, a commuter matching system is to be used, the survey form may provide some mechanism for the respondent to supply the x, y coordinate of his origin, perhaps by large grid maps placed at central locations. Many directors, however, suggest that this geo-coding should be done by the program administration to avoid mistakes.

If the matching is to be done by hand the respondent could be asked to indicate either his address, or the closest major intersection to his home (within walking distance) and his community or Zip Code or some category by which an initial sort may be made.

The following data may be considered for inclusion on the survey form:

1) Name, Address, Phone (home)
2) Beginning and ending work times
3) Whether or not the participant customarily puts in overtime
4) How often the participant needs his car at work
5) The department and/or building he/she works in
6) Whether the employee would like to participate as a driver, passenger, back-up driver or casual passenger.

The survey can be distributed either to employees residing in the pilot area or to the entire company. If specific employees are targeted, a paycheck enclosure or the mail would be an appropriate distribution method. If the entire company is to be surveyed, tear-off sign up sheets may be posted in addition to the mail or inter-office memo. It should be clearly stated that the information (including residential location) will be kept confidential until the point of an actual organizing meeting.

11.5 Matching

Matching can be carried out either manually or by computer. The Federal Highway Administration has recommended that if the anticipated number of matches is less than 300, a manual method will be easier and less expensive (Miller and

Green, 1976). Some car pool/van pool coordinators have also observed a reluctance to respond to matching-type surveys if employees believe the information (about themselves) will be sorted on computer tape.

Computer Matching. If a decision is made to use computer matching, a determination must be made on how to get the home location into machine readable form (generally x, y co-ordinates). If the company has a computerized employee data base, the computer can generate a punched data card for distribution to all employees, along with an explanation of the van pooling program. The employees will have access to a specially prepared map of the metropolitan area marked with x, y grid lines, and each employee who wishes to apply as a passenger or driver/coordinator will be asked to fill in the data required on the card, including the grid co-ordinates designating his place of residence, and return it to the Van Pool Administrator. Exhibit 11-3 presents an example of such a computer card. The completed data cards will be processed by the computer to generate three lists of names:

1) A company-wide list of all interested participants sorted in straight alphabetical sequence.
2) A list of all participants by starting time, grid area number, and alphabetical name sequence.
3) Lists of persons printed in groups of 10 to a set, who live within grid areas designated on the map.

While this procedure is easy, reasonably inexpensive, and fast, there are some problems associated with it. First, it places the burden of geo-coding on the employees who (experience has shown) frequently make mistakes. Some companies now simply ask the employee to identify the nearest major intersection and then the ride-sharing staff assigns x, y co-ordinates.

A second area of difficulty is the set of problems associated with the grid system of matching. Car pooling and van pooling is a route deviation type mode whose service area expands with distance and is somewhat affected by the transportation system. Simply put, the service area of any ride sharing vehicle looks like Figure A in Exhibit 11-4, not Figure B.

To simply draw lists from all those located in a particular grid ignores the natural clustering of pools illustrated in C and D of Exhibit 11-4. That is, pick-ups can be made all along the route to work which passes through several corridors or, residences may form natural clusters astride grid boundaries. Finally, such grid techniques do not recogninze the expansion of the potential match area with trip length.

There are a number of computer matching packages, the most widely used being the FHWA program. Some of them (including the FHWA second generation program), do make some attempt to correct for the above problems. If any of the programs exist (i.e., have been installed by local planning agencies, DOT or transportation authorities), by all means investigate using it. However, try to determine how many meaningless matches it is likely to give. The chapter evaluating car pool matching programs should prove helpful in making some initial evaluations of the available program (See Car Pool Manual).

Manual Matching. The primary advantage of the manual technique is that it

allows human interaction in the matching process. By visually inspecting a map, a coordinator can group people based on actual knowledge of travel conditions and "most likely route".

Though several individual matching methods have been devised, most are variations of a map matching technique where coded pins are used to locate prospective passengers and drivers. Based on this visual presentation, pool lists are formed. Sorting of work times can be done before or after the mapping process. Some methods do not actually map the origins, rather the matching is a process of sorting by Zip Code and/or community and then grouping employees somewhat intuitively. Such methods are not recommended for large numbers of respondents.

One particular method, developed by Chrysler, is of particular interest since it incorporates the "pie-shaped" approach to pooling and implicitly considers the transportation system. The Chrysler system uses employee survey forms and a map of the metropolitan area marked with lines similar to the spokes of a wheel, which represent the major commuting corridors, with the plant at the hub of the wheel. These segments are marked into areas of approximately ten square miles and assigned a number. A special filing system coded to these numbers serves as the matching mechanism (for further detail see Chrysler #2, 1975).

11.6 Driver Selection

After pooling areas have been identified, all employees in those areas who have indicated an interest in becoming drivers/coordinators should be screened. The selection of good, responsible, enthusiastic van pool drivers is extremely important to the success of the program, after the program is implemented, since the driver becomes the pivotal force in terms of maintaining the enthusiasm of the van riders and the efficiency of the operation. In most cases, drivers not only operate the vans, but provide most of the management of the service as well.

Driver Responsibilities. The drivers' responsibilities include:

- Organizing the van pool from the list of prospective participants or from other employees he can interest.
- Keeping the level of van occupancy at or above the break even load (9-10).
- Driving the van to and from the place of work, maintaining daily, reliable, on-time passenger service.
- Arranging for proper service, maintenance and cleaning of the van as needed.
- Providing adequate overnight parking of the van that will insure its safety and its reliability in the event of severe weather.
- Collect and dispense fares to the appropriate department of their company (unless the company chooses to have the riders pay their fares directly to the company).
- Keep a record of the van pool's operations, such as mileage for

commuting, business and personal use and number of passengers each week.
- Help select and train a back-up driver.

It is very important that these, and any other responsibilities the company wants the driver to assume be clearly spelled out. Most firms have their drivers sign an agreement that outlines both the duties of the driver and the commitments of the company. A sample agreement developed by the Mass Pool program is presented in Exhibit 11-5.

In outlining the responsibilities of the van pool coordinator/driver, it is important to remember that it should not interfere with this employee's basic functions. The paperwork burdens on the individual should be kept to a minimum.

Driver Incentives. In return for the services performed, most programs provide some or all of the following benefits to the driver.

- A free ride to and from work.
- Monetary incentive of allowing him to keep the fares of the extra passengers, which can potentially total about $100 per month (if the van is running at full capacity).
- Personal use of the van after working hours, on a mileage cost basis, generally $0.07 or $0.08 per mile.
- Option for buying the van, when it is retired from the fleet.

Driver Selection Criteria. The potential drivers are generally asked to submit an application which provides information on their driving record, attendance and mechanical aptitude. Recommendations may be obtained from supervisors concerning the employee's dependability, ability to get along with others and to assume responsibility.

Two or three different qualities are being sought for in a successful driver. First, the driver must be a safe driver (with a record to back it up). He must be dependable (come to work on time and keep a schedule, etc. No creative, but erratic geniuses!) and very important, he must be a "hustler"--be able to find and keep passengers. In looking for these qualities (especially the latter), it is important for the interviewer to understand personal motivations. As one manual put it, "a person who wants to drive a van only for the personal use or extra income without showing a genuine interest in the success of the operation may not be the best choice for a driver" (Miller and Green #2, 1976).

A number of formal sets of criteria have been established for driver selection. A composite is presented below:

- The candidate's geographical location in relation to possible passengers.
- His driving record (obtained from the State Department of Motor Vehicles).
- Recommendation of his supervisor (to determine whether the position of Pool Coordinator will interfere with his work and whether he can handle the responsibility).

- Facilities for keeping the van at his home (electrical outlet for the engine block heater is required by General Mills in Minnesota): a garage is preferred.
- A good work attendance record is essential. It is necessary, therefore, to select an individual whose job does not involve a great deal of travel.

11.7 Pool Formation - Route Selection

Forming the Pool. Once the driver for each van pool area has been selected, he should be given the list of employees who have indicated that they would be interested in van pooling in the driver's pool area. The driver should get in touch with each to get a final commitment from those willing to join the pool. One suggestion (Mass Pool, 1976) is to hold a van pool coffee-break where the potential passengers have a chance to meet one another, discuss their compatibility, route and schedules before a final commitment.

Route Selection. Once a pool has been formed, a route needs to be mapped out that minimizes time and cost to the passenger. Two rules-of-thumb need to be borne in mind. The first is that the difference between the total route distance and the distance from the first pick-up should be between one-fourth and one-third the direct distance of the first passenger. The second is the utility measure developed by 3-M. It is suggested that the ratio

$$\frac{\text{Pick-up Time (min)}}{\text{Line Haul Time (min)}}$$

should not exceed 1.

