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AN OVERVIEW OF RIDESHARING AND MASS TRANSIT EMPLOYER INCENTIVES

Region VIII
Denver, Co.

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ABSTRACT

This report reviews the incentives currently being used by public and private sector employers to encourage employee use of ridesharing and mass transit as an alternative to the single occupant vehicle and identifies a few successful incentive programs. The legal and institutional aspects of employer sponsored incentive programs are discussed in some detail. Existing carpool matching systems and costs are briefly discussed.

PREFACE

This report was prepared by members of the U.S. Environmental Protection Agency's Denver Air Task Force. The Task Force was established to assist in the preparation of a local/state/federal government Action Plan for dealing with Metropolitan Denver's air pollution problems.

Since Metropolitan Denver's air pollution problems are caused primarily by automobile emissions, reduction in single occupant automobile use can lead to appreciable air quality improvements. In the short term, we see four alternate forms of transportation as having potential to replace the single occupant vehicle for certain trips --- carpools, buses, bicycles, and --- vanpools. The purpose of this report is to document our findings after a careful review of the literature on the subject of employer incentives. Employer incentives are planned measures offering inducements to employees for the use of an alternative mode of transportation other than the single occupant vehicle.

We have attempted to identify the types of incentives programs currently in use throughout the United States and the relative success of these programs. We have also identified some of the legal and institutional constraints associated with employer incentive programs. We are convinced that employer incentives are an important part of a total program to reduce single occupant auto use and concomitant air pollution.

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I. INTRODUCTION

General

There is some type of motivation behind every decision to form or join a carpool, vanpool, buspool, or to utilize public transit. For most pre-energy crisis carpools, motivations were largely unplanned. They included shortage of parking spaces, parking costs, and automobile operating costs. During the energy crisis motivations included the rapidly escalating price of gasoline and long lines at the service stations. Another motivation is emerging among residents of the Denver Metropolitan Area: improvement of the air quality of the area. Most successful programs designed to get individuals out of the single occupant vehicle (SOV) recognize the importance of these motivations, but rely on planned programs of incentives to encourage carpooling, vanpooling, buspooling, and bicycling.

Employer Incentives

Incentives are planned measures offering inducements for the use of carpools, vanpools, buspools, public transit, bicycles, etc. The following discussion of specific incentives is structured on the basis of the basic motivations which a person either explicitly or implicitly considers in making his travel decisions. These basic motivations are:

Travel cost
Travel time
Convenience
Intangible and non-traveled related factors

In a multi-modal situation, the commuter uses these considerations to decide whether to drive alone, take the bus, carpool, etc. However, many commuters in the Denver area do not have a choice of means of travel because of where their home or job is located or because of their work schedule. Other commuters feel that service by the Regional Transportation District is inadequate. One difficulty with trying to encourage carpooling is that many commuters have an established habit of driving alone. Denver "grew up" as an automobile-oriented city with very low density development. Parking is inexpensive and even today, congestion is minimal relative to other cities. Incentives can add weight to arguments in favor of pooling, busriding, and bicycling by providing benefits above and beyond those inherently involved in these activities.

The importance of incentives in encouraging pooling, bus riding, and bicycling has been debated. Some experts contend they are essential while others consider a good commuter matching system to be the key to increased pooling. There are only a few studies which show the quantitative effect of incentives on carpooling. A study conducted by Alan M. Voorhees and Associates, Inc., and Behavior Science Corporation, "A Study of Techniques to Increase Commuter Vehicle Occupancy on the Hollywood Freeway," November 5, 1973, showed some interesting results. Of those people who were at least somewhat interested in carpools, the following percentages stated they would be likely to carpool if the proposed incentives were provided.

Proposed Incentive	Percentage of People who Would be Likely to Carpool
Carpool parking lots near freeways	70%
Use of company cars for carpools	63%
Gas tax rebates	61%
Free or lower parking fees	60%
Reserved freeway lanes	57%
Preferential parking	57%

In spite of many unanswered questions, incentives do seem to offer the potential for producing higher rates of carpooling, buspooling, vanpooling, and bicycling and should be given serious consideration by employers. This report will discuss a number of possible incentives and identify a few successful incentive programs.

II. SUMMARY AND CONCLUSIONS

There is some type of motivation behind every decision to join a carpool, vanpool or use mass transit. Incentives are planned measures offering inducements to utilize these forms of transportation. Incentives are offered by a wide variety of agencies, employers, groups, and individuals. Travel cost is one of the most significant factors in the decision to utilize carpools, vanpools, mass transit or other forms of transportation. Cost-related incentives currently being used by employers are reducing automobile parking, ownership, and operating costs and transit commuting costs. Convenience-related incentives increase the attractiveness of utilizing pools, mass transit, etc. A few convenience incentives currently being used by employers include preferential parking, facilities for poolers and transit users, adjustment to working hours, and single occupant vehicle restrictions. Other incentives include awards to employees and employer-operated matchmaking schemes.

Carpool and buspool matching has been done in a variety of ways. Some situations require the use of computer methods, but many others can employ simple manual methods to great advantage. The three basic types of matching methods currently being used are the centralized matching technique, the locator board method, and the roster technique. Organizations desiring to begin a matching program with the least possible delay can start by using manual matching methods and then shift to automated methods as the size or complexity of the job warrants.

To insure that an employer incentives program operates at its maximum effectiveness, it is important to identify the relevant legal and institutional issues prior to implementation. Issues that must be understood and complied with include legal, security, compensation and the internal revenue, and insurance issues.

In conclusion:

1. Incentives are an effective tool that employers may utilize to induce employees to give up the single occupant vehicle and utilize carpools, vanpools, buspools, mass transit, bicycles, or other alternative means of transportation to and from the employment site.

2. Significant cost savings and conveniences may occur to the employer and employee.

3. A well-operated matching system is almost essential to assure effective and efficient carpool, vanpool and buspool programs.

4. All potential sponsors and participants of ridesharing programs should become familiar with applicable statutes and ordinances as they relate to employer and employee responsibilities, security of information, and insurance requirements.

III. OBJECTIVES

There are a number of benefits associated with widespread use of transportation pools; some are public benefits that accrue to society as a whole and others are private benefits that accrue to the individuals involved. The primary objective of this report is to identify employer incentive measures that may ultimately lead to improving the air quality of the Denver Metropolitan Area.

Improved Air Quality

Chief among public benefits would be improved ambient air quality. Metropolitan Denver presently has one of the worst air quality problems in the country. This air quality problem is critical because of the health effects of poor air quality and the number of people affected. The Six County Metropolitan Denver Area is presently in violation of federal/state health standards for carbon monoxide, particulates, and photochemical oxidants; and violations for nitrogen dioxide are expected by 1985. At least one study has shown that citizens of the area are exposed to more carbon monoxide than the other 20 cities involved in the study as shown by carbon monoxide content in the blood. (1) It is generally acknowledged that private passenger cars are the primary source for carbon monoxide contributing 95% and hydrocarbons contributing 84%. Although minor improvements in air quality may result from tighter controls on non automotive sources, any significant improvement must come from reducing the pollutants released by automobiles. It has been estimated that it will be necessary to reduce the total daily miles traveled by over 50%, even with the use of cleaner catalytic equipped cars, if the Metropolitan Denver Area is to meet standards set for the protection of public health within the next 10 years.

Gasoline Conservation

Another important public benefit could be reduced energy consumption, provided that vehicles no longer being used for driving to work are not used for other trips. The Highway Users Federation estimated that a 25% increase in carpooling would reduce the consumption of petroleum by nearly 2 percent.(2)

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(1) U.S. Environmental Protection Agency, Normal Carboxyhemoglobin Levels of Blood Donors in the United States, EPA-650/1-73-004, Office of Research and Development, Washington, D.C., May,1973.

(2) Highway Users Federation for Safety and Mobility, News Release, August 29, 1973.

Reduction in Commuting Costs

Another benefit of not using the SOV is the direct money savings for the commuter. Amounts saved depend on many things such as car size, parking costs, distance driven, etc. The Highway Statistics Division of the Office of Highway Planning, Federal Highway Administration estimated that the average cost of owning and operating an automobile in 1976 was about 17.9 cents per mile for standard size, 14.6 cents per mile for compacts, and 12.6 cents per mile for subcompacts. These costs included depreciation, maintenance, gas and oil, parking, insurance, and taxes (See Figures 1 and 2). Pooling reduces costs in direct proportion to the number in the pool. Public transit, in most cases, is less expensive than driving alone. Bus fares vary from $0.25 for circulators to $1.25 for regional long distances in the Denver metropolitan area.

Reduced Facility Costs

Parking facilities are a major expense for any employer. Many companies have found effective ridesharing programs are a financially pleasing alternative to the endlessly expanding parking lot. Through a conscientiously-promoted program of voluntary carpooling, with preferred parking as one incentive, and free or low cost bus service to central points as another incentive, Government Employees Insurance Company (GEICO) in Chevy Chase, Maryland, found that it reduced its demand for parking and saved a considerable amount in construction costs by not building new facilities. The 3M Company saved $2.5 million in construction costs for a parking facility at its headquarters in St. Paul, Minnesota, because of its successful vanpooling program. (3)

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(3) U.S. Department of Transportation, How to Pool It, May, 1975.

Figure 1

COST OF OWNING AND OPERATING AN AUTOMOBILE 1976

SUBURBAN-BASED OPERATION
TOTAL COSTS: CENTS PER MILE

SIZE	ORIGINAL VEHICLE COST DEPRECIATED	MAINTENANCE, ACCESSORIES, PARTS & TIRES	GAS & OIL (EXCLUDING TAXES)	PARKING GARAGE, PARKING & TOLLS	INSURANCE	STATE & FEDERAL TAXES	TOTAL COST
STANDARD* WITH STANDARD EQUIPMENT, WEIGH MORE THAN 4,000 LBS. EMPTY.	4.9	4.2	3.3	2.2	1.7	1.6	17.9
COMPACT WEIGH MORE THAN 2,700 LBS. BUT LESS THAN 3,600 LBS. EMPTY.	3.8	3.4	2.5	2.1	1.6	1.2	14.6
SUB COMPACT WEIGH LESS THAN 2,700 LBS. EMPTY.	3.2	3.1	1.8	2.1	1.5	.9	12.6

* NOT SHOWN IN THIS STUDY ARE THE INTERMEDIATE-SIZE CARS THAT WEIGH 3,600 – 4,000 LBS. EMPTY.