Routes that do not meet this criteria can be brought into line by asking some of the passengers who require rather long deviations (in time or distance) to meet the van at designated points.

Once a good route has been selected, the driver (along with the program coordinator) should drive the route to determine the exact mileage and pick-up times. This mileage then becomes the basis for the passenger fares.

When the van is in actual operation, the driver may find it helpful to assign a particular seating arrangement which facilitates loading and unloading.

Van Pool Information Meeting. One or two weeks before the vans are actually scheduled to arrive, the van pool should be called together where the fare schedule, route, pick-up times, and "rules" can be presented and discussed.

During this meeting, the responsibilities of the driver, passenger and company should be clearly spelled out. Particularly important is an explanation regarding the method of collecting passenger fares. The fare should be given and the method of computation presented. The passengers should also understand that they are paying for their space in the van in advance, in essence a reserved seat (unless otherwise determined by the company).

The necessity of promptness should be stressed, and at this time a "wait" time should be agreed on--generally two to three minutes. If the passenger has not boarded the van by this time, the driver goes on to the next stop. It would also be helpful to establish a communications system to alert a driver to skip a passenger (e.g., when he/she is sick). That passenger might call the passenger just preceeding him to alert the driver. Other "rules of riding" might be agreed upon at this time regarding smoking, policies on the radio, heat, etc., and arrival time (it may be wise to plan on arriving 5 to 10 minutes early to allow for unforeseen circumstances).

The van pool route should be described, and suggestions encouraged since the passengers may know driving conditions and possible alternate routes not immediately obvious to the driver.

Some companies during this meeting finalize the passenger commitment by asking participants to sign a memorandum of agreement after the above presentation has been made. However, such an agreement should be carefully tailored to the individual companies' needs by the firm's legal staff.

11.8 Ongoing Administration

Once a van pool program is installed there are only three activities which require regular staff attention: 1) program accounting; 2) vehicle maintenance; and 3) keeping the vans full. A large portion of these activities may be borne by the driver if the company chooses. In that case the financial and programatic success of van pooling will depend heavily on the drivers. Incentives will have to be sufficient to motivate him/her to bear that kind of responsibility. Below we describe some alternatives for handling each of these activities.

Accounting. An efficient system for handling fare collection and cost reimbursments will have to be established. Nearly all coordinators recommend some form of monthly pre-payment. It can be collected by means of a payroll deduction which is handled automatically in the company's payroll process, or fares may be collected by the driver with the driver receiving a monthly bill for the fixed and operating costs of the van.

Cost reimbursement procedures will depend on the maintenance plan of the company. In some companies, the driver is completely responsible for maintaining the pool vehicle. He keeps very detailed records of the maintenance work, as well as the mileage which is a sensitive barometer of the vans' condition (see Exhibit 11-6). Maintenance expenses are either billed to the company or deducted by the driver from his fare collections. Records should be monitored by a van pool coordinator. Alternatively, many companies which have leased vehicles have also purchased a maintenance package which makes the vehicle dealer responsible for regular maintenance. The cost of the service is part of the lease cost which is billed to the firm on a monthly basis. Incidental costs which are best handled by the driver are then reimbursed to the driver from the dealer via the company. Commuter-Computer in Los Angeles, issues its drivers credit cards which may be used for some main-

tenance and are automatically billed to the lessor.

Costs associated with personal use of the van can be determined from mileage records and billed to the drivers.

Maintenance. One of the "selling" points of van pooling is reliability. Reliability depends on a systematic maintenance program. If the company already maintains a fleet of business vehicles the vans can be included in the existing fleet management plan--with regular maintenance done during the day at the plant site. Some leasing firms also offer regular on-site maintenance visits. If a vehicle is in serious need of repair a back-up van is brought in during the day and substituted with little inconvenience to the passengers or driver. Alternatively, the driver may handle all maintenance. If this course is chosen--a policy will have to be established on time-off for getting the van to and from the garage. Maintenance standards will have to be clearly stated and if the program is large, back-up vans will probably have to be purchased. 3-M and Knoxville records indicate that a ratio of about 1 back-up to 20-25 vehicles is appropriate.

Pool Maintenance. Pools, once formed are extremely stable. There are occasional drop-outs, however, and replacing them is a responsibility most easily assumed by the driver--since he or she generally has an economic incentive to maintain a full van. Matching records should be maintained. New employees may be given an opportunity to become part of a van pool by filling out a match form when he or she begins work. As sufficient numbers of people in an area express an interest in van pooling, new pools may be formed.

Exhibit II-1

Steps Involved in Implementing Company Sponsored Van Pool Programs

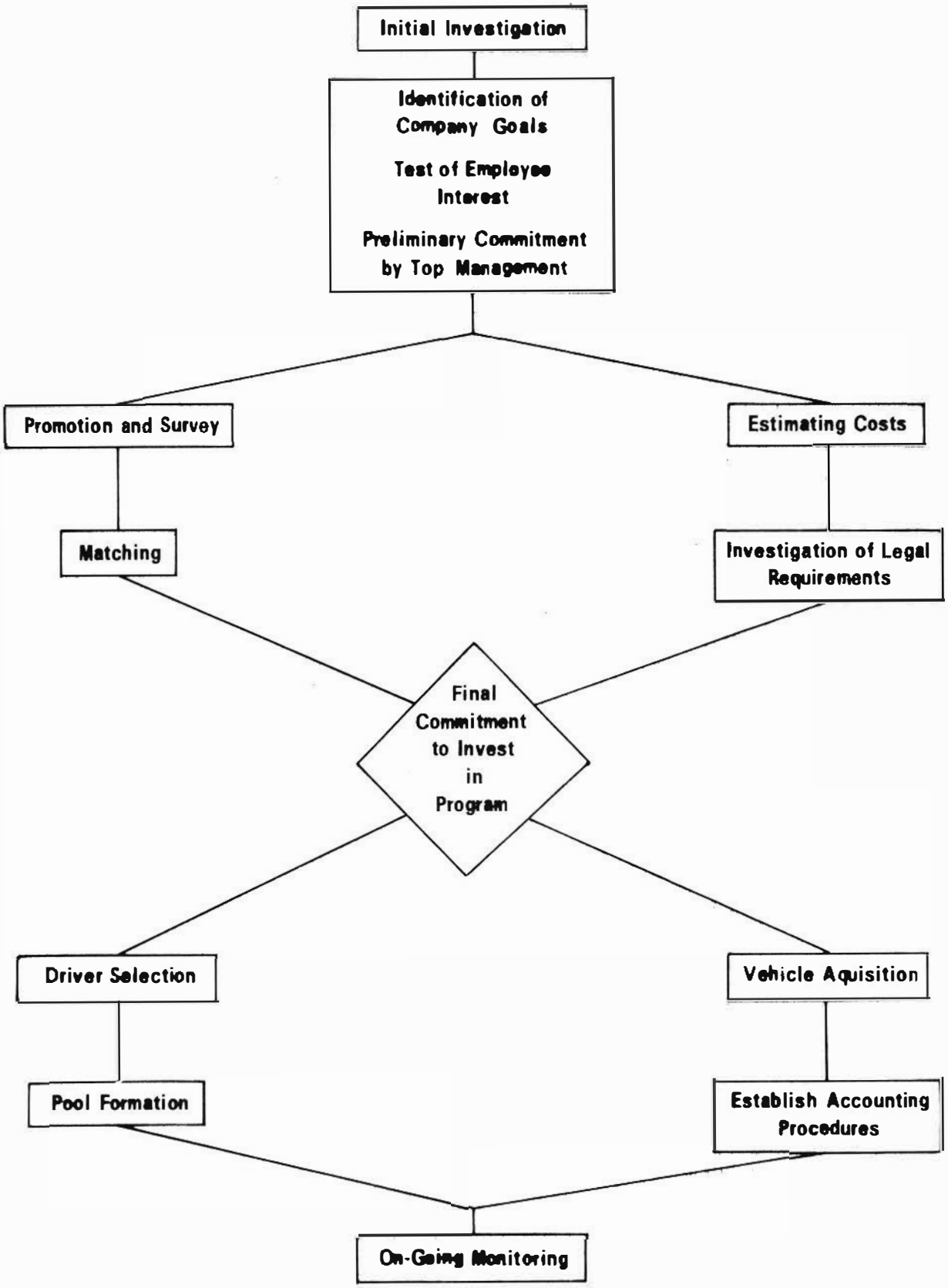


Exhibit II-2

Sample Memo Announcing Van Pool Program

Memorandum

Date: *(Issue date of memo)*

To: All Employees

From: *(President of the Company, Name and Title)*

Subject: Introduction to Commuter Vanpooling Program

In an effort to lower commuting costs for our employees, to reduce highway congestion and to conserve fuel, (*company name*) is offering a commuter vanpooling program in areas where there is sufficient interest. (*Company name*) plans to (*purchase or lease*) twelve-passenger deluxe vans and make them available to our employees who will pay monthly fares calculated to cover the cost of the vans and their operations.