U.S. DEPARTMENT OF TRANSPORTATION
Federal Highway Administration

Office of Highway Planning
Highway Statistics Division

Figure 2

ESTIMATED COSTS OF OPERATING 1976 AUTOMOBILES
(Cents Per Mile)

Year of Ownership	Standard Size	Compact Size	Sub-Compact Size
1st	18.73	12.15	9.95
2nd	15.44	12.30	9.95
3rd	17.79	13.63	10.65
4th	19.23	15.71	14.39
5th	17.04	15.77	14.03
6th	17.08	15.54	14.10
7th	19.94	18.20	14.38
8th	16.48	15.29	15.21
9th	20.12	14.21	13.08
10th	17.63	15.24	14.30
Average	17.88	14.56	12.64

U.S. Department of Transportation
Federal Highway Administration

Office of Highway Planning
Highway Statistics Division

IV. CARPOOL/VANPOOL/BUSPOOL RELATED INCENTIVES

A ride pool can be many things: a carpool of two or more people, a vanpool of up to 15, or a buspool of up to 50. Carpooling is an informal arrangement in which people share the driving to work usually on a daily, weekly, or monthly basis. Vanpooling is a formal arrangement that guarantees commuters a ride every day, despite such variables as vacations, sickness, or mechanical breakdowns. A company, public agency, or other sponsoring group buys or leases a number of vans and gives them to the commuting employees who will be the drivers. In return for driving, those employees get free transportation to and from work; they may also use the van as a personal car during off-hours for a small mileage charge. The other commuters pay a monthly transportation fee directly to the sponsoring group. The passenger's fees reimburse the sponsors for most or all of the costs involved in buying, operating, and maintaining the vans.

The buspool is the logical extension of the carpool or vanpool. Buspools become economically practical when large numbers of employees live in the same neighborhood or subdivision and can collect at a common point or at a few points along one route. The added fuel efficiency of a bus is a significant factor unless it is dissipated by extensive "deadhead" travel.

This section identifies incentives presently being used by employers to encourage carpooling, vanpooling, and/or buspooling and a few successful programs currently underway.

Cost-Related Incentives

Travel cost is one of the most significant factors in the decision to form or join pools, ride the bus or bicycle. Cost-related incentives can be devised to reduce or eliminate automobile parking, ownership, and/or operating costs. On the other hand, cost-related incentives can also be devised to increase the cost of operating and parking a single occupant vehicle (SOV).

Parking Costs - One of the more effective incentives to carpooling and vanpooling is for the employer to cover all or a portion of the parking cost for poolers. The effectiveness of this incentive depends upon current parking charges, the likelihood of increased parking charges or surcharges, or the opportunity to switch to alternative parking sites with no appreciable increase in parking cost. In areas where off-street parking or low cost parking is nearby, this incentive measure is less likely to be successful than in central downtown areas with relatively high parking costs.

Conversely, an increase in parking rates can similarly provide an incentive to carpooling. A general increase in parking rates tends to promote the use of carpools without diverting existing transit riders to carpools.

There are several examples of successful parking cost incentives. This type of incentive should be coordinated with incentives for mass transit, so that people don't switch from transit to carpools and thus increase vehicle miles traveled (VMT).

The Port of Portland, Portland, Oregon, has an ongoing program, whereby the Port pays a maximum of $15 per month for parking for employees who commute in three person carpools 90 percent of the time, exclusive of educational leave, sick leave, and vacation. If the carpool is four or more, the Port pays an additional $0.14 per mile. Parking is adjacent to the office building. A list of potential carpoolers is maintained by zip code to avoid giving out addresses. Employees look for individuals with the same zip code and meet on an individual basis, on company time, for carpool arrangements. Only salaried employees participate in the program. Employees are reimbursed for parking every three months by check.(4) The Port is a public agency that receives revenue from taxes (Tri-County), ship repair, and revenue bonds. It has not received any adverse publicity concerning the program.

A survey of employees at the King County Assessor's Office in Seattle, Washington indicated that free parking was nearly twice as effective as other methods in encouraging carpooling. The Assessor's Office presently has a program that provides for free parking at private lots within a two to three block radius of the employment site. Some 100 King County and 200 Seattle employees in carpools of three or more persons participate in the program.(5) The City of Seattle handles arrangements for the parking facilities.(6)

In 1973, the City of San Francisco, California instituted a 25 percent increase in the parking tax. This resulted in a significant decline in the number of all-day parkers.(7) It is believed that a substantial portion of this reduced parking demand was a result of an increase in carpooling.

(4) Personal conversation with Ms. Messinger, Port of Portland, on January 9, 1978.

(5) U.S. Department of Transportation, Incentives to Carpooling, January, 1974.

(6) Personal conversation with Assessor's Office receptionist on January 10, 1978.

(7) U.S. Dept. of Transportation, Incentives to Carpooling, January, 1974.

Traveler's Insurance, Hartford, Connecticut, provides free parking to its carpooling employees and the Prudential Insurance Company, Boston, Massachusetts, provides free indoor parking to carpools of 3 or more.(8) These programs have proved to be very successful.

The parking cost incentive may be the most effective incentive to encourage carpooling and vanpooling for agencies located in the downtown Denver area where parking costs are relatively expensive. Federal agencies may obtain parking spaces from private lots through the General Services Administration.

Automobile ownership costs - As the cost of owning, insuring, and maintaining an automobile increases, the effectiveness of incentives related to these costs is enhanced. This type of incentive offers relief from some or all auto or van ownership costs in exchange for organizing and operating a carpool or vanpool.

Most governmental agencies at the federal, state, county and local levels have a pool of motor vehicles which is used to conduct government business. The vehicles are usually returned to a garage or lot at the end of the day to remain idle until the next morning. This capital equipment could be more effectively utilized by allowing carpooling employees to drive the vehicles home at night. This will reduce VMT as well as reduce costs for the individual employees. In the federal sector, federal law (31 USC Section 638a(c)) specifically forbids the use of government vehicles for the transportation of government employees between their domiciles and places of work. However, there is a proposal to change this legislation in the Department of Transportation's legislative package presently being considered by the House Public Works and Transportation Committee. In past hearings before the Committee, the business sector has supported similar proposals. The State of California Assembly, recognizing that vanpools and carpools constitute one of the most cost-effective and energy-efficient modes of transportation, passed Assembly Bill No. 3267 amending the State Code relating to carpools. Effective January 1, 1977, the bill permits the state to operate carpool and vanpool programs using county-or state-owned or leased vehicles for county or state employees. An adequate fee is charged to fully reimburse the county or state for such service. The pending federal legislation is patterned after the California legislation.

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(8) U.S. Department of Transportation, Incentives to Carpooling.

The Arkansas State Highway Department in Little Rock, Arkansas, encourages the use of departmental vehicles assigned to directors, division heads, field personnel, etc., for carpooling. These are vehicles that are already assigned to these individuals for overnight use. Carpools average two to three riders per car. These vehicles are assigned parking immediately behind the building. When a Department vehicle is out of the city, another individual in the pool is allowed to park his personal vehicle in the vacant space. The system has been in operation since 1974 and is quite successful.(9)

A major problem with this carpool incentive technique is that taxpayers tend to view use of government property as a discriminatory benefit to government workers. This objection can be countered in several ways:

- Public information programs to show that fuel savings from carpooling/vanpooling is in the public interest.
- Daily recording of mileage while vehicle is not on government business, with a pro-rata mileage charge assessed against the poolers.
- A flat monthly assessment for the carpool based on established mileage.

If the legislation presently before Congress is passed, the provision of vehicles for pooling may be an effective incentive for federal employers.

A variation on the use of vehicles for a carpool is the provision, by the employer, of vans suitable for pooling. A driver, who also may be a paid employee of the sponsoring organization and who may be paid additionally for the responsibility of recruiting and driving pool riders, has an active role in creating and maintaining the pool. The additional pay is normally in the form of a free ride to work, use of vehicle during off-hours, etc. The vehicle can be put to other uses during the day. A more detailed discussion of vanpooling is covered in the report Vanpooling - An Overview prepared by the Environmental Protection Agency, Region VIII.

Some private employers may find it cost-effective to provide company-owned vehicles to employees who carpool or vanpool. The vehicle may be used during the day to conduct company business. The effectiveness of this incentive measure depends on several factors, such as expense and tax position of the company, the availability of alternative transportation to the members of the carpool, and the potential for forming and maintaining a carpool under these circumstances.

(9) Personal conversation with Mr. Jim Gilbert, Arkansas State Highway Department on February 10, 1978.

Automobile-operating costs - This type of incentive falls into two major categories: negative incentives which increase auto-operating costs for SOV's and positive incentives which reduce operating costs for carpoolers. Some of these types of incentives may be implemented by employers, while others must be implemented by legislative bodies. This discussion will include only those incentives which may be implemented by employers.

Repayment of some portion of the cost of fuel and insurance is a possible incentive. The rebate could be paid directly to the employee by the employer upon proof of regular carpooling. One employer pays non-drivers one dollar per day. (10) This type of payment may not be possible to implement in the governmental sector.

A disincentive that may be effective is to charge nonpoolers for parking on government reservations. The Public Buildings Amendments of 1972 (P.L. 92-313, 86 Statute 219, June 16, 1972) established the concept of charging users of space and services their approximate commercial value.(11) However, the General Services Administration regulations adopted do not provide for executive agencies implementing employee parking charges above the operating expenses of a facility. Under these regulations, where self-parking without attendants is used, free parking is permitted. This regulation could be revised to provide for employee parking charges.