If you are interested in participating either as a van rider or driver, we've enclosed a Vanpool Interest Survey for you to complete and return to the Vanpooling Administrator (*administrator's name*). Some of the advantages of riding in a van include lower cost and wear and tear on your own automobile, and a more pleasant commuting trip with time to socialize, read or just relax.

Exact vanpool fares have not been set. They will depend on the costs of the vans and the distance you travel, but you can figure on the following approximate monthly costs:

Your one-way mileage to work	Approximate Monthly Fare
10	$28.00
20	$31.00
30	$35.00
40	$39.00
50	$43.00

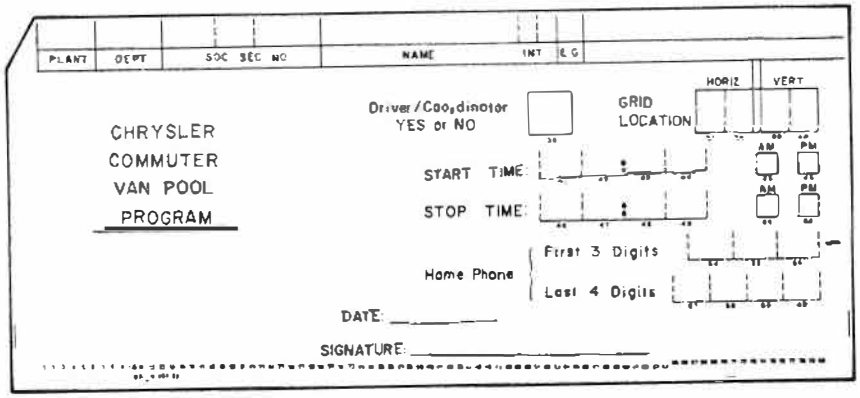
If you are interested in becoming a vanpool driver there are many advantages available as well as some new responsibilities. Van drivers will have a free commute to work, personal use of the van at minimal cost and the possibility of bonus fares for keeping the van full. Indicate your interest in driving on the enclosed questionnaire and you will be considered for selection if you come from an area where others are interested in vanpooling, if you have a good driving record, a good attendance record, and can accept the responsibilities of organizing and running a vanpool.

We expect to begin the vanpool program in (*month and year*) and hope to receive an enthusiastic response to this questionnaire. Please turn in your questionnaire to (*name of administrator and location*) by (*date*). You can reach (*him/her*) at (*phone number*) if you have any questions.

[illegible] Van Pool, 197[illegible].

Exhibit II-3

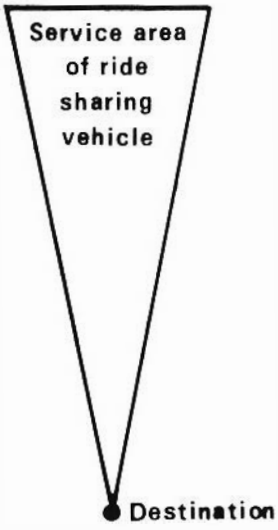
Computerized Matching Program
Employee Interest Response Card



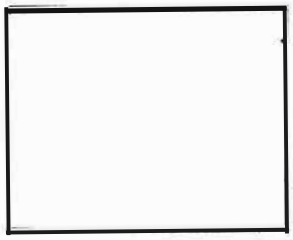
Source: Chrysler Corporation [illegible] (1975).

Exhibit II-4

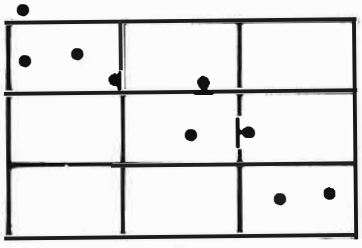
Some Problems with Grid Matching



A. Service area of a ride sharing vehicle

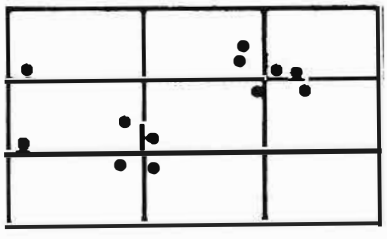


B. Common matching area for ride sharing



C.

Destination



D.

Destination

Sample Form

Exhibit 11-5

Vanpool Driver/Coordinator Cooperative Agreement

This Agreement between the Driver/Coordinator whose signature appears below and (*Company Name*), hereinafter called the "Company", shall become effective on the date it is accepted by the Company, as evidenced by the signature of its authorized representative in the space provided below for this purpose.

For the purpose of forming and operating a vanpool with a minimum of nine (9) passengers, the Company agrees to furnish the use of a 12-passenger van, to assist in forming and maintaining the vanpool and to render such other reasonable assistance as may be required for the functioning of the vanpool. The Driver/Coordinator will be the primary driver of the van during the term of this Agreement.

The Driver/Coordinator agrees to be responsible for the following in connection with the operation of the van assigned to him or her:

1. Obtain and maintain a valid State driver's license for operating the van.
2. Drive the van to and from his/her Company location and pick up and deliver the other Company employees who pay to ride with him/her.
3. Keep the passenger pool for the van at or above the minimum of nine (9) paying passengers, but not to exceed a maximum of eleven such passengers.
4. Operate the van on a punctual schedule and according to a route approved by the Company.
5. Arrange for service and maintenance in accordance with the schedule prescribed in the vehicle's maintenance manual. Obtain fuel for the van and clean the vehicle inside and out as needed.
6. Train sufficient Backup drivers to assure daily operation of the van and reimburse the Backup driver for the usual driver benefits for the days the Backup driver operates the vanpool.
7. Supply a secure place for "at home" parking of the van, preferably in a locked garage.
8. Arrange alternative transportation for passengers to and from the Company in the event the van is not operable due to mechanical failures or other similar emergencies.
9. Keep a record, satisfactory to the Company, of the operation, expense and income of the van.
10. Maintain a list of all passengers and either bill and collect from passengers by the first day of each month the approved fares and deposit the monies as specified by the Company, or submit a signed list for monthly payroll deductions as specified by the Company.

Sample Form

Cooperative Agreement (continued)

This Agreement may be terminated by either party on thirty (30) days written notice delivered to the other party in person, by telegram or by mail. In addition, it will terminate automatically on (a) termination of the Driver/Coordinator's employment with the Company, (b) loss by the Driver/Coordinator of the required State driver's license or (c) breach by the Driver/Coordinator of the terms of this Agreement.

Driver/Coordinator

_____

Date _____

Accepted:
(*Company Name*)

By _____

Date _____

Agreement to Serve as Backup Driver

I have received a copy of the above Vanpool Driver/Coordinator Cooperative Agreement, have read it and agree to be bound by its terms in serving as Backup driver to the above Driver/Coordinator. I understand that breach of such terms will result in automatic termination of my right to serve as Backup driver.

	Signature	Commencement Date	Termination Date
1			
2			
3			
4			

Source: Mass Pool, 1976.

Sample Form

Cooperative Agreement (continued)

The Company agrees to reimburse the Driver/Coordinator for his or her out-of-pocket expenses in the operation of the van to and from work along the prescribed route. The Company also agrees that the Driver/Coordinator may ride free to and from work daily and retain any funds received from passengers in excess of the required minimum of nine (9) passengers and that he or she may use the vehicle during off hours at a rental rate of _____ cents per mile to be based on the actual costs incurred by the Company including, but not necessarily limited to gas, oil and maintenance. The Company also agrees that the Driver/Coordinator may make the vehicle available for use by the Backup driver, as an incentive to the Backup driver, at the above rate and under the same terms as applicable to the Driver/Coordinator as set forth herein. The Backup driver must maintain required State driver's license for driving the van. The Company reserves the sole right to decide if the off-hour use of the vehicle is proper and does not become excessive as to type of use of mileage.