Travel Time Incentives

The primary area in which travel time incentives can be implemented is the journey itself. Thus, almost all travel time incentives involve travel on public streets and are usually only implemented by public agencies and not by employers. Examples include exclusive freeway lanes, contra-flow freeway lanes, reserved lanes at toll plazas, etc. The basic motivation associated with these priority techniques is reduced travel time for high occupancy vehicle occupants. Typically, the priority treatments are in force only during peak periods and, thus, are applicable primarily to commuter vehicles.

(10) GCA/Technology Division, Study and Evaluation of Computer Carpool Programs in Certain Metropolitan Areas, April, 1974.

(11) Memorandum to James Sakolosky, Chief, Field Coordination Branch, Environmental Protection Agency from Robert Kenney, Attorney Advisor, Office of Enforcement, EPA," EPA Parking Fees."

Convenience Incentives

Convenience-related incentives increase the attractiveness of carpooling, vanpooling or buspooling. There is some overlap between convenience incentives and cost or travel time incentives, since time and cost are often elements of convenience. In general, however, the following incentives appeal most directly to the motorist's sense of comfort and his desire to minimize the effort related to travel.

Preferential parking - Parking specifically reserved for carpools and conveniently located can encourage pooling if parking is in short supply or if the carpool parking would substantially reduce the time or distance between parking lot and building. This procedure may be applied by individual employers either public or private, who control a single parking area or by coordinated management at a multiemployer site. This method offers poolers an advantage over other drivers at the work site in terms of convenience, time savings, and comfort. The methods of application include:

- Assignment of close-in spaces in parking lots to carpoolers and vanpoolers.
- Assignment of reserved parking spaces to poolers.
- Assignment of parking spaces nearest street level in multi-level parking structures to poolers.
- Assignment of sheltered parking spaces, where some parking areas are not sheltered, to poolers.
- Assignment of all parking spaces to carpoolers and vanpoolers only.

Preferential parking can be implemented quickly and inexpensively. It has been proven of significant value in a large number of applications. McDonnell Douglas Corporation, St. Louis, by reserving lots for carpoolers, has achieved a vehicle occupancy rate of 2.8 persons per car.(12) The Connecticut Department of Transportation has reserved 245 choice parking spaces for carpoolers.(13) The successful NASA program, Washington, D.C., allocates preferred spaces on the basis of car occupancy as well as years of service.(14) The provision of 500 close-in parking spaces has been a factor in the increase of carpoolers from 400 to 1,000

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(12) U.S. Department of Transportation, Incentives to Carpooling, January, 1974.
(13) Ibid.
(14) Ibid.

at state offices in Little Rock, Arkansas.[15] GEICO, which is located in an area where parking is difficult to find and large lots can mean an extra 10 minute walk from car to office, has reserved over 500 spaces for carpool vehicles in the company lot.[16] One company in Boston converted its executive parking lot into a preferred parking lot for carpools. To make the point even stronger, it stanchioned off the lot with red velvet rope and placed a uniformed guard at the entrance to usher in the "honored" commuters - and keep out interlopers.[17]

In the Denver area, the Air Force Accounting and Finance Center has in place a very effective preferential parking system. The Center employs some 3,300 people and has a parking facility which extends some distance from the building and is totally managed by the Center's Space Manager. The system is designed to allow the largest carpools to obtain the close-in parking. As the carpools become smaller, the distance between the parking space and the building becomes greater. SOV's must park a significant distance from the building. Requirements for participating are that a carpool must consist of two or more riding to and from work at least 80 percent of the time.[18] The system is actively enforced, with the Space Manager having the authority to deputize personnel to write tickets. If two tickets are received in one month, the driver is prohibited from parking on base. The system is, to a large degree, self enforced. When a pool loses a member, it is given two weeks to secure another rider or lose its space.[19] Management works closely with the local union and has its support, and carpooling was handled as a separate amendment to the contract. The Space Manager estimates that about 40 percent of his time involves the carpool program.

Preferential parking may be a very effective tool for agencies able to manage their parking facilities. A possible disadvantage of this technique is opposition from those who may now have preferential treatment on the basis of rank, seniority, or handicap, and compromises may be required. The Air Force Accounting and Finance Center has handled this problem, in accordance with Air Force regulations, by reserving up to 10% of its close-in spaces for executives (GS-14s, Master Sgts, Lt. Colonels). The local union is requesting that reserved executive parking be reduced to less than 10%.[20]

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(15) U.S. Department of Transportation, Incentives to Carpooling
(16) U.S. Department of Transportation, How to Pool It, May, 1975.
(17) Ibid.
(18) Personal conversation with Mr. Russell Kraus, Space Manager, Air Force Accounting and Finance Center on January 6, 1978.
(19) Ibid.
(20) Conversation with Mr. Kraus.

Facilities for carpools, vanpools and buspools - Employers and public agencies can provide a number of facilities to encourage the use of carpooling and vanpooling. Such facilities generally require little capital or maintenance cost, and in some cases, already exist and need only be designated for carpoolers and vanpoolers.

One successful method for encouraging carpools is to locate and designate certain parking areas for use by poolers as a rendezvous point. Many shopping center lots now are being used in this manner either with or without agreement of the management. Employers could take the initiative to contact and work with the management of these lots to secure arrangements. The Denver Federal Center could be used as a park-and-ride lot for federal employees for carpools and/or vanpools. Arrangements could be made with the Regional Transportation District (RTD) to provide frequent bus service between the Federal Center and downtown Denver during the morning and evening rush hours.

Special loading/unloading areas provided for carpools, vanpools, and buspools can be a real convenience, especially where large numbers of personnel work in one building or where parking lots are large. The Federal Building at 18th and Stout Streets is an excellent example of a location where this method would be applicable. Such loading areas could provide nearly as much convenience as preferential parking and may not involve as many objections from people with existing parking priviledges. The area could be a bay or simply a reserved area that will permit standing for a short time while pool vehicles are loaded and unloaded without interfering with the normal outflow of traffic. The cost of these loading and unloading zones could vary from a minimal cost for some curb paint and a sign to several thousand dollars for additional construction of a bay outside the main traffic lane.

The employer could also provide sheltered waiting areas for carpool, vanpool, and buspool riders as an additional inducement to pool. These may simply be designated areas in existing buildings convenient to pool parking, or shelters may be constructed specifically for this purpose. The cost for this type of facility may vary from an almost negligible cost for designating space in an existing building to several thousand dollars for a new bus-shelter type of building.

Large employers, with company grounds and buildings having various gates and entrances, may reserve areas for the exclusive use of carpools and vanpools. Any other gate or entrance open to employees would also be available to poolers. This type of incentive is more effective in situations where existing access to grounds and buildings is hampered due to congestion or circuitious routings. The cost of this type of incentive is almost negligible. Some federal reservations may be able to utilize the gate and plant entrance method.

Campuses, industrial parks, office parks, federal reservations and other institutions having restricted internal roadway systems can permit carpool, vanpool, and buspool use of restricted roads. This incentive can permit door-to-door service for carpoolers. The above facilities can also restrict roads to SOV's to encourage carpooling and vanpooling.

An effective marketing process will itself be an incentive, because it would be convenient, personal, helpful, and otherwise conducive to participation in the pooling program. Company provision of bulletin boards, information kits, and pool matching systems can be a tremendous benefit. Costs will vary depending on the service provided. Most successful pooling programs provide a good matching service. Refer to the Carpool Matching Methods and Existing Matching Systems sections of this report.

Adjustments to working hours - Carpools, vanpools, or buspools may be difficult to form if people find they are delayed in leaving work by the need to wait for someone who leaves later or must walk substantially further to reach the parking lot. Such delays may be especially discouraging if they cause the person waiting to experience greater traffic congestion in the parking lot or on the street system. Both public and private employers can apply carpool incentives which will permit employees greater flexibility and freedom in arranging pools with other employees who may have different working hours.

Entire pools could be allowed to leave a few minutes early as an incentive to avoid waiting lines in a parking lot at quitting time or traffic congestion on the streets. A further working hour incentive is an overall reduction in working hours for persons who pool, perhaps applied to both ends of the work day. This type of incentive would be more effective for employees not participating in flexitime or staggered work hours.

Other possible incentives are shift rotation preferences for poolers or even a day or half-day off. An alternative approach is for management to encourage the maintenance of normal work hours, so that employees will not be subjected to overtime and can meet their transit pools. This has been done at the Pentagon.

The flexible-working-hours incentive measure would not reduce the total number of working hours by a pooling employee, but would permit working hours to be arranged so that starting and quitting times fall within a specified range. This measure can be implemented for little cost other than any initial bookkeeping charges that might be required. On the basis of the popularity of this type of plan in companies already applying it to all employees, it appears to be an effective incentive. However, the implementation of flexible working hours could

adversely affect existing carpools. Experience of the Air Force Accounting and Finance Center is that carpools were adversely affected for an initial two or three month period, but that after the initial disruptions, carpooling actually increased.(21)

Parking restriction - Pooling is encouraged if the supply of parking is inadvertently or artifically reduced. This may be done by regulating the number of new or existing parking spaces available.

A specific reduction in the number of parking spaces available for non-poolers could be imposed. Local jurisdictions might permit only carpools in designated public and/or private lots and garages during commuter hours. Restriction might be applied on a proportional basis, allowing some provision for single drivers on some priority basis. This technique is employed at NASA, GSA, and several other federal office buildings in Washington, D.C.(22)

Other Incentives

Personalized techniques could be applied to meet the special needs of some employees. For example:

- Matching schemes designed to match smokers with non-smokers.
- Face-to-face meetings on company time for potential carpoolers to get acquainted.
- Carpool information for new employees.

Recognition or monetary awards may be an incentive for employees to pool, use public transit, bicycle, or walk. Examples are:

- Listing of these individuals in company newspaper.
- Time off or bonuses.
- Company or agency luncheons where the company or agency head personally recognizes these individuals.

Walker and Dunlop, a real estate firm in Washington, D.C., gives trading stamps to carpoolers and transit riders. The Gillette Company in Boston, Mass., kicked off its carpool program with a limerick contest, in which four $50.00 prizes were awarded. Mutual of Omaha gave carpoolers free breakfast for the first month of its carpool program. Minnesota Plywood Company held a monthly drawing among its carpoolers for 10 gallons of gasoline.(23)

(21) Conversation with Mr. Kraus.
(22) U.S. Department of Transportation, Incentives to Carpooling.
(23) U.S. Department of Transportation, How to Pool It.