It is agreed that the following regulations apply to the operation of the van:

1 Operation of the unit is permitted only by the Driver/Coordinator and Backup drivers and by the spouse of either of them, if properly licensed. Only under emergency conditions will any other person be permitted to operate the vehicle. In this connection, in the absence of both the Driver/Coordinator and the Backup driver, any Company employee that is a member of the vanpool may operate the van for pickup and delivery of passengers to and from work if he or she is authorized to do so by the Driver/Coordinator and is properly licensed.

2 The vehicle is to carry no passengers to and from the Company facilities, other than Company employees.

3 In the case of personal use, the carrying of passengers other than Company employees and members of the immediate household of either the Driver/Coordinator or the Backup driver is not allowed without prior written permission of the Company.

4 The vehicle is not to be used for a trip beyond a one-hundred (100) mile radius of the Driver/Coordinator's home without specific advance written approval from the Company.

5 The vehicle is not to be used to carry passengers or freight for hire, for ride sharing or any other purpose involving pay for transportation, other than the specific purpose of the Company vanpool program.

6 Repair work will be done only by those persons approved by the Company. All repair work, except in emergency situations, must have prior approval of the Company.

7 Accessories, including appearance items, or additional equipment will not be added or removed without prior approval of the Company.

8 Use of the vehicle to pull trailers is not allowed. No trailer hitches, temporary or permanent, are to be attached to the unit.

9 The vehicle is not to be used for any purpose requiring the removal of any seats.

(continued)

10 The vehicle is to be driven only on hard surfaced public streets and highways and other normal access roads and driveways, and is not to be driven off normal roads, on beaches or in fields, on frozen lakes and rivers, or in any other manner that would expose the vehicle to unsafe conditions.

11 The vehicle is not to be driven over bridges posted to allow vehicles weighing _____ tons or less.

12 The Driver/Coordinator is responsible for promptly reporting any accident involving bodily injury or property damage. Such reporting is to be in accordance with the procedures outlined in the Company's Auto Accident Information Kit, which is to be in the glove compartment of the unit at all times.

a Such reporting is also to include injury to a passenger in the van even though no other party is involved. (This would include such cases as a person falling inside the vehicle or injuring himself or herself while entering or alighting from the vehicle.)

b The Driver/Coordinator will be responsible for completing and filing all appropriate motor vehicle accident reports as well as the Company automobile accident reports.

c In the case of any and each accident during personal use of the van in which damage to the van is sustained, the Driver/Coordinator or Backup driver must pay the Company up to a maximum of (the Company collision deductible, if any) for repairs to cover the deductible amount under the van insurance.

13 Safe courteous driving habits, consistent with complete observance of all traffic regulations is of the utmost importance. Any citation resulting from a moving traffic violation while driving the van is the responsibility of the Driver/Coordinator and/or Backup driver. The Driver/Coordinator and/or Backup driver agrees to report to the Company any citation resulting from a moving traffic violation, whether committed while driving the van or any other vehicle.

14 The Company, at its sole option, may dissolve any vanpool which is unable to maintain the minimum number of nine paying passengers and/or which is operating uneconomically.

15 The fares charged passengers will be periodically reviewed by the Company and increased or decreased consistent with the cost of operation.

16 The Driver/Coordinator is responsible for reporting the extra income received from any passengers over the minimum of nine on his or her State and Federal Income Tax returns.

Sample Form

Exhibit II-6

Vanpool Daily Log

Month Year Vanpool Number

Beginning odometer reading Driver coordinator

Date	Odometer reading	Total miles	Commute miles	Driver personal miles	Backup personal miles	Business miles	Person and department using van for business or backup driver name

Vanpool Expense Report

Driver/Coordinator Vanpool number Daily commute miles

Work phone Monthly expenses from to

Beginning mileage	Ending mileage	Total miles	Commute miles	Driver/Coord. personal miles	Backup personal miles	Business miles

Vehicle operating expenses (itemize and attach receipts)	Gas-- gallons	Oil-- quarts	Amount paid and due driver	Or amount billed company
1.				
2				
3				
4				
5				
6				
7				
Total fuel, oil and operating expenses				
Less personal use of miles @ $.085/mile				
Less Backup driver miles @ $.085/mile				
Less business miles @ $.15/mile				
Plus bonus revenue due Driver/Coordinator				
Amount due Company (attach check)				
OR amount due Driver/Coordinator				

Driver/Coordinator signature Vanpool Program Administrator approval

Date submitted Date approved

Source: Mass Pool (1976)

Van Pooling

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Appendix A

Van Pool Costs

Despite the fact that van pooling is a relatively new mode, there are many reports on the costs involved. We have based our costs on a synthesis of these previous studies.

There are two types of van pools: single employer, and multi-employer. The costs vary for the two types because of differences in insurance rates and administrative costs.

The costs presented in this Appendix are not the total costs of the mode, but rather the costs that are typically used to determine fares. The difference is that the total promotional and program maintenance costs are not included in the fare for any van pool program in the country. For further explanation see administration costs in this Appendix, and program costs in the Van Pool Chapter 6.

Labor (Driver). Van pools typically are run by large companies and the driver is usually a commuting employee who gets a free fare and personal use of the van at a nominal cost in turn for driving. He may also get the fares of the ninth and tenth passengers. However, as this does not affect the costs that are used to determine fares, we will use a zero labor cost.

Fuel. Van pool programs are reporting mileage of around 10 m.p.g. (Pratsch, 1975 and 1976) At $0.60/gal (1975 gasoline price) that amounts to $0.06/VM.

Maintenance Costs

The CONOCO Van Program has developed a maintenance program with associate costs for their vans which is shown in Exhibit A-1 (CONOCO, 1976). Some of the maintenance costs occur with a given mileage and some occur after a fixed time. The variable costs are $.012 per mile traveled and the yearly fixed cost are $95.00. The costs per mile for different daily round trip lengths are shown in Exhibit A-4.

Insurance. It is difficult to come up with an average insurance cost, as insurance companies are just beginning to deal with a van pool vehicle as different from a privately-owned and operated automobile. We are using $600 for single-employer insurance cost based on known van pool policies. Policy costs vary from $10/year at Montgomery Ward (additional amount to their existing general liability insurance) to $900/year (the current premium at Ward). Exhibit A-2 presents other reported single-employer insurance costs. For multiple-employer, we are using $1010 based on Exhibit A-3 which is taken from Shared Rider Services (Shallbetter and Herzberg, 1975 Public Service Options, July 29, 1975). See the Van Pool insurance Chapter 8 for more information about insurance costs.

Adminsitration. Administrative costs include staff time, materials, promotion, start-up, monitoring and accounting for the program. In most single-employer van pool programs, all administrative costs are absorbed by the employer. Even in multi-employer programs, a large amount of the administrative cost is paid through federal subsidy and is not carefully accounted for. The Van Pool program cost section (Chapter 6, Section 3) delineates the various costs that are lumped into administration costs. For single-employer programs, the annual costs can be summarized as $900 overhead cost per program plus $200 per van. For multi-employer, the annual costs are $41,700 per program and $618 per van. However, these costs are not included in fares in any existing programs. Therefore, we have calculated total mode costs as they are currently done, that is, with no administrative costs for single-employer pools and with only a portion of administrative costs for multi-employer. The figure we used for multi-employer is $30 per month or $360 per year per van based on the amount that Commuter-Computer charges for their administration time.

Taxes, Fees and Licensing. Requirements for licensing and registration vary from state to state. Weare using $70 per year as a rough average of reported fees.

Capital Cost. The following capital costs assume that the vans are bought rather than leased. To compute the capital cost per year we have used the same forumla and procedure described in Car Pool Appendix C. described. For the real price growth, we are assuming that vans will follow a similar pattern as automobiles which have been decreasing in real price at -3% annually for the last 8 years (see Section 1.1). Over the short-run, van prices have risen sharply in the last three or four years due to increased popularity. However, conversations with dealers indicate that supply will catch up with demand within a year or two and their prices will change at about the same rate as automobiles. This may have already happened due to concern over gas prices. Because a decrease in price of the magnitude of 3% per year would produce unrealistically low prices over the long-run, we have used zero change for our calculations. The average 1975 price of a van was $6,000 based on several companies with van pool programs. We used $7000 to include taxes, dealer's preparation and other initial costs.

The lifetime of the vehicle is considered to be four years by most companies (CONOCO, 1976). Most fleet leasing companies figure the salvage value to be 20% of the original value after four years, although vans have been sold at much higher prices due to their recent popularity. Again, however, supply will catch up with demand so we will use the 20% figure or $1400. Using these figures and the capital cost formula, we arrive at an annual capital cost of $1588.

Exhibit A-4 shows the costs per vehicle mile and the total costs for round trips of various lengths.

Exhibit A-1

Conoco Van Maintenance Program

Lubrication, oil change & filter @ 4,000 Miles	$15.00
Wash at $2,00 each for 26 annually	52.00
Transmission fluid change @ 35,000 miles	20.00
Rear end fluid change @ 50,000 miles	20.00
Tune up @ 10,000 miles	39.95
Cooling system flush @ 1 per year	12.95
Wheel alignment and balance @ 1 per year	29.95
Miscellaneous and unforeseen per 10,000 miles	30.00

Source: Van Pooling (Conoco, 1976)

Exhibit A-2

Costs of Single Employee
Van Pool Insurance
($/van)

3-M (Self-Insured)	$480.00
Aeorspace	674.00
CALTRANS	267.00
Scott Paper	480.00
Poloroid	450.00
New England Mutual	527.00

Exhibit A-3

Costs of Multiple Employer
Van Pool Insurance

Basic Liability	$550.00
$500,000 Bodily Injury and Property Damage	
PIP - $20,000/$10,000	
$100 Deductible Comprehensive/Collision	$165.00
Umbrella	$295.00
(Excess Coverage of $5,000,000 above Primary Limits)	
	$1,010.00

Range $400-$700 per van per Year

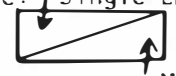
Source: Shallbetter and Herzberg, 1975.

Exhibit A-4

Van Pool Costs vs. Round Trip Length
($/Mile)

Journey-to-work Round Trip Length	Total Annual Mileage	Fuel	Maintenance	Insurance	Administrative Costs	Fees & Licenses	Capital $1548	Cost Per Vehicle Mile	Total Cost/Year $/Yr
10	2520	.060	.049	.238 / .401	.143	.028	.614	.989 / 1.295	2492 / 3263
20	5040	.060	.030	.119 / .200	.071	.014	.307	.530 / .682	2671 / 3441
30	7560	.060	.023	.079 / .134	.048	.009	.205	.376 / .479	2846 / 3616
40	10,080	.060	.020	.060 / .100	.036	.007	.154	.301 / .377	3025 / 3795
50	12,600	.060	.018	.048 / .080	.028	.006	.123	.255 / .315	3201 / 3971
60	15,120	.060	.018	.040 / .067	.024	.005	.102	.225 / .276	3397 / 4167
70	17,640	.060	.016	.034 / .057	.020	.004	.088	.202 / .245	3558 / 4328
80	20,160	.060	.016	.030 / .050	.018	.003	.077	.186 / .224	3745 / 4508
100	25,200	.060	.015	.024 / .040	.014	.003	.061	.163 / .193	4103 / 4866

Note: Single Employer Cost



Multiple Employer Cost

Appendix B

SOME TAX CONSIDERATIONS FOR VAN POOLING

Several investigators, including ourselves have concluded that private companies will probably not spontaneously initiate van pool programs unless it is a solution to an accute company transportation problem or unless the company would substantially benefit from the public relations aspects of the program. We have further noted in Chapter 6 that company-sponsored vans are less expensive than third-party van pools to install and maintain.

Below, we present a simple tax accounting example based on existing laws which shows an existing tax benefit if interest costs are ignored as they often are in current programs, but a loss if they are not. We take as an example, a large company which has invested in ten vans for a pilot van pooling program. In our preliminary discussion, we will assume a tax free, interest free world. Later, we will incorporate both these factors into our analysis.*

Let us assume the full cost of each of these vans to be $10,000 ($8,000 purchase, taxes delivery and preparation, $2,000 for a conversion package) so that the full capital investment for the program is $100,000. We further assume annual insurance rates of $600 per van, and $100 per year per van for licenses, etc. Operating expenses are $10 per mile. The vans average 11,000 mi./yr. for an annual variable expense of $1,100 per van. Total annual operating expense (including insurance and taxes) for all vans would be $18,000 (see Exhibit B-1). Fares will be calculated to recover both the operating expense and the initial investment of $10,000 per van. In our illustration, we will also assume that the vans may be disposed of at the end of four years for a salvage value of $1,500 per van. Exhibit B-2 summarizes the calculation of a van fare which would recover the direct costs of the vans over four years excluding tax considerations and the time costs of money.

If we assume that van fares will be established which will recover the investment costs of the vans and the operating expenses, the operation will be self-supporting over the life of the program. Our cash flows will, however, not be matched.

	Revenue	Cash Outlays	Net Cash Flow
Year 0		($100,000)	($100,000)
Year 1	$39,250	(18,000)	(11,250)
Year 2	39,250	(18,000)	(11,250)
Year 3	39,250	(18,000)	(11,250)
Year 4	39,250	(18,000)	
		15,000	36,250
Total, 4 years	$157,000	$157,000	- - -

* This discussion is for illustrative purposes only. The Internal Revenue Service or your tax advisor should be consulted for specific cases.

Our discussion to this point has ignored the effects of taxes, interest expenses, and the ongoing administrative costs associated with operating the programs. We will consider the effects of the first two below.

Tax considerations have a substantial impact on the computations of the economics of van pooling. The two major tax considerations are the effects of accelerated depreciation methods on after tax income, and the investment tax credit.

In Exhibit B-2 we provided an annual depreciation charge of one-fourth of the initial purchase cost of the van less the salvage value. In this computation the straight-line method of depreciation was used. This method assumes that the value of the equipment will be expensed equally over its four-year life. In reality, however, greater depreciation occurs in the initial years than in the later years. Tax laws and regulations recognize this fact and provide specific methods for accelerated depreciation. It is to the taxpayer's advantage to be able to take the depreciation early since it reduces tax liability, thereby increasing cash flow.

One of the most popular methods of accelerated depreciation for tax purposes is the double declining balance method. This is a rate twice the straight-line method can be used when it would be advantageous.* If we were to apply the double declining balance method to our van example, our depreciation schedule would be as shown in Exhibit B-3.

At various times in the past fifteen years, Congress has enacted an investment tax credit for the purpose of stimulating capital investment. The credit is used to reduce the income tax payable for one year equal to a specified percentage of the cost of certain types of depreciable assets that are acquired. This rate has fluctuated over the years as has the restrictions associated with the credit.

Currently, the full investment tax credit of ten percent is available for capital assets with a depreciable life greater than seven years. One-third of the maximum tax credit is available for assets held at least three years and two-thirds of the total credit available if the assets are held for at least five years. In our van pooling example, the company offering the service could initially claim a tax credit of 66.6% of its van pool assets because of effective life of 5 years. However, because we have assumed the van would be sold in four years, half of this amount or 33.3% would be recaptured at the time of their disposal.

In our example, a company operating the described van pools would receive an initial tax credit of $6,666 the year the vans were purchased assuming there were sufficient taxable income to absorb this credit. In year 5, $3,333 would be recaptured because the vans were disposed of before five years.

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*The double-declining depreciation method can only be used for equipment.

Exhibit B-4 summarizes the tax effect on the van pool operations shown in Exhibit B-2. In this example we assume a corporate tax rate of 48 percent and ignore the effect of state taxes. Ignoring the rate change of cash flow, the net effect of the van pooling is to provide the company with revenues equal to the investment tax credit.

If we now introduce the concept of the time value of money, we can more completely evaluate the economic consequences of the van pooling example. The discounted cash flow analysis is based on the assumption that a dollar available for investment today is greater than a dollar available in the future because it can be accruing income in the interim. Consequently, the timing of cash in-flow and out-flow is important in any investment analysis. The rate that funds (received or paid, in the future) are discounted is the rate that can be earned on funds.

In our van pooling example, the rate which the cash flow would be discounted would vary depending on the individual company's circumstances. Some companies might use a rate equal to their average return on assets and others might use the cost of borrowed funds. It should be noted that there exists several bases for selecting a rate, the specific rate selected will have a significant effect on the analysis. For purposes of illustration, we will assume a discount rate of 10 percent which might approximate the costs of short-term loan on automobiles. Exhibit B-5 summarizes the cash flow data included in Exhibit B-4 and discounts it to the period of initial investment. The economic costs of the van pooling are somewhat changed when the time value of money is included. A net "profit" of $3,333 over four years is converted to a $12,903 loss due to the timing of the cash flows. The initial investment of $100,000 is a cash out flow occuring at the outset. This investment is not recovered until later with funds that must be discounted to the period of the initial investment.