Summary

Table 1 presents a summary of carpool and vanpool employer incentives and relative cost to the employer.

Table 1

Summary of Carpooling and Vanpooling Employer Incentives (24)	Initial Cost	Continuous Cost
Cost-Related Incentives		
Parking Cost	Low	Low
Automobile Ownership Cost	High	Varies, can break-even
Automobile Operating Cost	High	Low
Convenience Incentives		
Preferential Parking	Low	Low
Facilities for Carpoolers and Vanpoolers	Low/Moderate	Low
Adjustments to Working Hours	Low/Moderate	Moderate/High
Parking Restriction	Low	Low
Other Incentives	Variable	Variable

(24) U.S. Department of Transportation, Incentives to Carpooling, January, 1974.

Successful Carpool and Vanpool Programs

The following represents a cross section of relatively successful carpool, vanpool, and buspool programs. Many were sponsored by employers, some by third parties, and an increasingly greater percentage by urban-wide ridesharing campaigns. They all feature convenient, door-to-door service in which the total traveltime is comparable to that of the privately driven automobile.

Carpool Programs

Carpools are one of the most effective ways to decrease VMTs immediately and economically. Carpooling has been "big business" for a long time. Even prior to the energy crisis in the winter of 1973-74, more commuters traveled in carpools than all other forms of shared riding combined. Following are a few successful carpool programs from around the nation. These programs utilize a variety of incentives and carpool matching methods.

Hallmark Cards[25] - In Kansas City, Missouri, Hallmark Cards with 4,000 employees embarked on a carpool-matching program in early 1973. Initially, a survey of existing auto occupancies found 132 cars carrying 460 Hallmarkers in carpools with at least three members. With apparent room for improvement, a low-key program of carpool-matching and parking priorities was established. Without the aid of a carpool computer program, Hallmark collected data from 2,500 employees, hand matched the employees, and distributed a personalized list to each participant. While this approach was adequate, a more efficient computerized matching system was developed. Upon joining Hallmark, each new employee is now offered the option of entering the computerized carpool-matching system and upon leaving, he or she is removed from the system.

Priority parking spaces at the most desirable locations are reserved for carpools of three or more. Management, not in three-person carpools,now parks immediately behind the carpoolers in the next best spaces. These efforts have proved fruitful as the three-person carpools doubled to 258 carrying 907 employees. The above figure, based on an estimate of two-person carpools, indicates there are over one-third of all Hallmark employees currently pooling to work in private autos.

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(25) U.S. Department of Transportation, Carpool and Buspool Matching Guide, Fourth Edition, January,1975.

Jantzen, Inc. [26] - In April 1973, Jantzen, Inc., a clothing manufacturer, decided to make an effort toward reducing pollution. Because there was little or no direct industrial pollution from its facilities, the policy of aiding employees in forming carpools at all Jantzen facilities was established. At each site, the Jantzen supervisors distributed and collected carpool data forms, resulting in an 80 percent response. With 3,360 employees at seven sites in four states, carpools increased by an estimated 30 percent to a current total of 45%. The participation at these sites varies. For example, 48% of the 207 employees in Los Angeles, and 35 percent of the 1,568 employees in Portland, Oregon, are carpooling. In July, 1974, 90% of all new carpools were still operating.

The company believes that the individual's self-motivation is the key to success. It's objective is to make it convenient for employees who are interested in carpooling to get together. Excellent matching services were provided along with posters for bulletin boards, a few buttons, and a pamphlet titled "What's All This Talk About Carpooling." Jantzen used a map board with pins representing residential location of employees instead of computer listings, as many locations had only a few hundred employees. Because of plentiful parking, incentives such as preferential locations were not established.

General Dynamics [27] - The auto occupancy of 6,600 General Dynamics employees increased from 1.2 to 1.87 by June, 1974. General Dynamics is located about 10 miles west of Fort Worth, Texas. Auto occupancy exceeds an average of two persons after the summer vacation periods.

General Dynamics developed a grid-based carpool computer program modeled after the Federal Highway Administration (FHWA) program. One square-mile grids were superimposed on maps and distributed to employees along with a questionnaire and memorandum explaining the program. The matching process was believed to be extremely important to the success of the program. General Dynamics obtained a 96% return rate on the questionnaires. To aid in forming carpools, four starting shifts were consolidated into two shifts, one at 7 a.m. and one at 8 a.m.. Since parking is convenient and plentiful, parking priorities were not established.

Federal Highway Administration (FHWA) [28] - On a small group basis, carpooling was actively promoted among 72 FHWA employees arriving in Washington, D.C., in November, 1971. The employees were informed of an official U.S. Department of Transportation (DOT) policy requiring carpools

(26) U.S. Department of Transportation, Carpool and Buspool Matching Guide.
(27) Ibid.
(28) Ibid.

with three or more participants as a parking permit prerequisite. Within a month, 55 % selected carpools averaging 4.1 persons per car. Of the remaining, six walked to work, five could not be matched, and 26 took the bus. This is an example of matching a small sample in a large metropolitan area.

Also, in Washington, D.C., the FHWA completed its first computerized carpool matching program in August,1972 by distributing a personalized computer listing to over 600 participating employees. To determine the program's impact, a comprehensive followup questionnaire was distributed in October,1972. The results indicated an average auto occupancy of 3.8 among carpoolers and an overall occupancy of 2.34 for all FHWA employees. The latter figure increased to 2.45 after a carpool-matching program was implemented. The unusually high before occupancy can be largely attributed to a DOT policy requiring most employees to be in a carpool to obtain a parking permit. Even with extensive ridesharing many employees indicated that the carpool lists helped improve their existing carpools by allowing them to switch members, thus making the carpools more convenient. Over 90% indicated a desire to see the matching service run periodically every six or twelve months.

Baltimore federal employees [29] - Federal employees from various agencies in Baltimore were asked to participate in a pilot testing of the FHWA Carpool Matching Program. Initially, listings were produced and distributed to over 600 participating Federal employees in July,1973.

In November, 1973, the effort was expanded to include additional Federal agencies in nearby buildings. Of 6,000 employees in the survey group, 3,600 returned carpool-matching questionnaires.

In March, a followup survey of commuting habits was completed. Carpooling was up 7 % from the previous July to a total of 36% of employees. A breakdown of other modes of transportation shows 42 percent commuting by other means.

Washington, D.C. [30] - In the Washington, D.C. metropolitan area, the Washington Metropolitan Council of Governments, the Board of Trade, and the Washington, D.C. Department of Highways and Traffic sponsored an areawide carpool program. Given the low occupancy rate of the automobile for commuter purposes (1.2 persons per vehicle for work trips from suburb to suburb and 1.5 from the suburb to Washington, D.C.), carpooling is one of the primary measures proposed to implement the National Ambient Air Quality standards for carbon monoxide and photochemical oxidants.

(29) U.S. Department of Transportation, Carpool and Buspool Matching Guide.
(30) Ibid.

Increased carpooling resulted from the public service campaign, carpool-matching at over 100 employment sites, and the energy crisis. Determining the increase in carpools due to matching or advertising has yet to be accomplished. However, one thing is certain: downward auto occupancy trends in Washington, D.C., were broken; auto occupancy on the Potomac River Bridges in May, 1974 were up by 8% over May, 1972 figures.

Vanpool Programs

Following is a discussion of a successful vanpool program. Additional programs are discussed in the report Vanpooling - An Overview.

In St. Paul, Minnesota, the 3M Company, with 8,000 employees, established a "commute a van" pilot program serving areas inconvenient to public transit or 3M's buspool program. The initial demonstration used six popularly-sized, 12-passenger vans, and "Pool coordinators" for drivers who are permanent 3M personnel. Participants saved up to $15 monthly on parking costs and $75 per month on auto expenses. The 3M vanpool program now has some 90 vans.

Buspool Programs

The buspool, sometimes called "Bus Club" or "Subscription Bus," represents transit service where the riders determine the operating parameters of the service (routes, origins, destinations, etc.). The buspool concept may include various approaches, such as charter, contract, subscription, and user-owned buses. Buspools usually originate at a limited number of stops, generally fringe parking areas. Collection time is minimized and riders are guaranteed a seat. The bus travels nonstop to the destination, which may be a single employer or several employers in the immediate vicinity. Thus, the outstanding feature of a buspool is its fast, point-to-point, convenient service. The buses can travel at the same speed as the automobiles providing for excellent travel times, and when bus lanes are provided, the buses may even be substantially faster than automobiles. Buspool growth has been rapid over the past eight to nine years. Documented examples of successful buspool experiences can be found in the following cities:

Reston, Virginia	Rochester, New York
Mantua, Virginia	Tuxedo, Maryland
Columbia, Maryland	Palo Alto, California
Los Angeles, California	Fredericksburg, Pennsylvania
St. Louis, Missouri	Detroit, Michigan
Meriden, Connecticut	Omaha, Nebraska
Pittsburgh, Pennsylvania	San Francisco, California

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(31) U.S. Department of Transportation, Buspools, January, 1974

It should be noted that buspools may not be the most efficient pooling from an energy conservation standpoint. Single direction use of a buspool with deadheading (a trip without passengers) may result in an operation that would most effectively use autos or vans without the deadheading problems since autos and vans can be parked at the end of the trip. Another potential problem is the necessity for available buses. In many locations, surplus buses may not be available and transit operators may not be willing to charter buses since they already have a peak-hour demand problem.

St. Louis, Missouri - In the greater St. Louis area, a private bus company providing express bus service has grown from one to 22 buses in 15 years. Financed 100 percent from the farebox, the company provides service from semi-rural towns 25 to 50 miles from the passenger's suburban employer, the McDonnell Douglas Corporation. When passengers were interviewed, their number one concern was travel time, with cost an important second. If either of these was excessive, they would return to carpools. By minimizing the service stops (the loading and discharging of passengers) to an average of three per bus through well-located fringe parking areas, the buses not only reduced total travel time, but provided smooth, virtually nonstop service which the passengers appreciated. This nonstop service, in combination with comfortable seating, allowed the passengers to sleep, which was a big favorite. This private bus company has grown not by accident, but by a sincere effort to serve the commuters' desires.