If the foregoing van pooling example were to be treated as a profit making investment rather than an employee benefit program, the fare structure would have to be adjusted to include provisions for interest costs. In our example, we have not included this cost in the fare calculations. We would propose also to look at the economic consequences for a company offering the example van pooling service to its employee at no cost to the employee.

Before reviewing the economics of this situation it is important for the reader to understand the tax consequences of a no charge van pool service to its employees. The Internal Revenue Service imputes a fair market value to any benefits provided an employee by their employer other than those specifically exempted, such as health care and life insurance premiums. Van pooling is not an exempted benefit (although this may be considered as an incentive). The employee is required to include the fair market value of such non-exempted benefits in his taxable income. Since van pooling is not a specifically exempted benefit, the only basis on which a company could apply for exemption from this treatment is if the working facilities are not easily accessible and the only way the company could attract personnel is to provide this service.

In order to determine the cost of our van pooling example under the assumption that the company receives no compensation from its employees we restate Exhibit B-6, excluding the fare income. On this basis, the tax savings reduce an out-of-pocket expenditure of $15,700 to a loss over four years of $78,307. On a discounted cash flow basis, this loss is reduced to $65,546. This cost can be composed to the total benefits provided the employees over the four years of $157,000.

If we assume that ten passengers can use a van, the annual cost net of taxes for providing the van service is approximately $165.00 per passenger per year.

Exhibit B-1

Operating Cost over the 4-year life of Vehicle

	Annual Cost per Vehicle	4 year cost per Vehicle	4 year Cost 10 Vehicle
Operating Expense			
Gasoline, oil, maintenance, tires 11,000 miles per van @ $.10 per mile	$1100	$4400	$44000
Insurance	600	2400	24000
Licenses fees and local taxes	100	400	4000
	$1800	$7200	$72000

Exhibit B-2

Computation of Fare

	Cost of One Van	Cost of 10 Vans
Initial Investment	$10,000	$100,000
Less Salvage Value	1,500	15,000
Net Investment	$ 8,500	$ 85,000
Annual Depreciation using the straight line method	$ 2,125	$ 21,250
Operating Expense	1,800	18,000
Total Annual Expenses	$ 3,925	$ 39,250
Fare per Vehicle required to recover total expenses	$3,925	
Fare per mile required to recover total exprnses	$ 357	

Exhibit B-3

Van Pooling Depreciation for Tax Purposes

Year	Cost 1 Van	Book Value	Depreciation Rate	Depreciation Charges per Year	Depreciation Charges for year - 10 Vans
1	$10,000	$5,000	50%	$5,000	$50,000
2	10,000	2,500	50%	2,500	25,000
3	10,000	2,000	straight line	500	5,000
4	10,000	1,500	straight line	500	5,000

Assumptions (1) 4 year life

(2) Salvage value of van $1,500

Exhibit B-4

Summary of the Van Pooling Operations Including its Tax Consequences

	Year 1	Year 2	Year 3	Year 4	Total
Fare Revenue	$39,250	$39,250	$39,250	$39,250	$157,000
Operating Expenses	18,000	18,000	18,000	18,000	72,000
Depreciation	50,000	25,000	5,000	5,000	85,000
Net Income (Loss)	($28,750)	($3,750	$16,250	$16,250	———
Corporate taxes @ 48%	(13,800)	(1,800)	7,800	7,800	———
Investment Tax Credit	(6,666)	———	———	3,333	3,333
Net Contributions to Corporate Profit	($8,284)	($1,950)	$8,450	$5,117	$3,333

Exhibit B-5

Discounted Cash Flow Analysis of Van Pooling

	Year 0	Year 1	Year 2	Year 3	Year 4	Total
Purchase of Van[1]	($100,000)					
Fare Revenue[2]		$39,250	$39,250	$39,250	$39,250	$157,000
Operating Expenses[2]		(18,000)	(18,000)	(18,000)	(18,000)	(72,000)
Taxes[2]		20,466	1,800	(7,800)	(11,333)	3,333
Salvage Value[3]					15,000	15,000
Net Cash Flow	($100,000)	$41,716	$23,050	$13,450	$24,917	$3,333
Discounted Cash Flow	($100,000)	$39,690	$19,852	$10,485	$17,070	($12,903)

[1]Purchased price assumed to be expended at the beginning of Year 1, operating revenue and expenses.

[2]Assumed to be even monthly cash flow and therefore discounted from the midpoint of the year. This closely approximates discounting using the annuity formulation.

[3]Salvage value assumed to be received at the end of the four years.

Exhibit B-6

Analysis of Van Pooling Assuming No Fares

	Year 0	Year 1	Year 2	Year 3	Year 4	Total
Purchase of Van	($100,000)					($100,000)
Operating Expenses		($18,000)	($18,000)	($18,000)	($18,000)	(72,000)
Taxes		39,306	20,640	1,040	7,707	78,693
Salvage Value					15,000	15,000
	($100,000)	$21,306	$2,640	($6,960)	$4,707	$78,307
Discounted Cash Flow	($100,000)	$20,271	$2,274	($5,426)	$17,335	($65,546)

Appendix C

SELECTED STATE LEGISLATION REGARDING VAN POOLING

Connecticut Public Act No. 75-611
(Signed into law July 7, 1975)

AN ACT CONCERNING TRANSPORTATION OF PERSONS TO AND FROM WORK WITHOUT LIVERY LICENSE.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

Section 1. Section 16-328 of the general statutes is repealed and the following is substituted in lieu thereof:

(a) Any person, while operating a passenger motor vehicle registered in this state between his place of residence and his place of employment, may carry for reasonable compensation not more than five other persons regularly employed in the locality of such person's place of employment without obtaining a livery license or a permit from the commission, (provided the making of more than one round trip in any day under the provisions of this section shall constitute a violation of the provisions of this chapter.)

(b) ANY CORPORATION OR EMPLOYEE OF SUCH CORPORATION MAY OPERATE ONE OR MORE MOTOR VEHICLES EACH HAVING A SEATING CAPACITY OF NOT MORE THAN FIFTEEN PASSENGERS FOR THE PURPOSE OF TRANSPORTING PERSONS TO AND FROM THEIR PLACE OF EMPLOYMENT WITHOUT OBTAINING A LIVERY LICENSE OR PERMIT FROM THE COMMISSION.

Sec. 2. This act shall take effect from its passage.

Excerpt from State of Washington House Bill No. 1272
(Signed into law March 25, 1976)

The term "auto transportation company" shall not include, nor shall the provisions of this chapter apply to, any operation whereby passengers are transported between their places of abode, or termini near such places, and their places of employment in a motor vehicle with a seating capacity including the driver not exceeding fifteen persons in a single daily round trip where the driver himself is also on the way to or from his place of employment: PROVIDED that said transportation or operation shall not compete with nor infringe upon service of an existing auto transportation company certificated under this chapter.

Excerpts from Maryland House Bill No. 1134
(Signed into law May 17, 1976.)

HOUSE OF DELEGATES

No. 1134

By: Delegates Amory [[and Madonna]], Madonna and Brown
Introduced and read first time: January 30, 1976
Assigned to: Judiciary

Re-referred to: Economic Matters, March 2, 1976
Committee Report: Favorable with amendments
House Action: Adopted with floor amendments
Read second time: March 23, 1976

CHAPTER _____

AN ACT concerning

Company Van Pools

FOR the purpose of defining the term Company Van Pool; providing that the terms "private carrier," "transit service," and "common carrier" do not include any company van pool; providing that company van pools are not required to obtain common carrier permits from the Public Service Commission; classifying company van pool vehicles as Class P vehicles; setting a certain yearly registration fee for Class P vehicles; requiring drivers of Class P vehicles to have a certain type of license; [[and]] requiring Class P vehicles to be inspected yearly for safety defects; and requiring insurance to be obtained.

EXPLANATION: CAPITALS INDICATE MATTER ADDED TO EXISTING LAW.
[Brackets] indicate matter deleted from existing law.
Underlining indicates amendments to the bill.
[[Double brackets]] enclose matter stricken out of bill.
Numerals at right identify computer lines of text.

SECTION 1. BE IT ENACTED BY THE GENERAL ASSEMBLY OF MARYLAND, That Sections 2(f) and (i) of Article 66B - Metropolitan Transit Districts, of the Annotated Code of Maryland (1972 Replacement Volume and 1975 Supplement) be and they are hereby repealed and reenacted, with amendments, to read as follows:

Article 66B - Metropolitan Transit Districts

2.