Reston Commuter Bus [32] - Over seven years ago, Reston, a growing new suburban community with a population of only 3,000, initiated its first express commuter bus to Washington, D.C., 25 miles away. Today the town has a population of 23,500. Commuters are served daily by approximately 48 bus runs financed entirely by fares. The typical passenger is a middle-class suburbanite, the type who supposedly will use only his private automobile. There are various reasons for the success of the program, but the major one is relatively fast, convenient service. According to a November, 1971, survey, 56 percent of the passengers ranked the reduction of travel time first in importance in increasing ridership.

While the Reston program has proved to be an outstanding success, it began only after residents had tried in vain to get scheduled express bus service started in their area. Actually, the bus company's refusal to provide scheduled service was a blessing in disguise as it led to a flexible user-controlled contract or "buspool" operation. Routes can be improved at will without the time-consuming scrutiny of a regulatory body, payment is generally made by check, and the routes to and from Reston can be varied allowing the bus to adapt to traffic conditions.

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(32) U.S.D.T., Carpool and Buspool Matching

Government Employees Insurance Company (GEICO) [33] - GEICO, located in Chevy Chase, Maryland (a suburb of Washington, D.C.), responded to a parking shortage with a carpooling and buspooling program. The company provided buspools from park-and-ride lots at outlying shopping centers to the GEICO office. This employer-instituted program indicates the potential for organizing buspools at this level. The employer can provide one of the most efficient catalysts for buspooling. The necessary factors of place of residence and work hours are known by the employer, thereby allowing the employer to effectively institute buspooling service for employees.

Tuxedo, Maryland [34] - Atwoods Goldline Service in Tuxedo, Maryland (suburban Washington, D.C.) charters buses to various groups which are responsible for determining pickup points, destinations and schedules. Each group is responsible for its own fare collection. The amount of bus club business has expanded from one bus per day in 1968 to approximately 15 buses per day at the present time. Groups using the service are varied, with rider clubs and employer-sponsored service being represented.

- National Geographic Society - 8 buses per day
- Washington Bus Riders, Fort Meade - 1 bus per day
- Congressional Secretaries Club - 2 buses per day
- EPA employees - 1 bus per day
- Atomic Energy Commission - 3 buses per day

Service varies by commuter group. The EPA group commutes between a suburban shopping center and downtown Washington, D.C. (approximately a 30-mile one-way trip). The AEC group commutes between Germantown, Maryland and downtown Washington, D.C. (a one-way distance of 40 miles). Revenue is remitted by the bus clubs at mutually agreed intervals. The operation is managed and controlled by Atwood Goldline Service. The services all originated from telephone inquiries by interested parties.

Two problems of significance involved (1) the bus operators who consider the jobs rather undesirable because of the long distance trips, and (2) an insufficient number of buses. There have been no regulatory or insurance problems. Atwood will continue to seek this type of business so long as equipment is available and operators can be found to drive the buses.

(33) U.S.D.T., Buspools
(34) Ibid.

V. TRANSIT-RELATED INCENTIVES

Increased use of mass transit for commuting to and from places of employment can significantly reduce vehicle miles traveled. A few obvious benefits include less traffic congestion, increased energy conservation, and improved air quality. This section discusses a few incentive measures which may induce employees to use mass transit facilities.

Subsidized Transit Fares

Payment of all or a portion of the cost of commuting by public transit has been an effective incentive for many employers. The Port of Portland will pay up to $16 per month (the cost of a monthly bus pass) to employees who ride the bus 90 % of the time, exclusive of educational leave, sick leave, and vacation.(35) The local transit company, Tri-Met Bus System, increases the effectiveness of this incentive with relatively good service including transit malls, symbols for different areas of town, senior citizen $0.10 fares and the $16 monthly pass.(36) By providing the transit fare incentive in addition to the parking cost incentive, the Port is not encouraging individuals to abandon public transit for carpools.

In the Denver area, a few downtown Denver employers have ongoing public transit incentive programs. For example, the United Bank of Denver has had a transit subsidization program in place for some time. From the time the program was instituted to the present, the Bank has paid employees the price of a one-way local fare ($0.35).(37) As of January,1978, the price of local fares was increased to $0.50. However, because the Bank's budget had been submitted prior to the increase, the subsidy remains at $0.35. Estimates as to the effect of the price increase on bus ridership are not available at this time.

This type of incentive may be difficult to implement at the federal level. However, if agencies begin to provide free or low cost parking for carpools and vanpools, something must be done to minimize the possible negative impact on public transit.

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(35) Personal conversation with Ms. Messinger, Port of Portland on January 9, 1978.
(36) Ibid.
(37) Personal conversation with Mrs. Barbara Alcorta United Bank of Denver, on January 5, 1978.

Adjustments to Working Hours

Work hour adjustments may benefit public transit agencies, by spreading the commuting period over a longer period of time, thereby allowing service to an area by more than one express bus. Transit users could be allowed to leave a few minutes early as an incentive. Other possible incentives are shift rotation preferences for transit users or even a day or half-day off.

The implementation of a staggered working hours program by a number of employers could provide for better transit services. By staggering the peak commuting times over a longer period of time, public transit services to some areas could be increased, providing an incentive to ride the bus. Downtown Denver, Inc., in cooperation with RTD and the Denver Regional Council of Government (DRCOG), is presently attempting to develop a staggered working hours program with the 500 largest employers in the Downtown Denver area.(38) The purpose is to encourage the use of public transit for commuting to and from the downtown area by providing more frequent bus services to more areas of the system. The project is designed to relieve downtown traffic congestion and improve the area's air quality.

Other Incentives

Recognition or monetary awards may be an incentive to inducing employees to use public transit. Examples include:

- Listing of these individuals in company newspapers
- Time off or bonuses
- Company or agency luncheons where the company or agency head personally recognizes these individuals.

Walker and Dunlop, a real estate firm in Washington, D.C., gives trading stamps to carpoolers and transit riders.

Another incentive aid is to provide bus route maps and schedules in a convenient place for employees, and selling bus passes at the employment site. Many employers presently provide tnese services.

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(38) Personal conversation with Mr. Phil Milstein, Executive Vice President, Downtown Denver, Inc., on January 28, 1978.

VI. NON-MOTOR VEHICLE RELATED INCENTIVES

Other measures which may be used by employers to reduce VMT include encouraging employees to bicycle or walk. Employers would need to encourage employees to live near their places of employment for maximum effectiveness. Incentives that may be implemented include:

Bicycle Information

As stated previously, bicycle information services could be provided by employers. Information services would include a list of bicycle purchase and repair shops, regional bikeway maps, registration and licensing materials, and safety information. Safety education programs could be provided by the employer during working hours. Parking racks could be provided in secure, sheltered areas.

List of residences

Employers could maintain a list of available residences within walking distance of the office, for use by new employees in house or apartment hunting, locating a permanent residence, and current employees wishing to relocate.

Shower facilities

The employer could also provide facilities for bicyclers or walkers desiring to freshen up prior to reporting to work. These facilities would also be available for individuals after jogging or exercising activities.

VII. CARPOOL MATCHING METHODS

There are many ways to structure a ridesharing program. Each program must be designed to fit the needs, goals and objectives of the individual company or organization. Even though informal ridesharing has been going on for years and methods for developing and maintaining a ridesharing program are not new, the recent resurgence of interest in ridesharing has produced a new, fast-moving technology. A comprehensive carpool, vanpool or buspool program requires an information service which matches commuters' travel needs. Generally, it is difficult to establish an acceptable carpool among associates due to their widespread, random residences. By enlarging the universe of potential matches to include virtually all employees at a specific location, the carpool information service can bring together commuters sharing similar travel needs, especially when other substantive incentives to pooling are present.

In addition to a carpool/vanpool/buspool locator service, other facets of a comprehensive carpool service are:

- Public information to inform the commuter of the benefits of carpools and buspools;
- Incentives to establish parking priorities for carpools, and where feasible, priority lanes;
- Continuing programs to provide carpool locator assistance for new and moving employees.

Although setting up a ridesharing program is 90 percent common sense, a review of the steps used by others will be helpful to anyone involved in developing a program.

The two basic categories of matching systems are manual and computer. Manual systems may be self-service or operated by assigned personnel. Computer systems always involve control and matching through a centralized coordinator. Manual systems are most suitable for small companies of 100 to 1,000 employees. (39) Where large numbers of employees are involved, computer programs generally prove the more effective. Many companies have started with a manual system and later converted to computerized matching since it is often quicker to implement a manual system. When a company foresees doing this, care should be taken to provide for easy conversion to a computer system.

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(39) U.S. Department of Transportation, Manual Carpool Matching Methods, January, 1974.

Basic advantages and disadvantages of manual systems, particularly self-service systems, include:

. Advantages

- low cost
- quick implementation
- more personal involvement

. Disadvantages

- need continuing strong promotion and incentives
- system maintenance deteriorates without management assistance
- locating errors occur often
- feedback is poor on what ride pools are actually formed, so that follow-up efforts are difficult to organize.

Some advantages and disadvantages of computer-assisted programs are:

. Advantages

- quick matching of large volumes
- minimum employee effort for matching
- can be administered among a number of employers to widen the potential numbers of poolers
- errors are minimized
- provides list of potential matches to each employee
- simplifies follow-up on no-matches

. Disadvantages

- higher startup costs than manual systems, although the per match cost may be less
- company computer equipment may not be applicable
- not always suitable to smaller employers

Whatever matching system is selected, one must consider the following:

- potential size of the ridesharing program
- possibility of expanding program to fit into multiemployer or community-wide programs, i.e., DRCOG
- ability of available data processing equipment to handle pooling operation
- desired degree of control over the program

The following matching techniques will be discussed:

- manual matching techniques
- centralized matching techniques
- locator board methods
- roster technique

Manual Matching Techniques

There are several satisfactory self-service manual systems which may be used for matching employees. The three basic methods that presently have the most widespread application are the centralized matching technique, locator board method and the roster technique. These methods are described in some detail in the following sections.

Carpool and buspool matching has been most successful at places of employment. Manual methods may also be used by such groups as neighborhood volunteer groups, home-owners and apartment dwellers, associations, PTA's, churches, and government agencies in suburban cities. There are only a few examples of very successful large scale neighborhood carpool and buspool matching processes. Most neighborhood pools are formed by informal matching between neighbors and friends. Work-based matching systems work best because of (1) the higher concentrations of people at work locations, making it easier to contact potential poolers, (2) employer involvement in matching activity, (3) the opportunity to provide tangible incentives, and (4) existence of common problems such as parking scarcity. (40) Many companies have never gone into the intricacies of computer matching and still have achieved impressive results.

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(40) U.S. Department of Transportation, Manual Carpool Matching Methods January, 1974

Centralized Matching Technique

This technique utilizes a single person or group for managing and operating the carpool.buspool matching program. It has responsibility for distributing questionnaires, geocoding of questionnaires, matching potential carpoolers, monitoring and other activities to insure a successful ongoing program.

The first step in this program involves the preparation, distribution and collection of questionnaires. A grid system is drawn on a large scale map of the area. The supervisor locates the grid cell containing the residence of each participant, codes the grid cell designation in the corner of the questionnaire, and sorts the questionnaires into groups on the basis of grid cell number. The supervisor records the names, addresses, telephone numbers and working hours of all respondents within a particular grid cell. The list is copied and distributed to all respondents in that grid cell for their use in organizing carpools. If the grid cell contains fewer than four persons (to allow some choice in compatible poolers), the list is expanded to include adjacent cells until a sufficient number of candidates is identified. Possible parking and pool facilities are located and supplied to the list of potential poolers. Pools are normally formed through individual initiative once the match lists have been distributed.

The system should be monitored for effectiveness. The pool supervisor may distribute another questionnaire asking those persons who have formed pools to notify the supervisor. Effectiveness may be monitored by counting the number of cars in the parking lot, sampling the occupancy levels of cars arriving at the lot, and tracking the number of carpools which are receiving company-offered incentives.

Periodic surveys should be made to insure that data files are kept up to date. Existing carpools that have vacancies should be supplied lists of potential new members. The pool supervisor must work closely with the personnel department to keep current on terminations, transfers, hirings, or changes in residence or working hours.

Locator Board Method

A grid system is displayed on a larger map of the metropolitan area, as with the centralized method. Employees enter their personal information on a card, also identifying their home area, using grid coordinates from the locator map. The individual's information card is placed in a pigeonhole marked with the same coordinates as his home. To find matches, he searches the box for cards of other employees living in his area, and if suitable matches are not found, he can pull cards from adjacent grid cells. This system is, for the most part, self-sorting.

The system is largely a self-operated system requiring a minimum of supervision. However, editing of the information cards to catch errors in coding home locations is required. If there are many small and medium-sized employers housed in the same office building, this method could be easily applied as a cooperative project, or could be supplied and supervised by building management. One shortcoming of the Locator Board Method is that only one board should be used to serve a group of employees. The board must be in a location that is frequented by the majority of employees. Using more than one board in a large facility may attract participants but also may dilute matching effectiveness.

Roster Technique

The roster system is the simplest, least formalized system in use. For smaller groups of employees (less than 100) a Roster Technique using a numbered list of names, addresses and phone numbers, in conjunction with numbered tacks on a map of the area, is probably sufficient to achieve a reasonable level of pooling. A roster of personnel is prepared which includes the same information required by the method previously described, i.e., name, address, work hours, telephone number, area of residence. This roster is posted in a convenient location for employees. Beside each number is a map tack with a matching number. Those employees interested in pooling write their names, addresses and phone numbers on the appropriate spaces on the form. They would then take the map tacks, whose numbers correspond to the line numbers containing that information, and place the areawide map at appropriate residential locations. To locate potential carpool mates, an employee inspects the map and determines visually the map tack numbers most conveniently located for pooling, then goes to the numerical list and determines the names and telephone numbers of the corresponding persons.

The Roster Technique requires little or no monitoring or maintenance after the initial roster and map have been posted. Once employees have formed carpools, their map tacks should be removed and their names crossed out.

Most of the operating programs are hybrid of two or more of the methods described above. The NASA program which will be described later, uses elements of all three methods. The Hallmark Card Company program, which was briefly described earlier, is an example of the pure Centralized Matching Technique.

The Roster Technique is usually considered the least expensive in terms of manpower and direct expenditures and is most appropriate where there are only about 100 or fewer potential carpoolers being matched. The Locator Board Method is most effective where there are from 100 to 2,000 potential poolers,or when used as a team effort by a group of small to medium-sized employers located in the same building. The Centralized Matching Technique should always be used where the potential exists for going from manual to computerized matching. It's major drawback is that it has a higher manpower requirement than the other two methods.

Successful Programs

This section identifies several existing matching programs utilizing the preceding methods and representative costs of implementing and operating them.

Hallmark Card Company

This is an example of a large employer which used a centralized manual matching method to get a carpool program working. Hallmark began to experience a parking supply problem in 1973. Management resorted to a carpooling program in an attempt to alleviate the problem. Hallmark conducted a survey of its 4,500 employees and some 2,500 responded, by returning a questionnaire which indicated their desire to carpool, telephone numbers, and addresses, including zip codes.

One employee worked nearly full-time for more than two months in performing the matching process and sending lists of names to potential carpoolers. It was often necessary to use detailed street maps to locate the employee's residences since the questionnaire asked only for address and zip code and in some instances, zip codes covered large areas (many square miles). One unique feature of the Hallmark system was the use of 8½"X11" double thickness paperboard sheets which contained ten slots capable of holding the questionnaire. The responses were placed in these slots so that only the names and work telephone numbers of the respondents were showing. These were then photo-copied and distributed to potential carpool members.

The process resulted in a substantial expansion of carpools which alleviated the parking shortage. As an incentive, a reserved parking space was provided for each carpool, resulting in about 300 officially registered carpools, each with a minimum of three persons per vehicle. The fact that Hallmark is now converting to a computer-based system suggests that a manual matching method may not be a practical method for an organization of this size.

Pentagon Locator Board

The Pentagon Building in Washington, D.C. utilizes a self-service Locator Board approach. The board is located in the Mall area of the building, a high traffic area with shops and other attractions. The board is complete with instructions and a map marked with numbered grids. Incentives related to reserved, close-in parking have for many years provided the motivation for carpooling.

A carpool supervisor registers the carpools and assigns parking. The supervisor also does minor housekeeping chores, such as clearing outdated cards from the pigeon holes and maintaining a reasonable reservoir of blank cards.

Motorola Transportation Availability Console

An electronic Locator Board method of carpool matching hardware (non-computerized) was developed and implemented by Motorola, Inc. Communications Division in the Chicago area. The console consists of an equipment enclosure with an illuminated map of the surrounding area. The person who desires a ride or has a vacancy in an existing carpool completes a color coded card. The card contains such information as name, department number, plant phone extension, and starting time. The card is inserted into a numbered slot which corresponds to the number on the map in the vicinity of his home. A green light on the map is illuminated for a driver available; a red light designates a rider available. An employee can check the console for transportation availability at a glance.

The console is placed in a high traffic location in the plant where it is visible to the greatest number of people. It has been in use for about eight years and has received good support from the employees. Prime parking locations are set aside for carpool parking. To qualify for a space, members must present their cards at the personnel office for validation.

Denver Regional Council of Governments

The DRCOG utilizes a computer assisted Centralized Matching System. Prospective carpoolers are required to complete a questionnaire (see next page). Information from this form is keypunched, and the prospective carpooler is located on a map. Grids are one square mile in area. The computer supplies five names from the particular grid. If five names are not available, the system is able to supply additional names from an adjacent grid. The prospective pooler(s) is responsible for making all contacts and arrangements. Approximately 13,400 individuals participate in the program.(41) Turnaround time is about five working days. DRCOG is currently improving their system in terms of turn around. Their goal is to have "real time" matching via telephone.

Manpower Requirements and Costs

There is not a lot of data available on the manpower requirements and costs of developing the various types of matching programs. The Town of Vienna, Virginia implemented a home-based carpool matching program which cost approximately $450 for composing and printing 5,200 questionnaires (8.7¢ each) and $325 in postage, $225 for mailing out questions (4-1/3¢ each) and $100 for returned responses (20% at 10¢ each). The Town's planner spent 10 days over a five-month period organizing and executing the program, while a local service organization provided eight person-days of effort in the matching phase of the program.

The following typical costs and manpower requirements for a home-based carpool program are somewhat higher than the Vienna program:

Direct Costs(42)

Questionnaires

Printing	$100 for 5,000 (2¢ each)
Mailing Costs (Direct Mail Permit)	$200 for 5,000 (4-1/3¢ each)
Return Mail Costs	$100 for 1,000 (10¢ each)

Carpool Lists

Paper	$ 10 for 1,000 sheets
Postage	$ 80 for 1,000 lists

Manpower Requirements

Program Coordinator	10-15 workdays over three months initially plus 1/2 workday per month for maintenance
Matching Personnel	10-15 workdays over one-two weeks

(41) Presentation by Mr. Fred Wolfe, Denver Regional Council of Governments, at a EPA Region VIII sponsored meeting on January 31, 1978.
(42) U.S. Department of Transportation, Manual Carpool Matching Methods.