As used in this article, the following words and terms shall have the following meanings, unless the context clearly requires a different meaning:

(f) "Private carrier" means any corporation, person, firm or association rendering transit service within the District pursuant to an operating permit or license issued by an agency of the State of Maryland exercising regulatory jurisdiction over transportation of passengers within the State and persons engaged in that business[;]. IT DOES NOT INCLUDE ANY COMPANY VAN POOL.

(i) "Transit service" means the transportation of persons and their packages and baggage in regular route, special or charter service by means of transit facilities between points within the District, or in any county contiguous to the District as permitted in this article, and includes the transportation of newspapers, express and mail between such points but does not include taxicab service. IT DOES NOT INCLUDE ANY COMPANY VAN POOL.

SECTION 2. AND BE IT FURTHER ENACTED, That new Section 2(j) be and it is hereby added to Article 66B - Metropolitan Transit Districts, of the Annotated Code of Maryland (1972 Replacement Volume and 1975 Supplement) to read as follows:

Article 66B - Metropolitan Transit Districts

2.

(J) (1) "COMPANY VAN POOL" MEANS ANY NONPROFIT COMMUTER SERVICE PROVIDED BY OR ORGANIZED BY AN EMPLOYER ORGANIZATION OR BY A COMPANY [[ON A NONPROFIT BASIS]] OR A GROUP OF COMPANIES FOR ITS EMPLOYEES AND WHICH:

(I) TRANSPORTS EMPLOYEES, INCLUDING THE DRIVER, [[PRIMARILY]] EXCLUSIVELY BETWEEN THEIR HOMES AND THEIR EMPLOYER'S PLACE OF BUSINESS;

(II) IS AVAILABLE ON A NONDISCRIMINATORY BASIS TO ALL OF THE [[COMPANY'S]] EMPLOYEES OF THE COMPANY OR GROUP OF COMPANIES;

(III) DOES NOT REQUIRE PARTICIPATION OF ANY EMPLOYEE AS A CONDITION OF EMPLOYMENT; AND

(IV) USES MOTOR VEHICLES HAVING A SEATING CAPACITY OF NO MORE THAN 15 PERSONS EACH AS THE SOLE MEANS OF TRANSPORTATION ACROSS LAND.

(2) IT DOES NOT INCLUDE ANY COMPANY WHICH PROVIDES COMMUTER SERVICE FOR ANOTHER COMPANY'S EMPLOYEES UNDER A CONTRACT OR AGREEMENT WITH THAT COMPANY.

SECTION 3. AND BE IT FURTHER ENACTED, That new Sections 1-113.1 and 3-812 be and they are hereby added to Article 66 1/2 - Vehicle Laws, of the Annotated Code of Maryland (1970 Replacement Volume and 1975 Supplement) to read as follows:

Article 66 1/2 - Vehicle Laws

3-812.

AN ANNUAL FEE OF $60 SHALL BE PAID FOR EACH MOTOR VEHICLE BEING USED AS COMPANY VAN POOL VEHICLES. THESE SHALL BE CLASSIFIED AS CLASS P VEHICLES.

SECTION 4. AND BE IT FURTHER ENACTED, That Sections 3-811(b), 6-102.2(d) and (e), 13-101(2), and 13-106 of Article 66 1/2 - Vehicle Laws, of the Annotated Code of Maryland (1970 Replacement Volume and 1975 Supplement) be and they are hereby repealed and reenacted, with amendments, to read as follows:

Article 66 1/2 - Vehicle Laws

3-811.

(b) [Motor] CLASS P VEHICLES AND MOTOR vehicles paying the annual fee required by § 188(a) of Article 56 or § 273(a) of Article 81 [shall] ARE not [be] subject to the fees required by this section.

6-102.2.

(d) A Class C license authorizes the licensee to drive any bus, ANY CLASS P VEHICLE and any vehicle which the holder of a Class D license may drive.

13-106.

(D) BEFORE THE ADMINISTRATION REGISTERS ANY VEHICLE AS A CLASS P MOTOR VEHICLE, IT SHALL REQUIRE THE APPLICANT TO PRESENT A CERTIFICATE FOR THE VEHICLE ISSUED IN ACCORDANCE WITH THIS SUBTITLE NOT MORE THAN 30 DAYS PRIOR TO THE DATE OF APPLICATION FOR REGISTRATION. A CERTIFICATE SHALL BE REQUIRED FOR ANY INITIAL REGISTRATION AS A CLASS P VEHICLE AND FOR EVERY YEARLY RENEWAL REGISTRATION OF ANY VEHICLE AS A CLASS P VEHICLE.

(E) BEFORE THE ADMINISTRATION REGISTERS ANY VEHICLE AS A CLASS P MOTOR VEHICLE, IT SHALL REQUIRE THE APPLICANT TO PRESENT A CERTIFICATE FOR INSURANCE FOR THE VEHICLE AND ITS OCCUPANTS IN AN AMOUNT AT LEAST EQUAL TO: (1) FIVE TIMES THE MINIMUM COVERAGE REQUIRED IN ARTICLE 66 1/2, SECTION 7-101(C)(I) FOR THE PAYMENT OF CLAIMS FOR BODILY INJURY OR DEATH; (2) THE MINIMUM COVERAGE REQUIRED IN ARTICLE 66 1/2, §7-101(C)(II) FOR PROPERTY DAMAGE CLAIMS; AND (3) THE MINIMUM BENEFITS REQUIRED IN ARTICLE 66 1/2, §7-101(C)(III).

SECTION 5. AND BE IT FURTHER ENACTED, That Sections 2(d) and 32(b) of Article 78 - Public Service Commission Law, of the Annotated Code of Maryland (1975 Replacement Volume and 1975 Supplement) be and they are hereby repealed and reenacted, with amendments, to read as follows:

Article 78 - Public Service Commission Law

2.

(d) "Common carrier" means and includes any person, public authority, federal, State, district or municipal transportation agency engaged in the public transportation for hire of persons, property or freight, whether by land, water, air or any combination of them, and includes, but is not limited to, air line company, canal company, car company, express company, freight company, freight line company, motor vehicle company (including automobile company, motor bus company and trucking company), power boat company (including vessel-boat company and steamboat company and ferry company), railroad company, street railroad company, sleeping car company, taxicab company, toll bridge company, towing and lightering company, and transit company. Any provisions of this article to the contrary notwithstanding, "common carrier" does not mean and shall not include any county revenue authority or any toll bridges or other facilities owned and operated by any county revenue authority. "COMMON CARRIER" DOES NOT INCLUDE ANY COMPANY VAN POOL.

(b) No such permit, however, shall be required for the following:

(8) COMPANY VAN POOLS.

SECTION 7. AND BE IT FURTHER ENACTED, That this Act shall take effect July 1, 1976.

Minnesota Statutes 1976
Excerpts from Chapter 233, House File 1382
(Signed into law April 9, 1976)

A bill for an act

Relating to transportation; authorizing the commissioner of administration to acquire vehicles for the car pooling of state employees; removing, restricting or clarifying certain laws which discourage use of shared ride commuter vans to transport employees to and from work; providing certain incentives; excluding income tax liability of a driver resulting from the use of a commuter van; appropriating money; amending Minnesota Statutes 1974, Chapter 221, by adding a section; and Sections 16.85, Subdivision 1; 658.47, Subdivisions 1 and 2; and 290.08, by adding a subdivision; and Minnesota Statutes, 1975 Supplement, Sections 658.43, Subdivision 12; 221.011, Subdivision 22; repealing Minnesota Statutes 1974, Section 16.755.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF MINNESOTA:

Section 1. In order to conserve energy and to alleviate traffic congestion in and about the location of state offices, the commissioner of administration shall, in cooperation with the director of the Minnesota energy agency, the commissioner of highways and interested nonprofit agencies, establish and operate an employee transportation program utilizing commuter vans with a capacity of not less than seven nor more than 16 passengers. The commissioner shall acquire or lease commuter vans, or otherwise contract for the provision of commuter vans, and shall make the vans available for the use of state employees in a manner consistent with standards and procedures adopted by the commissioner. Standards and procedures adopted pursuant to this section shall not be subject to chapter 15. Commuter vans may be used by state employees to travel between their homes and their work locations, and for personal purposes after working hours, not including partisan political activity. The commissioner shall provide in his standards and procedures for the recovery by the state of vehicle acquisition, lease, operation and insurance costs through efficient and convenient assignment of vans, and for the billing of costs and collection of fees. A state employee using a van for personal use shall pay, pursuant to the standards and procedures adopted by the commissioner, for operating and routine maintenance costs incurred as a result of the personal use. The commissioner shall promote the maximum practicable participation of state employees in the use of the vans. Fees collected pursuant to this section shall be deposited in the accounts from which the costs of operating, maintaining and leasing or amortizing acquisition costs for the specific vehicle are paid.