Denver Regional Council of Governments

DOUBLE UP! CARPOOL SURVEY

PRINT ONE LETTER OR NUMERAL IN EACH BLOCK — PLEASE LEAVE SPACE AFTER EACH WORD

①

FILL IN NUMBER:
1. NEW POOLER
2. CHANGE
3. DELETION

SOCIAL SECURITY NUMBER

EMPLOYEE NAME
LAST AND FIRST

HOME ADDRESS
NUMBER | DIR. | STREET NAME ONLY - NO CITY, STATE, P.O. BOX OR RTE # | TYPE

EXAMPLE
HOME ADDRESS 03256 | E | 82ND | AV
NUMBER | DIR. | STREET NAME ONLY - NO CITY, STATE, P.O. BOX OR RTE # | TYPE

ZIP CODE

WORK DAYS
SUN MON TUE WED THUR FRI SAT

CURRENT MODE OF TRANSPORTATION: 1. CARPOOL 2. BUS, 3. DRIVE, 4. WALK, 5. OTHER

IN A CARPOOL DO YOU PREFER: 1. DRIVE 2. RIDE, 3. EITHER

DO YOU PREFER: 1. NON-SMOKING 2. SMOKING, 3. DON'T CARE

DIRECTION
(LEAVE BLANK IF NOT A SPECIFIC PART OF YOUR STREET ADDRESS)
N — NORTH
S — SOUTH
E — EAST
W — WEST

STREET TYPE

AVENUE	—	AV
BOULEVARD	—	BL
BYPASS	—	BY
CIRCLE	—	CI
COURT	—	CT
DRIVE	—	DR
HIGHWAY	—	HW
PARKWAY	—	PK
PLACE	—	PL
STREET	—	ST
TRAIL	—	TR
VIADUCT	—	VI
WAY	—	WY
LANE	—	LA
ROAD	—	RD

②

TELEPHONE (WORK OR HOME) — EXT.

WORK HOURS
STARTING TIME : QUITTING TIME

EXAMPLE { SHOW 8:00 A.M. AS: 08 : 00
AND 4:30 P.M. AS: 16 : 30 }

EMPLOYER NAME

EMPLOYER ADDRESS
NUMBER | DIR. | STREET NAME | TYPE

ZIP CODE

ALL INFORMATION ON THIS SURVEY WILL BE USED ONLY FOR CARPOOL MATCHING AND FOR STUDIES RELATED TO TRANSPORTATION PLANNING REQUIRING GROUPING OF PERSONS BY ORIGIN AND DESTINATION. THE DENVER REGIONAL COUNCIL OF GOVERNMENTS ASSUMES NO LIABILITY FOR ITS USE BY THIRD PARTIES

☐ I DO NOT WISH CARPOOL INFORMATION, AT THIS TIME.

Another program, for a plant with 400 to 500 employees, was a hybrid employment-based system utilizing elements of the Centralized Matching Technique and the Locator Board Method. The majority of the program coordinator's time was devoted to the supervision of the incentive program. The carpool/buspool locator systems were largely self-administering.

The largest direct cost is the construction of the carpool/buspool locator board containing the urban map and pigeonholes for completed questionnaires. Following are costs that one

Direct Costs (43)

Questionnaires	
Printing	$ 5 for 500 (1¢ each)
Map Tacks	$30 for 500 (6¢ each)
Locator Board	
Total Costs	$250
Manpower Requirements	
Program Coordinator	8 workdays over 2 months initially 1 workday per month for maintenance
Secretary	5 workdays over 2 months initially 1 workday per month for maintenance
Matching Personnel (centralized method only)	5 mandays initially

(43) U.S. Department of Transportation, Manual Carpool Matching Methods

VIII. LEGAL AND INSTITUTIONAL ASPECTS

Legal Issues

This section identifies and briefly discusses the possible legal implications of carpooling programs, with particular emphasis on the law in Colorado. The discussion is not intended to be definitive or exhaustive, but rather to alert potential sponsors and participants to the major legal issues involved, so that they may make whatever further inquiries they deem necessary.

Regulatory status of carpools - Carpooling encompasses two basic types of arrangements: (1) members of the group may alternate in driving their own vehicle, or (2) one or more members may simply contribute to the expenses. The differences in the arrangements do not appear to be significant from the standpoint of regulatory status. It is to be recognized that in each arrangement an element of compensation or consideration is involved, insofar as the carpool members perform obligations in exchange for benefits; but that element is not determinative of whether either arrangement is within regulatory boundaries. The controlling factor, it would appear, is whether the arrangement is one for business or private gain, as distinguished from one involving the use of highways in the ordinary course of life and business. The use of streets and highways under the former arrangement is considered a privilege subject to government control, whereas the latter arrangement is considered a right inherent in members of the public.

Under Colorado law, the critical factor in determining if a carpool or vanpool program falls within the regulatory jurisdiction of the Public Utilities Commission (PUC) appears to be whether or not it involves transportation "for compensation." The PUC has not promulgated any regulations nor issued any guidelines or policy statements to aid in determining whether carpooling or vanpooling arrangements fall within the somewhat vague statutory language. However, it is presently taking the position that the sharing of expenses does not of itself constitute compensation.

An arrangement whereby the driver obtains some special benefit, such as the use of a company or government vehicle in the evenings and on weekends, presents a closer question. Perhaps the most that can be said is that the PUC has not, thus far, shown any eagerness to become involved in regulating these types of programs.

Applicability of guest statutes to members of carpools - A substantial number of states have statutes which, in effect, impose upon the driver a lower standard of care towards a passenger who is a guest than to a for-hire passenger. In a few jurisdictions, the concept has been judicially imposed.

In the early 1970's Colorado repealed its "guest statute." This means that there is no longer the dual standard of liability towards passengers. A driver in the State of Colorado is expected to exercise the accepted standard of care at all times. However, if Colorado's workmen's compensation statute were found to cover a particular type of carpool or vanpool program (see discussion under Responsibility of Sponsors, below), then, where both were acting within the scope of their employment, one employee would be barred from suing another.

Possibility that driver's negligence will be imputed to passengers - Imputing the driver's negligence to the carpool passengers can have two possible effects: carpool members may be jointly liable with the driver for negligence causing injuries to third persons; carpool members may be barred, in whole or in part, from recovering from a third person whose negligence, together with the negligence of the carpool driver, causes them injuries.

The theory of imputed negligence is variously predicated upon concepts of joint enterprise or joint venture, on the basis of which each member of the enterprise is held responsible for the negligent operation of the motor vehicle (regardless of which member is the driver or who owns the vehicle). Imputed negligence rests upon a showing that the vehicle was operated for a common purpose and that each member of the joint enterprise had an equal right (whether or not exercised) to control the operation of the vehicle.

It is unsettled whether carpool arrangements fall within the above category, subjecting members to the possible consequences of imputed negligence. Whether or not the doctrine is applicable may well depend upon the particular carpool arrangement. (It should be noted, however, that it is generally held that the negligence of the driver will not be imputed to the passengers for the purpose of barring recovery by them for personal injuries resulting from the driver's negligence.)

Responsibility of sponsors of carpooling programs - There is an absense of legal precedents bearing directly upon the question of whether sponsors of voluntary carpooling programs may be required, as a matter of Law, to provide assurance of any kind with respect to vehicle or driver safety. However, the responsibility of the sponsor will probably depend upon what kind of pooling arrangement the sponsor organizes -- the less mandatory the plan, the less likelihood of sponsor liability. Thus, it is unlikely that the sponsoring agency would be held to a standard of care to investigate questions relating to safety and security of carpool participants in any case where, as sponsor, it organizes and administers a voluntary carpooling program in which drivers and passengers with common transportation interests are identified and matched but are not assigned or in any way compelled by the sponsor to participate.

Although it would not appear that an agency or an employer which simply sponsors or renders limited assistance in the development of a carpool program would, as a general rule, have responsibility to take any steps to secure passenger safety, a standard of care may be imposed upon the sponsor if the nature of the program is such that there is reason to believe that the participants may rely upon some effort by the sponsor to determine whether the transportation offered by the program is reasonably safe. For example, if the carpooling plan has been imposed upon employees by an employer as a condition of employment and the employer or sponsoring public agency actually assigned employees to a specific carpool, a standard of care to make some investigation with respect to safety matters may arguably be implied, upon a contract or tort basis. Similarly, a labor organization which, in conjunction with an employer, participated in the establishment and management of a planned transportation program of this kind, may also be exposed to liability upon this basis. And, of course, the most likely situation in which liability would be imposed upon the sponsor is one in which the sponsor provides and services the vehicle; the sponsor would necessarily be responsible, at a minimum, for its condition.

At least one sponsor of a computer-matching system requires participants to sign statements releasing it from any liability in connection with the program. This type of formal release may represent an overbundance of caution, and may also be legally ineffective, since a court may void a release which it believes is unfair under the particular circumstances. Nonetheless, it is advisable for the sponsor to explicity inform program participants of the limits of the responsibilities it has undertaken.

Two other issues deserve note. One is the possibility that Colorado's workmen's compensation statute would be found to cover particular types of carpool and/or vanpool programs. Although the general rule is that injuries sustained by an employee off the employer's premises, outside of the fixed hours of employment, in the course of commuting to or from work, are not compensable under the statutes, there is a recognized exception where special circumstances are found to create a causal connection between the conditions of employment and the resulting injury. In a recent Colorado case, in which an employee slipped and fell in a parking lot adjacent to her office building, it was held that, because free parking in the lot was a fringe benefit of her job, she was entitled to receive workmen's compensation benefits. This reasoning might be extended to cover the situation in which a carpool or vanpool program was provided as a "fringe benefit" by an employer, as where the company furnished the vehicle.

There is also a question regarding an employer's liability to third persons injured because of the negligence of an employee driving a motor vehicle for carpool or vanpool purposes. Colorado follows the common law rule that mere ownership of a motor vehicle does not make one responsible for the negligent acts of another to whom the vehicle is loaned. However, if an employee is operating a vehicle within the scope of his or her employment, even if it is not the employer's vehicle, the employer will be held responsible for the negligent acts of the employee, under the doctrine of respondent superior. (This in no way relieves the employee of his or her responsibility; rather, the injured third person may sue either or both.) Thus the employer's liability will depend upon whether the carpool or vanpool arrangement is such that the driver can be said to have been performing services necessarily incidental to his or her employment, so as to bring his or her actions within the scope of employment.

Competitive aspects of carpooling/vanpooling - The issue here is whether any action by affected transportation interests would lie either against state or local governments, private sponsors of carpool programs, or participants in carpool programs for interference with rights of any bus or mass transit system, including taxi operators, under a certificate of public convenience and necessity, a franchise or operating permit. Although there is an absence of legal authority on this issue, it would seem unlikely that, in states such as Colorado where carpools and vanpools are considered to be outside the regulatory scheme, such programs would be held to interfere with transportation interests which are subject to regulation.

Government charge for parking on federal reservations - The Public Buildings Amendments of 1972 (P.L.92-313, 86 Stat. 219, June 19, 1972) established the concept of charging users of space and services their approximate commercial value. This requirement applied to all executive agencies furnishing such facilities. A portion of Section 4 of this Act, (codified as 40 U.S.C. §490(k)) stated, "Any executive agency, other than the General Services Administration, which provides to anyone space and services set forth in subsection (j) of this section, is authorized to charge the occupant for such space and services at rates approved by the Administrator (of GSA)." Section 7 of the same Act provides that such rates must also be approved by the Office of Management and Budget. In developing regulations to implement Section 4, GSA considered several alternative methods of applying the user charge to federal parking facilities. The regulations adopted established that only operating expenses of a facility should be considered in setting employee parking charges, which is different from the "approximate commercial charge" principle established in the law. Under these regulations, parking attendants may be employed and "in these instances, charges shall be made for parking to compensate the concessionaire." Where self-parking without attendants is used, no charges for parking are permitted.

Government subsidization of public transit and parking costs - At the present time there is no federal mechanism which provides for subsidies for those federal employees using public transit to commute to work.

It does appear that the federal government can legally provide parking spaces for carpools on government-owned property and can also lease commercial space for that purpose. In most cases, parking space is procured for federal agencies by the General Services Administration.

Security and Confidentiality of Information

For all intents and purposes, the security of persons participating in carpooling should not be a significant problem when all pool members know each other -- because they either work for the same organization or live in the same neighborhood. For pooling on a wider scale among persons who have no common relationships, security issues should be considered. For example, as far as the control of information is concerned during the matching process (either manual or computer) necessary to unite potential carpoolers, there are security problems related to the use of participant information gathered, processed, and distributed. Presumably, if satisfactory matches are made, there are no further security problems, except for casual use. When carpooling is used as a backup or casual system, security problems similar to those involved in hitchhiking are introduced.

The program sponsor should not extend the scope of the matching program beyond that to which the participants have consented. Thus, if participants contemplate that they will only be matched with co-employees, their names and other data should not be fed into a broader pool - e.g., an area-wide system without their prior authorization.

Security issues related to the control of information center around the type of data gathered from potential participants. The more complete the file of information, the easier it is to secure a successful match, and the more risk there is for the person surveyed. Obviously, the trade-off on data gathered is related to there being more responsibility as more data are collected, processed and distributed.

Once the information is gathered, the problem becomes controlling access to the data file during processing and physical distribution of the information. Those wishing to use the information for its intended purpose must be separated from those who wish to use it for other purposes. This could range from individuals seeking contact with others for the purpose of theft or assault, as well as representatives of companies or other organizations seeking areas to the information for marketing purposes. Under no circumstances should the information be released for marketing purposes or for mass campaigns and solicitations.

The supervision and control of the final data should be decided in advance by the sponsors of the project and the project directors. Questions of access to the data also need to be answered early in the program. Policies on distribution should seek to protect the privacy and security of individuals.

In summary, security issues related to the control of information imply that it will be necessary to limit data gathered, to limit access to the data, and to take steps to insure that the data are disseminated only to persons authorized by the supplier of the data and only for its intended purpose. Methods of abstracting the data for use while preserving sensitive facts should be adopted. Unfortunately, it is difficult to impart anonymity to location of residence, name, working location, and travel time for a carpooling data base. Therefore, separation should be made on the basis that there is no need to hide a name and address that can be found in a standard telephone directory, but it should also be unnecessary to print out a public listing of who leaves home at a certain time.

Insurance Issues

Employer liability - As discussed in the section on Responsibility of Sponsors, above, there is some question regarding the employers liability, even where he or she furnishes the vehicles for a carpool or vanpool program - the test being one of scope of employment. Colorado Law does require the owner of a motor vehicle to maintain a minimum level of insurance coverage. The "no fault" provisions of a complying policy cover anyone occupying the vehicle with the owner's consent. However, the employer should check to be certain that the liability coverage extends for carpool or vanpool purposes with his or her consent. The employer would also be well-advised to discuss the adequacy of insurance coverage with his or her insurance agent.

In the event that Congress authorizes the use of government vehicles by federal employees for carpooling or vanpooling, it is hoped that the legislation will clarify the applicability of the Federal Fort Claims Act to the program.

Carpooler liability - Typical carpools are formed either with a group of individuals taking turns as drivers or with one driver regularly providing rides for a number of passengers. In any kind of carpool where there is no payment of money for expenses or otherwise, each driver's insurance offers protection on the day he or she operates the vehicle. The primary factor a driver need consider is the adequacy of his or her liability coverage for bodily injury or death. (A group of three or four wage earners riding as passengers represents a substantially greater potential for damages in the event of a serious accident than would normal riders in a typical family car situation.) This is a matter for each individual to weigh, balancing the cost of insurance with the risk of loss of personal estate. It is also a proper subject for discussion among the carpool members, who have a legitimate, mutual concern in the adequacy of coverage.

Carpool insurance in Colorado - Carpools are treated the same as individually-operated automobiles in Colorado, in that increased rates are not charged. In either, the case where an individual is now driving to work daily and desires to carpool or the case where he is not presently driving to work and will begin using his vehicle to commute, he should check with his insurance agent regarding rate changes and recommendations for increased or decreased coverage. Some companies in Colorado offer a reduced rate to clients who carpool, rather than driving their own vehicles to work on a daily basis. This rate reduction is from 10-15%, when a family car is used to commute no more than 20% of the workdays each month.

Compensation and the Internal Revenue Service

The following statement from the Cumulative Bulletin of the Internal Revenue Service (IRS) 1955-2C.B.20 (also Section 262. Rev.Rul. 55-555) describes the IRS position with respect to carpools:

> "It has long been the position of the Internal Revenue Service that a carpool arrangement in which the members share the responsibility for furnishing transportation to and from their places of work and each takes his turn at driving his own automobile is not an arrangement which gives rise to taxable income or deductible expenses. The Service has been asked whether the same rule applies to a carpool arrangement in which only one member uses his own automobile and his fellow members pay him a stated sum of money for transporting them to and from work.
>
> It is the position of the Service that money received by an automobile owner from fellow employees for transporting them to and from work constitutes reimbursement by them for their share of the personal expenses incurred in the operation of the automobile for their mutual convenience. Such money is not includable in computing the gross income of the automobile owner for Federal income tax purposes. The automobile expenses incurred by him in commuting between his home and place of employment are personal expenses for which no deduction is allowed for Federal income tax purposes. However, this Revenue Ruling is not intended to apply to the situation where a particular car owner has developed his carpool arrangements to the extent that he can be said to have established a trade or business of transporting workers for hire from which a profit is derived."

This current IRS position implies that there are no significant income tax problems with respect to carpools. However, if special incentives, such as employee subsidies or extra payments for serving the handicapped, are introduced, then problems may arise.

Carpool users should also consider the following factors:

- Commuting costs are non-deductible expenses
- Since a share-cost arrangement is not a trade or business, the use of a private auto in carpool service does not change the auto's status as a non-depreciable cost.
- While state and local tax implications should be investigated on a local level, it is not expected that the rulings would differ significantly from the above IRS position.
- Conflicts with IRS rules can be minimized by encouraging only those incentives which do not generate taxable income.
- If carpools are developed on a taxable basis, suggest that a carpool club or other institutional framework be created to handle taxes, insurance, regulatory reports, and if necessary customer billing procedures.

References

U.S. Environmental Protection Agency, Normal Carboxyhemoglobin Levels of Blood Donors in the United States, EPA-650/1-73-004, Office of Research and Development, Washington, D.C., May 1973.

Alan M. Voorhees and Associates, Inc. and Behavior Science Corporation, A Study of Techniques to Increase Commuter Vehicle Occupancy on the Hollywood Freeway, November 5, 1973.

Highway Users Federation for Safety and Mobility, News Release, August 29, 1973.

U.S. Department of Transportation, How to Pool It, May, 1975.

Personal conversation with Ms. Messinger, Port of Portland, January 9, 1978.

U.S. Department of Transportation, Incentives to Carpooling, January, 1974.

Personal conversation with City of Seattle Assessor's Office receptionist on January 10, 1978.

Personal conversation with Mr. Jim Gilbert, Arkansas State Highway Department, on February 10, 1978.

GCA/Technology Division, Study and Evaluation of Computer Carpool Programs in Certain Metropolitan Areas, April, 1974.

Memorandum to James Sakolosky, Chief, Field Coordination Branch, Environmental Protection Agency from Robert Kenney, Attorney Advisor, Office of Enforcement, EPA, Washington, D.C., "EPA Parking Fees."

Personal conversation with Mr. Russell Kraus, Space Manager, Air Force Accounting and Finance Center, on January 6, 1978.

Personal conversation with Mr. Phil Milstein, Executive Vice President, Downtown Denver, Inc., on January 23, 1978.

U.S. Department of Transportation, Carpool and Buspool Matching Guide, Fourth Edition, January, 1975.

U.S. Department of Transportation, Buspools, January, 1974.

Personal conversation with Mrs. Barbara Alcorta, United Bank of Denver, on January 5, 1978.

U.S. Department of Transportation, Manual Carpool Matching Methods, January, 1975.

U.S. Department of Transportation, Legal and Institutional Issues of Carpooling, January, 1974.

U.S. Internal Revenue Service, Cumulative Bulletin 1955-2C.B.20 (also Section 262.Rev.Rul. 55-555)

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16. ABSTRACT

This report reviews the incentives currently being used by public and private sector employers to encourage employee use of ridesharing and mass transit as an alternative to the single occupant vehicle and identifies a few successful incentive programs. The legal and institutional aspects of employer sponsored incentive programs are discussed in some detail. Existing carpool matching systems and costs are briefly discussed.

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