Sec. 2. Use of the vans shall be limited to areas not having adequate public transportation between the residences of state employees and their places of employment. During the first year, the van program shall be implemented both in the seven-county metropolitan area and in one other region of the state.

Sec. 3. The program shall be evaluated after its first year of operation, and the commissioner of administration shall at that time recommend to the legislature whether the program should be expanded or discontinued. The commissioner shall at least semi-annually inform the

Metropolitan council and the capitol area architectural and planning board on the operation of the program.

Sec. 4. Notwithstanding section 15.31 or any other law to the contrary, the commissioner of administration may purchase, pursuant to chapter 16, collision insurance coverage for the commuter vans. Notwithstanding sections 16.75, subdivision 1, and 168.012, the vans shall not be marked. The vans shall not be equipped with tax-exempt motor vehicle number plates.

Sec. 5. Minnesota Statutes 1974, Section 16.85, Subdivision 1, is amended to read:

. . .

The code shall require that any parking ramp or other parking facility constructed in accordance with the code include an appropriate number of spaces suitable for the parking of motor vehicles having a capacity of seven to 16 persons and which are principally used to provide prearranged commuter transportation of employees to or from their place of employment or to or from a transit stop authorized by a local transit authority.

Sec. 6. Minnesota Statutes, 1975 Supplement, Section 65B.43, Subdivision 12, is amended to read:

Subd. 12. "Commercial vehicle" means:

(a) any motor vehicle used as a common carrier,

(b) any motor vehicle, other than a passenger vehicle or a station wagon, as those terms are defined in section 168.011, subdivisions 7 and 23, which has a curb weight in excess of 5500 pounds apart from cargo capacity, or

(c) any motor vehicle while used in the for-hire transportation of property.

Commercial vehicle does not include a "commuter van", which for purposes of chapter 65B shall mean a motor vehicle having a capacity of seven to 16 persons which is used principally to provide prearranged transportation of persons to or from their place of employment or to or from a transit stop authorized by a local transit authority which vehicle is to be operated by a person who does not drive the vehicle for his principal occupation but is driving it only to or from his principal place of employment, to or from a transit stop authorized by a local transit authority or for personal use as permitted by the owner of the vehicle.

Sec. 7. Minnesota Statutes 1971, Section 65B.47, Subdivision 1, is amended to read:

65B.47 [PRIORITY OF APPLICABILITY OF SECURITY FOR PAYMENT OF BASIC ECONOMIC LOSS BENEFITS.] Subdivision 1. In case of injury to the driver or other occupant of a motor vehicle other than a commuter van, if the accident causing the injury occurs while the vehicle is being used in the business of transporting persons or property, the security for payment of basic economic loss benefits is the security covering the vehicle or, if none, the security under which the injured person is an insured.

Sec. 8. Minnesota Statutes 1974, Section 65B.47, Subdivision 2, is amended to read:

Subd. 2. In case of injury to an employee, or to his spouse or other relative residing in the same household, if the accident causing the injury occurs while the injured person is driving or occupying a motor vehicle other than a commuter van furnished by the employer, the security for payment of basic economic loss benefits is the security

covering the vehicle or, if none, the security under which the injured person is an insured.

Sec. 9. Minnesota Statutes, 1975 Supplement, Section 221.011, Subdivision 22, is amended to read:

Subd. 22. "Exempt carrier" means any carrier exempt from chapter 221; or from any other law or regulation by the public service commission. The following are so exempt:

• • •

(1) A motor vehicle, in chapter 221 referred to as a "commuter van," having a capacity of seven to 16 persons which is used principally to provide prearranged transportation of persons for a fee to or from their place of employment or to or from a transit stop authorized by a local transit authority which vehicle is to be operated by a person who does not drive the vehicle for his principal occupation but is driving it only to or from his principal place of employment, to or from a transit stop authorized by a local transit authority, or for personal use at other times by an authorized driver; provided, that commuter vans shall not be exempt from any provision of chapter 221 which by its terms explicitly applies to these vehicles.

Sec. 10. Minnesota Statutes 1974, Chapter 221, is amended by adding a section to read:

[221.711 [COMMUTER VANS; DRIVER LIABILITY.] Subdivision 1. Notwithstanding any other law to the contrary, the services performed by a driver of a commuter van shall be deemed to be those of an independent contractor and not those of an employee acting within his scope of employment, unless provided in writing to the contrary.

Subd. 2. A driver or owner of a commuter van shall not be held to the standard of care applicable to drivers or owners of common carriers, nor shall they be subject to ordinances or regulations which relate exclusively to the regulation of drivers or owners of automobiles for hire or other common carriers or public transit carriers.

Sec. 11. Minnesota Statutes 1974, Section 290.08, is amended by adding a subdivision to read:

Subd. 23. [COMMUTER VAN USE.] Gross income shall not include benefits derived by a driver from the personal use of a commuter van owned by a person other than the driver. For purposes of this subdivision, commuter van shall mean a motor vehicle having a capacity of seven to 16 persons which is used principally to provide prearranged transportation of persons to or from their place of employment or to or from a transit stop authorized by a local transit authority which vehicle is to be operated by a person who does not drive the vehicle for his principal occupation but is driving it only to or from his principal place of employment, to or from a transit stop authorized by a local transit commission, or for personal use when authorized by the owner. The exemption shall not apply to monetary compensation received by a person in return for his services in driving the van.

Sec. 12. The sum of $100,000 is appropriated to the commissioner of administration from the general fund to carry out the purposes of sections 1 to 4 of this act.

Sec. 13. Minnesota Statutes 1974, Section 16.755, is repealed.

Sec. 14. Section 5 of this act is effective January 1, 1977, and the remainder of the act is effective the day following final enactment. Sections 1 to 4 of this act shall expire June 30, 1979.

Tennessee House Bill No. 2184
(Signed into law March 28, 1976)

BE IT ENACTED BY THE GENERAL ASSEMBLY OF THE STATE OF TENNESSEE:

SECTION 1. Tennessee Code Annotated, Section 6-3802, is amended by adding the following new paragraph between the present first and second paragraphs of the section:

Neither this chapter on Tennessee Code Annotated, Title 65, Chapter 16, shall be construed as allowing a municipality, county, metropolitan government, or combination thereof to regulate any motor vehicle engaged primarily in the hauling of fifteen (15) or fewer passengers to and from their regular places of employment, taxicabs and airport limousines excepted, or to regulate the organizers, sponsors or promoters of motor vehicles engaged primarily in the hauling of passengers to and from their regular places of employment but regulations by the appropriate government shall be permitted, however, if the motor vehicles excluded from regulations, and the organizers, sponsors and promoters of such vehicles, are specifically defined and regulated as a class separate and distinct from other existing common carriers and contract carriers.

SECTION 2. Tennessee Code Annotated, Section 65-1601, is amended by adding the following new paragraph at the end of the present section:

Neither this chapter or Tennessee Code Annotated, Title 6, Chapter 38, shall be construed as allowing a municipality, county, metropolitan government or combination thereof to regulate any motor vehicle engaged primarily in the hauling of fifteen (15) or fewer passengers to and from their regular places of employment, taxicabs and airport limousines excepted, or to regulate the organizers, sponsors, or promoters of motor vehicles engaged primarily in the hauling of passengers to and from their regular places of employment but regulation by the appropriate government shall be permitted, however, if the motor vehicles excluded from regulation, and the organizers, sponsors, and promoters of such vehicles, are specifically defined and regulated as a class separate and distinct from other existing common carriers and contract carriers.

SECTION 3. The Tennessee Code Annotated, Section 65-1503, amended by changing the period at the end of the subsection(k) to a semi-colon and by adding the following new subsections:

(l) nor to any motor vehicle, except taxicabs or airport limousines, used primarily for hauling fifteen (15) or fewer passengers to and from their regular places of employment to organizers, sponsors, or promoters of such vehicles under the Tennessee Code Annotated, Section 65-1517; provided, however, that the Public Service Commission may inspect these motor vehicles as it deems necessary for purposes of safety under the provisions of Tennessee Code Annotated, Section 65-1515, and may establish a minimum level of insurance coverage to be required of all vehicles operating pursuant to this subsection. Provided, however, that vehicles operating pursuant to this act shall be subject to the inspection, control, and supervision fee as provided in Tennessee Code Annotated, Section 65-1518;

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